

Divided We Survive? Multi-Level Governance during the Covid-19 Pandemic

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Abstract

We compare the intergovernmental health system responses to the first wave of COVID-19 pandemic in Italy and Spain, two countries, healthcare is managed at the regional level, and the impact of the first wave was highly localized. However, whilst in Italy the regional government allowed for a passively accepted central level coordination without restricting autonomy ('coordinated autonomy'), in Spain, the health care system was de facto centralized under a 'single command' ('hierarchical centralization'). We argue that the latter strategy gave rise to limited incentives for information sharing and regional participation in decision-making. This article documents evidence of important differences in health outcomes (infected cases and deaths) and outputs (regular and emergency hospital admissions) between the two countries, both at the national and at the regional level. We then discuss several potential mechanisms to account for these differences. Given the strong localized impact of the pandemic, allowing more autonomy in Italy compared to a centralised governance in Spain can explain some cross-country differences in outcomes and outputs.

JEL-Codes: H750, I180.

Keywords: Covid-19, health system governance, decentralization, Italy, Spain, State of Alarm.

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INTRODUCTION

Although pandemics such as the recent COVID-19 actually require the highest level of intergovernmental coordination, the design of policy responses for subnational governments presupposes critical information sharing and local knowledge about how to best address the pandemic's heterogeneous needs across the territory. This issue is relevant in several European Union healthcare systems, where health policy expertise is shared within various levels of government, and in some countries, particularly resides at the regional level (Costa-Font and Greer 2012). Indeed, territorial health system governance has been at the heart of previous policy responses to pandemics and epidemics, and the balance of power between highly centralised and more decentralised coordination allows for a heterogeneous solution within a country's institutions.

In unitary states that have decentralized some of their policy responsibilities, one can typically contemplate two different governance models as a reaction to the pandemic. A common model is *hierarchical centralization*, which refers to a *uniform* response to the pandemic to counteract adverse effects of territorial self-interest to fight the virus after a state of alarm (e.g., not sharing timely information, or circulating essential protective equipment) implemented in France, and as we argue in Spain during the first wave of the pandemic. An alternative governance structure is that of *decentralized coordination*, common when the expertise in the regulation of health care is undertaken by regional governments. The main advantage of coordination by regional governments, even when led by the central government, is that it provides incentives for information sharing and experimentation, especially with policies that vary in their stringency. Cross-country and cross-regional coordination allows for the rapid exchange of information about the pathogen's characteristics, as well as the establishment of common standards to track its evolution and collect comparable data, regulations to manage the actions of infected patients

and prevent the disease from spreading further (including border closures and quarantines)¹. While coordination across borders is required at the European level to respond to a global pandemic, it is equally important within countries, as regional responses are more flexible to respond to idiosyncratic needs. In contrast, a 'one-size-fits-all' approach might be a less efficient governance design when the impact of policies is highly uncertain as it is the case in the presence of a completely new virus.

This article examines the effects of different reactions to COVID-19 in Italy and Spain by exploiting the *first wave of the pandemic*, when the new virus was largely unknown and governments (both at the central and at the local level) had to decide what to do rapidly to protect the health of citizens with almost no information on the potential impact of specific policies. Strikingly, Italy and Spain have adopted different coordination strategies despite having very funding and organising health care in a similar way. The role of private hospitals in both countries exhibit the same overall share of private hospitals beds - 32 percent of all beds in 2020, according to the OECD (2020). Finally, both countries have adopted a similar model of health care decentralisation (Costa-Font and Turati 2016): regional governments have large range of powers in designing health care programs; and most of the knowledge health system expertise is at the regional level. Hence, in the event of a pandemic they lack capacity to incentivise cooperation and information sharing².

In Italy, regional governments remain active in the first wave and issued regional ordinances aimed at imposing restrictive measures beyond those adopted at the national level, such as the idea, albeit unconstitutional, to close regional borders in Campania, compulsory flu vaccinations in Lazio, and the closure of all educational institutions in Marche (Alber et al. 2021).³ Similarly, less affected regions were able to propose ordinances to ease the lockdown, though they were later challenged in court, and the Bolzano provincial government eased the

lockdown a week before the rest of the country.. This was possible due to the weaker central government compared to regional governments, which was illustrated by failure of regional governments to implement legally binding central level interventions. That is, the Italian response resulted from some form of informal regional cooperation in which regional governments passively agreed to a more active central level action.

In contrast to Italy, Spain's central government was far more pro-active, adopted the so-called "single command," after the state of alarm which allowed the central government to suspend, and then assume, regional health care responsibilities which were then delegated to the different central level ministers. The Minister of Health formally took over the responsibility for decision-making and coordination of health policy decisions.⁴ However, the lack of experience of central and access to operational data turned out to be a problem for an efficient coordination of the joint actions of regional governments (Kölling 2020). Although the coordination body of Spain's regional health system (the Inter-Territorial Council for the Health System) met weekly, it was more for information sharing than co-governance during the first wave of the pandemic. However, the period of single command ended in May 2020 which gave rise to a period of 'co-governance' with regions, as in Italy. In contrast, following the end of the first wave of the COVID-19 pandemic, the positions swapped, and regions in Spain reclaimed their health-care responsibilities, whilst the Central government in Italy introduced highly centralized policies (later confirmed by a decision of the Constitutional Court). Hence, the evidence from the first period of the pandemic provides important insights into the effect of multilevel governance on pandemic outcomes (mortality and cases) and outputs (use of hospital care and critical care or ICU's).

This article compares the policy response to the COVID-19 pandemic in Spain, where regions were unable to formulate their own health policies and had little incentives to cooperate with

the central government, to the policy response in Italy, based on regional co-governance, and regions could still add to the central government's restrictive measures to adjust to their regional specific needs. We examine the effect on outcome and outputs if cooperation during the first wave can explain the evolution of trends in the number of cases and mortality, as discussed further below.

We add to the growing multidisciplinary literature by investigating how decentralized health systems dealt with the pandemic's spread (e.g., Casula and Vidal 2021, Bailey et al. 2020, and Dodds et al. 2020). More specifically, we study the impact of different form of multilevel governance during COVID-19 on a variety of outcomes in Italy and Spain following the declaration of a state of emergency. This is important because, theoretically, it is unclear whether regional autonomy provides an advantage in the face of a pandemic, especially when policy effects are uncertain, as was the case during the first wave of COVID-19. Hence, this paper take advantage of the different governance of the first wave of the pandemic by two otherwise similar countries to shed some light on the question of the health system effect of multilevel governance. .

In Italy, health system governance was driven by collaboration, that is regions did not oppose a leading central state role.⁵ In contrast, in Spain, the central government did not attempt to implement any form of co-governance during the first wave of the pandemic, and adopted a more hierarchical approach like that of France, where the central government centralized health-care repositories abilities. The distinction lies in the way authority and influence are distributed. Whilst we observe different policy restrictions across Italian regions, particularly Veneto and Lombardy Catalonia and Madrid barely different in its policies during the first wave of the pandemic. However, whether outcomes and outputs differ across both countries is an empirical question that we address later in the article.

The following section of the article provides context for this study, discusses previous studies, and describes pandemic policy in both countries. Subsequent sections provide the data and methods, present the findings; discuss the findings in light of the literature and questions; and summarize the article's conclusions.

BACKGROUND

The Origins of different coordination models

Whilst in Spain, the Constitution defines the circumstances of a "state of emergency," the Italian Constitution does not contemplate such an "emergency provision," and only allows the national government to legislate by temporal decree in cases of "necessity and urgency," and national legislation does not define the level of government to be used, so it can refer to regional or even local governments. This means that unlike in Spain, regions and local governments in Italy could develop and implement their own emergency plans in accordance with national framework regulations (Alber et al. 2021). This is a significant difference from Spain, where information sharing was limited or non-existent, and cooperation in Italy remained in place, even though dysfunctional at times.

The Pandemic in Italy and Spain

Italy and Spain share common institutional backgrounds (e.g., decentralized health care systems), but differed in the governance of the first wave of COVID-19 pandemic (Casula and Vidal 2021). Both countries were hit hard by the pandemic at approximately the same time: Spain was only a few weeks behind Italy in the spread of the virus. In May 2020, when the 'first wave' was reaching an end and countries gradually re-opened their economies, reported cases in Italy (230,000) were comparable to those reported in Spain (240,000), and the same applies

to deaths (33,000 and 29,000, in Italy and Spain, respectively). However, despite sharing a heavily decentralized health system (and, hence, an important regional level expertise), their central governments responded differently during the crisis. Whereas the Spanish government centralized the purchase of health care equipment and imposed a central level coordination in all policy domains related to pandemic management, the Italian government did not enforce a full coordination among the regional governments. In addition, before the Central government called a national lockdown, regional governments were *de facto* allowed to differ in their policy priorities: Lombardy relied mostly on hospitals, while Veneto focused on contact-tracing (largely because of the different model adopted for the regional healthcare system, as argued in Costa-Font et al., 2022). This was not possible during the first wave of the pandemic in Spain, given the centralization of power in the hand of the central government. Hence, the latter offers an opportunity to study the effects of this choice on relevant outcomes.

Given their different governance responses to the first wave of the COVID-19 outbreak, comparing evidence from Italy and Spain can be informative of the *balance of territorial power* allocation, and specifically, the welfare effects of health care de/centralization. Hierarchical centralization by central government can crowd out bottom-up coordination and information sharing, which runs the risk of amplifying the effect of a policy when it succeeds. A uniform response across the entire national territory is still possible when effective cooperation takes place, as has been the case of the countries of the United Kingdom during the first wave of the pandemic. In contrast, decentralized designs allow for experimentation in identifying a regional specific policy solution to face the spread of the virus. When the latter proves effective, then other regions can learn from such effects and adjust their own response. Given the regional expertise in the management of the health system, during the first wave problems of scarcity in hospitals were generalized throughout Spain, giving rise to shortages of protective equipment including facemasks, ventilators, and problems of the lack of equipment in hospitals,

discoordination in collecting and elaborating health datasets primarily. Indeed, centralized single command in Spain resulted in deficits in planning and coordination, as well as delays in decision-making, revealed great structural weaknesses in the Spanish system which have been compared to an act of negligence and dilution of responsibilities shared between the central and regional governments (Erkoreka et al., 2021; Erkoreka and Hernando-Pérez, 2022).

In this article, besides studying national aggregate data, we also consider four regional case studies, Lombardy and Veneto in Italy and Madrid and Catalonia in Spain, and we argue that an effective policy solution was found by the Veneto Region in Italy. Despite bordering the Lombardy Region, Veneto experienced fewer than 20,000 cases, compared to about 80,000 cases in Lombardy during the first wave emergency. In contrast, Madrid and Catalonia replied in the same manner, given the limited role for local policies allowed by the central government in Spain. There are two main reasons to examine those regions: first because they were the focus of the first wave pandemic in both countries, and second, because the private health care providers are more independent in Lombardy and Madrid, and more integrated in the health system in Veneto and Catalonia (Costa-Font et al, 2022).

Policy reactions to COVID-19 in Italy

The first COVID-19 case in Italy was officially identified on 20 February 2020, at a public hospital in Codogno, a small town close to Milan, in Lombardy, thanks to the intuition of an anaesthesiologist, who tested a 38-year-old patient *against* the national advice for COVID-19 testing (before detecting this first case, the people to be checked and tested were only those returning directly from China according to directions from the Ministry of Health). Actually, the Italian Prime Minister had declared a national emergency via an 'emergency decree' since 31 January 2020, for a period of six months, without taking any important measure to counter the virus in the first weeks after.

Another similar town to Codogno was Vo' Euganeo, an even smaller jurisdiction in the surroundings of Padua, in Veneto, where an outbreak was early discovered. Yet, both Codogno and Vo' Euganeo were locked-down into a *red-zone* by the Central government after 23 February 2020, which entailed temporary closures of all economic activities but for essential services, and stay-at-home orders for all the people residing in the area. On 8 March 2020, the entire Lombardy, as well as few provinces in the bordering regions of Veneto, Piedmont and Emilia Romagna were locked into *red zones* too. Finally, the whole country was locked down in a national *red zone* a few days later, after 11 March 2020. Upon months of lockdown, a de-escalation of measures began in early May, ending the first wave of COVID-19 pandemic in Italy.

Despite enacting a national lockdown, the evolution of the first wave epidemic in Italy was largely regionally heterogeneous. More specifically, Northern Italy was more exposed to COVID-19 infection compared to both the Centre and South, where the spread of the new coronavirus did not follow a similar growth. In Northern Italy, Lombardy was by far the most affected region, and one of the most affected in the world during the first wave. Conversely, in Veneto the evolution of contagion had been more mitigated. These are the two Italian regions that we consider as case studies below.

The Italian National Healthcare System (NHS) has provided universal healthcare coverage since 1978, and it is financed with taxes, mostly collected at the central level. During the 1990s, several policy reforms transferred administrative and organizational responsibilities from the central government to the regional administrations, so that Italian regions have significant autonomy in organizing their own healthcare system (Turati 2013). This autonomy was enjoyed also during the pandemic despite the declaration of the national emergency, and it helps explain the different policy patterns followed by Lombardy and Veneto.

Among the regions, Lombardy has a population of 10 million residents, and it ranks among the most competitive areas in Europe. Public expenditure for healthcare services reached 19 billion euro in the last year. The healthcare system comprises approximately 150 hospitals generating 1.5 million discharges annually. A regional reform in 1997 radically transformed the healthcare system in Lombardy into a quasi-market in which citizens are free to choose the provider, regardless of its ownership (private or public). Unlike other Italian regions, the healthcare system in Lombardy is entirely built on a clear separation between insurers (the Local Health Authorities, LHA) and providers, on resources allocated based on a prospective payment system based on DRGs, and on the reimbursement for all the (public and private) providers within the regional accreditation system (Brenna 2011). The unfolding of the COVID-19 pandemics led to a rise of hospitalizations, allowing the virus to spread into the hospitals which forced authorities in the provinces of Bergamo and Brescia to convert entire hospitals into COVID-19 wards, increasing bed capacity in ICU, and moving physicians and nurses from their usual activity to care patients affected by the coronavirus. This policy of increasing ICU bed capacity was later adopted across the country.

In contrast to Lombardy, Veneto presented a more centralized healthcare model, with the regional government able to better coordinate with a top-down approach the choices of hospitals. As for the pandemic, this model appeared more ready to deal with the epidemic *outside the hospital*. Veneto addressed COVID-19 epidemic by extensive testing of symptomatic and asymptomatic citizens, broad contact tracing around positive cases, quarantine for cases and suspected with daily telephone monitoring, detailed practical guidelines on home isolation, minimization of contacts with physicians and nurses, and limited hospital admissions to patients with major healthcare needs (Binkin et al. 2020).

Policy reactions to COVID-19 in Spain

During the first wave, Spain had one of the highest numbers of COVID-19 cases in the world, after the United States. The first positive case was detected on 31 January 2020, but it was only in March that the diagnoses began to increase exponentially. As of 25 February 2020, cases in Spain skyrocketed because people with pneumonia of unknown origin were tested for COVID-19. On the same day, four new cases related to the Italian cluster were confirmed in Spain. By 13 March 2020, cases had been confirmed in all 50 provinces of the country. A state of alarm and national lockdown was imposed on 14 March, and the central government was allocated full responsibility to coordinate and implement interventions to deal with the COVID-19 crisis. On 29 March 2020 it was announced that, beginning the following day, all non-essential workers were to stay home for the next 14 days. On 28 April, the government announced a plan for easing lockdown restrictions, but people were allowed out of their homes for short walks and individual sports only from 2 May. This put an end of the first wave also in Spain, which implied a gradual de-escalation in four phases based on epidemiological indicators. Mobility restrictions were lifted phase on a region by region basis until 21 June, when the state of alarm ended. On 25 October 2020, the Spanish government declared a second state of alarm, however and in contrast to the first state of alarm in March, the second was implemented in a decentralized manner and managed primarily by the regional governments (Erkoreka et al. 2021).

Spain and Italy are probably the most similar health systems in Europe, which makes them especially suitable for a comparative analysis. Indeed, the health system in Spain compares to the Italian one in all its relevant design features: it is organized along the lines of a National Health System and the governance of the system is decentralized at the regional level. Seventeen regions (called autonomous communities) have health care responsibilities with regards to providers' organization and funding, and the system is funded by unadjusted block grants and, and to a lesser extent, by regionally devolved and own taxes. So far, evidence

documents that decentralized governance plays a role in lowering regional inequalities in health care use and in stimulating innovation (Costa-Font and Turati 2018). However, strikingly, a newly appointed Minister of Health coordinated the commandment of the health system amidst the state of alarm, which was declared on 14 March 2020. The decree centralized the purchase of medical equipment, and the suspension of flights from Italy.

At the time of the first wave, health care policies were already highly heterogeneous across regions since regional governments were run by different political coalitions. At the time of the first outbreak, the region of Madrid was run by a conservative coalition government which has engaged in a plan of significant health care privatization, and during the pandemic pushed ahead outsourcing health care services to private for-profit providers. In contrast, Catalonia was run by a regional coalition whilst the central government was supported by a left-wing coalition with different regional supports. Madrid was the focal point of the pandemic in Spain, followed by Catalonia, which we consider as the two case studies in Spain below. Yet, although exposure to the pandemic differed by region considerably (e.g., besides Madrid and Catalonia, other heavily affected regions were the two Castile's, Basque Country, Navarra and Andalusia), as the speed of the pandemic differed by regions, a state of emergency and a central level coordination was imposed. In contrast, in the second and third wave, regional governments kept their own responsibilities. This provides some level of policy variation to examine the effects of decentralization on relevant health outcomes.

In addition, some regions in Spain share important similarities with some regions in Italy, in so far as the private sector in Catalonia is mostly not for profit and integrated in the public health system,⁶ whereas in Madrid it is for profit and mostly not integrated in the health system. In Catalonia, private providers work mainly with the public health care network and 24 percent contracted out private health care, whilst in Madrid this figure is 9 percent (Ministry of Health,

Ministerio de Sanidad. Cuentas Satélite del Gasto Sanitario Público 2020). Private health care spending per capita in Spain is the highest in Madrid 791€ compared to 659€ in Catalonia (Ministry of Health and Consumption, 2020)⁷.

MATERIAL AND METHODS

Data

The aim of this research is to compare the reaction to the first wave of COVID-19 pandemic in Spain and Italy to learn about the effect of different governance in terms of centralization/decentralization in the management of the pandemic. We focus on the first wave in the first half of 2020, from the start to about its exhaustion: this period is characterized by the novelty of COVID-19, hence by the uncertainty surrounding policies aimed at containing the spread of the virus. Spanish data are gathered from the website of Instituto de Salud Carlos III (<https://COVID19.isciii.es>), while Italian Civil Protection provides daily updated data in a Github repository ([https://github.com/pcm-dpc/ COVID-19](https://github.com/pcm-dpc/COVID-19)).

Data reliability is clearly an issue for the comparison of performance in the first wave, and, more generally, for research related to COVID-19 (e.g., Odone et al. 2020). In collecting data, there were some concerns regarding data quality, since a common framework at both supra-national and national level to guarantee comparability was missing, especially for the first wave. First, information on the number of affected people is influenced by the number of people that have developed the symptoms, have been treated by healthcare systems and have been tested by swab (the only method that produce reliable information). However, the use of swabs as a test procedure to identify COVID-19 infections has been very different across countries, and across regions within countries. In addition, testing policies have also changed during the

pandemic for different reasons, including the fact that swabs or reagents were unavailable, again particularly in the first wave. Second, the number of hospitalizations, especially in ICU, have been influenced by the policies adopted by different regions and countries, and by the availability at the local level of beds, which were adapted according to needs to be able to treat all patients (see, e.g., Fagioli et al. 2020, on the dramatic situation experienced at the Hospital Giovanni XXIII in Bergamo, Lombardy). Third, similar problems related to the number of infected applies to the number of deaths, which overlap with in-hospital mortality also for other causes. The absence of accepted standard for counting patients dying only for COVID-19 and patients affected by several other pathologies struck down by COVID-19 will produce noisy statistics in this respect. Considering these issues, ICU admissions and hospitalizations seems to be the most reliable information, for at least two reasons: these data reflect the strategy in contrasting the COVID-19 epidemic (Nacoti et al. 2020), and bed capacity has been increased to admit all possible patients, so that capacity constraints do not represent a crucial issue. In our analysis below, we therefore consider these two outcomes (ICU admissions and hospitalizations) besides the number of cases and the number of deaths.

In addition to data on COVID-19 outcomes, we collect data on the Stringency index produced by the Blavatnik School of Government at the University of Oxford (available at <https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>) with the aim to compare the restrictions applied in our countries of analysis. The index provides a better representation of the lockdown imposed in the two countries, detailing information on the policy response by governments like, e.g., school closures and stay-at-home orders (Hale et al. 2020).

Table A.2 in the Appendix provides descriptive statistics for all the variables included in our two datasets, one considering aggregate national data for both Spain and Italy, and one pooling information related to our four regional case studies.

Methods

Our discussion is based on a descriptive analysis of COVID-19 outcomes measured at the national level in Italy and Spain, and at the regional level considering four selected case studies in the two countries. We examine the total number of infected cases, hospitalized patients, and patients admitted in ICU, together with evidence on regional and country specific mortality. To better interpret the evolution of the pandemic in the two countries during the first wave, we paired the time series for each country following the timeframe resulting from the day when Italy and Spain exhibited the same number of hospitalized patients, namely 7 March 2020 in Spain and 25 February 2020 in Italy (t_0). Furthermore, we considered the same length in days of the time series (75) and truncated for Italy on 9 May and for Spain on 20 May (t_{75}), corresponding to the end of the first wave emergency.

Given that trends across spatial units might be affected by factors like differences in population age groups, we also consider a simple regression model to complement our descriptive analysis. First, considering national data, we estimate the following model:

$$y_{i,t} = \alpha + \beta_1 SI_{i,t} + \sum \beta_{2,t} d_Month_t + \beta_3 d_ITA_i + \varepsilon_{i,t} [1]$$

where y is one of the four COVID-19 outcomes (cases, hospitalizations, ICU admissions, and deaths), observed in country i ($i=Italy, Spain$) in day t , SI is the overall Stringency Index (summarizing several restrictive measures), d_Month are time dummies (February as a reference category, March, April, May), and ε represents the error term. The coefficient of

interest is β_3 for the dummy d_ITA , which is equal to 1 for Italy and 0 for Spain. This coefficient estimates the differences between Italy and Spain in each Covid-19 outcome.

To explore regional differences, we select four regional case studies (Veneto and Lombardy in Italy, Catalonia and Madrid in Spain). Pooling data referring to these four regions, we then estimate the following model:

$$y_{i,t} = \alpha + \beta_1 SI_{i,t} + \sum \beta_{2,t} d_Month_t + \sum \beta_{3,i} d_Reg_i + \varepsilon_{i,t} \quad [2]$$

where all the variables are defined as before, except for the regional dummies, included to control for differences in the management of the COVID-19. Vector of coefficients β_3 is associated with the dummies d_Reg , a vector of four regions: Veneto, Lombardy, Madrid and Catalonia (excluded as a reference category).

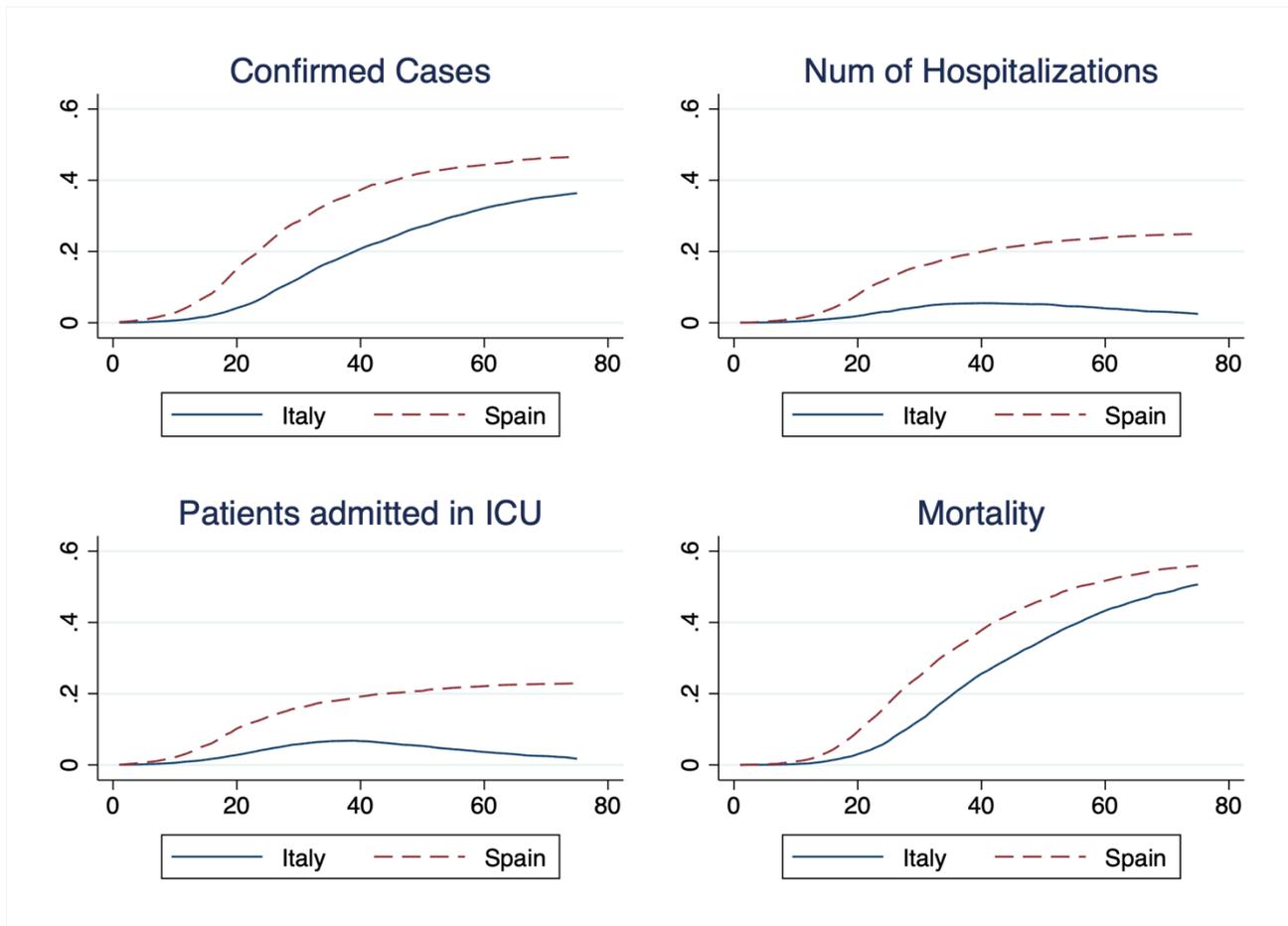
RESULTS

Descriptive Evidence at the National Level

Figure 1 displays the cross-country comparisons in terms of the four COVID-19 related measures: number of infected cases and deaths (measuring *outcomes*), and hospitalizations, admissions in ICU (measuring *outputs of the health system* that can explain the above outcomes). Data consider aggregate figures at the national level and all the measures are standardized rates in terms of population. To obtain a comparable scale for all plots, number of cases and hospitalizations rates are multiplied by 100, whereas admissions in ICU and deaths are multiplied by 1,000. The values on x-axis refer to days t_0 - t_{75} , as defined above. All figures reveal a consistent path: despite Spain has a population of about 47 million people compared to about 60 million people in Italy, Spain recorded a higher number of confirmed cases, hospitalized patients, patients admitted in ICUs and deaths. More strikingly, while

hospitalizations and admissions to ICU tail-off after 30 days in Italy, they continue growing in Spain. This descriptive evidence points toward a better performance of a governance model allowing for regional differentiation of policies.

Figure 1: evolution of COVID-19 first wave in Italy and Spain



Source: MOMO for Spain and ISTAT for Italy.

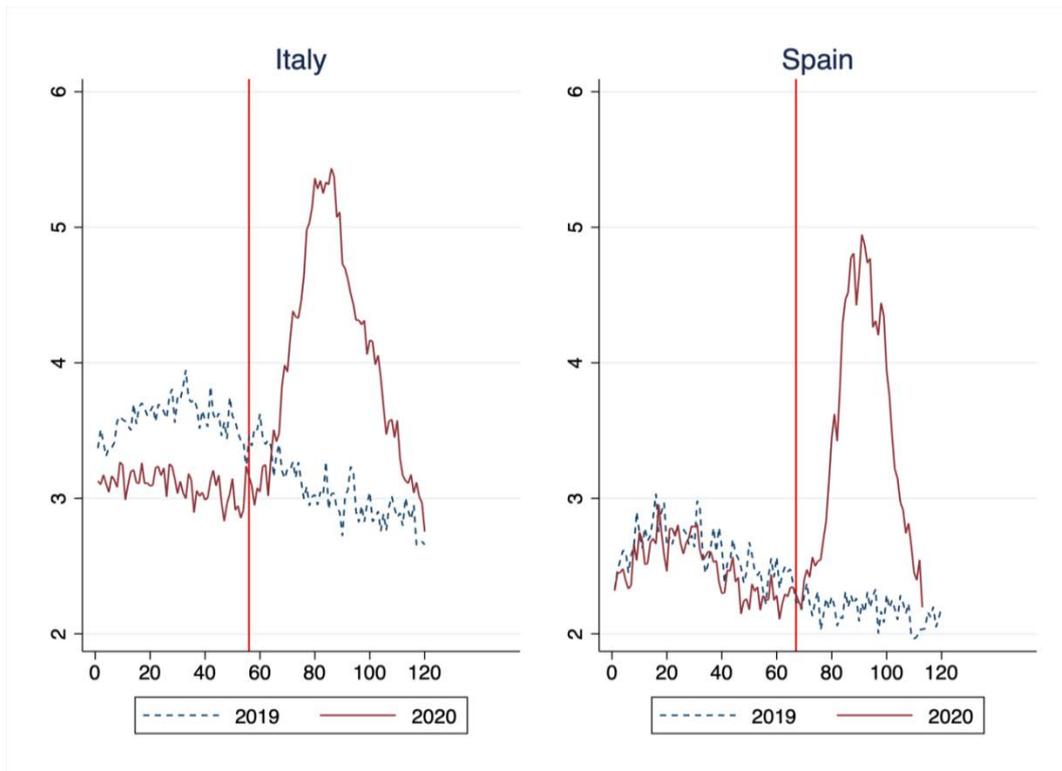
One potential explanation of the differences between Italy and Spain lies in the stringency of measures implemented in Italy. Let us consider the Stringency index produced by the Blavatnik School of Government. The index details the lockdown policies adopted by the countries, summarizing several information about containment efforts, including the following measures: school and workplace closures, cancelling public events, limits on private gatherings, closing of public transport, and restrictions on internal movement between cities/regions. The index is

computed at the national level, and it ranges from 0 to 100: a higher value of the Stringency index suggests that the overall government response has become stronger. The comparison between Italy and Spain (see Table A.2) in terms of the Stringency index suggests that although in the early days of the pandemic the two countries differed in the stringency of measures implemented to fight the pandemic, both countries ended up exhibiting similar values of the index. In the following analysis, we consider the overall index provided by Blavatnik School of Government, instead of single specific policy domains included in the index. In fact, most of the measures (relative to school closures, international travel controls, or cancelling public events) were implemented early on in both countries. However, restrictions about workplaces or public transportations were applied later in Spain compared to Italy. The t_0 in the two countries is different: 7th March in Spain and 25th February for Italy. Hence, the few days of delay with which central government in Madrid adopted harsh measures as compared to Italy might explain part of the difference in outcomes between the two countries (on this, see e.g., Montesò-Curto et al. 2020).

The slight delay in response by the Spanish government with respect to the actions taken in Italy can be gauged also by looking at excess mortality in 2020 compared to mortality estimates in 2019. Information about overall mortality in Spain are gathered from the Spanish Mortality Monitor (MoMo, available at <https://www.isciii.es>). Spanish data are daily collected and include all-causes mortality obtained from the General Register of Civil Registers and Notaries of the Ministry of Justice, distributed among all the regions (Autonomous Communities), and including the 52 provincial capitals. During 2020, MoMo in Spain includes deaths from all causes from 3,929 computerized civil registries, representing 92 per cent of the Spanish population. Daily data are available from 5 April 2018 up to 22 April 2020. The Italian Institute of Statistics (ISTAT) provides data about overall mortality in Italy. ISTAT focused on the municipalities with reliable data that show at least ten deaths in the period 1 January - 31 May

2020 and that recorded a 20 per cent increase in mortality in the period 1 March - 4 April 2020 compared to the average mortality for the same period in the years 2015-2019. ISTAT made available the data of 7,357 municipalities (out of a total of 7,904, 93.1 per cent), for which a consolidation was possible until 31 May 2020, and covering 95 per cent of the population resident in Italy. In Figure 2, the comparison between Spain and Italy is performed analyzing the first four months (January-April) of 2019 and 2020, and mortality rate is computed by considering population in the two countries. Excess mortality is higher in Italy than in Spain. However, it is also evident that excess mortality in Spain was positive sharply after t_0 , while t_0 in Italy is about ten days before excess mortality becomes positive. Once again, this supports the view that the Spanish government was some days late in adopting the same measures adopted by the Italian government. In addition, notice that mortality is higher in Italy also in 2019 with respect to Spain, suggesting that differences in the age structure of the population might affect the level of mortality, and the outcome of COVID-19. For instance, Islam et al. (2021) show that when accounting for the different age structures of European countries, excess mortality in Italy in 2020 is lower than that recorded in other European countries, including Spain, Belgium and the United Kingdom.

Figure 2: Excess Mortality 2019-2020 (January-April)



Source: MoMo for Spanish data and ISTAT for Italian data.

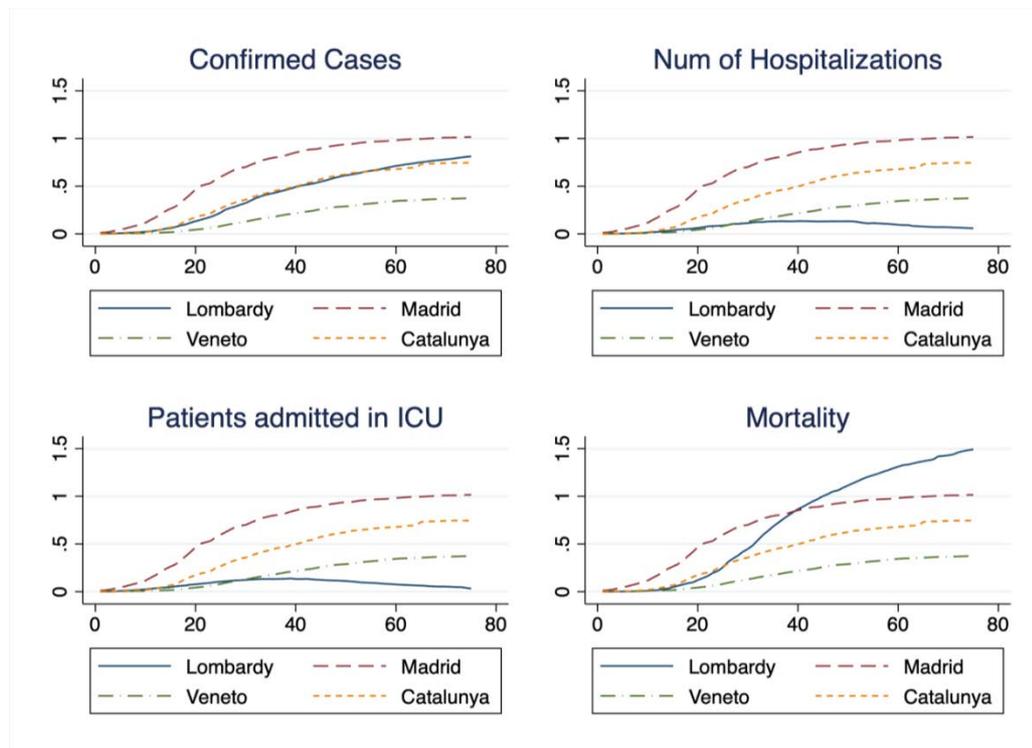
A further and connected explanation of the differences observed in the number of cases and the number of excessive deaths, calling into question the role of governance, is that the pandemic was strongly concentrated in very few regions in Italy because of the adoption of severe measures early from the start of the pandemic, while in Spain the region of Madrid remained open and contributed to spread the pandemic to other regions. To better understand the concentration and the evolution of the pandemic, we compute the Gini index on the number of deaths in each region and each week from t_0 to t_{75} . Results (not reported here for brevity) confirm a higher concentration of the COVID-19 pandemic in Italy than in Spain, which implies that a centralized governance allows for more homogeneous outcomes across regions, while a decentralized solution allows to separate and identify best practices from those regions that have adopted unsuccessful choices. The concentration index also shows a decreasing trend for Spain, suggesting even more homogeneous outcomes as the pandemic makes progress also in regions that were not hit at the beginning by the virus.

Regional Level Evidence

To better understand the role of regional patterns, we examine the regional trends of COVID-19 outcomes, selecting as case studies two of the most affected regions in the two countries under analysis, namely Lombardy and Veneto in Italy, and Catalonia and Madrid in Spain. As for Italy, the importance of focusing on Veneto and Lombardy is well described by Binkin et al. (2020) in terms of the different approach to COVID-19 epidemic in the two Italian regions. The authors showed that the community-based approach adopted in Veneto seems to be correlated with a limited rate of cases, hospitalizations, and deaths, whereas the approach based on a strong hospitalization of positive cases adopted in Lombardy overwhelmed the healthcare system with major consequences on the whole regional population. Similar arguments are discussed also by Costa-Font et al. (2020), which studies the different models of managed competition adopted by the two regions, with the one adopted by Lombardy more decentralized than the one adopted by Veneto.

As for Spain, the importance of focusing on Madrid and Catalonia is supported by, e.g., Legido-Quigley et al. (2020). The Madrid region was the epicentre of the crisis in Spain. Catalonia requested a complete shutdown of the region together with a full range of social distancing measures, but the royal decree declaring national emergency contained new controversial measures attributing to the central government more and new powers over health services. Panels in figure 3 are defined following t_0 - t_{75} at the national level. They compare the four regions in the two countries, standardizing all measures by the population in each region. Panel representing confirmed cases shows evidence that the two regions that were the focus of the pandemic in both countries (Lombardy and Madrid) reveal increasing trends in terms of confirmed cases, but Catalonia in Spain follows Madrid closely while Veneto in Italy presents a very different pattern with respect to Lombardy.

Figure 3: evolution of COVID-19 first wave in four regions in Italy and Spain



Source: MoMo for Spanish data and ISTAT for Italian data.

Panels relative to the number of hospitalizations and patients admitted in ICU describe the trends in the two variables in each of the four regions. The two Spanish regions clearly stand above Lombardy and Veneto following very similar patterns, while Lombardy performs differently from Veneto. As for mortality, Lombardy exhibits much higher numbers than all the other regions; the trend in Madrid is very similar to the trend in Catalonia, while Veneto clearly follow a very different pattern with respect to Lombardy. This is consistent with the differential role of regional autonomy in Veneto and Lombardy, compared to a much more centralized management of the crisis in Spain.

Regression analysis

Estimates of Equation [1] based on aggregate national data are reported in Table 1, Panel A. We use robust standard errors in all specifications. Coefficient for the Stringency Index is consistently positive and significant for all the outcomes: when cases are increasing, severe measures are positively associated with the number of cases. Monthly dummies are also significant and positive, picking up the increasing trend in the outcomes during the severe phase of the pandemic. The country dummy (negative and statistically significant) emphasizes that all the outcomes are lower in Italy than in Spain, suggesting a different approach to the management of the pandemic between the two countries.

We estimate Equation [1] also first differencing the four outcome variables.⁸ Results are reported in Table 1, Panel B. Coefficient for the Stringency Index is still positive and statistically significant: an increase in the measures adopted by the two countries to contain the spread of the COVID-19 is positively associated with the growth in outcomes. Interestingly, monthly dummies are not all significant and increasing with respect to February when the epidemic started, for hospitalizations and ICU admissions. As for the country dummy, all the outcomes show that Italy is characterized by lower values with respect to Spain. This result is in line with the descriptive analysis presented above and can be explained by the delay in the adoption of restrictive measures and the multilevel governance implemented in Italy. Before moving to the regional analysis, we also tested two further specifications of Eq. [1]. We consider the number of hospitalized patients and ICU patients (standardized by the number of infected cases) as additional outcomes in Eq. [1]. Results are reported in Table A.3 in the Appendix. The country dummy for Italy still shows a negative coefficient for both hospitalizations and ICU admissions, but for the model in first differences for ICU patients. Interestingly, the Stringency Index coefficient is now positive and significant only for the number of patients, suggesting that more stringent measures were associated to the rise in the number of patients needing to be hospitalized.

Estimates of Equation [2] based on pooled data referred to the four case studies (Lombardy, Veneto, Madrid, and Catalonia) are in Table 2, Panel A (levels) and Panel B (first differences). All the previous findings on the Stringency Index and the time dummies are largely confirmed. More interesting, dummies for regional governments are almost all statistically significant; however, only the dummy for Veneto is consistently negative, both for the model in levels and in first differences, across all the outcomes. In addition, the dummy for Lombardy is positive for cases and deaths but negative for hospitalizations and ICU admissions, in both the models. These results suggest that regional differences are much larger in Italy than they are in Spain, where the management of COVID-19 has been largely centralized in the hand of the central government in Madrid.

Table 1. Estimates of Equation [1] – Countries

Panel A – Levels				
VARIABLES	(1) Cases	(2) Hospitalizations	(3) ICU	(4) Death
Stringency Index	0.0560*** 0.005	0.0822*** 0.004	0.0737*** 0.006	0.0890*** 0.010
Mar vs Feb	3.0026*** 0.259	2.3452*** 0.240	2.1305*** 0.209	3.4229*** 0.266
Apr vs Feb	4.2420*** 0.263	2.8315*** 0.248	2.2997*** 0.236	5.0149*** 0.315
May vs Feb	4.8592*** 0.304	3.4397*** 0.282	2.7216*** 0.243	6.0028*** 0.365
Italy vs Spain	-0.6462*** 0.136	-1.7064*** 0.104	-1.6730*** 0.093	-0.5912*** 0.192
Constant	3.1447*** 0.336	1.5801*** 0.315	0.5327 0.419	-2.7606*** 0.625
Observations	150	150	150	150
R-squared	0.874	0.920	0.908	0.880
Panel B- First Differences				
VARIABLES	(1) Cases	(2) Hospitalizations	(3) ICU	(4) Deaths
Stringency Index	0.0314*** 0.005	0.0676*** 0.006	0.0356*** 0.006	0.0600*** 0.010
Mar vs Feb	2.4601***	1.5118***	1.9445***	3.3527***

	0.284	0.483	0.726	0.327
Apr vs Feb	2.1052***	-0.1188	0.3261	3.4327***
	0.294	0.524	0.754	0.369
May vs Feb	0.9887***	-1.2617**	-0.9632	2.7753***
	0.332	0.528	0.755	0.401
Italy vs Spain	-0.3137**	-2.1667***	-1.6059***	-0.4175**
	0.140	0.167	0.151	0.183
Constant	3.3230***	1.6410***	1.3129*	-2.3372***
	0.332	0.575	0.787	0.639
Observations	147	113	112	148
R-squared	0.597	0.756	0.710	0.666

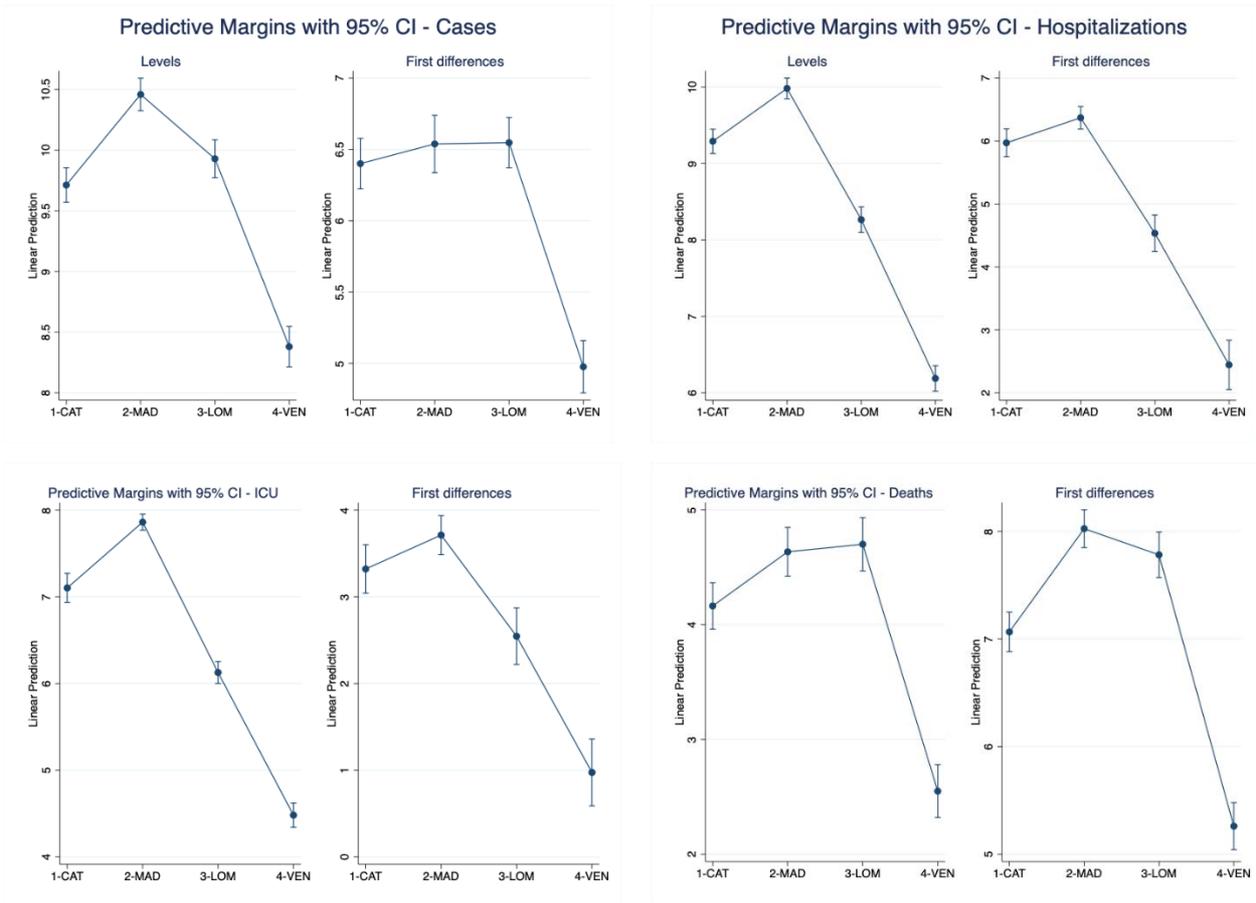
Table 2. Estimates of Equation [2] – Regions

Panel A – Levels				
VARIABLES	(1) Cases	(2) Hospitalizations	(3) ICU	(4) Deaths
Stringency Index	0.0620*** 0.005	0.1123*** 0.008	0.0822*** 0.006	0.0837*** 0.006
Mar vs Feb	2.4765*** 0.184	1.4755*** 0.168	1.3427*** 0.142	2.6567*** 0.208
Apr vs Feb	3.5791*** 0.203	1.6521*** 0.226	1.3650*** 0.185	4.3147*** 0.229
May vs Feb	4.2732*** 0.222	2.5046*** 0.236	1.8715*** 0.177	5.2897*** 0.267
MAD vs CAT	0.7458*** 0.096	0.6914*** 0.109	0.7587*** 0.101	0.9587*** 0.118
LOM vs CAT	0.2161* 0.118	-1.0247*** 0.133	-0.9755*** 0.116	0.7159*** 0.157
VEN vs CAT	-1.3314*** 0.122	-3.1002*** 0.135	-2.6209*** 0.120	-1.8051*** 0.162
Constant	1.5017*** 0.364	-1.5067*** 0.503	-0.9712** 0.420	-3.4621*** 0.376
Observations	300	300	300	300
R-squared	0.883	0.915	0.890	0.894
Panel B- First Differences				
VARIABLES	(1) Cases	(2) Hospitalizations	(3) ICU	(4) Deaths
Stringency Index	0.0382*** 0.007	0.0661*** 0.007	0.0331*** 0.009	0.0540*** 0.007
Mar vs Feb	1.9206*** 0.296	1.0620*** 0.273	0.8959*** 0.332	2.4405*** 0.251
Apr vs Feb	1.4275*** 0.325	-0.4776 0.365	-0.5055 0.420	2.5846*** 0.277

May vs Feb	0.3644	-1.6224***	-1.7700***	1.9934***
	0.330	0.359	0.431	0.299
MAD vs CAT	0.1380	0.3985***	0.3908**	0.4714***
	0.135	0.128	0.182	0.142
LOM vs CAT	0.1468	-1.4359***	-0.7753***	0.5370***
	0.135	0.201	0.224	0.169
VEN vs CAT	-1.4245***	-3.5264***	-2.3468***	-1.6130***
	0.137	0.257	0.253	0.170
Constant	1.9120***	0.5995	0.7073	-2.6512***
	0.538	0.474	0.620	0.496
Observations	294	227	217	287
R-squared	0.611	0.694	0.449	0.623

To further discuss this issue, in Figure 4 we report the predictive margins for regional dummies obtained from estimates of Equation [2], both in levels and first differences. Several insights emerge. First, Lombardy and Madrid seem to be largely comparable for most outcomes. The fact that they serve as hubs for their countries, share connections with the rest of the world and of the country, and have a lively and strong economy are all factors to account for in the spread of the pandemic and in the definition of containment policies. Second, and much more important for our purpose here, Catalonia and Madrid appear to be much more similar than Veneto and Lombardy. This supports the view that a centralized solution in the management of a pandemic crisis homogenizes the outcomes across the regions, not allowing for experimentation, which – on the contrary - might offer useful insights when government are facing an unknown challenge like the COVID-19 in the first wave.

Figure 4: Predictive margins for the four regions – Catalonia, Madrid, Veneto, and Lombardy



DISCUSSION

COVID-19 has put multi-level governance systems under an unprecedented strain. It has forced public authorities to enforce regional to comply with mobility restrictions including national lockdowns. Furthermore, the design of policy responses for subnational governments presupposes critical information sharing and local knowledge, which requires some collaboration between levels of government, especially when the health policy expertise is at the regional level. Hence, the question of how, in the face of a crisis, decision-making power should be balanced between national and sub-national governments is far from trivial. One way to provide an empirical account to better understand what model of government to adopt in a pandemic lies in comparing countries that share similar health system funding and organisation, as well as a comparable model of health system devolution, such as Italy and Spain (Costa-Font and Turati 2018).

We have focused on the evidence from the first wave of the pandemic, where political actors at different levels of government had little information to anticipate the effects of the pandemic. However, the expertise in running the health system both in Italy and Spain was located at the regional level. In such a context, compare whether a more centralised hierarchical response in Spain as opposed to decentralised cooperation in Italy delivers different outcomes and outputs.

We argue that in Spain, the pre-crisis governance mechanisms that would prove crucial in a pandemic were effectively paralysed with the implementation of a single command that effectively centralised health care decision making, and to large extent, inhibited incentives for cooperation between different governments. That is, the logic of the state of alarm deterred such information sharing let alone coordinate joint actions of regional governments (Kölling 2020). The inter-territorial system meetings of Spanish regions which are designed to coordinate health care became purely informative, which crowded out the incentives for regions to share their expertise and local knowledge. However, the situation changed in the second and further waves, and further autonomy was then allowed.

In contrast, in Italy, intergovernmental tensions emerged only with the second wave, when it was clearer how to manage the virus. During the first wave of the pandemic, regions passively allowed an increasing coordination role led by the central state. However, given that such coordination was not hierarchically imposed, it did not reduce the incentives to share information on best practices with regards to the health system governance, not to enhance the policy restrictions implemented by the central government. Comparing the reactions to the pandemic in two countries (Italy and Spain) allow us to empirically gather some evidence on trends in measures of outcomes and output which help to study whether hierarchical

centralization in Spain fared better than informal decentralized coordination implemented Italy. Our findings suggest that decentralized governance in Italy exhibited better health outcomes and outputs than in Spain, because it provided incentives for information sharing and relied on the cooperation of agents at the regional level that hold the health system expertise.

Our empirical estimates document a significant gap in the number of COVID-19 cases, hospitalizations, ICU admissions, and of deaths in Italy and Spain, both at the national and at the regional level. Our analysis indicates evidence that in the event of *a strong localization of the health needs of the pandemic both in Italy and in Spain*, regional autonomy can incentivize information sharing as well as fostering experimentation and local solutions to local COVID-19 outbreaks. Our empirical evidence suggest that multilevel governance can explain the cross-country differences in such cross-country trends. Unlike what we observe in non-critical times, policy experimentation was deterred in Spain, unlike in Italy where some regions were able to modify their policy restrictions above and beyond those imposed by the central government⁹. Although in Italy we observe evidence of coordination, unlike in Germany and the United Kingdom it came about spontaneously and passively rather than being actively enacted. Indeed, in the United Kingdom and especially in Germany where policy making is decentralised, scholars have observed evidence of some form of cooperation, which is called “compensation through-participation” (Vampa 2021)¹⁰. This would mean in a decentralised health system setting allowing regions (or states) to participate in central state decision making, incentivising sharing relevant local knowledge and ultimately effective coordination.

More generally, an interpretation of our findings is that even though coordination does play a role in solving potential collective actions problems (e.g., border closures), regional autonomy can make a difference sharing information and addressing localized spreads that result in

measures of outcome such as a larger number of fatalities (lives saved), which are explained by a differential use of health care that results in different health outputs such as avoiding unnecessary hospitalizations. Our estimates provide evidence of trends consistent with our argument as well as additional mechanisms examination and qualitative evidence of how the pandemic was governed in the two countries. Given the comparability between the two country health systems, our results support the idea that there is a penalty to centralisation in the first wave of a pandemic when information sharing is crucial and experimentation important to address regional specific needs and to produce policy information that can be used across the country.

More specifically, encouraging regional cooperation but relying on regional autonomy (albeit involuntarily) such as in Italy might provide an advantage in facing the challenges during the first wave of the COVID-19 pandemic. The latter might have allowed knowledge sharing of good practices to manage the pandemic, compared to more centralized approaches, especially when regional needs and knowledge are largely heterogeneous. That said whether these good practices are then extended to the whole country during later waves is an interesting issue to be discussed in future work and not the object of this article. More specifically, the strategic reactions and tensions that emerged in the second and further waves were different than that of the first wave, which is why this article focus on the first wave alone.

Finally, an important finding to highlight refers to the significant differences even within countries. For instance, in Italy, there were differences in how the health systems in Lombardy and Veneto responded to the pandemic, and as a result health outcomes were better in Veneto than in Lombardy (Costa-Font et al. 2022). Hence, one could well argue that Italy, and possibly Spain, would have exhibited a more successful policy response had they followed a more integrated health system such as in Veneto, where private providers work in coordination with

the rest of the health system, thereby reducing the costs of information sharing and coordination.

CONCLUSION

The purpose of this article is to investigate the impact of territorial healthcare system governance on COVID-19 on the health system outcomes and outcomes in two countries that, despite similar financing and territorial organization, exhibit significant differences in how the central government addressed the need for health system coordination during the first wave of the COVID-19 pandemic. We argue that multilevel governance influences critical policy responses for subnational governments, such as information sharing and local knowledge, which weaken regional cooperation, and can influence the health systems response.

Consistently with the idea that regional autonomy through co-governance is a more efficient strategy when the source of the pandemic is localized and policy uncertainty is high (as it was during the first wave of the pandemic), we show that a decentralized coordination, which was passively adopted in Italy, proved to be advantageous, insofar as enhanced coordination, and particularly information sharing, as well as regional profiling of their policy restrictions above and beyond those of the central government. Such decentralised coordination adopted in Italy stands in stark contrast to Spain's 'single command' approach during the first wave of the pandemic, which discouraged information sharing incentives and regional co-governance.

Nonetheless, the institutional design of the health system to address the needs of the COVID-19 pandemic was corrected in the second wave of the pandemic, when Spain followed model. In contrast, in Italy attempts were made to turn to a more centralized governance in later waves, and in both Italy and Spain, we observe evidence of strategic regional policy making and tensions along the line of resources as well as different policy preferences.

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NOTES:

¹ Such decentralised is implemented at the European Union level, via cross-country coordination and information sharing via the European Centre for Disease Control (ECDC).

² However, as we discuss here, the central government can cooperate with regions despite an active role of the central government leadership as in Italy, or alternatively, impose a hierarchical centralisation giving rise to central level coordination, as in Spain during the first wave of the pandemic

³ Veneto's an example of how the more integrated regional health care system was at an advantaged compared to other regions such as Lombardy (Costa-Font et al. 2021).

⁴ The suspension of self-government did not stop the activity of regional government, but it simply it made it respond to the central government's authority following the guidelines marked out by the sole command.

⁵ This was possible because the Spain's Constitution embeds a state emergency and has clear rules to overcentralize under a single command which is not present in the Italian constitution. In both countries, there was some forms of centralisation of some government function took place (Vampa 2021)

⁶ The development of quasi-markets in Catalonia entailed integrating fully private providers in the public system, and hence putting them under the governance of the public system.

⁷ In 2020, private healthcare attended to 30 per cent of hospitalizations for Covid and 29 per cent of admissions to the ICU.

⁸ First differences have been computed simply as $\Delta=y_t-y_{t-1}$.

⁹ Evidence suggests that policy innovation in health care takes place at the local level and then such information might then spread throughout the country in subsequent waves (Costa-Font and Rico 2006).

¹⁰ The dynamics between the Länder in the first wave were rather coordinated (though the situation would then change in the second wave) allowing Germany to minimise the number of victims and also contain the territorial inequalities.