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Decentralisation, Unfunded Mandates, and the Regional Response to the COVID-19 Pandemic

Andrés Rodríguez-Pose[1] and Miquel Vidal-Bover[2]

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Abstract

The COVID-19 pandemic has sparked a surge in the number and scope of governmental interventions, both in centralised and decentralised states. Decentralisation theories and recent empirical studies suggest that highly decentralised systems are more resilient to shocks and cope better with adversity. Yet, little is still known about how decentralised governments have coped with the COVID-19 health emergency. Using an original dataset of 445 regions across 26 OECD countries, this article finds that COVID-19-related mortality rates are not connected to the degree of fiscal and political decentralisation, but rather are tied to the mismatch between the two dimensions, also known as unfunded mandates. Large unfunded mandates are positively associated with higher COVID-19 mortality rates. Fiscal and political decentralisation, by contrast, become statistically insignificant, when unfunded mandates are considered. Hence, better —not more—decentralisation is needed, as unfunded mandates are a threat to the capacity of subnational authorities to address the COVID-19 emergency. In emergency situations, the dysfunctionality caused by unfunded mandates undermines the effectiveness of the response of the relevant public authorities to pressing challenges.

Keywords: COVID-19, decentralization, unfunded mandate

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I. Introduction

In 2020, healthcare systems worldwide were stretched to the limit by the COVID-19 pandemic. To contain the disease and avoid the collapse of health centres, over half of the world's population was forced into lockdown and other strict containment measures were adopted (OECD, 2020). Despite these measures, during 2020 alone, more than 1.8 million excess deaths were reported across 36 OECD countries relative to the five previous years (OECD, 2021). Not all countries and regions in the OECD, however, were homogenously affected.

Defined as the transfer of power and resources from central to subnational tiers of government (OECD, 2017), differences in decentralisation may have contributed to the uneven regional impact of COVID-19. The institutional structure of a country affects its performance in different areas (Lv et al., 2021). Yet, studies published so far have shed little light on the extent to which fiscal and/or political decentralisation are linked to better health outcomes. On the one hand, it has been argued that a greater capacity to adapt by decentralised systems is bound to facilitate policy adaptation, improving health delivery (e.g., Collins and Green, 1994; Asfaw et al., 2007) and, in the case of the pandemic, lowering excess mortality. Others, in contrast, suggest that decentralisation of health services atomises resources and leads to diseconomies of scale, thereby provoking efficiency losses and quality downgrades (Jiménez-Rubio and Smith, 2005; Naudé, 2020).

The variety of empirical results may derive from the omission of a relevant explanatory variable. Existing studies on decentralisation and health outcomes have something in common: they all test the effects of fiscal and political decentralisation on healthcare as two independent variables, unrelated to each other. In so doing, researchers make the crucial assumption that "finance follows function", that is, that devolved responsibilities to subnational governments always come

accompanied by the necessary resources to fulfil them (Bahl and Martínez-Vázquez, 2013). This is a far-fetched assumption, as subnational authorities often complain about mismatches between their powers and the resources available to fulfil their mandates. These "unfunded mandates" are the norm rather than the exception. Failing to factor in the presence and the width of unfunded mandates may therefore bias the empirical results obtained in studies so far.

This study sets out to fill this gap in existing knowledge by adding unfunded mandates to models testing the link between decentralisation and COVID-19 excess mortality rates. Using an original cross-sectional dataset of 445 regions in 26 OECD countries, we analyse the extent to which unfunded mandates (as well as fiscal and political decentralisation separately) raise COVID-19 excess mortality rates. We thus seek to determine whether it is the extent of fiscal or political decentralisation of healthcare what affects excess mortality, or whether it is rather the magnitude of the unfunded mandate (i.e., alignment between both dimensions of decentralisation) what drives variation in the regional rates of excess mortality.

This study is structured as follows. In Section 2 we provide an overview of the literature on the link between decentralisation, efficiency, and healthcare, and we delve in the concept of unfunded mandates. In Section 3 we outline the research question and hypotheses, the methodology, and the data used for our econometric estimations. Section 4 includes our empirical results and analysis. Finally, Section 5 summarises our conclusions, policy implications, and ideas for future research.

II. Decentralisation and Healthcare Under Unfunded Mandates

a. Decentralisation, efficiency, and healthcare

The interest in understanding the complexity of decentralisation has been a constant for over five decades. Theorists of decentralisation have traditionally been divided into two camps. The first

one argues that decentralising powers delivers gains in efficiency (Oates, 1972). The second strand posits that, as appealing as decentralisation may sound, it may fall short of delivering on its promises of efficiency gains and hamper economic development.

This long-standing division also applies to analyses of the healthcare sector. Following Klugman (1994), subnational authorities are more likely to understand regional healthcare needs and preferences, focusing, for instance, on elderly care solutions in regions where older people abound or directing more resources to preventive care in places with a younger population. Decentralised systems are also expected to offer a better match between healthcare provision and citizen health demands. They are also perceived as more flexible and less resistant to change (Collins and Green, 1994). Moreover, decentralised countries have governance coordination systems between the different tiers of government in place (Aubrecht et al., 2020; Naudé, 2020). All these factors are perceived to make decentralised health systems more "prepared by design" (Carinci, 2020) to face times of adversity, such as the advent of a pandemic.

Yet, decentralising healthcare powers to lower tiers of government could also lead to a more unequal and dysfunctional healthcare system. Indeed, decentralised subnational entities may enjoy different analytical, operational, and institutional capacities (Capano and Lippi, 2021): if the redistributive effect of centralisation is removed or is deficient, poorer regions will be less able to afford the health services their population demands, prompting both patients and healthcare professionals to vote with their feet. The fragmentation of subnational healthcare and the resulting regional disparities in health provision could be exacerbated in a system where the centre is weak and lacks an effective equalisation mechanism. Without a strong national lead, limited economies of scale may limit adequate healthcare production (Jiménez-Rubio and Smith, 2005). In the event of an emergency, weak central governments may lack the capacity to

coordinate emergency responses (Kuhn and Morklino, 2021) and become unable to control political "blame games" (Schneider, 2008). This may explain why in the early stages of the COVID-19 pandemic there was a tendency to recentralise the health response in several countries of the OECD (De Biase and Dougherty, 2021).

The empirical findings on the link between decentralisation and healthcare system outcomes are similarly mixed and often contradictory. Robalino et al. (2001) show that greater fiscal decentralisation is associated with lower mortality rates, particularly in lower-income countries. Similar results have been reported, using different measures for health outcomes, for developed —Spain (Cantarero and Pascual, 2008), Germany (Kuhn and Morlino, 2021)— and developing countries —India (Asfaw et al., 2007), Honduras (Zarychta, 2020). By contrast, negative and significant relationships are also frequently reported. For example, Navarro et al. (2020) report how the decentralisation of the Philippines's healthcare system complicated the task of providing services in poorer regions, due to the legal and budgeting weakness of the central government. In Pakistan (Zaidi et al., 2019) and Indonesia (Kristiansen and Santoso, 2006), two countries with a weak central government stewardship capacity of healthcare, inequities in child immunisation rates or the number of health professionals for birth assistance at the district level are rife. China's decentralised health system has also contributed to a highly territorially uneven health provision (Hao et al., 2021). Decentralised healthcare also resulted in very unequal responses to the first wave of the COVID-19 pandemic among neighbouring Italian regions, such as Lombardy, Emilia-Romagna and Veneto (Capano and Lippi, 2021). There is also research that concludes that the relationship between decentralisation and healthcare outcomes is more complex. It may be positive but non-linear (Cavalieri and Ferrante, 2020); depend on the level of

development of the region (Di Novi et al., 2019); or hump-shaped, pointing to an optimal level of decentralisation for healthcare outcomes (Dougherty et al., 2021).

The huge variety of empirical results points to two potential weaknesses in previous research. First, most previous studies linking decentralisation with differences in the availability and quality of healthcare provision measure one dimension of decentralisation only (fiscal, political, or administrative), using national-level data. Second, they tend to rely on small samples — frequently, single-country analyses— which are hardly generalisable.

b. The threat of unfunded mandates

These mixed results reported above suggest that decentralisation is not a panacea to address the dysfunctionalities of healthcare systems. Indeed, decentralisation may aggravate them. Hence, it seems essential that, in order to address health emergency situations more effectively, 'better' (not more) decentralisation of health systems may be needed. How can a 'better' decentralisation be achieved?

'Better' (or optimal) decentralisation is a situation where subnational authorities receive the necessary resources for each of the responsibilities that are devolved to them. Nevertheless, this is rarely the case. During a process of decentralisation, devolved responsibilities are often not adequately financed. In other words, sometimes finance does not follow function (Bahl, 1999). This phenomenon, which has received limited scholarly attention, is usually referred to as 'unfunded mandates' (e.g., Adler, 1997; Posner, 1998). The materialisation of unfunded mandates in decentralised countries reflects the competing interests of central and subnational governments. For the central government, decentralisation can be perceived as a politically desirable tool to shirk policy responsibilities without facing their costs (Bennett, 2014; Half and Welham, 2016). However, subnational governments may reject such opportunistic behaviour, as

it directly threatens their financial sustainability and their effective capacity to cater for the needs of their citizens.

The width and frequency at which unfunded mandates emerge depends on the degree of legitimacy enjoyed by both central and subnational entities during the decentralisation process (Rodríguez-Pose and Gill, 2003). When legitimacy falls with central governments, they will feel freer to devolve more powers than resources. Unfunded mandates will proliferate as a result. By contrast, when regions hold the upper hand, subnational governments have a wider margin of manoeuvre to negotiate and obtain more resources for the devolved responsibilities they must fulfil. This power hierarchy, which determines the presence and dimension of unfunded mandates, can vary over time as decentralisation is intensified or as the cost for the provision of services at the local level increases. If legitimacy tilts towards the central government, resources may not adapt and match subnational needs, thereby widening unfunded mandates. Similarly, if political differences emerge between central and regional governments, the allocation of funding may respond to political interests rather than efficiency, again enlarging misalignments between devolved responsibilities and resources.

Despite the limited attention that they have received, unfunded mandates are present in countries across the world irrespective of their federal or unitary nature and regardless of their level of development. Examples range from Dutch municipalities, whose portfolio of responsibilities has increased while the financial resources to fulfil them have remained stable (De Groot, 2019), through South Africa, where many subnational authorities complain about their lack of funding to attract the human capacities required to implement essential local economic development policies (Khambule, 2020), to the UK, where indirectly-elected regional development agencies have been expected to fulfil many responsibilities without the appropriate budget (Morgan, 2002;

Lee, 2017). The recent Levelling-Up White Paper has re-awakened interest in this subject (Cörvers and Mayhew, 2021; Department for Levelling Up, Housing and Communities, 2022).

Unfunded mandates are essential to understand the effects of decentralisation processes on variables such as economic growth or mortality rates. Large mismatches between responsibilities and funding can be expected to undermine the capacity of subnational governments to spend time and resources to gather information, adapt policies to their constituents' needs, and implement them with the necessary expertise (Klugman, 1994; Prud'homme, 1995). The resulting ineffectiveness may undermine policy innovation, competition, and public trust. Efficiency gains may suffer, as a consequence (Donahue, 1997; Rodrik et al., 2004).

Specifically in the health sector, unfunded mandates may translate into fewer primordial services being offered, especially in poorer areas. If subnational authorities lack sufficient funding (or the powers to raise it), healthcare provision may become inefficient and ineffective. Unfunded mandates may jeopardise the response to shocks like the COVID-19 pandemic, leading to collapses in the healthcare system and worse health outcomes. For instance, the US's "New Federalism" doctrine, which during the Trump presidency required state and local governments to comply with balanced budget requirements, squeezed lower government tier budgets. This particularly affected subnational governments in the poorest areas of the US, often leading to pay cuts and layoffs. As the pandemic surfaced, some state and local governments quickly became overburdened (Im, 2021). Other pre-COVID-19 studies in Indonesia or the Philippines also show that insufficient equalisation transfers as well as insufficient powers to levy taxes locally force subnational authorities to reorient their priorities and often resort to privatisation strategies that further fuel interpersonal and interterritorial inequalities in access to healthcare (Liwanag and Wyss, 2018; Rakmawati et al., 2019).

Therefore, devolving healthcare without the appropriate resources may result in worse healthcare performance and outcomes. To our knowledge, no study on decentralisation and healthcare to date has duly incorporated unfunded mandates as a variable in its own right to assess the effects of decentralisation on healthcare in a cross-regional analysis. Instead, most research has devoted efforts to determine the impact of the degree of fiscal and political decentralisation on various indicators related to healthcare, critically assuming that finance follows function. Unfunded mandates are mentioned in different studies, but these take the form of case studies that offer limited generalisability (e.g., Boex and Martínez-Vázquez, 2006; Bahl and Martínez-Vázquez, 2013). There is thus an important gap about how unfunded mandates affect the impact of decentralisation on health outcomes.

III. Methodology

a. Research question and hypotheses

In this paper we seek to determine the extent to which the presence of unfunded mandates affect COVID-19 excess mortality rates in OECD regions. We define unfunded mandates as the mismatch between the powers and resources decentralised to subnational tiers of government. We control for fiscal and political decentralisation as well, in line with most previous research on the topic. Following the theoretical and empirical discussion above, we hypothesise that the presence and dimension of unfunded mandates at the regional level is connected to COVID-19 excess mortality rates.

We also expect that large unfunded mandates may affect the link between fiscal and political decentralisation, on the one hand, and the health impact of COVID-19, on the other, meaning that, everything else being equal, considering unfunded mandates will reduce the significance of fiscal and political decentralisation for the quality of responses to COVID-19. This hypothesis is

anchored on the perception that it is not the extent to which fiscal and political decentralisation is pursued, but rather the mismatch between the two, that mattered for health outcomes during the pandemic.

b. Data

Decentralisation studies at country-level generally suffer inadequate data. This problem is aggravated when conducting research at subnational level (Martínez-Vázquez et al., 2017). And the shortage not only applies for our variables of interest (i.e., fiscal and political decentralisation, unfunded mandates, and COVID-19 excess mortality rates), but also for the relevant control variables. We therefore have had to build a large cross-regional dataset on decentralisation and unfunded mandates for 445 regions in 26 OECD countries. These data have been manually extracted primarily from international, national, and regional statistical offices (see Tables A1 and A2 in the Appendix).

The unit of analysis is OECD regions. 'Regions' are defined mostly at the OECD Territorial Level 2 (TL2) level, which encompasses the first administrative tier of subnational government. This is also the regional level at which more information is available for both the variables of interest and the controls. However, for those countries where TL2 constitutes merely a statistical region (see, e.g., the Czech Republic), TL3 is used provided data are available (see Table A3 in Appendix for the regions comprised in our regressions).

One of the few universally acknowledged facts in decentralisation research is that there is no single measure of decentralisation (Martínez-Vázquez and McNab, 2003). Decentralisation is a multidimensional process that induces modifications to a region's fiscal, political, and administrative indicators (Jiménez-Rubio and Smith, 2005). For fiscal decentralisation, the share of total public expenditure spent by subnational entities is the most traditionally used proxy. This

indicator, however, is only available at the national level. We, therefore, construct an alternative indicator measuring the expenditure capacity per capita for each of the 445 regions considered. The data was collected manually from the individual budgets of each region. All currencies were converted into constant 2015 USD, adjusted by purchasing power parity (see Table A1 in the Appendix).

For political decentralisation, we acknowledge the difficulty in correctly assessing this broad phenomenon using a single indicator (Ezcurra and Rodríguez-Pose, 2013). This is why different scholars have provided different indexes, where values for relevant aspects related to political decentralisation are weighted and added up to form composite indicators of political decentralisation. Among these indicators, we select the most complete and, increasingly, widely-used Regional Authority Index (RAI), proposed by Hooghe et al. (2016, 2021). To our knowledge, this is the only index that provides within-country variation (Lessmann, 2012; Filippetti and Sacchi, 2016). The RAI overall score results from the addition of the values in eight sub-categories organised around two main pillars: self-rule and shared rule. The former calculates the degree of authority by the region over its own territory. The latter estimates a region's degree of authority (or influence) over the central government decisions. Two of these sub-categories measure fiscal elements too (i.e., fiscal autonomy and fiscal control). Since this could generate collinearity issues in our estimations, we remove the values for these two categories and recalculate the RAI overall score, used as our proxy for political decentralisation.

Measuring unfunded mandates is even more complicated, as this indicator has not been used as a quantitative variable in its own right. We develop an index for unfunded mandates by combining the indicators of political and fiscal decentralisation. We first make fiscal and political decentralisation comparable by standardising them around the mean (mean value equal to 0 and

standard deviation equal to 1). The standardised values for fiscal decentralisation are then subtracted from those for political decentralisation, obtaining a relative index of unfunded mandates. If a region shows a value of unfunded mandates above 0, then that region has a degree of unfunded mandates above average for the OECD. Conversely, if the value is below 0, unfunded mandates in the region are less of a problem than for the average OECD region. This novel index provides an estimated degree of unfunded mandates for each region relative to the gap between fiscal and political decentralisation in all the remaining regions of our sample.

The dependent variable measures health outcomes during the COVID-19 pandemic through excess mortality rates. We use data on weekly deaths per region from international, national, and regional statistical offices (depending on availability) to calculate excess mortality rates from the deviation from expected deaths in a specific region over the 24 months covered in the analysis (2020 and 2021). More precisely, excess mortality is estimated by calculating the ratio between the number of deaths per week during the period of interest and the average deaths for the same weeks in the period 2015–2019. Certainly, this proxy is not without its problems. Not all excess deaths during this period were due to COVID-19. Factors such as the fear or inability to reach a hospital during the pandemic may have affected excess mortality. However, even this type of excess mortality is an indirect consequence of COVID-19. Excess mortality is also a more reliable indicator of the health incidence of COVID-19 than other alternatives. Previous research has underlined that using the number of COVID-19 cases or the official toll of COVID-19 deaths is likely to suffer from the deficiencies and inaccuracies of COVID-19 case reporting and from variations and modifications in the definition of what is considered a 'COVID-19 death' (Rodríguez-Pose and Burlina, 2021). COVID-19 reporting, especially early in the pandemic, also became a political football, which may have influenced reported statistics (Dombey and Burn-

Murdoch, 2020). Mortality, by contrast, has been measured in a more reliable and consistent way and sticking to excess mortality circumvents the limitations and vagaries of other types of COVID-19 reporting. It is generally considered as the most accurate indicator of the overall incidence of COVID-19 (Vanella et al., 2021).

The analysis also includes several control variables that have previously been deemed relevant in the study of decentralisation and health and that contribute to producing consistent parameters (Canavire-Bacarreza et al., 2017). Seven control variables are used in the analysis. First is the level of development, measured by regional GDP per capita as the impact of decentralisation is contingent on the wealth of a territory (Lessmann, 2012). We also include demographic indicators, such as population and population density, since COVID-19, as a contagious disease, thrives in the denser environment of larger cities. Similarly, regional accessibility has been identified as a driver of the spread the disease (Rodríguez-Pose and Burlina, 2021). We thus include a measure of interregional mobility as a control. Education is also taken into account, as more educated individuals have shown greater rates of awareness of and adherence to protective behaviours, such as social distancing or mask wearing (Bish and Michie, 2010; Kleitman et al., 2021). The quality of the air and the environment have also been linked to COVID-19 excess death rates (Cohen et al., 2017). Considering the respiratory symptoms of this disease, we use regional estimates of air pollution as a control. In addition, studies suggest that, even in highly decentralised countries, strong leadership is required to ensure coordination and government effectiveness (Robalino et al., 2001). We use the World Bank's government effectiveness indicator to control for the central government's ability to coordinate and lead in times of adversity. Finally, we also include a continental dummy variable for the five mega-regions of the OECD: Latin America, North America, Western Europe, Eastern Europe, and Asia and the

Pacific. Table A1 in the Appendix offers a detailed description of all variables used in this analysis as well as their sources.

c. Model specification

To test the two hypotheses in this study, an original dataset containing data for 445 regions in 26 OECD countries has been built. Our dependent variable (COVID-19-related excess mortality) offers reliable data for 24 months, covering the entire 2020 and 2021. Recognising that during this time many different policy strategies have been adopted in the regions of study, we run our estimations for the whole period and in six-monthly tranches with the aim of being able to detect statistical changes over time. Due to the unique nature of the pandemic, we run a set of ordinary least square (OLS) regressions. The regressions always include all control variables, but the three independent variables of interest are not regressed simultaneously to avoid incurring in multicollinearity issues. Thus, as the sign and statistical significance of unfunded mandates is what this article is most interested in, for all periods tested our estimations include a regression with unfunded mandates alone, one with unfunded mandates and fiscal decentralisation, and another one with unfunded mandates and political decentralisation. Our full model thus adopts the following form:

$$ExcessMortality_{it} = \alpha + \beta Unfunded_i + \gamma Fiscdec_i + \delta Poldec_i + X_i'\theta + \mu_i + \varepsilon_i$$

where $ExcessMortality_i$ represents COVID-19-related excess mortality in region *i* for period *t*; $Unfunded_i$ stands for unfunded mandates and denotes the difference between political decentralisation and fiscal decentralisation; $Fiscdec_i$ captures the level of fiscal decentralisation; $Poldec_{it}$ that of political decentralisation; and $X_{it}'\theta$ encapsulates the seven relevant control variables considered (regional GDP per capita, population, population density, share of population aged 20 to 64 years old with tertiary education, air pollution, interregional mobility,

and government effectiveness). μ_i represents the continental dummy variables, acting as a fixed-effects term; while ε_i denotes the error term. All standard errors are clustered at the regional level to capture potential serial correlation in the residual error term.

IV. Results

a. Descriptive statistics

Even though OECD regions share many similar characteristics, individual indicators show substantial variation. This is even more the case regarding the degree of decentralisation, where each country has its own historical context and institutional structure. Table 1 provides a summary of descriptive statistics regarding our main variables of interest.[1] As can be seen in the minimum and maximum columns, there are regions that suffer from a mismatch between fiscal and political decentralisation roughly four times larger than the one for the region with the smallest mismatch (read, for example, the Silesian voivodeship in Poland and the Irish Mid-West region, respectively). There is also significant variation in levels of fiscal and political decentralisation. The data reflects, for instance, the well-known contrast in terms of fiscal and political autonomy between the autonomous communities of Spain and the French regions.

As regards excess mortality, Table 1 lists the four main periods considered in the analysis. Although this remains descriptive, the mean scores for the 6-month periods seem to follow a logical pattern: since the pandemic started in most OECD countries between late February and late March 2020, the period for the first half of the year shows a relatively low mean score (although a significantly high maximum value), if compared to the second half of 2020, which displays a substantial increase probably due to the low immunisation rates of the population at

[1] See Table A4 in the Appendix for an extended summary of descriptive statistics for all variables used in our estimations.

that moment. Later, in the first half of 2021, the population at risk underwent mass vaccination programmes and policy measures to avoid the spread of the virus (such as antigen testing in some countries) may have already been more fine-tuned. Most of these measures remained well into the second half of 2021. Overall, the two-year period shows significant variation in our sample.

TABLE 1. Unfunded mandates, decentralisation and COVID-19 excess mortality

Variable	Obs	Mean	Std. Dev.	Min	Max
Unfunded mandates	505	0.017	1.086	–2.445	2.382
Fiscal decentralisation	518	7.810	1.348	4.3	10.638
Political decentralisation	505	12.73	6.241	2	23
Excess mortality (24 mon.)	465	12.661	14.788	–10.920	193.914
E. mortality (1st half 2020)	465	6.477	13.424	–17.032	117.109
E. mortality (2nd half 2020)	465	18.709	21.01	–18.223	143.718
E. mortality (1st half 2021)	465	9.62	25.464	–24.45	57.904
E. mortality (2nd half 2021)	464	9.17	16.641	–46.032	73.226

Simple correlation analyses point to a potential, but relatively marginal, link between the presence of unfunded mandates and excess mortality linked to COVID-19.[2] Figures 1–5 show that, irrespective of the level of unfunded mandates, there is considerable variation in the COVID-19-related excess mortality rates. Nevertheless, as the regression line shows in all figures —with the exception of Figure 5—, there is a marginally positive correlation between unfunded mandates and excess mortality. Observations showing higher values of excess mortality generally happen when the values of unfunded mandates are above the mean of 0. Although some of these cases could be considered outliers, there seems to be a distinct group of

[2] See Table A5 in the Appendix for all possible pairwise correlations with the variables used in this study.

regions with higher values of excess mortality that are also clearly above the average OECD region in terms of unfunded mandates. These include some Mexican states, US states, and Polish voivodeships, among others. Conversely, regions with higher-than-average values of excess mortality coupled with low or average levels of unfunded mandates are far less common. This correlation is most clear in Figure 3 on data for the second half of 2020, when mortality was highest according to our dataset commented earlier. These correlation graphs point us to the need to apply inferential techniques to assess whether this relationship between variables, which may be driven by some outliers, holds when controlling for a set of relevant factors that may have also influence excess mortality in COVID-19 times.

FIGURE 1.

Unfunded mandates and excess mortality (24 months)

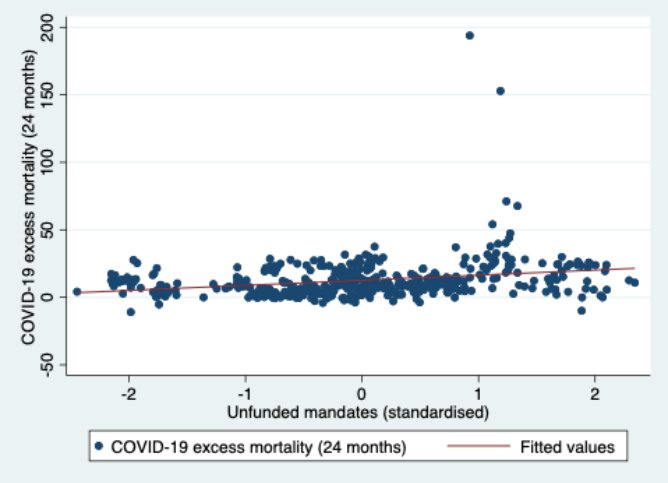


FIGURE 2.

Unfunded mandates and excess mortality (1st half 2020)

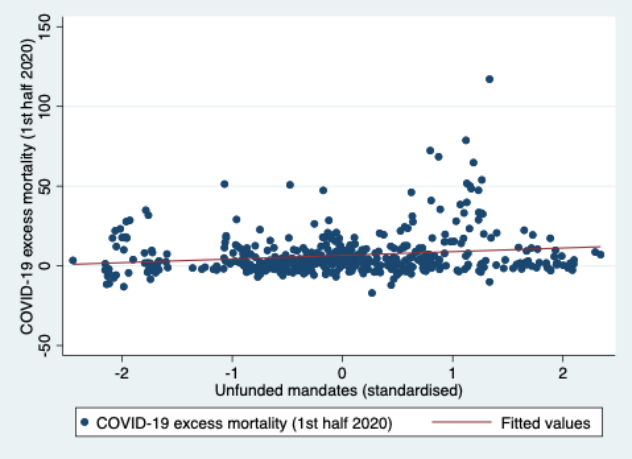


FIGURE 3.

Unfunded mandates and excess mortality (2nd half 2020)

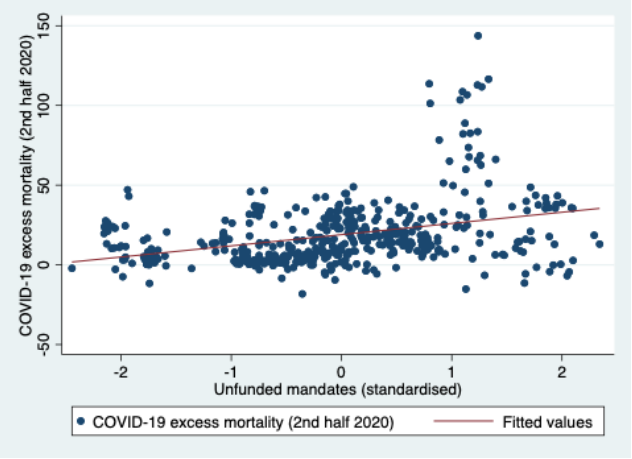


FIGURE 4.

Unfunded mandates and excess mortality (1st half 2021)

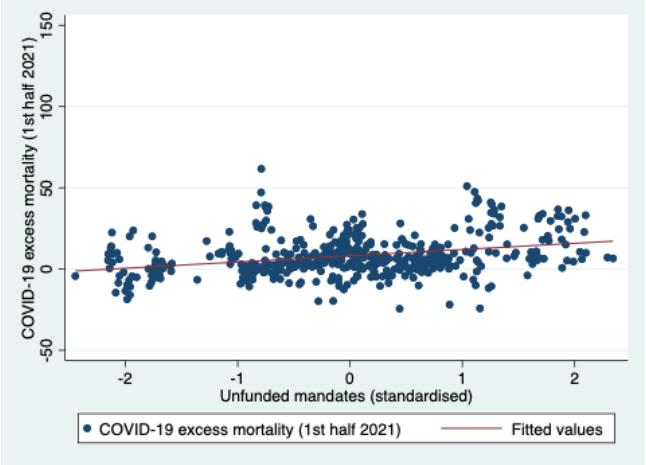
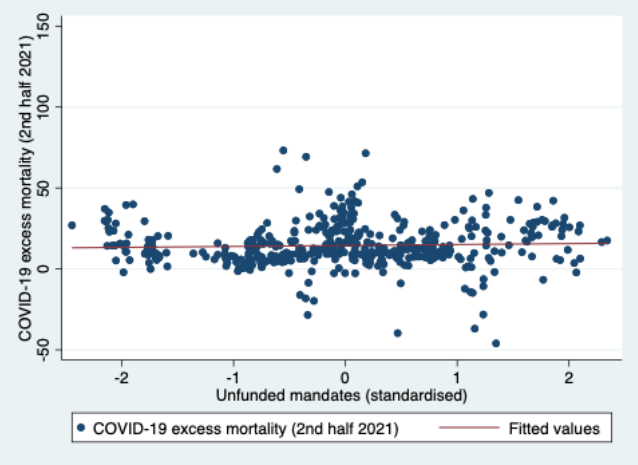


FIGURE 5.

Unfunded mandates and excess mortality (2nd half 2021)



b. Regression results

Regressions for the whole period

We conduct different ordinary least squares estimations using the COVID-19-related excess mortality rate as the dependent variable for different periods. Given the cross-sectional structure of our dataset, this method allows for closer examination of time variations throughout different stages of the pandemic. Table 2 reports the results of conducting five different regressions on the dependent variable for the 24 months for which we have reliable data. Firstly, we examine the behaviour of the two decentralisation variables separately. As can be seen, fiscal and political decentralisation are negatively associated with excess mortality (Table 2, Regressions 1 and 2). Regional autonomy is thus connected with lower excess mortality, perhaps due to the increased capacity to tailor a region's response to a crisis depending on its characteristics and resources, as a substantial part of the literature suggests (e.g., Collins and Green, 1994; Heitmueller and Roemheld, 2020). This is in line with the group of studies that has found, both before or during COVID-19 times, that higher fiscal and political decentralisation is associated with better health outcomes (Robalino et al., 2001; McCann, 2021; Rodríguez-Pose and Burlina, 2021).

But what happens when the mismatch between the two main dimensions of decentralisation is considered? What happens when unfunded mandates are included in the analysis? Regression 3 removes the two variables previously analysed separately and adds unfunded mandates. As can be seen, unfunded mandates are extremely relevant when it comes to explaining excess mortality rates. As we had hypothesised, the magnitude, sign, and statistical significance of the estimated coefficient point to the existence of a strong and positive association between unfunded mandates and excess mortality. This is further corroborated in regressions 4 and 5 on Table 2. To avoid multicollinearity issues, each of these regressions adds one of the two dimensions of decentralisation. When unfunded mandates are added to the model together with another

decentralisation variable, both variables for fiscal and political decentralisation are rendered insignificant, whilst that of unfunded mandates remains positive and statistically significant at over the 5 percent level of significance. This statistical phenomenon indicates that, while decentralisation may in principle help reduce excess mortality, it is in fact not the degree of decentralisation that matters for better health outcomes, but rather the width of the gap between the two dimensions of decentralisation. This represents a clear policy implication for decision-makers when decentralising, as better —not necessarily more—decentralisation is required for the healthcare system to operate more efficiently under a massive health shock like the COVID-19 pandemic.

TABLE 2. Regressions for excess mortality over 24 months (entire available period)

Excess mortality (24 months)	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
Unfunded mandates			1.016***	1.672***	0.730**
			(0.310)	(0.503)	(0.408)
Fiscal decentralisation	-0.890*			0.933	
	(0.457)			(0.617)	
Political decentralisation		-0.218**			0.070
		(0.072)			(0.091)
Regional GDP per capita	1.474	-1.672	-0.975	-1.682	-1.250
	(3.866)	(3.652)	(3.574)	(3.840)	(3.763)
Population	0.689	0.685	0.559	0.621	0.568
	(0.448)	(0.420)	(0.428)	(0.442)	(0.433)
Population density	-0.000*	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Education	-0.183***	-0.106**	-0.103**	-0.110**	-0.104**
	(0.058)	(0.046)	(0.046)	(0.046)	(0.046)
Air pollution	0.807***	0.520***	0.538***	0.498***	0.521***
	(0.143)	(0.108)	(0.113)	(0.105)	(0.108)
Interregional mobility	0.745***	0.697***	0.502**	0.653***	0.546**
	(0.237)	(0.190)	(0.207)	(0.229)	(0.216)
Government effectiveness	-5.421***	-4.713***	-4.240**	-4.482***	-4.366***
	(1.673)	(1.629)	(1.646)	(1.567)	(1.584)
Observations	445	440	440	440	440
Continental FE	YES	YES	YES	YES	YES

R^2	0.580	0.616	0.618	0.619	0.618
Adjusted R^2	0.568	0.605	0.607	0.607	0.606

Robust standard errors, clustered at the regional level, in parentheses

*** p<0.01, ** p<0.05, * p<0.1

As for the control variables, we do not observe significant anomalies and all of them are strongly consistent throughout the five regression models. We do not find a significant relationship between demographic indicators and excess mortality. Similarly, regional GDP per capita does not seem to affect mortality rates. On the other hand, higher education attainment rates do reduce excess mortality rates. This seems to give credence to arguments whereby more educated individuals have been more likely to be aware of and comply with health norms as well as adopt greater health precautions (Bish and Michie, 2010). Air pollution is significant and positively associated with mortality rates, as indicated by the literature (Cohen et al., 2017). In addition, whereas demographic factors did not seem to exert an impact on mortality rates, interregional mobility appears to push mortality rates upwards. Mobility exposed people to greater risks of contagion, increasing the likelihood of dying from COVID-19 (Bardey et al., 2021; Vega-Villalobos et al., 2022). Finally, even the most decentralised regions require better institutions (Rodríguez-Pose and Burlina, 2021) and effective leadership and guidance from the central government, especially during an emergency (Capano and Lippi, 2021). Accordingly, government effectiveness at the central level is negatively linked with excess mortality and strongly significant at the 1 percent level. All estimations include continental fixed effects, which (although not displayed) show that Latin American regions in OECD member countries had higher mortality rates during the period of analysis than regions in other continental or supranational groupings.

Regressions for each of the four semesters

In order to explore the temporal variations of a cross-sectional dataset, we split the excess mortality data into four six-monthly periods in Table 3. These three periods provide us with an overview of how the factors that drove the incidence of the pandemic from its very start changed over time.

The models for the first semester of 2020 reveal that our main variables of interest (unfunded mandates and fiscal and political decentralisation) are statistically irrelevant to explaining patterns of excess mortality. OECD regions, faced with a phenomenon most of them were ill-equipped for, reacted slowly. They were unprepared and had to improvise and learn how to fight COVID-19 in a process of trial and error. Factors such as the degree of decentralisation or the level of unfunded mandates made virtually no difference as a means to control excess mortality rates (Table 3, Regressions 1, 2 and 3). Yet, the process of learning paid off already in the second half of 2020, particularly in regions with a better match between their health responsibilities and the resources at their disposal. During this period, regions with less unfunded mandates became better at fighting the pandemic —the coefficient becomes positive and strongly significant (Table 3, Regressions 4, 5 and 6). Regions with higher unfunded mandates, in contrast, were less capable of reacting adequately and far from ready to combat COVID-19. Consequently, excess mortality was significantly higher in these regions. Again, as in Table 2, neither fiscal nor political decentralisation alone are relevant to explain these regional disparities in terms of health outcomes. These statistical trends were maintained in the first and second semesters of 2021, when larger unfunded mandates continued to drive excess mortality rates up. Control variables show broadly consistent results, in line with previous research (Rodríguez-Pose and Burlina, 2021). The share of educated people is connected to lower regional excess mortality rates, as does central government effectiveness. Conversely, air pollution and, this time, population size

are linked to higher mortality rates. Finally, interregional mobility shows significant temporal variation, moving from slightly statistically significant at first, insignificant during the second period, and highly significant in the last two periods. Strict lockdown measures put in place in most countries at the beginning of the pandemic contributed to limit the expansion of the virus (Waitzberg et al., 2021). Yet, as lockdowns started to be lifted and interregional mobility re-emerged, mobility became, once again, a factor behind the spread of COVID-19, contributing to greater excess mortality, especially in those OECD regions where immunisation rates were lower.

TABLE 3. Regressions for excess mortality per semester

	First semester of 2020			Second semester of 2020			First semester of 2021			Second semester of 2021		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Excess mortality (per semester)	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Unfunded mandates	-0.099	0.022	-0.067	1.771***	2.313***	1.373**	1.702***	3.019***	1.493*	0.775*	3.051***	1.036**
	(0.453)	(0.840)	(0.451)	(0.419)	(0.631)	(0.543)	(0.613)	(1.102)	(0.970)	(0.393)	(0.957)	(0.409)
Fiscal decentral.		0.172			0.772			1.873			1.804	
		(0.827)			(0.798)			(1.531)			(1.525)	
Political decentral.			-0.012			0.149			0.079			0.231
			(0.130)			(0.120)			(0.216)			(0.204)
Regional GDP pc.	3.540	3.410	3.587	8.766**	8.182**	8.178**	-13.445	-14.863	-13.754	-3.678	-6.557	-5.764
	(2.463)	(2.758)	(2.670)	(3.549)	(3.858)	(3.768)	(11.132)	(12.033)	(11.779)	(6.821)	(7.304)	(7.130)
Population	1.278**	1.289**	1.277**	-1.335***	-1.285**	-1.316***	1.435*	1.558*	1.445*	0.660	0.907	0.724
	(0.503)	(0.507)	(0.503)	(0.481)	(0.497)	(0.489)	(1.034)	(1.074)	(1.045)	(1.143)	(1.135)	(1.138)
Population density	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education	-0.194***	-0.192***	-0.194***	-0.294***	-0.300***	-0.297***	-0.190**	-0.205***	-0.191***	-0.399***	-0.431***	-0.411***
	(0.063)	(0.062)	(0.062)	(0.068)	(0.068)	(0.068)	(0.075)	(0.072)	(0.074)	(0.106)	(0.104)	(0.104)
Air pollution	0.130**	0.123**	0.133**	0.974***	0.941***	0.938***	0.533*	0.453*	0.515*	0.738***	0.575***	0.613***
	(0.021)	(0.033)	(0.031)	(0.129)	(0.121)	(0.122)	(0.306)	(0.262)	(0.274)	(0.228)	(0.198)	(0.205)
Interregional mobil.	0.464	0.491*	0.456*	0.054	0.179	0.150	1.225***	1.529***	1.276***	2.151***	2.766***	2.487***
	(0.288)	(0.290)	(0.276)	(0.364)	(0.400)	(0.374)	(0.343)	(0.478)	(0.402)	(0.438)	(0.556)	(0.482)
Government effectiv.	-6.787***	-6.832***	-6.766***	-4.416***	-4.615***	-4.683***	-1.262*	-1.743*	-1.403*	2.698	1.704	1.733
	(1.721)	(1.718)	(1.735)	(1.684)	(1.591)	(1.587)	(0.618)	(0.372)	(0.393)	(3.336)	(3.273)	(3.276)
Observations	440	440	440	440	440	440	440	440	440	439	439	439
Continental FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.458	0.458	0.458	0.698	0.699	0.699	0.195	0.197	0.195	0.110	0.116	0.115
Adjusted R^2	0.443	0.442	0.442	0.690	0.690	0.690	0.172	0.172	0.170	0.0845	0.0893	0.0877

Robust standard errors, clustered at the regional level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1

V. Conclusion

Since decentralisation processes became a global phenomenon, research has focused most of its efforts in determining what level of decentralisation —fiscal, political or administrative— increases efficiency and enhances the performance in key indicators related to economic development. Some authors have argued that decentralisation spurs economic development (Iimi, 2005); conversely, others have warned that the economic impact of decentralisation is far less positive (Rodríguez-Pose and Ezcurra, 2011); and half-way between these positions, some have maintained that there is an optimal level of decentralisation above which decentralisation's benefits derail and turn into hindrances (Thießen, 2003). This empirical ambiguity is reproduced in studies on the link between decentralisation and health outcomes, with some research perceiving decentralisation as linked to lower mortality rates (e.g., Robalino et al., 2001) and others seeing it as related to the opposite (e.g., Navarro et al., 2020). We hypothesise that this heterogeneity of results may stem from the omission of a relevant explanatory variable. To our knowledge, all empirical studies assess the effect of the degree of both fiscal and political decentralisation on health outcomes separately. In so doing, these studies assume that "finance follows function", that is, that devolved responsibilities to elected lower tiers of government come with the necessary resources to fulfil them. This is, however, rarely the case as mismatches between powers and resources, also known as unfunded mandates, are more common than the lack thereof (Bahl and Martínez-Vázquez, 2013). Hence, the mixed results in existing research leave policy-makers blind in the context of decentralisation processes and even becomes dangerous when an emergency situation such as a pandemic emerges. For all we know, decentralisation (or lack of it) may have contributed to increasing or reducing the number of COVID-19 deaths.

Using a novel dataset for 445 regions in 26 OECD countries, our analysis provides regional estimates for unfunded mandates and finds sufficient support to conclude that unfunded mandates matter more than fiscal and political decentralisation by themselves. In other words, it is not so much the degree of fiscal and political decentralisation that is relevant for lower COVID-19 excess mortality rates, but rather the width of the gap between the two dimensions.

We also find that, at the beginning of the pandemic, OECD regions were, on average, unprepared and rose slowly to the challenge. This may explain why, irrespective of a country's institutional structure, neither decentralisation variables nor unfunded mandates are significant in the first half of 2020. Once the situation stabilised in the second half of 2020 and governments learned how to fight COVID-19, unfunded mandates became a serious obstacle preventing regions from reacting to the virus and curtailing their capacity to redress excess mortality rates in comparison to those regions with a better match between levels of autonomy and the resources at their disposal. This pattern continued into 2021. Levels of fiscal and political decentralisation, by contrast, become irrelevant for explaining excess mortality rates, when accounting for the mismatch between the two. Hence, it is not the degree of fiscal or political decentralisation that has mattered for health outcomes during the pandemic. Instead, it is the gap between fiscal and political decentralisation that matters for lower excess mortality rates linked to COVID-19. Therefore, our models suggest that better rather than more decentralisation should be pursued for OECD healthcare systems to react effectively and in a coordinated manner in the event of a critical emergency, thus being able to save more lives. Our study also reveals that national government effectiveness is strongly negative and statistically significant, giving credence to the argument that, irrespective of a country's level of decentralisation, the central government played a crucial role in providing national guidelines and leading and coordinating the fight against COVID-19.

What policy implications can be extracted from this analysis? Policy-makers have sometimes perceived and pursued decentralisation as a magic bullet to solve a wide-ranging of economic, societal, and political challenges. Nevertheless, more decentralisation —whether fiscal or political— is unlikely to yield any of the purported benefits if 'finance does not follow function'. When unfunded mandates are rife, the capacity of autonomous regional governments to deliver on their goals is strongly curtailed. Particularly in the health sector, decentralised entities must be allocated human and financial capacities to make public healthcare accessible to their constituents while the central government may still need to intervene to avoid diseconomies of scale. Otherwise, a scarcity of resources may unleash dysfunctionalities that can contribute to the collapse of healthcare systems and, thus, have a considerable cost in human lives. Therefore, if 'finance follows function', the recent COVID-19 experience teaches us that a narrower gap in terms of powers and resources is expected to reduce excess mortality rates in case of health emergencies.

As any study in the field of decentralisation, this article is subject to some limitations. Granular data at the regional level for many observations is novel and informative, but it also reduces the data options available. For example, the proxy for political decentralisation (RAI) does provide some regional variation for several countries, but it is rather limited. This complicates the task of investigating within-country differences. In addition, our research cannot be generalised to developing and emerging economies, as the OECD members are selected primarily based on levels of development. It would thus be interesting to consider expanding the analysis to other economies globally to check whether the influence of unfunded mandates on excess mortality holds. Moreover, given the wide variety of decentralisation forms, it would be enlightening to examine data not only on COVID-19 outcomes, but also on the COVID-19 response. Econometric estimations could test the effect of specific policy choices at the regional level on health outcomes, such as adopting stricter

or milder types of lockdowns, social distancing measures, antigen testing, or business closures. The effect of these policies would probably be mediated by the level of political decentralisation and, by extension, that of unfunded mandates.

In spite of these limitations and the research possibilities that lie ahead, this article makes a significant contribution to the field of decentralisation by shedding light on the relationship between unfunded mandates and COVID-19 excess mortality rates. By estimating and testing the concept of unfunded mandates —which has so far received limited scholarly attention— we are able to convey the message that pushing for higher levels of decentralisation will not solve issues related to healthcare and may even prove counterproductive. Instead, the focus should be re-directed to addressing the mismatches that usually exist between fiscal and political decentralisation. Neglecting this important factor has consequences that go beyond academic discussions of institutional design. Regions with wide unfunded mandates will likely suffer from worse health outcomes and higher excess mortality rates, prompting social discontent about geographical disparities in service provision (Iammarino et al., 2019). Therefore, policy-makers should ensure that 'finance follows finance' by building and continuously working towards the improvement of an effective decentralised system that eliminates unfunded mandates and thus removes any potential for healthcare system dysfunctionalities that may end up costing precious lives.

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VI. Appendix

TABLE A1. Data sources and definition of the variables

Variable	Definition	Source
Dependent variable		
COVID-19 excess mortality rate	Ratio between the number of deaths per week during the period of interest and the average number of deaths for the same weeks in the period 2015–2019.	Eurostat, OECD, national statistical offices, and author's calculations.
Independent variables		
Unfunded mandate	Difference between the standardised values of *poldec* and *fiscdec* (with mean 0 and standard deviation 1).	Author's calculations.
Fiscal decentralisation	Regional total public expenditure per capita in constant USD 2015 adjusted by PPP (logged).	National statistical offices and regional statistical offices.
Political decentralisation	Regional Authority Index's overall score excluding fiscal decentralisation indicators (i.e. *fiscalautonomy*, *fiscal_multilateral*, *fiscal_bilateral*).	Hooghe et al. (2021)
Control variables		
Regional GDP	Regional GDP per capita in constant USD 2015 adjusted by PPP (logged).	Eurostat, OECD, and national statistical offices.
Population	Regional population (logged).	Eurostat, OECD, and national statistical offices.
Population density	Regional population per square kilometre of land area.	Eurostat, OECD, and national statistical offices.
Education	Share of population aged 20 to 64 years old with tertiary education (levels 5-8 ISCED 2011).	Eurostat, OECD, and national statistical offices.
Air pollution	Share of population exposed to fine particulate matter (PM2.5).	Eurostat and OECD.
Interregional mobility	Share of newcomers from other regions over population.	OECD
Government effectiveness	A composite measure capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, etc.	World Bank

TABLE A2. Data sources

Country	Source name	Source hyperlink
Australia	Australian Bureau of Statistics	https://www.abs.gov.au/
Austria	Bundesanstalt Statistik Österreich (Statistics Austria)	https://www.statistik.at/web_en/statistics/index.html
Belgium	National Bank of Belgium – Online Statistics	https://stat.nbb.be/
Canada	Statistics Canada	https://www.statcan.gc.ca/eng/start
Czech Republic	Český statistický úřad (Czech Statistical Office)	https://www.czso.cz/csu/czso/home
Denmark	Danmarks Statistik (Statistics Denmark)	https://www.dst.dk/en/
Finland	Tilastokeskus (Statistics Finland)	https://www.stat.fi/index_en.html
France	Collectivités locales	https://www.collectivites-locales.gouv.fr/
Germany	1. Ministerium für Finanzen – Baden-Württemberg 2. Bayerisches Staatsministerium der Finanzen und für Heimat – Bavaria 3. Senatsverwaltung für Finanzen – Berlin 4. Ministerium der Finanzen und für Europa – Brandenburg 5. Der Senator für Finanzen – Bremen 6. Finanzbehörde – Hamburg 7. Hessisches Ministerium der Finanzen – Hesse 8. Finanzministerium – Mecklenburg-Vorpommern 9. Niedersächsisches Finanzministerium – Lower Saxony 10. Ministerium der Finanzen des Landes Nordhrein-Westfalen - North Rhine-Westphalia 11. Ministerium der Finanzen – Rhineland-Palatinate 12. Ministerium der Finanzen und Europa – Saarland 13. Staatsministerium der Finanzen – Saxony 14. Ministerium der Finanzen des Landes Sachsen-Anhalt – Saxony-Anhalt 15. Finanzministerium - Schleswig-Holstein 16. Finanzministerium – Thuringia	1. https://fm.baden-wuerttemberg.de/de/startseite/ 2. https://www.stmfh.bayern.de/ 3. https://www.berlin.de/sen/finanzen/ 4. https://mdfe.brandenburg.de/mdfe/de/ 5. https://www.finanzen.bremen.de/ 6. https://www.hamburg.de/fb/ 7. https://finanzen.hessen.de/ 8. https://www.regierung-mv.de/Landesregierung/fm/ 9. https://www.mf.niedersachsen.de/startseite/ 10. https://www.finanzverwaltung.nrw.de/ 11. https://fm.rlp.de/de/startseite/ 12. https://www.saarland.de/mfe/DE/home/home_node.html 13. https://www.smf.sachsen.de/ 14. https://mf.sachsen-anhalt.de/ministerium-der-finanzen/ 15. https://www.schleswig-holstein.de/DE/Landesregierung/VI/vi_node.html 16. https://finanzen.thueringen.de/
Ireland	Rialtas na hÉireann (Government of Ireland)	https://www.gov.ie/en/#
Italy	Istituto Nazionale di Statistica (Italian National Institute of Statistics)	https://www.istat.it/en/
Japan	1. Statistics Bureau of Japan 2. Ministry of Internal Affairs and Communications	1. https://www.stat.go.jp/english/index.html 2. https://www.soumu.go.jp/main_sosiki/joho_tsusin/eng/
South Korea	Korean Statistical Information Service	https://kosis.kr/eng/
Lithuania	Oficialiosios statistikos portalas (Official Statistics Portal)	https://osp.stat.gov.lt/en
Mexico	Instituto Nacional de Estadística y Geografía (National Institute of Statistics, Geography and Informatics)	http://en.www.inegi.org.mx/default.html
Netherlands	Centraal Bureau voor de Statistiek (Statistics Netherlands)	https://opendata.cbs.nl/#/CBS/en/
New Zealand	Stats NZ	https://www.stats.govt.nz/
Norway	Statistisk sentralbyrå (Statistics Norway)	https://www.ssb.no/en

Poland	Bank Danych Lokalnych (Bank of Local Data)	https://bdl.stat.gov.pl/BDL/start
Portugal	Instituto Nacional de Estatística (Statistics Portugal)	https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_main
Slovakia	1. Bratislavský kraj – Bratislava 2. Trnavský samosprávny kraj – Trnava 3. Trenčiansky samosprávny kraj – Trenčín 4. Nitriansky samosprávny kraj – Nitra 5. Žilinský samosprávny kraj – Žilina 6. Banskobystrický samosprávny kraj – Banská Bistrica 7. Prešovský samosprávny kraj – Prešov 8. Košický samosprávny kraj – Košice	1. https://bratislavskykraj.sk/ 2. https://www.trnava-vuc.sk/ 3. https://www.tsk.sk/ 4. https://www.unsk.sk/ 5. https://www.zilinskazupa.sk/ 6. https://www.bbsk.sk/ 7. https://www.po-kraj.sk/en/welcome.html 8. https://web.vucke.sk/sk/
Spain	Ministerio de Hacienda (Ministry of Finance)	https://www.hacienda.gob.es/en-GB/Paginas/Home.aspx
Sweden	Statistiska centralbyrån (Statistics Sweden)	https://www.scb.se/
Switzerland	Federal Finance Administration	https://www.efv.admin.ch/efv/en/home.html
United Kingdom	Office for National Statistics	https://www.ons.gov.uk/
United States	United States Census Bureau	https://www.census.gov/en.html

TABLE A3. Territorial levels (TL)

TL2		TL3	
Country	*Unit name (number)*	*Country*	*Unit name (number)*
Australia	States/territories (8)	Czech Republic	Kraje (14)
Austria	Bundesländer (9)	Estonia	Groups of maakond (5)
Belgium	Régions (3)	Finland	Maakunnat (19)
Canada	Provinces and territories (13)	Ireland	Regional Authority Regions (8)
Denmark	Regioner (5)	Japan	Prefectures (47)
France	Régions de France métropolitaine (13) + Régions d'outre-mer (4)	Korea	Special city, metropolitan and province (17)
Germany	Länder (16)	Lithuania	Counties (10)
Italy	Regioni (21)	Norway	Fylker (18)
Mexico	Estados (32)	Portugal	Grupos de municipios (25)
Netherlands	Provinces (12)	Slovak Republic	Kraj (8)
New Zealand	Regional councils (14)	Sweden	Län (21)
Poland	Voivodeships (17)	Switzerland	Cantons (26)
Spain	Comunidades Autónomas (19)		
United Kingdom	Regions and countries (12)		
United States	States and the District of Columbia (51)		

TABLE A4. Descriptive statistics (extended)

Variable	Obs	Mean	Std. Dev.	Min	Max
Excess mortality (24 mon.)	465	12.661	14.788	–10.920	193.914
E. mortality (1st half 2020)	465	6.477	13.424	–17.032	117.109
E. mortality (2nd half 2020)	465	18.709	21.01	–18.223	143.718
E. mortality (1st half 2021)	465	9.62	25.464	–24.45	57.904
E. mortality (2nd half 2021)	464	9.17	16.641	–46.032	73.226
Unfunded mandates	505	0.017	1.086	-2.445	2.382
Fiscal decentralisation	518	7.811	1.349	4.301	10.638
Political decentralisation	505	12.731	6.241	2	23
Regional GDP per capita	508	39126.363	18449.69	4458	190146
Population	518	13.733	1.519	8.863	17.49
Population density	518	374.685	1158.966	.02	15844.4
Education	509	30.807	11.332	10.36	66.583
Air pollution	506	12.3	6.063	2.371	31.08
Interregional mobility	499	2.327	1.958	.17	19.1
Government effectiveness	518	1.195	.628	-.155	2.02

TABLE A5. Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) E. mortality (24mon.)	1.000														
(2) E. mortality (1st 2020)	0.451*	1.000													
	(0.000)														
(3) E. mortality (2nd2020)	0.570*	0.445*	1.000												
	(0.000)	(0.000)													
(4) E. mortality (1st 2021)	0.816*	0.130*	0.150*	1.000											
	(0.000)	(0.005)	(0.001)												
(5) E. mortality (2nd2021)	0.772*	-0.014	0.152*	0.702*	1.000										
	(0.000)	(0.768)	(0.001)	(0.000)											
(6) Unfunded mandates	0.259*	0.172*	0.337*	0.207*	0.060	1.000									
	(0.000)	(0.000)	(0.000)	(0.000)	(0.203)										
(7) Fiscal decentral.	-0.078	0.121*	-0.097*	-0.196*	-0.014	-0.542*	1.000								
	(0.093)	(0.009)	(0.037)	(0.000)	(0.760)	(0.000)									
(8) Political decentral.	0.250*	0.326*	0.328*	0.035	0.095*	0.436*	0.467*	1.000							
	(0.000)	(0.000)	(0.000)	(0.454)	(0.042)	(0.000)	(0.000)								
(9) Regional GDP	-0.292*	-0.100*	-0.304*	-0.297*	-0.081	-0.323*	0.522*	0.217*	1.000						
	(0.000)	(0.031)	(0.000)	(0.000)	(0.082)	(0.000)	(0.000)	(0.000)							
(10) Population	0.235*	0.356*	0.188*	0.097*	0.043	0.212*	0.065	0.340*	0.099*	1.000					
	(0.000)	(0.000)	(0.000)	(0.036)	(0.355)	(0.000)	(0.140)	(0.000)	(0.025)						
(11) Population density	-0.055	0.090	-0.029	-0.079	-0.082	0.022	0.059	0.068	0.174*	0.176*	1.000				
	(0.233)	(0.052)	(0.537)	(0.091)	(0.076)	(0.626)	(0.181)	(0.129)	(0.000)	(0.000)					
(12) Education	-0.099*	0.081	-0.207*	-0.148*	-0.012*	-0.194*	0.342*	0.191*	0.584*	0.078	0.196*	1.000			
	(0.033)	(0.082)	(0.000)	(0.001)	(0.797)	(0.000)	(0.000)	(0.000)	(0.000)	(0.080)	(0.000)				
(13) Air pollution	0.316*	0.176*	0.439*	0.218*	0.073	0.373*	-0.368*	0.009	-0.453*	0.189*	0.271*	-0.329*	1.000		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.117)	(0.000)	(0.000)	(0.834)	(0.000)	(0.000)	(0.000)	(0.000)			

(14) Interregional mobil.	-0.136*	-0.020	-0.226*	-0.089	-0.012	0.122*	-0.088*	-0.028	0.036	-0.249*	0.073	0.282*	-0.024	1.000	
	(0.004)	(0.675)	(0.000)	(0.060)	(0.804)	(0.007)	(0.050)	(0.542)	(0.431)	(0.000)	(0.101)	(0.000)	(0.601)		
(15) Gov. effectiveness	-0.523*	-0.420*	-0.649*	-0.324*	-0.145*	-0.418*	0.435*	-0.027	0.690*	-0.257*	0.037	0.428*	-0.589*	0.176*	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.544)	(0.000)	(0.000)	(0.405)	(0.000)	(0.000)	(0.000)	

*** *p<0.01,* ** *p<0.05,* * *p<0.1*