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► **To cite this version:**

Raül Magni-Berton. Territorial Countervailing Powers Under the Pandemic. Clara Egger, Raul Magni-Berton, Eugénie de Saint-Phalle. Covid-19 Containment Policies in Europe, Palgrave Macmillan Cham, pp.97 - 111, 2024, 978-3-031-52095-2. 10.1007/978-3-031-52096-9\_6 . halshs-04597205

**HAL Id: halshs-04597205**

**<https://shs.hal.science/halshs-04597205>**

Submitted on 8 Jun 2024

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# Territorial Countervailing Powers Under the Pandemic

*Raul Magni-Berton*

## INTRODUCTION

It has become commonplace to say that among the vices and virtues of federalism, the ability to respond to emergencies falls under the first category. A look at emergency laws is enough to show that they tend to centralise power. In principle, federalism or decentralisation are expected to suffer from severe coordination problems, such as disorganised initiatives, conflicting messages and the need to constantly adjust policies. The COVID-19 crisis saw this idea largely spread among commentators. For example, Huberfeld et al. (2020) suggest that federalism complicated the U.S. response to the pandemic and attempts to provide insights to mitigate the harmful side effects of federalism.

However, when this assumption is put to empirical test in a comparative way, it is no longer so obvious. During the 2007 financial crisis, many studies analysed whether centralised states were more able to react quickly

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© The Author(s) 2024  
C. Egger et al. (eds.), *Covid-19 Containment Policies in Europe*,  
International Series on Public Policy,  
[https://doi.org/10.1007/978-3-031-52096-9\\_6](https://doi.org/10.1007/978-3-031-52096-9_6)

to the crisis than federal and decentralised states. Braun and Trein (2014) report no significant difference while Del Pino and Pavolini (2015) explain that regionalised states (Spain and Italy) stopped their decentralisation process during the crisis, without much positive impact on the management of the crisis.

Similar studies were conducted during the COVID-19 crisis. Hegele and Schnabel (2021) compare European federal states—such as Austria, Germany and Switzerland—and do not find same responses. While Austria and Switzerland had a centralised approach, Germany opted for a coordinated decentralised decision making. Nevertheless, Germany was one of the most effective countries in containing the pandemic (Greer et al., 2023). Similarly, Aubrecht et al. (2020) find that in developed countries, centralised systems were no more effective than decentralised ones. Also, Kuhn and Morlino (2022) show that the German decentralised management was more effective than the Italian centralised one. These articles argue that while decentralised systems reduce coordination, they improve the ability to reduce uncertainty because decentralised policies allow incumbents to gather information about which policies work better.

This chapter uses the EXCEPTIUS data to analyse the extent to which European countries change their territorial structure during the pandemic. The data show that there is no homogeneity in territorial responses, but most countries centralised decision making during the first wave and decentralised it during the second and third waves. Also, a simple comparison between territorial strategies and excess lethality during the crisis suggests that decentralisation is a better strategy, although after controlling for income levels, neither the territorial organisation nor the level of decentralisation of the responses seem to be relevant to explain cross-country differences in the level of lethality of the pandemic. As a result, the idea that extraordinary events cannot be managed with ordinary institutions does not seem to be confirmed.

## THE TERRITORIAL ORGANISING OF POWERS IN EUROPE

Regarding the territorial structure of European states, there is no consensus on categorization. Formally, four federal states can be identified: Austria, Belgium, Germany and Switzerland. In practice, however, these states have very different systems. Switzerland is an example of competitive federalism, where subnational units (cantons) are constitutionally sovereign. In fact, while this sovereignty is mainly symbolic, the cantons are

politically autonomous and their own revenues are substantial. Germany, an example of cooperative federalism, is also highly decentralised. The subnational entities (*Länder*) also have political autonomy and large revenues to exercise it. In contrast to these two countries, federalism in Belgium and Austria does not directly translate into strong subnational power. In Belgium, where federalism has been introduced since the 1970s, the different communities and provinces have a weak influence on the central power, although they benefit from a large autonomy. Also, according to the European Committee of the Regions, the relative share of total subnational spending compared to total government spending is much lower than in Germany (40% versus 75%). Austria is even less decentralised. Formally a federation, Austria has gradually got closer to a centralised country (Erk, 2004). According to the decentralisation index of the European Committee of the Regions, Austria ranks 18th in the European Union, while Germany ranks 1st and Belgium 7th. Despite these notable differences, we consider federal states to be an appropriate umbrella category for these countries because, constitutionally speaking, federal entities have more power over the system, and this could favour them in case of conflicts arising from crises.

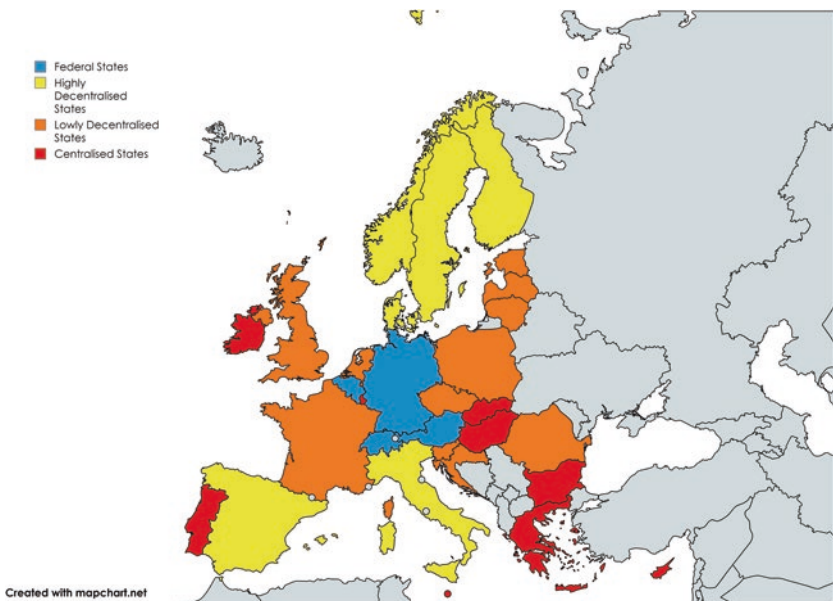
As the other European countries are unitary, they are grouped here according to the share of consolidated local expenditure in total expenditure. The data is based on the Organisation of Economic Co-operation and Development and the European Committee of the Regions. Although these data are not identical, they are highly correlated ( $r = 0.92$ ). The OECD data cover non-EU countries (including Switzerland, Norway and the United Kingdom), while their data are not available for some EU countries (Bulgaria, Croatia, Cyprus, Malta, Romania). Taken together, they cover all countries included in the EXCEPTIUS database.

These data allow identifying highly decentralised unitary states. Among them, in the Nordics (Denmark, Finland, Norway and Sweden), more than one-third of current expenditures are controlled by the subnational level. This is particularly true in Denmark, where about two-thirds of the expenditures are delegated to the subnational level. In addition, Spain and Italy are often considered as regionalised states, where the central state has devolved legislative powers to all or some of its regions. In Spain, the regions (*Comunidades Autónomas*) have great fiscal autonomy, and two of them can even raise taxes. In Italy, on the other hand, regionalisation is much less developed, an observation is confirmed by the level of fiscal expenditure, which is lower than in the countries of this group. However,

Italy has devolved health policy to the regions, which is particularly relevant for the pandemic. Given its traditional decentralisation, Italy is the last country in this category.

Lowly decentralised unitary states also form heterogeneous category. Some countries, such as the Czech Republic, the Netherlands and Poland, are almost as decentralised as Italy. Large states such as France or the United Kingdom are still much more centralised, as are some Balkan states (Croatia, Slovenia and Romania) and the Baltic states (Estonia, Latvia and Lithuania). Among them, Latvia certainly is the most decentralised state but is not covered by the version 2.0 of the EXCEPTIUS dataset.

Finally, many small states can be described as centralised. They have a negligible rate of local spending and sometimes no territorial organisation at all. This category includes Bulgaria, Cyprus, Greece, Hungary, Ireland, Luxembourg, Malta, Portugal and Slovakia. Figure 6.1 shows the types of regimes in the EXCEPTIUS database.



**Fig. 6.1** Territorial systems in Europe. *Source:* OCDE and the European Committee of the Regions data, own rendering

## SUBNATIONAL AND NATIONAL POLICIES UNDER THE COVID-19 CRISIS

There are two main ways of capturing the decentralisation of policymaking with the EXCEPTIUS database. The first way is to identify the authority that promulgates a legal text, be it national or local. This measure suffers from two potential problems. On the one hand, it only captures the number of political decisions, irrelative of their importance. In some cases, promulgating more legal texts does not mean being more powerful. However, it helps to identify the cases where local policies played a role in the pandemic. On the other hand, it is not so easy to collect decisions at the subnational level in every country. So, we cannot distinguish between the absence and the unavailability of policy data. While this problem is not secondary, the ability to find subnational is also a sign of their importance.

The second way is to identify transfers of authority during the pandemic. This approach focuses only on those regulatory texts that change the responsibility for future policy. Again, only their number is considered, not their importance. However, the most interesting aspect of this measure is to know in which cases states tend to centralise or decentralise during the first three waves of the pandemic. Moreover, this measure is consistently different from the previous one, so that when they provide consistent results, they reinforce each other.

### *Subnational versus National Authority*

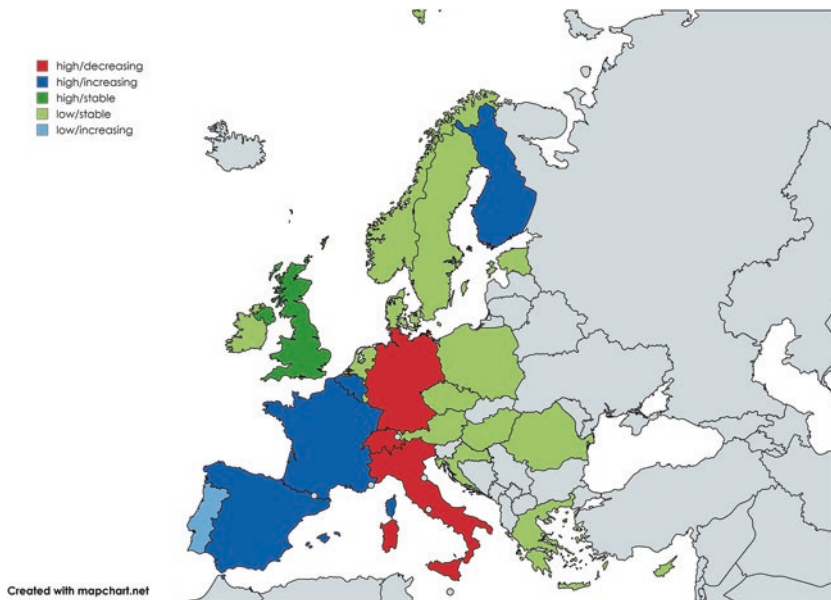
In the first wave, the percentage of decisions taken at the subnational level does not clearly depend on the degree of centralisation, but rather on the size of the country. While Germany is the country in which almost all policies were initiated at the subnational level (97%), the United Kingdom (79%), Italy (66%) and France (60%) follow. Surprisingly, only 13% of the Spanish policies were decided upon at the subnational level. In contrast to these large countries, the territorial system (federal versus unitary) is more relevant in smaller countries. In fact, in all these countries, almost all decisions were taken at national level, apart from the federal systems of Switzerland and Belgium, where subnational decisions accounted for 42% and 38%, respectively. The only exception was Austria, where crisis management policy was 100% centralised, despite its (weak) federal system. Faced with an emergency, large and federal countries, therefore, tend to

make some decisions at subnational level, which is not the case for countries that do not have either of these characteristics.

During the second wave, the overall trend is similar, with some interesting changes. Compared to the first wave, some countries have become more centralised. This process of centralisation is particularly pronounced in Italy, where the central state controlled all decisions, and in the United Kingdom, where only 31% of decisions were made by the local power. Similarly, while Germany remained largely decentralised, only 64% of decisions in the second wave came from the *Länder*. In contrast, some countries significantly increased the percentage of decisions taken at the subnational level. In Spain, 95% of legislative texts were of subnational origin in the second wave. To a lesser extent, France increased its share of local decisions (72%). Finally, Finland, which, like most of the sparsely populated countries, reacted in an exclusively centralised way, greatly increased its local decision-making in the second wave (60%). The other countries did not significantly change their territorial decision-making, including Belgium (35%) and Switzerland (37%).

Finally, the third wave is the least reliable in terms of data collection, but also the least rich in terms of political decisions. The data show that compared to the previous waves, pandemic management has become more decentralised in Belgium, Finland, Portugal and the United Kingdom, and more centralised in Switzerland and Germany. Figure 6.2 summarizes the average level of decentralization of pandemic management and its evolution over the three first waves.

Overall, three lessons can be drawn. First, pandemic management was not always centralised. As expected, federal states are more likely to devolve authority to subnational entities. Large states also tend to manage the pandemic largely at subnational level. Second, centralisation does not increase over time. On the contrary, this is only the case for some federal states, notably Germany and, to a lesser extent, Switzerland. Unitary states tend to decentralise pandemic management over time, with the sole exception of Italy. This suggests that systems with different balances of territorial powers tend to converge during the pandemic, but the equilibrium is not centralisation. Third, the trajectories of centralisation/decentralisation are very different over time. The most extreme cases were Germany, where subnational decisions went from 97% in the first wave to 0% in the third wave, and Finland, which started with 0% and counted 93% of local decisions in the third wave. These different adjustments across waves mitigate



**Fig. 6.2** Level of policies led by the subnational authority and evolution over the three first waves. *Source:* EXCEPTIUS database, own rendering

the tendency for convergence. Each country follows, at least in part, a specific evolution.

### *Transfers of Competencies*

During a state of emergency, many countervailing institutions lose their powers to the benefit of the national government (see Poyet, Kuebler and Egger in this volume). Subnational powers are not exception: in the face of the pandemic, states are expected to centralise certain powers. This pattern does exist, but the opposite transfers have also been observed. On November 28, 2020, the Belgian government published a decree to “grant special powers to the Walloon government to deal with the second wave of the COVID-19 health crisis for matters governed by Article 138 of the Constitution”. This is an example of the transfer of powers from the central to the subnational governments. In some cases, these transfers do not increase decentralisation, since they only contribute to revert the



centralisation process initiated during the first wave. In other cases, such as Belgium, local governments benefit from unusual devolution of powers to cope with the pandemic. These transfers are not necessarily decided at the central level. In federal countries, many transfers come from the local level. In some cases, national standards are incorporated into local policies, such as the ban on anti-constitutional symbols on masks in Thuringia (Germany). In other cases, local governments have transferred responsibilities to other territorial levels. For example, the canton of Schwyz (Switzerland) stipulates that if the closure of a daycare centre is unavoidable, the municipalities must provide a suitable replacement.

Transfers of authority were common during the pandemic. Only a few countries did not change their territorial organisation of power. Among the federal states, there were no consistent transfers of authority in Germany. In four centralised states, Cyprus, Greece, Luxembourg and Malta, no transfer of power was observed. This is also the case in the Netherlands and Croatia, which are more decentralised. In the other countries, transfers varied considerably from one wave to the next.

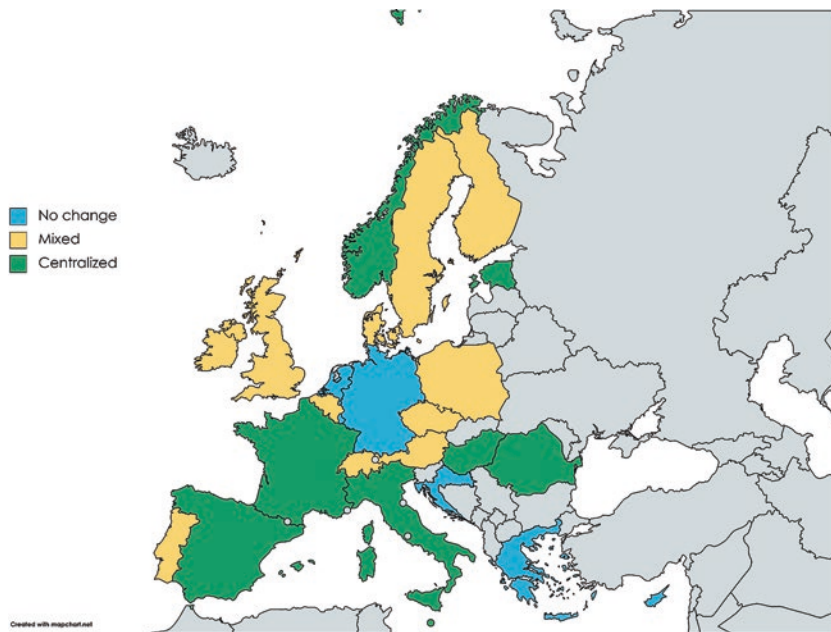
During the first wave, almost all European countries centralised authority. Austria, Belgium and Switzerland centralised many regulations to fight the spread of the virus. This was also the case for all highly decentralised states (Nordic countries, Italy and Spain) and for almost all centralised states. The only country in which some decentralisation occurred in the first wave is the Czech Republic, where the government resolution of March 15 significantly centralised powers. At the end of March and beginning of April, three resolutions relaxed some of the decisions taken two weeks earlier. All in all, the expected centralisation of power in the face of the emergency is observed, especially in decentralised countries. The only exception is Germany, which has not changed its institutional structure.

During the second wave, this trend changed significantly. Centralisation only continued in the most decentralised systems. Such centralisation is reported in Belgium, Spain, Norway and Poland. In six countries, centralisation stopped in the second wave after increasing in the first wave. These countries are the Czech Republic, Estonia, France, Hungary, Italy and Romania. This does not mean that these countries were more decentralised than those in the first group. Rather, these countries adopted particularly stringent policies (see Chazel's contribution to this volume). It is plausible that the concentration of power in the first wave was already high and did not require adjustment in the second wave. More surprisingly, eight countries developed decentralised policies during the second wave

after adopting centralised ones in the first wave. These are Austria, Denmark, Finland, Ireland, Portugal, Sweden, Switzerland and the United Kingdom.

The process of decentralisation observed during the second wave got even more accentuated during the third wave. At that time, no country centralised any powers. On the other hand, seven countries decentralised powers, be they originally exercised them at the subnational level or they did new devolutions. These countries are Belgium, Denmark, Poland, Portugal, Switzerland, Sweden and the United Kingdom. Most of them were already decentralised before the pandemic, and they decided to manage the pandemic in a more decentralised way. Figure 6.3 summarises the map of different pandemic response strategies.

Considering these data, I suggest that the COVID-19 pandemic has challenged the conventional wisdom that centralisation is an asset in the face of crises. This is consistent with existing reports that suggest that



**Fig. 6.3** Transfers of competencies between the central and the local level.  
*Source:* EXCEPTIUS database

decentralisation might be more effective (Kuhn & Morlino, 2022; Kuhlmann et al., 2021). As noted in the introduction, this is not really new, and the debate on the effectiveness of decentralised pandemic management policies is still open. What is new, however, is that this conventional wisdom has been challenged by policymakers themselves. While most of them opted for centralising powers at the beginning of the pandemic, they chose a more decentralised management afterwards. This may be due to the special case of Germany which served as a role model. While decentralised management has been discussed and criticised in the domestic arena (see Färber, 2021), the exceptionally low number of infections and deaths in this country may have presumably influenced management in other countries.

### SOME EVIDENCE OF TERRITORIAL EFFECTIVENESS IN CRISIS MANAGEMENT

So far, I have analysed different territorial policies in various European countries with different territorial structures. Some of them centralised powers, others did not alter their territorial organisation and another group opted for a mixed strategy, increasing their centralisation in the first wave and then reducing it.

The most important takeaway would be to know which strategy is the most effective. Unfortunately, it is also the most difficult information to find. To rigorously assess the effects of territorial management, one would have to account for many confounding factors, such as the level of income of a country, its healthcare capacities, culture, trust and so on. These cannot be considered when the analyses are estimated at the national level, with only 25 countries. However, it is possible to provide some descriptive clues to initially assess territorial effectiveness for crisis management.

The first aspect to consider is how to measure an effective policy. Today, it is certainly simplistic to consider only the direct health consequences of COVID-19, since every policy also has economic, social and psychological consequences. However, the direct health consequences are a good starting point and give some indication of the best short-term health strategy. Health consequences have been measured in terms of either infections or (excess) deaths. In both cases, these measures are self-reported and can be influenced by COVID-19 testing strategies as well as by the way data is collected by each national authority. Deaths are certainly more reliable and more relevant than infections for measuring effectiveness because the main

goal of any government is to avoid deaths, not to avoid infections. I, therefore, collected the number of deaths per 100,000 population, provided by Johns Hopkins University. Today, these data are considered to be close to reality because they roughly correspond to the excess mortality during the pandemic (Sanmarchi et al., 2021).

Table 6.1 shows the mean number of deaths according to the type of regime (federal, highly and lowly decentralised, centralised) and the type of territorial management chosen (no change, mixed, centralised). The last column displays the countries included in each category. In two of them, only one country appears, in others only two.

The first information provided by the table is that federal and highly decentralised countries experienced much lower mortality rates than centralised and lowly decentralised countries. However, this could be explained by other factors. The most important is income. GDP per capita is the main factor explaining why some countries have fewer deaths (Sorci et al., 2020). Wealth improves the technical capacity to contain the pandemic and provide the best quality health care. In each category, the richer the country, the fewer the deaths. Countries with low levels of decentralisation have the lowest average GDP per capita, while countries with high levels of decentralisation or federal systems have the highest GDP per

**Table 6.1** Deaths according to the territorial organisation

<i>Regime</i>	<i>Management</i>	<i>Mean deaths</i>	<i>Countries</i>
Federal		213	
	No change	178	GER
	Mixed	162	SWI
Highly decentralised	Centralised	257	AUT; BEL
	172		
	Mixed	141	DEN; FIN; SWE
Lowly decentralised	Centralised	202	ITA, NOR, SPA
	278		
	No change	272	NED; CRO
Centralised	Mixed	308	CZE; FRA; UK
	Centralised	255	EST; POL
	252		
	No change	193	CYP; CRO; GRE; LUX; MAL
	Mixed	202	EIR; POR
	Centralised	419	HUN; ROM

Source: EXCEPTIUS and John Hopkins University data

capita. For example, in the first group, Denmark, Finland, Sweden and Norway have high GDP per capita and very low numbers of deaths. In contrast, Italy and Spain have more deaths than France and the Netherlands, which are less decentralised. Other factors, such as geography or trust, seem to play an important role. However, what the table can say at this stage is that decentralisation does not seem to create major problems in facing a pandemic.

The second relevant descriptive evidence concerns how the pandemic was managed. I used the data provided in this chapter to distinguish three strategies for each type of regime. The first decision is not to change the current territorial organisation. Germany is the only example for federal states, the Netherlands and Croatia for lowly decentralised states, and five centralised countries followed this strategy. No highly decentralised state fits in this group, confirming that decentralisation is fragile in unitary states. The second strategy is to mix centralisation in the first wave and decentralisation in the following. The relative majority of countries followed this strategy. Finally, the last strategy is to centralise power at the national level, which is the classical strategy. This does not mean that power is concentrated. In Belgium, for example, a large number of decisions are made at the subnational level during each wave. However, compared to the usual number of subnational decisions, Belgium centralised the governance of the pandemic except in the third wave, which is, in my view, too late to be considered as a truly mixed strategy. Only two countries further centralised their decisions while they were already largely centralised: Hungary and Romania.

In almost all political systems, mixed strategies are associated with lower mortality, except in countries with low decentralisation. Note, again, that the richer countries preferred a mixed strategy compared to the poorer ones. So, it is difficult to disentangle these different causes.

The most reliable result is probably the relative success of the COVID-19 containment that did not change the territorial organisation. Whether federal, centralised or decentralised, countries that managed the pandemic with the same territorial organisation as before the pandemic fared relatively better than others, even after controlling for economic and geographic factors. The only exception is Croatia, where the pandemic was particularly deadly despite the unchanged territorial organisation. Like the previous result, this one must be treated with caution. However, the descriptive data contradict two basic intuitions in crisis management. The first is that the normal organisation of power is inadequate to deal with

exceptional events. The second is that territorial centralisation is more effective in times of crisis. These ancestral ideas do not appear at all in the actual policies of European countries.

## CONCLUSION

It is not easy to compare territorial adaptation during the pandemic. Even in European countries, the territorial bases of political systems are very diverse, and their categorisation is not obvious. However, some preliminary insights can be drawn from the available data.

First of all, the expected centralisation of power during the pandemic did not occur. Most European countries centralised decision-making during the first wave, but in the following waves a more decentralised management was largely adopted. This can be seen either in the number of policy decisions made at the subnational level or in the laws that transferred powers from the subnational to the national level and vice versa. Also, in a not insignificant minority of countries, the territorial organisation has not changed.

As far as I know, this pandemic is the first crisis in which decentralisation has been documented as a common solution. Decentralised management could have the merit of better adapting policies to specific situations, which would also allow for faster responses. It also helps to compare different policies to assess the most effective one. These advantages may outweigh the disadvantages, which are mainly due to a lack of coordination. In developed countries, the quality of intergovernmental relations produces collaborative policies that enable effective pandemic response (Greer et al., 2023). All in all, decentralised crisis management is gradually being taken seriously and implemented, at least in developed countries (Vampa, 2021).

It is difficult to prove that such management is actually more effective than centralised management. The data show that, on average, decentralised countries experienced fewer deaths during the pandemic than centralised countries. The data also show that countries with decentralised pandemic management experienced fewer deaths. However, there is not a clear correlation between the level of decentralisation and GDP per capita. On average, richer countries are more decentralised and have managed the pandemic in a more decentralised way. Such a correlation is an example of how complicated it is to capture the net effect of decentralisation. Thus, this chapter cannot prove the superiority of decentralisation in crisis management, but it does provide initial evidence that centralisation is not always the best way to deal with an emergency.

## REFERENCES

- Aubrecht, P., Essink, J., Kovac, M., & Vandenberghe, A. S. (2020). *Centralized and decentralized responses to COVID-19 in federal systems: US and EU comparisons*. Available at SSRN 3584182.
- Braun, D., & Trein, P. (2014). Federal dynamics in times of economic and financial crisis. *European Journal of Political Research*, 53(4), 803–821.
- Del Pino, E., & Pavolini, E. (2015). Decentralisation at a time of harsh austerity: Multilevel governance and the welfare state in Spain and Italy facing the crisis. *European Journal of Social Security*, 17(2), 246–270.
- Erk, J. (2004). Austria: A federation without federalism. *Publius: The Journal of Federalism*, 34(1), 1–20.
- Färber, G. (2021). Germany's fight against COVID-19: The tension between central regulation and decentralised management. In *Comparative federalism and COVID-19* (pp. 51–69). Routledge.
- Greer, S. L., Dubin, K. A., Falkenbach, M., Jarman, H., & Trump, B. D. (2023). Alignment and authority: Federalism, social policy, and COVID-19 response. *Health Policy*, 127, 12–18.
- Hegele, Y., & Schnabel, J. (2021). Federalism and the management of the COVID-19 crisis: Centralisation, decentralisation and (non-)coordination. *West European Politics*, 44(5–6), 1052–1076.
- Huberfeld, N., Gordon, S. H., & Jones, D. K. (2020). Federalism complicates the response to the COVID-19 health and economic crisis: What can be done? *Journal of Health Politics, Policy and Law*, 45(6), 951–965.
- Kuhlmann, S., Bouckaert, G., Galli, D., Reiter, R., & Hecke, S. V. (2021). Opportunity management of the COVID-19 pandemic: Testing the crisis from a global perspective. *International Review of Administrative Sciences*, 87(3), 497–517.
- Kuhn, K., & Morlino, I. (2022). Decentralisation in times of crisis: Asset or liability? The case of Germany and Italy during COVID-19. *Swiss Political Science Review*, 28(1), 105–115.
- Sanmarchi, F., Golinelli, D., Lenzi, J., Esposito, F., Capodici, A., Reno, C., & Gibertoni, D. (2021). Exploring the gap between excess mortality and COVID-19 deaths in 67 countries. *JAMA Network Open*, 4(7), e2117359.
- Sorci, G., Faivre, B., & Morand, S. (2020). Explaining among-country variation in COVID-19 case fatality rate. *Scientific Reports*, 10(1), 1–11.
- Vampa, D. (2021). COVID-19 and territorial policy dynamics in Western Europe: Comparing France, Spain, Italy, Germany, and the United Kingdom. *Publius: The Journal of Federalism*, 51(4), 601–626.

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