

Ideology, political polarization, and agility of policy responses: Was weak executive federalism a curse or a blessing for COVID-19 management in the US?

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Abstract: We investigate whether weak executive federalism was beneficial or damaging for COVID-19 management in the US. We formulate a policy response model for subnational governments, considering the national government's preferred policy, in addition to other factors, with incomplete and with complete information. The hypotheses derived are tested using econometric techniques. Our results suggest that ideological and political biases were more influential in a situation of incomplete information than in one of complete information. As such, weak executive federalism allowed more agile policy responses in Democrat-led states when information was incomplete, thus reducing the rates of incidence and mortality. When information was complete, ideological and political biases were found to be of no relevance at all.

Keywords: COVID-19; crisis management; public policy; policy response; federalism.

JEL CODES: D81; H12; H77; H118

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Introduction

The COVID-19 crisis has intensified the debate regarding the respective effectiveness of centralized and decentralized responses to emergency situations. Indeed, recent studies have analysed differences in the policy responses to the pandemic of federal and unitary countries (e.g. Chattopadhyay et al., 2021). However, if we look beyond these specific case studies, multivariate empirical cross-country analyses have tended to conclude that federal countries adopted more agile (Bel et al., 2021) and more effective (Toshkov et al., 2021) policy responses. Yet, in line with long-standing debates about the relative strengths and weaknesses of executive federalism in the US (e.g. Eleazar, 1993; Bulman-Pozen, 2016), the early COVID-19-related

literature largely attributes the US's mediocre performance in the crisis in 2020 to failings in these processes of intergovernmental negotiation (e.g. Kettl, 2020).

Thus, our primary research question, here, is whether a weak executive federalism was a curse or a blessing for US management of the COVID-19 crisis. Our study builds on the policy response with the incomplete information model proposed in Bel, Gasulla and Mazaira-Font (2021). First, we modify this model to reflect the co-existence of national and subnational governments and then extend it to a subsequent situation characterised by complete information. Our main hypothesis is that the high degree of ideological and political polarization in the US caused inter-state differences in the agility and effectiveness of their policy response, and that this effect may have differed in scenarios with and without complete information. We test these hypotheses with data from the US measuring the intensity of policy response: first, with the initial hard measures taken against COVID-19 and, second, with the vaccination rollout.

Our study makes two contributions to the extant literature. First, rather than the timing of the response (i.e. who acted first), we evaluate the agility of response, relative, that is, to COVID-19 incidence rates and regional factors which might influence that policy response in a context of incomplete information. More specifically, we do not contribute by showing who acted first (which has been established in the literature); we contribute by showing who was more agile in the policy response (as distinct from 'being first'), which requires establishing a relation between policy response and rates of incidence of the virus, something that has not, to date, been attempted for the US.

Second, we also make an original contribution by evaluating the agility of response in the vaccination phase when the information on COVID costs was complete. In this regard, we expect to find, adjusting by the incidence rate, that Democratic-led states reacted quicker and

with greater stringency with incomplete information (outbreak of the crisis), but did not do so with complete information (vaccination rollout).

Our empirical results indicate that political and partisan factors were more influential with incomplete information, but that their influence disappeared when information was more complete. Hence, with respect to our main research question, we can conclude that had there been more executive federalism available to the Trump administration, its performance in the initial stages of the COVID crisis would have been worse. In other words, the weakness of executive federalism in the US was a blessing rather than a curse for its COVID-19 management.

COVID and federalism: Related literature

The centralized vs. decentralized response to crises debate is long-standing. Christensen, Lægreid and Rykkja (2016) argue that decentralization can lead to greater agility and effectiveness, and Congleton (2021) claims that decentralization allows policy responses that are better tailored to environmental conditions and preferences, and favours innovation. However, Janssen and van der Voort (2020) conclude that the more agile policy response provided by decentralized management should be balanced with the fact that centralized management allows for better adaptive governance, especially the management of shared resources and assets (Dietz, Ostrom and Stern, 2003). Yet, on balance, multilevel systems in which different levels of government and non-state institutions engage in collaborative governance seem to provide incentives for more agile and effective responses (Scavo, Kearne and Kilroy, 2008; Downey and Myers, 2020).

The COVID-19 outbreak has sparked an intense debate on the potential differences in policy response to the crisis manifest by federal and unitary countries. To date, narrative discourses and case studies provide either contradictory or mixed results. For example, Kennedy, Sayers

and Alcantara (2022), in an empirical analysis of political accountability and federalism in crisis management, find citizens unable to assign responsibility to the correct level of government in Canada; yet, Wehde and Choi (2021), in a study conducted in Oklahoma, US, find just the opposite. Interestingly, a narrative cross-country analysis comparing the COVID-19 management of federal and centralized countries tends to conclude that it was not whether countries had a federal or unitary structure, but rather whether they had better or worse governance, which influenced management of the COVID crisis (Cameron, 2021). Yet, beyond specific case studies, multivariate empirical cross-country analyses seem to find that federal countries had more agile (Bel et al., 2021) and more effective (Toshkov et al., 2021) policy responses.

Having said that, considerable diversity has been recorded in the COVID crisis management of federal countries. Thus, Hegele and Schnabel (2021) report predominantly centralized decision making in Austria and Switzerland but predominantly decentralized decision making in Germany, although Desson et al. (2020) conclude that flexible governance in all three instances contributed to comparatively better performance. Overall, a common recommendation that emerged during the crisis was to that of the need to improve intergovernmental relations and coordination (Chattopadhyay and Knüpling, 2021).

Political polarization has become more and more extreme in the US in recent decades (Nolette and Provost, 2018), and it seems this polarization, and its associated ideologies, played a significant role in the mediocre performance of COVID-19 management in the country (Jacobs, 2021). This situation tended to be exacerbated by increasingly disconnected Federal-State relations (Benton, 2020); in contrast, State-Local relations and coordination resulted in a much better performance (Benton, 2020; Mallinson, 2020). More specifically, various studies report that Republican-controlled states reacted later, re-opened sooner (Warner and Zhang, 2021), and implemented softer contingency measures, which were associated with a higher growth in

the number of COVID-19 cases (Hallas et al., 2020; Shvetsova et al., 2022). However, none of these studies standardized the comparison by incidence rates – and as such may have generated misleading results – given that agility and severity would have depended on the risk level faced by each state.

The weakness of executive federalism in the US has been blamed for its mediocre performance in addressing the COVID-19 crisis in 2020 (see, for example, Bowling, Fisk and Morris, 2020; Kettl, 2020; López-Santana and Rocco, 2021; Rocco, Béland and Waddan, 2020). However, when other metrics are considered, such as the speed of vaccination rollout, the US led the rankings until summer 2021, and its efforts were, as of November 2021, comparable to those of such countries as Germany and Australia (Ritchie et al., 2021), typically considered as exemplifying federal countries with relatively good COVID management records (Rozell and Wilcox, 2020).

Given these differences in performance metrics, any hypothesis that seeks to link the weaknesses of executive federalism and a poor policy response to COVID-19 is controversial. Indeed, Kincaid and Leckrone (2021: 243) conclude that “Executive federalism has been contentious, but federal and state agencies’ bureaucratic relations continued to be largely cooperative, except when the Trump administration interfered with some federal agencies’ functioning”. Likewise, Cigler (2021: 674) argues that it was not the lack of federal powers that undermined performance in the US, but rather “the President’s failure to accept responsibility and exercise existing authority quickly and fully, decisively and competently”. Against this backdrop, it was state partisanship, rather than federalism, that shaped state public health interventions and resulted in differences in outcomes (Birkland et al., 2021; Neelon et al., 2021).

Our research here seeks to determine whether weak executive federalism is to be blamed for the relatively poor performance of COVID-19 management in the US. We compare the policy response of Republican- and Democrat-led states to the outbreak of the COVID-19 crisis,

controlling for the risk factors in each state, and extend this analysis to the first stage of the vaccination rollout, so as to compare the response with and without complete information.

Modelling the subnational policy response to the crisis

We present a theoretical model that develops an empirical strategy which we then use to analyse the impact of political affiliation on policy-response agility. We build on the model proposed by Bel, Gasulla and Mazaira-Font (2021), representing a cost-benefit analysis undertaken by a rational government that cares about social welfare and which has incomplete information about the pandemic. Different strategies to manage the pandemic are analysed, which can be constrained by institutional characteristics, emotional biases, and the pursuit of self-interest.

We extend the basic model by inserting subnational leaders into a sequential decision-making process with incomplete information that translates into partial estimates of the parameters involved in the decision (including, for example, the effectiveness of their measures) and full disclosure of the preferences of the national leader, who is also involved in the process albeit at the national level. We assume two main types of measure: soft and hard. Soft measures (SMs), which are of the same nature at both the national and subnational level (the only difference being where they are applied), describe measures intended to contain transmission but without severely affecting human rights and freedom of movement (e.g. information campaigns, temperature controls at airports, etc.). Hard measures (HMs) refer to measures that do affect human rights and freedom of movement, such as lockdowns and border closures. As national and subnational leaders have different powers, their respectively imposed hard measures differ, and, as such, we can assume that two types of HM exist: subnational hard measures (SHM) and national hard measures (NHM).

Dynamics of the decision-making process

At the start of the pandemic, a set of exogenous factors, including the share of population above 65 years old and with pre-existing comorbidities (see [Álvarez-Mon et al., 2021](#); [Montserrat et al., 2021](#)), determined the virus reproductive number under no containment measures, ρ , and the death rate, d , both at the national and subnational levels. With the information available at that time, transmission rates well above 1 were estimated for all countries and regions (Hilton and Keeling, 2020; Katul et al., 2020), and the overall fatality rate was estimated at between 0.4 and 1.4% (Verity et al., 2020). A total of 2,200,000 deaths was predicted for the US during the first outbreak if no contention measures were implemented (Ferguson et al., 2020).

In each time period, national and subnational governments could decide whether to implement either hard or soft measures to contain the virus, based on their powers. Moreover, the national leader could also urge subnational leaders to adhere to a specific strategy. Four scenarios in terms of measures implemented are, therefore, possible: First, both national and subnational leaders implement soft measures at time t and the transmission rate is somehow reduced. Second, the national leader implements hard measures but the subnational leaders adopt soft measures and the rate of transmission falls more than in the first scenario, but costs in terms of production increase. Third, only the subnational leaders implement hard measures but the national leader adopts soft measures and, here, the effects are (with respect to the first scenario) as in the second scenario, that is, a lower transmission rate and higher production costs. Finally, both national and subnational leaders implement hard measures, as a result of which the transmission rate is lower than in all the previous three scenarios and production costs are higher.

These scenarios can be expressed more precisely as follows:

- (1) If both national and subnational leaders implement soft measures at time t , the transmission rate is reduced to $\rho_t = \delta^{SS}\rho$.

- (2) If the national leader implements hard measures but the subnational leaders implement soft measures, at the subnational level there is a loss of π_0 units of utility (lost production) but the transmission rate is reduced to $\delta^{HN}\rho$, with $\delta^{HN} < \delta^{SS} < 1$.
- (3) If the subnational leaders are the only ones to implement hard measures, at a subnational level there is a loss of π_1 units of utility and a reduction in the transmission rate to $\delta^{HS}\rho$, with $\delta^{HS} < \delta^{SS} < 1$.
- (4) If both national and subnational leaders implement hard measures, there is a loss of $\pi_2 > \pi_0, \pi_1$ units of utility and a reduction in the transmission rate to $\delta^{HH}\rho$, with $\delta^{HH} < \delta^{HS}, \delta^{HN}$.

Notice that the efficiency of the measures depends on the measures themselves, and on the degree of compliance with them. Hence, the δ^i factors have also to be interpreted by taking into consideration the degree of compliance expected from the population in relation to these measures.

Political factors involved in the decision-making process

As discussed at the beginning of this section, it can be assumed that decision-makers had to conduct a cost-benefit analysis when deciding which measures to implement and when to implement them: that is, they sought to maximize healthcare outcomes (keeping the number of deaths as low as possible) while incurring the minimum economic cost. Thus, they found themselves having to evaluate the different actions that might be taken in terms of both healthcare and economics.

Additionally, they might also have pursued their own self-interests, like staying in office, for example. Thus, it can be assumed that the economic costs of applying hard measures were slightly reduced, since in this way they avoided the political costs of voter punishment at the

ballot box for their improper response to the crisis, above all in highly competitive contexts and in a period close to elections (Baekkeskov and Rubin, 2014).

For each scenario, we can consider that each subnational leader is subject to a penalty k if they do not follow the national leader's preferred strategy. We can assume the penalty to be small or negative even (a reward, in fact) if the subnational and national leaders belong to opposing political parties. In contrast, the penalty is expected to be positive if both the national and subnational leaders belong to the same party. Hence, we would expect subnational leaders to lean in the same direction as that of their leader (Kahneman, 2011; Levy Yeyati et al., 2020). We can also assume that the greater the political polarization, the higher the expected value of this penalty will be (see Goelzhauser and Konisky, 2020, for recent evidence of punitive federalism in the US).

Utility function of the decision-maker

Within this setting, let n_{t-1} be the number of infected people at the end of time $t-1$ in a given subnational region. At the beginning of period t , the virus infects $\rho_t n_{t-1}$ people, who are then treated. Let us denote by c the perceived capacity of the healthcare system to deal with the pandemic, which is assumed to be equal (in relative terms) for all regions. Notice that it is reasonable to assume that the perceived healthcare capacity is equal for all states at the subnational level, since all states operate under the same national healthcare system. If $n_{t-1} < c$, then no infected people die and all are cured at t . Otherwise, the number of fatalities at t is $f_t = d(n_t - c)$, and the rest are cured.

To illustrate how the process works, we present a four-period process of decision-making (Figure 1). At the outset, nature determines the initial number of infected people n_0 and the transmission rate ρ for each region. For the sake of simplicity, we do not include an index for each region, but these parameters are expected to vary across regions. However, the

transmission rate is expected to be much higher than 1 in all regions (Hilton and Keeling, 2020; Katul et al., 2020). At $t = 1$, the infected people transmit the virus to others and then receive treatment. Therefore, $n_1 = \rho n_0$, and the number of fatalities at $t = 1$ is $f_1 = d \max \{n_0 - c, 0\}$. Both the subnational and national governments estimate the transmission rates $\rho_1 = \hat{\rho}$ and the total number of infected people, $\hat{n}_1$.

(Figure 1)

Each subnational government estimates its own parameters and the national government estimates any additional ones. These estimates can be expected to be influenced by the advice of experts and national institutions, such as the White House COVID-19 Response Team. Based on this information, both sets of decision-makers estimate the expected transmission and death rates during the following periods, as well as the impact and cost of the various measures they might simultaneously implement: $\hat{\rho}_{t+1} = E_t(\rho_{t+1})$, $\hat{d}_{t+1} = E_t(d_{t+1})$, $\hat{c}_{t+1} = E_t(c_{t+1})$, $\widehat{\delta^{SS}} = E_t(\delta^{SS})$, $\widehat{\delta^{HN}} = E_t(\delta^{HN})$, $\widehat{\delta^{HS}} = E_t(\delta^{HS})$, $\hat{\pi}_i = E_t(\pi_i)$.

Total fatalities are expected to be the product of the expected death rate and the total number of infected persons minus those that can be treated: $\hat{f}_{t+i}(\hat{n}_t) = \hat{d}_{t+i} \max \{\hat{n}_t - \hat{c}_{t+1}, 0\}$, with a total cost of $l \hat{f}_{t+i}(\hat{n}_t)$, where l represents the cost per fatality. Based on these estimates, the national government decides whether to implement soft or hard measures at the national level (in boxes in Figure 1), and which policy it prefers its subnational leaders to adopt ($P_j \in \{SM, SHM\}$).

The process continues until $t=4$, when a vaccine is discovered and, thanks to herd immunity, propagation falls to a stationary transmission rate, which is, on average, well below 1. Figure 1 shows how the subnational government expects the pandemic to evolve, at $t=1$, conditional to its deciding to implement hard measures at $t=1$ and soft measures at $t=2$, with the national government opting for the reverse strategy, and preferred subnational policies P_1 and P_2 . Let us

assume, for instance, that the national leader prefers to implement soft measures at the subnational level ($P_1 = P_2 = SM$), and that the national and subnational leaders belong to the same party. Then, the expected healthcare costs of the strategy shown in Figure 1 for the subnational leader in the first period correspond to the costs of the deaths of the infected population at the beginning of the pandemic. Thus, no measures were applied at the onset of the pandemic and the virus spread at the maximum transmission rate, which means at time $t = 1$ there are $\hat{\rho}\hat{n}_0$ infected persons. However, if the subnational leader implements hard measures during the first period while the national leader opts for soft measures, there is also an economic loss π_1 . Moreover, the fact that the subnational leader is not following the preferred policy of the national leaders incurs a penalty k . Hence, the total expected cost in period 1 is

$$EC(HM, SM) = l\hat{f}_1(\hat{n}_0) + \pi_1 + k$$

Following the same reasoning for the subsequent periods, we find that the total expected cost of the strategy shown in Figure 1 is:

$$EC(HM, SM) = l\{\hat{f}_1(\hat{n}_0) + \hat{f}_2(\hat{\rho}\hat{n}_0) + \hat{f}_3(\hat{\rho}^2\hat{\delta}^{HS}\hat{n}_0) + \hat{f}_4(\hat{\rho}^3\hat{\delta}^{HN}\hat{\delta}^{HS}\hat{n}_0)\} + \pi_0 + \pi_1 + k$$

The decision whether to apply hard or soft measures at the subnational level depends on the trade-off between the expected number of lives saved and economic costs, as well as the potential political cost. However, in the subnational case, the trade-off is altered by the national government in two ways. First, by applying hard measures at the national scale, it reduces the incentive for hard measures at the subnational scale, since transmission rates are expected to decrease without the need for additional costs. Subnational governments would only implement hard measures if they expected – with the information available to them – that the benefit of applying subnational hard measures would be higher than their cost; for instance, if they expected the healthcare system to collapse even with the national hard measures in place.

Second, there is an additional political cost (or reward) in the equation, which stems from

following or deviating from the national leader's preferred subnational policy. For instance, all things being equal, a subnational leader belonging to the same party as the national leader would be expected to have more incentives to apply subnational hard measures if this was the national leader's preferred policy.

Hypotheses derived from the model

Taking these differences into account, three main hypotheses emerge from the model at the subnational level:

H1: The higher the expected economic costs of subnational hard measures, the fewer the incentives for the subnational leader to implement these hard measures, especially if national hard measures are in place.

H2: Highly competitive contexts provide incentives for more agile policy responses at the subnational level.

H3: Highly polarized contexts provide incentives for subnational decision-makers to align with the national leader's preferred policy if they belong to the same party.

Finally, recall that for simplicity's sake we have assumed that at $t=4$ propagation falls to a stationary transmission rate due to the discovery and rollout of a vaccine. However, this also forms part of the decision process as policymakers have to decide on the percentage of the population to be vaccinated and the speed at which this target should be met. Both objectives are also subject to a cost-benefit analysis, but in this case complete information is available about vaccination costs, the reduction in the propagation of the virus and number of fatalities, and the costs avoided from continuing to implement hard measures. Notice, also, that in the vaccination process, variables related to the awareness and willingness of the population to be vaccinated might also play a role.

H4: The higher the costs of hard measures and the greater the efficiency of vaccination, the

higher are the incentives for subnational decision-makers to implement a massive and rapid vaccination campaign regardless of policy competition or any other factor.

Variables, data and sources

Sample

Our empirical analysis is conducted for the US. To ensure homogeneity in terms of the implications of policy response, we present our estimates considering the 49 mainland states, excluding Hawaii on the grounds that it is isolated at sea, more than 2,100 miles from continental US. Below, we discuss the variables used and explain how they are specified, in relation to the theoretical model, and identify the sources from which the data were drawn.

Variables

Targets:

Incidence rate when policy response began: We define the ‘*Incidence rate when policy response began*’ as the number of coronavirus cases (based on the Johns Hopkins Coronavirus Resource Centre) adjusted per total population of a state, when the states’ governors began to implement hard measures. This variable captures the agility of the policy response at the subnational level, as it identifies the stage of the pandemic when decision-makers reacted.

The *Stringency Index of The Oxford Covid-19 Government Response Tracker* (Hale et al., 2021)<https://doi.org/10.1038/s41562-021-01079-8> was used to determine the moment when hard measures can be considered to have been implemented. This index records the strictness of ‘lockdown style’ policies that primarily restrict people’s behaviour, including the closing of schools and workplaces, mandatory curfews, and border closures. It ranges from 0 (no measures at all) to 100 (maximum level of stringency).

When governments applied soft measures, the index ranged between 0 and 20; however, when restrictions of movement were imposed, it increased well above 30. The Federal government started applying hard measures on 16 March, five days after the World Health Organization (WHO) officially declared COVID-19 a pandemic. Borders were closed to non-essential travel, home schooling was recommended, as was avoiding social gatherings of more than 10 people, discretionary travel, and eating and drinking in bars, restaurants, and public food courts. These measures corresponded to a stringency index of 37.96. By that date, international pressure was considerable and many other countries had implemented even harder measures. For instance, the average stringency index of the measures implemented by EU countries was 59.39. Here, we define the moment when a state governor applied ‘hard measures’ as the day when the stringency of those measures was at least as high as that of those applied by the Federal Government (i.e. 37.96).

Early vaccination rate: We define the early vaccination rate as the percentage of vaccinated people amongst those eligible for vaccination in the first 60 days after the vaccine became available in the US (i.e. 11 February 2021). We used the vaccination rate as our main proxy for evaluating governor agility once they had complete information about the seriousness and costs of COVID-19 and experience in managing the pandemic. We used data from the subnational *Oxford Covid-19 Government Response Tracker*.

Covariates:

Political affiliation: We analysed each governor’s political affiliation (source: National Governors Association). The variable equals 1 if the Governor is Republican, and 0 otherwise. We took into account that the Montana governorship flipped from Democrat to Republican following the November 2020 election.

As explicitly stated by President Trump, during the first COVID-19 outbreak the federal strategy was to impose hard measures at the national level as regards, that is, international travel and trade, while being much less restrictive at the subnational level. For instance, on 15 March, the Trump administration restricted all international travel while continuing to allow domestic flights.

Evidence supporting the hypothesis that the Trump administration sought to impose hard measures at the national level, but softer measures sub-nationally, can be found in Trump's statements calling on various states to soften their lockdowns and to 'liberate', specifically, Michigan, Minnesota and Virginia (*New York Times*, 17 April 2020; all three states with a Democratic governor at that time). In the case of the vaccination campaign, newly elected President Biden, who began his term in January 2021, urged Americans to get their shot and enforced massive vaccination.

In line with these events and based on *H3*, we expect to find that Democrat governors reacted with greater agility during the first COVID-19 outbreak, while their Republican counterparts were more likely to follow Trump's strategy and apply subnational hard measures later. However, based on *H4*, we expect to find no differences in terms of agility attributable to political affiliation during the vaccination campaign.

Unemployment: To evaluate the economic baseline of a state, and the potential economic cost of the subnational measures, we gathered information on the unemployment rate in each state in January 2020 for the model with incomplete information and on the change in unemployment between January and November 2020 for the model with complete information. The data were obtained from the Bureau of Labor Statistics. We expected to find greater resistance to implementing hard measures under incomplete information at a higher unemployment rate, the economic fabric thus being more vulnerable to disruptive measures.

Proportion of elderly people: We estimated the perception of potential health costs attributable to COVID-19 at the subnational level for each state as the logarithm of the percentage of population 65 years or older (US Census Bureau). We expected governors of states with a higher proportion of elderly people to act faster and in a more effective way due to the greater vulnerability of that population segment to COVID-19 infection.

Days to next election: As voters may punish governments for improper crisis responses (Bueno de Mesquita et al., 2003), risk-averse administrations will implement proactive policies, especially within highly competitive contexts and close to elections (Baekkeskov and Rubin, 2014). The variable ‘days to next election’ corresponds to the logarithm of the number of days between the first diagnosed case of coronavirus in the state and the next scheduled state election date (National Governors Association and states’ official websites) in the model without complete information (first outbreak). In the model with complete information (vaccination), it corresponds to the logarithm of the number of days between the first vaccination and the next scheduled state election date.

Covariates primarily affected by nation-wide measures:

Evidence that healthcare capacity at the national level (e.g. health expenditure as % GDP) and tourist- and trade-related economic costs (% contribution to GDP of tourism and trade) were relevant drivers of the agility of government policy responses to the COVID-19 outbreak has been reported by Bel, Gasulla and Mazaira-Font (2021) in their cross-country analysis. Given that perceptions of healthcare capacity refer primarily to the national level (see modelling section) and tourist- and trade-related economic costs are associated primarily with national measures, we did not expect these factors to be as influential at the subnational level as when employed in cross-country analyses. Nonetheless, we operationalized three variables to take them into account.

Number of beds: We included in our model for the first outbreak the variable ‘number of beds’, as a measure of state health system standalone capacity in terms of hospitalizations (*Becker’s Hospital Review*, 2021).

Trade and tourism: We considered the relevance of the economic costs of nation-wide border closure using two indicators: total travel contribution and total trade (imports and exports), both as % of total GDP. The first indicator was obtained from the US Travel Association and the second from the US Census Bureau.

Covariates specifically related to the vaccination phase, and related to the capacity of the healthcare system to inoculate vaccines and the population’s willingness to vaccinate:

Number of nurses: As a measure of the health system’s capacity to vaccinate the population, we included in our model the number of nurses per million inhabitants. Data were obtained from the US Census Bureau and the National Council of State Boards of Nursing’s electronic information system.

Minority status: Evidence points to different levels of participation of ethnic minorities in medical research (e.g. Scharff et al., 2010), reflecting the history of federal medical studies conducted on vulnerable population groups (e.g. the Tuskegee syphilis study, see Tobin, 2022). Thus, we sought to determine whether greater mistrust among ethnic minorities with regards to medical research affected their vaccination dynamics. To this end, we included as a variable the percentage of non-white population in the state (with data being obtained from the US Census Bureau).

Education: The level of educational attainment is likely to be a factor in the vaccination decision, as the more educated are likely to have more and better information about the dynamics of the vaccination process and the availability of the vaccine. They are also more likely not to fear medical applications. Therefore, we included as a control the percentage of

population with a bachelor's degree or higher educational attainment (with data again being obtained from the US Census Bureau).

Table 1 describes the variables and their sources. Table 2 shows the descriptive statistics, while Table 3 reports the average value of the variables for Democrat and Republican states.

(Insert Tables 1, 2 and 3)

Empirical model and results

The empirical analysis we conduct is based on the theoretical model presented. First, we estimate the difference between Republican- and Democrat-led states in terms of their agility of response. Recall that, for the scenario with incomplete information, this agility of response corresponds to the number of cases of infection adjusted by the total population when subnational decision-makers started to apply hard measures (that is, with a level of stringency at least as high as the measures implemented at the federal level); while for the vaccination process, it corresponds to the percentage of eligible population vaccinated in the first 60 days after the vaccine became available in the US. Second, we test whether the differences are relevant or not, after adjusting for the cost-benefit analysis presented in the model. Finally, we test whether the differences are relevant or not, again, after adjusting for all other extensions of the model.

Effect of political affiliation under incomplete information

As is well known, the Democrat-led states reacted earlier (in time) and with greater stringency than the Republican-led states (See Figure 2). After the federal government started applying hard measures (16 March), the stringency index of subnational measures in Democrat states was 41.4 vs. 36.2 in Republican states. It would take the Republican-led states a further four

days to achieve a stringency of 41.4. However, this does not imply that the Democrat states were more agile (in the sense of acting at an earlier stage of the pandemic), because they were hit earlier by the disease (Figure 3).

(Figures 2 and 3)

To consider this difference, we have defined agility in the policy response to COVID-19 as the number of cases of infection adjusted by the total population from the time hard measures were adopted. To test the effect of political affiliation on agility we began with a simple model of the form:

$$Cases = f(population, political\ affiliation) \quad (1)$$

As in Bel, Gasulla, and Mazaira-Font (2021), we used a negative binomial distribution, given the problem's non-negative discrete nature. Alternative techniques, such as OLS, might also be used; however, they would require transforming the target and the variance of the problem (for instance, considering the natural logarithm of the cases per million population), which make them less suitable. Nevertheless, we considered also a Bayesian robustness check, with no prior information on the distribution of the parameters, to avoid any potential bias of the estimates due to assumptions about the distribution of the parameters. According to our theoretical model, with incomplete information, agility at the subnational level is also expected to be affected by the relative costs of subnational hard measures. We estimated a base cost-benefit model as:

$$Cases = f(population, unemployment, old\ people, political\ affiliation) \quad (2)$$

Next, we checked whether the inclusion of costs primarily related to national-level measures, such as tourism and trade, and healthcare capacity was relevant (estimation 3). We finally tested the robustness of the political affiliation effect when including other political competition effects (estimation 4).

Table 4 presents the different estimates. The political affiliation effect was highly significant in

all estimations. Republican governors responded with less agility than their Democrat counterparts to the first outbreak of COVID-19, even when adjusting by cost-benefit and political competition effects. Had Democrat-led states reacted in the same way as the Republican-led states, their average number of cases per 100,000 inhabitants at the moment of policy response would have risen from 2.16 to between 4.36 and 4.74; that is, the rate would have more than doubled. This provides a sound rationale for the fact that Republican-led states ended up with more cases in the subsequent outbreaks.

(Table 4)

However, the fact that, Republican governors, on average, responded with less agility than their Democrat counterparts does not mean that all Republican governors responded with less agility. For example, Republican Mike DeWine (Ohio) applied hard measures with an incidence rate of 0.26 cases per 100,000 inhabitants, while Democrat Tony Evers (Wisconsin), whose state had lower levels of unemployment than Ohio (3.5 vs 4.1%) and a similar percentage of old people making up the population (17.0 vs 17.1%) applied these measures with an incidence rate of 1.25. Another example can be found in the comparison between Republican Eric Holcomb (Indiana) and Democrat J.B. Pritzker (Illinois): the former, with higher expected costs due to higher unemployment (3.1 vs 2.8%) and a higher share of old population (15.8 vs 15.6%) applied hard measures with an incidence rate of 0.37, while the latter did so with 2.15. In fact, Republican governors Mike DeWine (Ohio) and Larry Hogan (Maryland) were considered among the five most aggressive governors in fighting the pandemic outbreak (Scher, 2020).

Estimations (2), (3), and (4) show that subnational costs were relevant for agility. As expected, the higher the rate of unemployment (the higher the expected economic costs), the lower the agility; and the higher the percentage of old people (the higher the expected healthcare costs), the higher the agility. Notice also that results from estimation (3) showed no significant effect of health capacity and trade/tourism, in line with our expectations as explained when presenting

our theoretical approach.

Our estimates rely on 49 data points. A small sample size can lead to a less robust estimation of parameters and standard errors, thus compromising the significance test of GLM, which relies on asymptotic properties of the estimators (Western and Jackman, 1994). Therefore, we conducted a robustness check by means of a Bayesian estimation of our model, which we performed using the *brms package* available in R (Bürkner, 2017), and using no prior information to avoid introducing any bias. Since the covariates primarily affected by national measures and the *days to election* variable are not relevant, we only estimated identification (2). As Figure 4 shows, all parameters were robust to the Bayesian estimation and close to the GLM estimates. Hence, there is no evidence of our results having been compromised by small sample size.

(Figure 4)

Effect of political affiliation with complete information

After three major waves of COVID-19 in the US during the course of 2020, the great costs and losses attributable to the pandemic, in terms, that is, of premature deaths, long-term impairments, mental health losses and direct economic costs, were painfully evident. Indeed, Cutler and Summers (2020) estimate the costs at around \$16 trillion. More specifically, the US GDP fell by 3.5% in 2020 (source: World Bank), while economic predictions for that year, made before the pandemic, were for 2.0% growth (Source: International Monetary Fund).

After the effectiveness of the Moderna, Pfizer, and Jansen vaccines had been demonstrated (94, 95, and 70%, respectively), the US Food and Drug Administration (FDA) issued an emergency use authorization to expedite their availability. In this way, the Pfizer-BioNTech COVID-19 Vaccine was approved on 11 December 2020, Moderna on 18 December 2020, and Jansen on 27 February 2021.

Once these data about the effectiveness of mass vaccination were made public and the information required for decision-making was complete, there were no incentives for subnational leaders not to implement a mass vaccination strategy as rapidly as possible. As such, we would expect to observe no statistically significant difference in terms of early vaccination rate attributable to the political affiliation of a State's governor.

As Figure 5 shows, there was almost no observable deviation between Republican- and Democrat-led states. On day 30, the vaccination rates for Republican and Democrat states were 3.95 and 3.72%, respectively; by day 45, they had risen to 9.35 and 9.15%, respectively; and, by day 60, they stood at 17.88 and 17.83%, respectively.

(Figure 5)

However, other drivers, including economic costs, healthcare costs or days to election (as a proxy of political competition costs), may have potentially influenced the agility of the vaccination program. Hence, we conducted three further estimations, following the same strategy as above. First, we estimated the effect of political affiliation on the vaccination rate of US states without considering any other covariate (estimation 5). Then, we checked whether the inclusion of subnational costs (unemployment change during the pandemic and percentage of population that died due to COVID-19 complications) was relevant (estimation 6). Finally, we included the number of days to the next election as a potential driver (estimation 7).

As Table 5 shows, political affiliation had no significant effect on delaying or accelerating the vaccination campaign, even when adjusting by economic costs, health costs, political competition factors, standalone healthcare capacity, minority status and education. This means that once there was complete information about the optimality of this policy and its outstanding social benefits, no differences according to political affiliation existed between the strategies implemented by the states, nor were they conditioned by other factors, consistent with *H4*

herein. Since the health and economic costs of COVID-19 were extremely high for all states (Cutler and Summers, 2020), they all had great incentives to act as swiftly as possible. Moreover, and with respect to the lack of significance of the control variables specifically included in this last estimation (only the number of nurses has some significance -even if weak), it might well be that the huge dimension of the Covid-19 crisis and the information available about its effects reduced the relevance of differences in the variables affecting the willingness to be vaccinated for which we have controlled.

(Table 5)

Discussion and policy implications

We have assessed the impact of political polarization on the agility of response to the COVID-19 crisis (adjusted by incidence rate) in two scenarios: First, during the first wave, under incomplete information; and, second, at the start of the vaccination rollout, when the severity and costs of COVID-19, as well as the effectiveness of the vaccines developed, were well known.

Our results provide robust evidence that, even when considering the inter-state differences in the initial evolution of the pandemic and differences in the risk and cost-related factors across states, Republican governors were – overall – less agile than their Democrat counterparts in responding to the health crisis. This provides a sound rationale for the fact that Republican-led states presented more cases of infection in the subsequent outbreaks, which is consistent with Neelon et al. (2021), who found that, adjusted by population and other factors such as the proportion of elderly people in the population, Republican-led states had lower COVID-19 incidence and risk rates than Democratic-led states from March 2020 to early July 2020, but that this association was then reversed.

Subnational cost considerations were relevant factors in explaining the agility of policy

response, which is consistent with the results obtained for national decision-makers in Bel, Gasulla and Mazaira-Font (2021) in their cross-country analysis. However, unlike the results reported in this cross-country analysis, we did not find health capacity, tourism, and trade to be relevant. As discussed when formulating our theoretical model, we did, in fact, expect the perception of healthcare capacity to be similar for all states; hence, the subnational perception of this capacity was not expected to play a relevant role.

It seems reasonable to assume that the costs primarily affected by nation-wide measures, and although not equal for all states, were not given special consideration by governors when making their decisions, precisely because they were measures that were not completely under their control. Indeed, several governors asked domestic passengers arriving from other US states to self-quarantine, but they did not (or could not) order a border closure. Finally, estimates show that the policy survival variable “days until next election” was not significant.

Interestingly, political bias in the policy response, which was such a relevant factor at the time of the outbreak of the crisis, ceased to be important in the vaccination phase, when we found no difference in the agility of policy response between Republican- and Democrat-led states. The primary difference between the two phases was that information was much more limited in spring 2020 than it was by winter 2021, when information on the health and economic costs of COVID was much more robust, as was information on the efficacy of the vaccines. The evidence that ideological and partisan differences in policy response disappeared in the vaccination phase suggests that such biases had much greater potential to influence policy responses when information was incomplete than when information was more complete.

So, what can be concluded about the weak executive federalism in the US and the country’s management of the COVID crisis? Lack of coordination has been blamed for shortcomings and overpricing in procuring medical supplies (Kettl, 2020: 599), but this criticism has likely been overemphasized. Spain’s experience in this regard is highly illustrative: the Spanish

government centralized all decision-making concerning the purchase of medical supplies, but little more than ten days later most regional governments began transgressing central procedures and implemented their own purchasing policies, prompted by the lack of efficacy of a central government that lacked experience in the practices of purchasing medical supplies, both nationally and internationally (Bel and Esteve, 2022).

If we look for a broader perspective on how crisis management was coordinated worldwide during the COVID-19 crisis, Dougherty et al. (2020) have shown that centralization was, in fact, a key feature, with recentralization being twice as frequent as decentralization across OECD countries. A focus on the world's ten largest countries by population (and, hence, those with the most complex governance) shows that seven of them are federations (India, the US, Pakistan, Brazil, Nigeria, Russia, and Mexico), while three are unitary states (China, Indonesia, and Bangladesh). Here, the case studies published in Chattopadhyay and Knüpling (2021) reveal that all the federal states, with the exception of the US, centralized management. Therefore, the most likely counterfactual of executive federalism in the US, as a means of coordinating the crisis, would have been centralization.

In such a scenario, it is reasonable to conclude that had the US centralized crisis management, the Trump administration would have had greater latitude to impose its preferred policy on the Democrat-led states in spring 2020. Based on our empirical exercise, we estimate that if the Democrat states had responded more slowly (in line, that is, with those of the Republican states), the incidence of COVID-19 at the time of adopting hard measures would have increased from 2.16 to between 4.36 and 4.74. For the Democrat-led states this would have meant a much higher number of infections and deaths than they actually experienced, thanks to the greater agility of their responses.

The results of our study are consistent with Cigler's (2021) claim that it was not the lack of federal powers that undermined performance during the COVID crisis in the US, but rather

Trump's mismanagement and his administration's general incompetence in exercising existing federal powers. In this regard, weak executive federalism proved to be beneficial for the agility of policy responses in the US, making it possible for the Democrat-led states to set their own priorities, based on their own specific health situation and policy preferences, and so contribute to decreasing rates of infection and, ultimately, saving lives.

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Table 1. Variables: Description and sources

	Description	Source
<i>Dependent variables</i>		
Incidence rate at policy response	Number of diagnosed cases adjusted per 100,000 inhabitants when the State's Governors began to implement hard measures.	Oxford Covid-19 Government Response Tracker
Early vaccination rate	Percentage of vaccinated people amongst the eligible for vaccination group after the first 60 days the vaccine was available in the US	Oxford Covid-19 Government Response Tracker
<i>Covariates</i>		
Political affiliation	Political affiliation (Republican or Democrat) of each Governor	Official webpages
Unemployment	Unemployment rate in January 2020 for every US state	US Bureau of Labor Statistics
Unemployment change	Change in unemployment rate between January 2020 and November 2020	US Bureau of Labor Statistics
Rate of elder people	Logarithm of the percentage of population 65 years or older (2018)	Population Reference Bureau
Days to next election	Logarithm of the number of days between the first diagnosed case in the state and the next scheduled state election date for the first model, and between the vaccine was available in the US and the next scheduled state election date for the second model (complete information)	National Governors' Association and States' institutional webs
<i>National-affected covariates</i>		
Number of beds	Number of hospital beds per 1,000 population in a US State	Becker's Hospital Review.
Trade	Logarithm of the trade (imports and exports) contribution as % of total GDP in 2018	US Census Bureau
Tourism	Logarithm of the travel contribution as % of total GDP in 2018	US Travel Association
<i>Vaccine-related covariates</i>		
Number of nurses	Number of registered nurses per 1,000,000 population in a US State (2019)	US Census Bureau, Nurses
Minority status	Percentage non-white population (2019)	US Census Bureau
Education	Percentage population 25 or older with Bachelor's Degree or higher (2019)	US Census Bureau

Table 2: Descriptive statistics

	Min	Max	Mean	St Dev
Incidence rate at policy response	0.10	45.63	3.43	7.00
Early vaccination rate	7.03	9.28	8.24	0.53
Political affiliation	0.00	1.00	0.51	0.51
Unemployment	-3.77	-2.81	-3.38	0.23
Unemployment change	-1.10	7.50	2.53	1.85
Rate of elder people	-2.20	-1.58	-1.81	0.12
Days to next election (1 st outbreak)	5.35	7.19	6.53	0.63
Days to next election (vaccination)	5.76	7.27	6.69	0.37
Death rate November 2020 (x 100,000 inhabitants)	15.22	199.85	86.50	43.46
Number of beds (x 1,000 inhabitants)	1.70	4.80	2.58	0.69
Trade	-1.33	-0.38	-0.82	0.21
Tourism	-1.49	-0.90	-1.27	0.13
Number of nurses (x 1,000,000 inhabitants)	1.19	3.30	1.76	0.40
Minority status (percentage of non-white population)	0.07	0.75	0.31	0.16
Education (% Bachelor's degree or higher, pop. 25 or older)	0.21	0.07	0.33	0.60

Table 3. Mean of the variable according to the political affiliation of the governor

	Republicans	Democrats
Number of States	25	24
Incidence rate at policy response	4.63	2.16
Early vaccination rate	17.88	17.83
Unemployment	-3.43	-3.30
Unemployment change	1.95	3.18
Rate of elder people	-1.78	-1.83
Days to next election (1 st outbreak)	6.52	6.55
Days to next election (vaccination)	6.74	6.63
Death rate November 2020 (x 100,000 inhabitants)	85.71	90.34
Number of beds (x 1,000 inhabitants)	2.72	2.43
Trade	-0.82	-0.80
Tourism	-1.25	-1.28
Number of nurses (x 1,000,000 inhabitants)	1.77	1.74
Minority status	0.28	0.34
Education (% Bachelor's degree or higher, 25 or older)	0.31	0.34

Table 4: Estimated parameters under incomplete information (GLM negative binomial)

	(1)	(2)	(3)	(4)
Constant	-10.722*** (0.219)	-11.999*** (3.248)	-11.244*** (3.891)	-12.086*** (3.751)
<i>Republican governor</i>	.745** (.304)	.761** (.307)	.813** (.323)	.757*** (.306)
<i>Unemployment</i>		1.741*** (.675)	1.851*** (.691)	1.731*** (.689)
<i>% Old people</i>		-3.865*** (1.244)	-4.076*** (1.298)	-3.845*** (1.248)
<i>Trade</i>			-.127 (.719)	
<i>Tourism</i>			.417 (1.221)	
<i>Number of beds</i>			-.131 (0.227)	
<i>Days to next election</i>				.014 (.240)
N. Observations	49	49	49	49
Residual/Null deviance	.911	.741	.733	.740

Standard errors in brackets. Level of Significance: *** p<0.01, ** p<0.05, * p<0.1

Note: We tested whether results are robust to the inclusion of Hawaii. In all cases, the political affiliation effect (*Republican governor*) is highly significant at 5% or 10% (results available upon request). We also tested whether geographical factors were determinant (dummy variables corresponding to East Coast, West Coast, and South; and Density of population, to account for rural versus urban dynamics). These are not significant and including them does not alter the significance of the other variables. The Republican governor effect for estimates including geographical factors lies in the range .767 to .804.

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Table 5: Estimated parameters under complete information (OLS)

	(5)	(6)	(7)	(8)
Constant	17.824*** (.587)	19.098*** (1.145)	14.793** (7.046)	16.668*** (3.240)
<i>Republican governor</i>	.059 (.805)	-.127 (.859)	-.178 (.871)	-.129 (.845)
<i>Unemployment change</i>		-.113 (.250)	-.103 (.252)	
<i>% Deaths</i>		-.010 (.010)	-.009 (.010)	
<i>Days to next election</i>			.629 (1.163)	
<i>Number of nurses</i>				1.598 (1.159)
<i>Minority status</i>				1.029 (3.244)
<i>Education</i>				5.698 (6.428)
N. Observations	49	49	49	49
R-squared	0.00	0.04	0.04	0.05

Standard errors in brackets. Level of Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Note: Results are robust to the inclusion of Hawaii. They are also robust If we consider 30 or 90 days, instead of 60. In all cases, variables are non-significant ($p > 0.1$). Results available upon request.

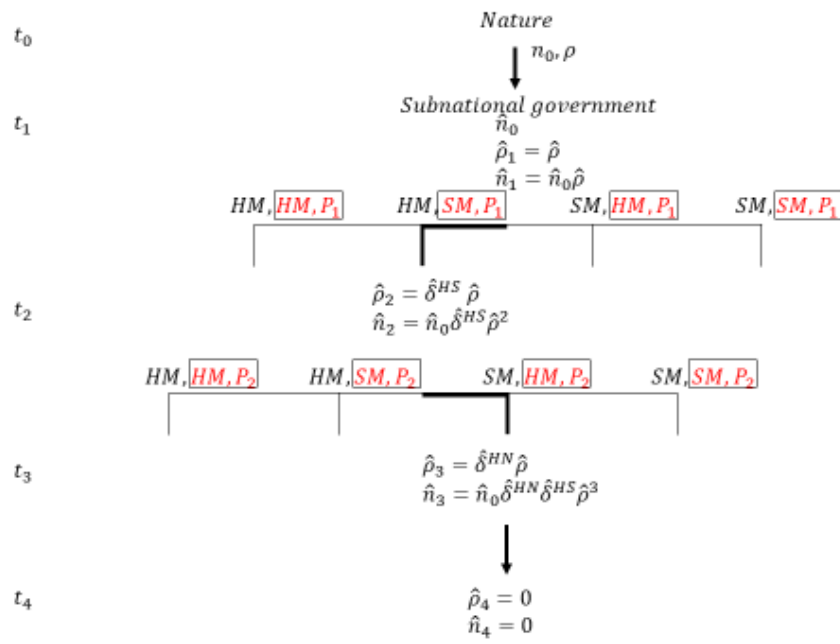


Figure 1. The 4-period decision-making process example for a subnational government. In boxes, decision taken by the national government.

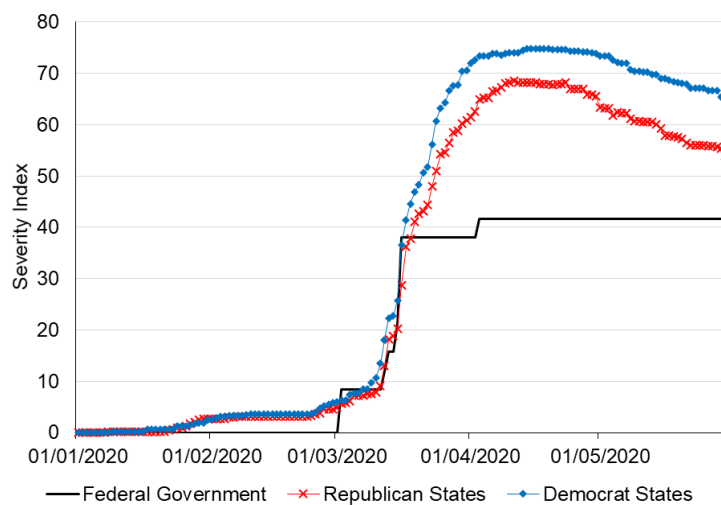


Figure 2. Severity of containment measures applied by the Federal US Government, Democrat-led States and Republican-led States; first COVID-19 outbreak

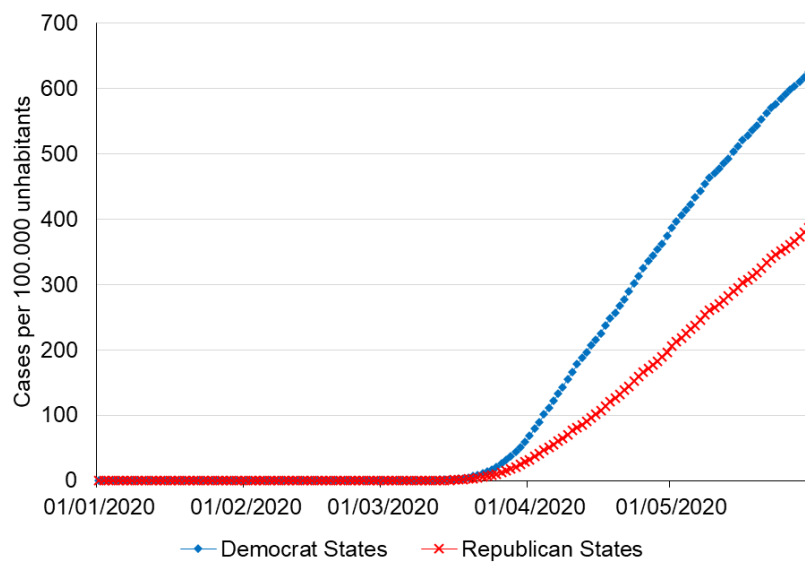


Figure 3. Average incidence rate of the states, by the political affiliation of the Governor, during the first outbreak of COVID-19

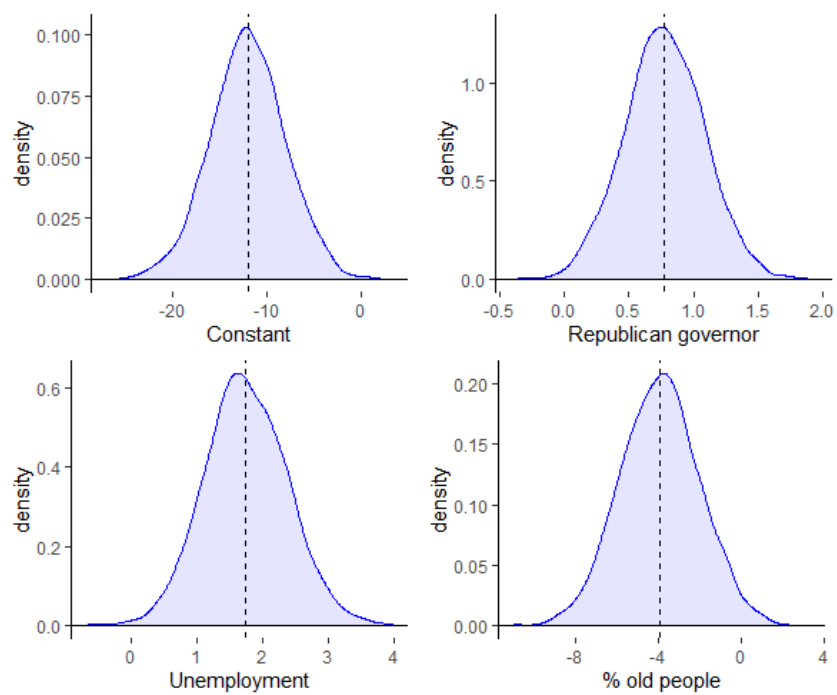


Figure 4. Distribution of the parameters of the model using a Bayesian estimation

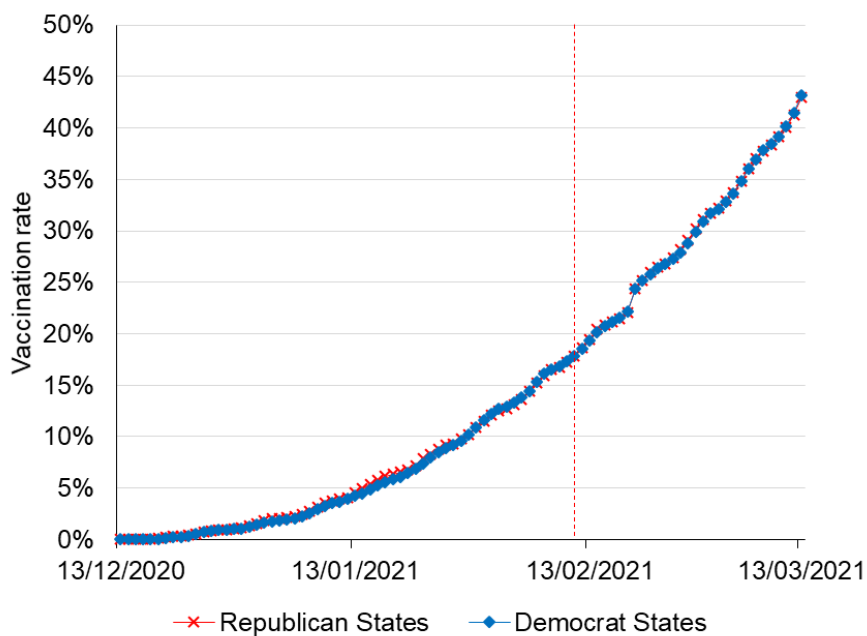


Figure 5. Average vaccination rate of Democrat-led States and Republican-led States during the first 3 months of vaccination. The dashed line corresponds to the day considered as the early vaccination rate (February 11th)