Lessons from Covid-19 for EU health policies

Policy brief

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"Public sector Jobs"

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Starting from January 2020, the Covid-19 pandemic originated in Wuhan, China, has rapidly spread also in Europe. Countries' early response to the pandemic have been very heterogeneous. Early hit countries, such as Italy and Spain, decided to enforce stay-at-home orders and implement strict lockdown measures. Other EU Member States, like Sweden, decided for much less stricter regulations. Following the subsidiarity principle, the European Commission was unable to intervene at the very early onset of the health crisis. However, as the pandemic was progressing, the European Commission has started to implement policies aiming at increasing Member States (MS) coordination and at supporting struggling national health systems.

After reaching a peak in the number of cases and deaths in April, Covid-19 infections declined during the summer, to start climbing again early in September, especially in Spain and France. Other MS followed and EU countries are currently faced with the threat of a second wave of Covid-19 infections. Besides economic and social consequences that are not still easily quantifiable, the pandemic so far has caused in Europe around 6 million cases and more than 200,000 deaths.

As a matter of fact, national health systems in most European countries have proved unprepared to face the health emergency posed by the pandemic. While the EU action has been limited by the lack of governance and funds, individual MS health systems had to face a huge wave of patients needing hospitalization. In this report, we briefly identify the current allocation of competences between EU and MS, we present the pre-pandemic situation of health systems in Europe, we discuss how these systems were stressed by the Covid-19, and we derive the main lessons for re-thinking EU health policies.

1. Current allocation of tasks between EU and Member States

Article 168 TFEU defines the allocation of competences in public health care between EU and MS. The article specifies that MS are in charge of defining and delivering health services and medical care, while EU policies and activities should complement national policies in order to: (i) prevent illness/disease by promoting healthier lifestyles; (ii) facilitate access to better and safer healthcare; (iii) contribute to innovative, efficient and sustainable health systems; (iv) deal with cross-border

threats; (v) keep people healthy throughout their lifetimes; (vi) harness new technologies and practices. In addition, Article 168, comma 5, specifies that the European Parliament and the Council, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee and the Committee of the Regions, may also adopt incentive measures designed to combat the major cross-border health scourges, including - for instance - monitoring, early warning of and combating serious cross-border threats to health. These are very broad goals that *de facto* leave to MS healthcare policies.

The current allocation of competences clearly implies large difference in spending between the EU and individual MS. The whole EU's Health program (2014-20) has a very limited budget, about EUR 450 million. Individual MS generally spend much more in one single year: for instance, healthcare spending in Italy this year is about EUR 120 billion, while in Germany is EUR 390 billion. Therefore, it is not surprising that the response to the challenge posed by Covid-19, especially in terms of curative care, was left to the different EU health systems despite the cross-border nature of the health crisis.

2. *Health systems and Covid-19*

To understand the differences in (health and economic) outcomes across MS one need to first compare how different the MS health systems were before the pandemic. Both structural and organizational differences are important. As for structural differences, total health care spending across EU-28 countries is rather heterogeneous: while Luxembourg devotes about 4% of GDP to healthcare, expenditure in Germany is about 11% of GDP (Eurostat 2020). On average, differences are quite large between Western and Eastern countries; and the latter are even more significant if health outcomes (in terms of Disability Adjusted Life Years) are considered (OECD 2018). These differences may be explained by both per-capita income and lifestyle; in what follows we focus on Western countries (EU-15, including UK), a more homogeneous group as income is concerned.

Even within this subset of EU countries, considerable differences prevail concerning the level of spending (Table 1). These differences in spending translate into differences in the main indicators of inputs relevant for the production of healthcare services, which proved to be important in managing Covid-19 pandemic. The workforce is very different, both as concerns the availability of doctors and nurses, and their relative weight. Also hospital capacity (the number of hospitals, their size and the availability of beds, including ICU beds) is quite different. This leads to a quite different pattern as concerns discharges and inpatients days produced by hospitals. On the contrary, the composition of spending in terms of preventive and curative care looks much more similar across countries, with curative care making up the largest share of spending in all countries.

Countries	**HS** (% of GDP)	**pub HS** (% of GDP)	**doctors** per 1,000 inh.	**nurses** per 1,000 inh.	**hospital beds** per 1,000 inh.	**n. of ICU** per 1,000 inh.	**hospitals** per million population	**av. hospital size**	**discharges** per 1,000 inh.	**bed-days** per 1,000 inh.
AT	0.09	0.07	5.25	7.14	728.67	21.8	29.92	243.5	228.87	1444.56
BE	0.09	0.07	5.84	19.6	563.65	15.9	15.27	369.24	164.64	1084.48
DE	0.11	0.09	6.20	17.25	798.92	29.2	37.25	214.48	234.17	1748.47
DK	0.07	0.06	6.52	19.29	243.5	6.7	.	.	.	.
EL	0.09	0.06	6.10	3.63	419.44	6.0	25.23	166.25	139.46	.
ES	0.10	0.07	5.59	6.6	298.04	9.7	16.76	177.83	114.97	692.74
FI	0.07	0.05	4.65	22.35	361.34	6.1	43.71	82.66	158.26	1016.03
FR	0.11	0.09	3.37	11.14	591.27	11.6	45.46	130.07	161.84	877.08

IE	0.05	0.04	4.82	16.89	299.67	6.5	17.8	168.31	136.01	807.22
IT	0.09	0.06	6.66	7.78	313.72	12.5	17.51	179.18	101.71	711.55
LU	0.04	0.03	4.15	24.77	455.15	24.8	16.61	274.0	125.05	945.1
NL	0.09	0.07	4.12	12.44	317.48	6.4	31.95	99.36	93.06	470.16
PT	0.11	0.07	5.15	7.16	344.27	4.2	22.35	154.04	109.3	985.24
SE	0.08	0.07	6.83	21.35	214.95	5.8	9.04	237.78	135.53	.
UK	0.08	0.07	3.78	10.4	250.24	6.6	28.82	86.83	124.89	758.37
Total	0.09	0.06	5.27	13.85	413.35	11.59	25.55	184.53	144.84	961.75

Table 1: source Eurostat (2018), OECD (2018)

Structural differences across countries today are the result of reforms that have been implemented across Europe in the last decades in order to improve spending efficiency. However, while some health care systems have reduced hospital beds and merged small hospitals, other countries have followed different patterns so that just before the present pandemic the efficiency of the health care systems even across the EU-15 is also quite heterogeneous (Jakubowski and Busse 1998; Thomson, Foubister, and Mossialos 2009). In particular, having too many hospitals and beds was considered, somewhat paradoxically now during the pandemic, an important source of inefficiency in some countries (e.g., in Germany, see Bertelsmann Stiftung 2019).

Structural differences are at least partly related to the organizational dimensions of healthcare systems. Most European countries provide care for free at the point of use to their citizens and finance expenditure with public resources. However, the way in which health care is actually financed is quite different across countries, the difference being determined by the history and the development of health care systems. Funding healthcare spending through general taxation is the predominant model, used in countries like Denmark, Finland, Greece, Italy, Spain and UK. Quite a few countries however (like France, Germany, Austria and Belgium) still use social insurance contributions to finance health care. In the Netherlands, health care spending is financed via insurance funds: subscribing a private insurance for a defined set of services is compulsory, but the government finance the difference between the premium and patients' ability to pay.

The differences in funding influence the organization along several lines: the role of private providers, the models of managed competition, the centralization/decentralization of functions (Siciliani, Chalkley, and Gravelle 2017; Siciliani and Straume 2019; Levaggi and Levaggi 2020). These variables have proved to be quite important in qualifying the resilience to the pandemic event and the provision of a swift response (Robone, Rice, and Smith 2011; Costa-Font, Levaggi, and Turati 2020). Classifying healthcare systems to account for all these dimensions always requires simplifications. The literature identifies two main original models, the Beveridge model and the Bismarck model; and the organization of today's systems has evolved from one of these two models (Paris, Devaux, and Wei 2010).

The Beveridge model is notably represented by the UK National Health Service. The English NHS foresees a public insurance paid through general taxation and a vertical integration of the system. The pure form has been reformed to introduce an 'internal market' (Jones and Cullis 1996) for health services (mostly hospital services) where public purchaser contract for services with public providers. The role of private providers is limited to the provision of specific treatments that the government decides to contract out.

The Bismarck model, whose most significant example is represented by Germany, foresees a competitive system for health care provision which is financed by a compulsory social insurance. There are two levels of competition: among purchasers of services, since citizens can choose the

health plan they prefer (as per Germany, the choice is mainly made at the Länder level); among providers, which are mainly private and which contract with the health plan for providing services to the patients.

Starting from these two 'pure' models, several 'hybrid' forms have evolved over time. For example, the health care systems of countries such as Spain and Italy evolved from the Beveridge model. Spending is publicly financed mostly by taxes levied at the central level, which fund regional provision of taxes through grants-in-aid, while local taxes play a marginal role. Within a constitutional mandate to guarantee uniform provision to all citizens for a predetermined subset of health services, sub-national governments can organize their supply differently. For instance, they can define the model of competition among providers, defining 'quasi-markets' at the local level and the role for private hospitals within 'quasi-markets'. This means that sub-national systems may become quite different across regions within the same country.

Different organizational models can produce very different outcomes during a pandemic, when the coordination of the actors involved in the provision of services is crucial. The Beveridge model implies a high level of decisions centralization, which clearly favours coordination, but imposes uniform solution to new threats. On the other hand, the Bismarck model as well as the regionally decentralized Beveridge models need forms of coordination (Rechel, Duran, and Saltman 2018). The mechanisms supporting coordination have to be defined by each country in the absence of a supra-national entity. In the German system, the Länder play a very important role, but the coordination during the Covid-19 pandemic is guaranteed by the Influenza Pandemic Preparedness Plan regularly updated by the Robert Koch Institute, the expanded powers granted to the Federal Ministry of Health (till Apr 2021), and the «Corona cabinet» defined within the Federal Cabinet of Ministers. In both Spain and Italy, coordination was allowed by a 'state of emergency' attributing full power to the central government. However, mainly for political reasons, the effects of this similar legislation were quite different in the two countries (Angelici, Berta, Costa-Font, and Turati 2020). In Spain, the Royal Decree declaring the 'state of alarm' conferred full responsibility to the Spanish government, which imposed uniform solutions in all regions. In Italy, the decree declaring the national emergency was not used by the central government to enforce the same rules across the country and allowed for regional experimentations, at least during the first wave. In both countries, there is evidence of conflicts between central and regional governments, which are unsurprising given that the pandemic has developed very differently at the local level.

Finally, also primary care systems are quite different across countries. As it has been observed, a well-functioning primary care system is crucial during a pandemic. An effective primary care system may allow preventing congestion in Emergency Departments, avoiding unneeded hospitalizations and reducing the risk that the virus affect hospitals and their workforce. Also in this case, classifying different systems imposes simplifications, but the literature allows to identify three main models (WHO 2015). Some health care systems (such as Spain, Portugal, Sweden, and Finland) use a 'public hierarchical normative model' where GPs are public employees. The level of regulation by the State is high, and this allows GP coordination at the national level. In the 'professional hierarchical gatekeeper model' (UK, Netherlands, Denmark, Slovenia, Italy) GPs are private professionals, but primary care is the cornerstone of healthcare policies with a gate-keeping role. However, this system needs a central (national or subnational) coordination and clear guidelines in managing emergencies. Finally, the 'free professional non-hierarchical model' prevails in other countries (Germany, France, Belgium, Austria, Switzerland): GPs are private professionals and usually do not play the role of gate-keepers. At least in principle, this is the model where primary care would have more difficulties during a pandemic.

3. *Benchmarking in normal times and during a pandemic*

As noted in the previous section, health systems in Europe were (and still are) quite heterogeneous along several dimensions at the beginning of the pandemic. It is then important to understand which system was performing better in normal times, that is, before the pandemics, in terms of efficiency/effectiveness (depending on how inputs translate into healthcare outputs/outcomes); and which system seemed doing better during the pandemic given the information collected so far with the first wave of Covid-19.

To properly compare healthcare systems, we consider a widely used benchmarking technique, such as the Data Envelopment Analysis (DEA). The DEA is a neutral benchmarking approach to estimate a microeconomic 'production frontier' defining the *minimum amount of resources needed to achieve a fixed desired level of output/outcome.* It is a non-parametric technique based on linear programming which requires only mild assumptions on the production set. DEA may also be adapted to different returns to scale specifications and, by comparing specifications with constant and variable returns to scale, it is possible to separate total efficiency measure into a *pure technical efficiency* and a *scale efficiency* component (Marselli and Vannini 2004; Ji and Lee 2010). Although DEA is mainly used to compare firms' efficiency, extending the microeconomic concept of 'production frontier', this approach has also been extensively used to assess the efficiency of public spending in different sectors, including healthcare (Herrera and Pang 2005; Afonso and St. Aubyn 2005; Sutherland et al. 2007; St. Aubyn et al. 2009; Afonso and Kasemi 2017).

Figure 1: model: outcome=f(input)

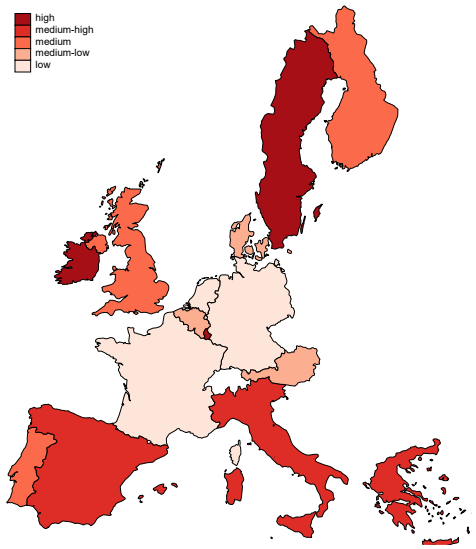
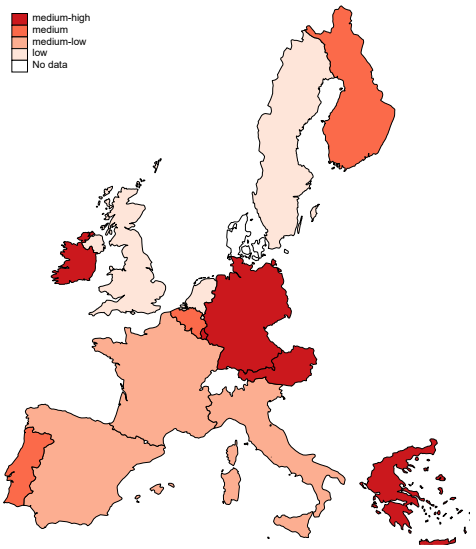


Figure 2: model: output=f(input)



Source: own estimates on Eurostat data

The benchmarking of healthcare systems requires the specification of input, output and outcome measures. As for the analysis in *normal times*, we select public health spending (% of GDP) as input, the number of discharges and the number of bed-days (% of the population) as output measures, while as outcome measures the Healthy Life Years (HLY) and the (inverse of the) number of preventable and treatable deaths over total deaths. We implement two models that consider respectively outcome and output measures as a function of the input. In Figures 1 and 2, we represent the scores computed through the two models when considering the HLY as outcome measure and the number of discharges

as output measure.[1] Looking at the two figures, it is possible to note that countries that are efficient in the production of outputs are not always well performing in terms of outcomes. In fact, the ranking correlation between the scores obtained with the two models is 0.1693. From this analysis, we can derive Remark 1: *healthcare spending matters, but health outcomes relate also to other variables (e.g., individual behaviour, climate, dietary habits, etc.).* When applied to the Covid-19 pandemic, this remark suggests that part of the difference in outcome (e.g., the number of deaths) observed across countries despite similar measures adopted can be explained by different individual behaviours.

As a step forward, we separate the overall efficiency into technical and scale efficiency finding that when considering total spending, scale efficiency is quite high in all countries included in the analysis. This is unsurprising, since curative care represents the largest share of total spending and this type of care, mostly provided through hospitals, is characterized by relatively limited scale economies. However, given (i) the difficulties in procurement during the pandemic experienced by countries, and (ii) the tiny share of spending devoted to prevention, which is clearly important in case of a pandemic, we run additional DEA models specifically considering these two spending sub-categories and using some more specific outputs and outcomes.[2] In general, we find that efficiency scores considering the two specific sub-functions are much lower when compared to those obtained from the benchmarking exercise on the overall health spending. More important, when separating pure technical efficiency from scale efficiency, it is possible to note that countries do not appear as scale efficient. From this result we derive Remark 2: *while the whole healthcare spending does not show evidence of scale economies to be exploited, specific sub-functions (like procurement spending and spending for prevention) exhibit potential scale economies*. In the case of Covid-19, there are also clear spillover effects related to the decisions taken by individual countries in terms of prevention and procurement policies. Hence, more coordination is needed to exploit scale economies and to account for these spillovers effects.

As for the benchmarking exercise *during the pandemic*, we run two DEA models considering as outcomes the (inverse of the) number of Covid-19 cases per 1,000 inhabitants and the (inverse of the) number of Covid-19 deaths per 1,000 inhabitants. For what concerns inputs, in model 1 we use variables reflecting structural differences in healthcare systems, such as the number of doctors and the number of nurses per 1,000 inhabitants, while in model 2 we consider a variable reflecting governments' reaction to the pandemic, measured by the Oxford COVID-19 Government Response Tracker (OxCGRT) (Hale et al, 2020).[3] Model 2 is based on the assumption that policies such as stay-at-home orders are costly in terms of GDP losses (Deb et al., 2020). In the two models we assess, for a given level of output, which countries use less resources measured as healthcare personnel in model 1,[4] or which countries consume more economic resources measured by GDP losses. Our findings

[1] When considering alternative output or outcome measures the ranking among countries remains substantially unchanged.

[2] For the procurement function we use as output the sum of medical technology machineries per 100,000 inhabitants (Computed Tomography Scanners, Magnetic Resonance Imaging Units, Gamma cameras, Angiography units, Lithotriptors, PET scanners, Radiation therapy equipment, Mammographs), while as outcome the (inverse of the) number of preventable and treatable deaths over total deaths (NPM). For the prevention function we use as output the percentage of people aged 65 and more with a vaccination against influenza, while as outcome the (inverse of the) number of deaths for infectious and parasitic diseases per 100,000 inhabitants.

[3] OxCGRT collects publicly available information on 18 indicators of government responses. Eight of the policy indicators record information on containment and closure policies, four of the indicators record economic policies, such as income support to citizens or provision of foreign aid. Six of the indicators record health system policies such as the COVID-19 testing regime or emergency investments into healthcare.

[4] As a robustness check, we also consider the general healthcare spending, the number of beds and the number of Intensive Care Units per 100,000 inhabitants.

show that efficiency scores of model 1 and 2 are negatively correlated (see figure 3[5]), meaning that countries with over-capacity (doctors, nurses, beds) had the opportunity to use less stringent regulations, limiting GDP losses.

Figure 3: Correlation between efficiency scores of Model 1 and Model 2

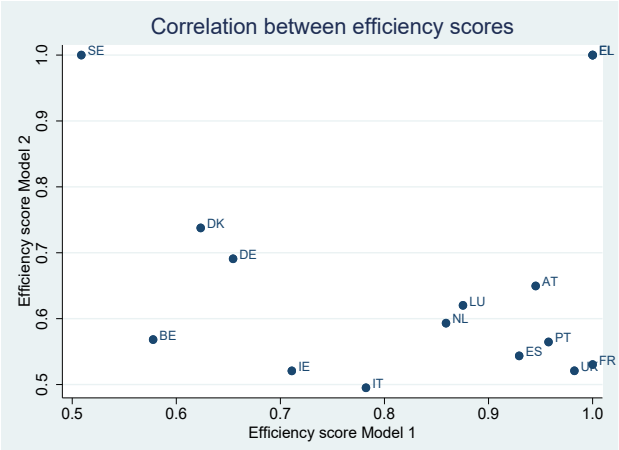
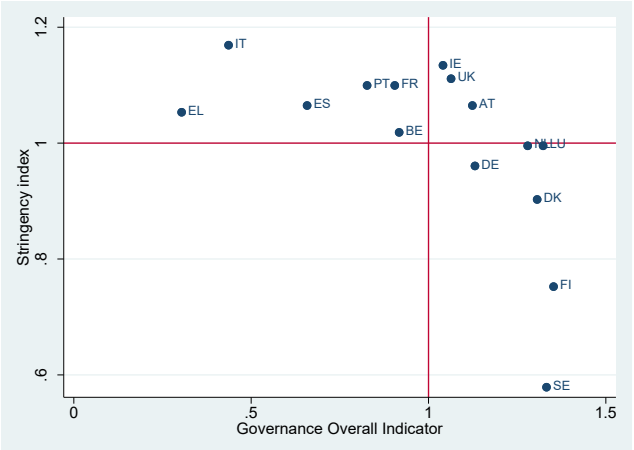


Figure 4: Correlation between governance indicator and stringency index



Source: own estimates on Eurostat, OxCGRT and World Bank data

However, countries characterized by a weak governance could have been forced to adopt stricter stringency policies with respect to countries with a good governance. In order to discuss this hypothesis, we build an indicator of governance starting from the World Bank Worldwide Governance indicator. In particular, we sum up for each country the score obtained in the different dimensions surveyed by the World Bank: voice and accountability; political stability and absence of violence; government effectiveness; regulatory quality; rule of law; and control of corruption (Sapir 2020). We then simply look at the correlation between this indicator and the OxCGRT; we find this correlation to be negative, as shown in Figure 4. Summing up, we derive Remark 3*: having spare capacity (in terms of inputs related to the production of healthcare services, such as doctors, nurses, beds) allows countries to adopt less stringent regulations to control the spread of the Covid-19; this is even more true for countries with a good governance.*

Finally, an additional potential factor to consider is the timing characterizing the reaction of each country to the pandemic threat. In this sense, focusing on five countries and considering a common initial period t(0) as the time of the first registered Covid-19 death for each country, the ranking is the following: Italy, Germany, Sweden, France, Spain. The last two countries, France and Spain, are those that experienced the worst outcomes in terms of deaths relative to the population during the first wave, suggesting that *time of reaction is a key variable in explaining the outcomes of a pandemic* (Remark 4).

4. *Normative suggestions: lessons for EU health policies?*

The Covid-19 pandemic has clearly emphasized the need for more coordination at the EU level for MS. Using the words pronounced by the president of the European Commission Ursula Von der

[5] In Figure 3 we report correlation between efficiency scores when considering as outcome variable the number of deaths per 100,000 inhabitants, results are similar when looking at the number of cases.

Leyen, "we need to build a stronger European Health Union" (State of the Union Speech, 16th September 2020).

Leaving aside the EU financial response to the crisis (from the funds already made available via the EU budget to those that eventually will be made available with the Next-Generation EU plan), during the first wave of the pandemic, the EU has already gone beyond its own competences to guarantee a coordinated European response to the global threat. For instance, the European Commission has started initiatives to: (i) create green lanes for goods when MS closed borders; (ii) bring home European citizens that were stranded all over the world; (iii) stop export bans introduced by countries for critical medical goods; (iv) ensure that critical medical supply could go where it was needed; (v) increase the production of masks, gloves, tests and ventilators; (vi) ensure that doctors from one country could treat patients in another one or that one country could send masks to its neighbors.

However, despite the great effort to handle with the emergency, the Covid-19 outbreak has highlighted the need of having European institutions with competences and funds to adequately prevent and control global health crises. In particular, the Commission's plan presented by the president of the European Commission requires to: (i) reinforce and empower the European Medicines Agency and the European Centre for Disease Prevention and Control (ECDC); (ii) build a European BARDA (Biomedical Advanced Research and Development Agency) to support EU capacity and readiness to respond to cross-border threats (including strategic stockpiling to address supply chain dependencies for pharmaceutical products); (iii) discuss further the question of health competences to be attributed to the EU.

Along the same line, the prime ministers of some EU countries (namely Belgium, Denmark, Germany, Spain, France and Poland) sent a letter to the European Commission asking for a stronger involvement of the EU in health policies, and suggesting a wide range of measures, including: (i) accessibility of relevant and comparable data; (ii) stronger and more targeted research and development; (iii) common procurement and cooperation on critical stocks; (iv) strengthen European resilience in critical supply chains.

To reach these challenging targets, the EU health program for the next seven years proposed within the EU Recovery and Resilience Plan (EU4Health 2021-2027) marks a change compared with previous health programs, both in terms of areas of actions and budget availability. EU4Health foresees investments for 9.4 billion euro to: (i) boost EU's preparedness for major cross border health threats by creating reserves of medical supplies, a reserve of healthcare staff and experts that can be mobilized to respond to crises across the EU, increased surveillance of health threats; (ii) strengthen health systems so that they can face epidemics as well as long-term challenges by stimulating disease prevention and health promotion in an ageing population, digital transformation of health systems, access to health care for vulnerable groups; (iii) make medicines and medical devices available and affordable, advocate the prudent and efficient use of antimicrobials as well as promote medical and pharmaceutical innovation and greener manufacturing. Moreover, further programs have been set up to complement EU4Health: the European Social Fund Plus (ESF+) to support vulnerable groups in accessing healthcare; the European Regional and Development Fund to improve regional health infrastructure; Horizon Europe for health research; Union Civil Protection Mechanism/rescEU to create stockpiles for emergency medical supplies; and Digital Europe and Connecting Europe Facility for creating the digital infrastructure needed for digital health tools (see https://ec.europa.eu/health/funding/eu4health_en).

How can we evaluate these proposals? According to our results, more investment and more spending does not automatically mean better outcomes: there is a low correlation between how much one

country spends on health (in percentage of GDP) and outcome indicators. The reason for this low correlation is that other variables are important to define how spending turns into outcomes: for instance, some characteristics of the health systems (such as the type of funding, organization and structure also play a role), together with variables like climate, dietary, individual behavior, and genetic characteristics of the population. Therefore, EU policies should not only focus on health inputs but should also encourage, for instance, virtuous behavior by citizens in respecting norms of social distancing.

Importantly, however, we find a negative correlation between supply indicators (number of beds, days of hospitalization, discharges etc.) and Covid induced mortality. Somewhat paradoxically, countries considered highly inefficient in the organization of their health system (such as Germany) have so far done better. This suggest that when defining 'efficiency' of health systems, we should also look at the potential responsiveness of a country to unexpected events such as an epidemic. When acting alone, single countries may choose different options to increase their readiness to large health crises: some may tolerate some amount of waste in order to create a buffer of healthcare inputs to use during the crisis, while some other may increase the "flexibility" of the system by organizing supply in ways that allows input to be easily adapted to different circumstances. Coordination is key to avoid (or at least contain inefficiency), while improving the readiness of European healthcare systems. Increasing coordination among countries will allow MS to reduce the need for spare hospital capacity (especially in terms of beds availability). The EU has played a relevant role to increase flexibility during the recent pandemic facilitating, for instance, the movement of materials and personnel across countries based on the real need. If the EU will be granted the necessary competences, this role may be reinforced increasing countries' preparedness for future emergencies.

When looking more in details at policies introduced by governments during the pandemic, we highlight two relevant aspects. First, the quicker stringency regulations were introduced when faced with the illness, the faster the curve flattened during the first wave. Second, there seems to be a negative correlation between quality of government and stringency requirement: countries with a high quality of governance felt less the need to introduce stringent requirements. This evidence suggests that if the EU becomes responsible for the prevention and control of cross-border health threats, the presence of a sound regulatory framework and a good governance that ensures effective implementation of policies are fundamental elements to limit negative social and economic impacts of health crises.

A final issue regards the type of investment that could be made more effective when managed at the EU level. Our analysis suggests that procurement and prevention are functions characterized by economies of scale and for which, intuitively, the role of spillovers among MS is relevant. In this sense, both the proposal of the European Commission and the one raised by prime ministers go in the right direction in suggesting that the EU should stimulate common procurement practices and be more involved in disease prevention. Other obvious candidates for a larger EU role are research and self-sufficiency in medical equipment.

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