

COVID-19 pandemic: a European perspective on health economic policies

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Abstract

In this contribution, delivered after more than one month of nationwide lockdowns of European countries, we discuss side-effects of the COVID-19 pandemic on citizens' access to medical care and the efficiency of national health systems in care provision. In the first section, we stress the importance of indirect mortality, i.e. non-diagnosis of non-COVID diseases whose standard-of-care management could have avoided death during the pandemic. We highlight how indirect mortality is linked to patients' psychological attitudes and behavioral responses to the unforeseen contingencies that the spread of COVID-19 has brought with it. The second section complements the first one by delving into the issue of the sustainability of financing and organization of national hospital systems, framing the discussion within the financial problems that the European Community is facing, which have been exacerbated by the current COVID-19 infection spread. Our interdisciplinary approach combines insights from academic surgery and psychiatry on the one side and behavioral and political economy on the other side.

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Keywords

indirect mortality — side-effects — health system — behavioral distortions — financial sustainability — behavioral economic insights

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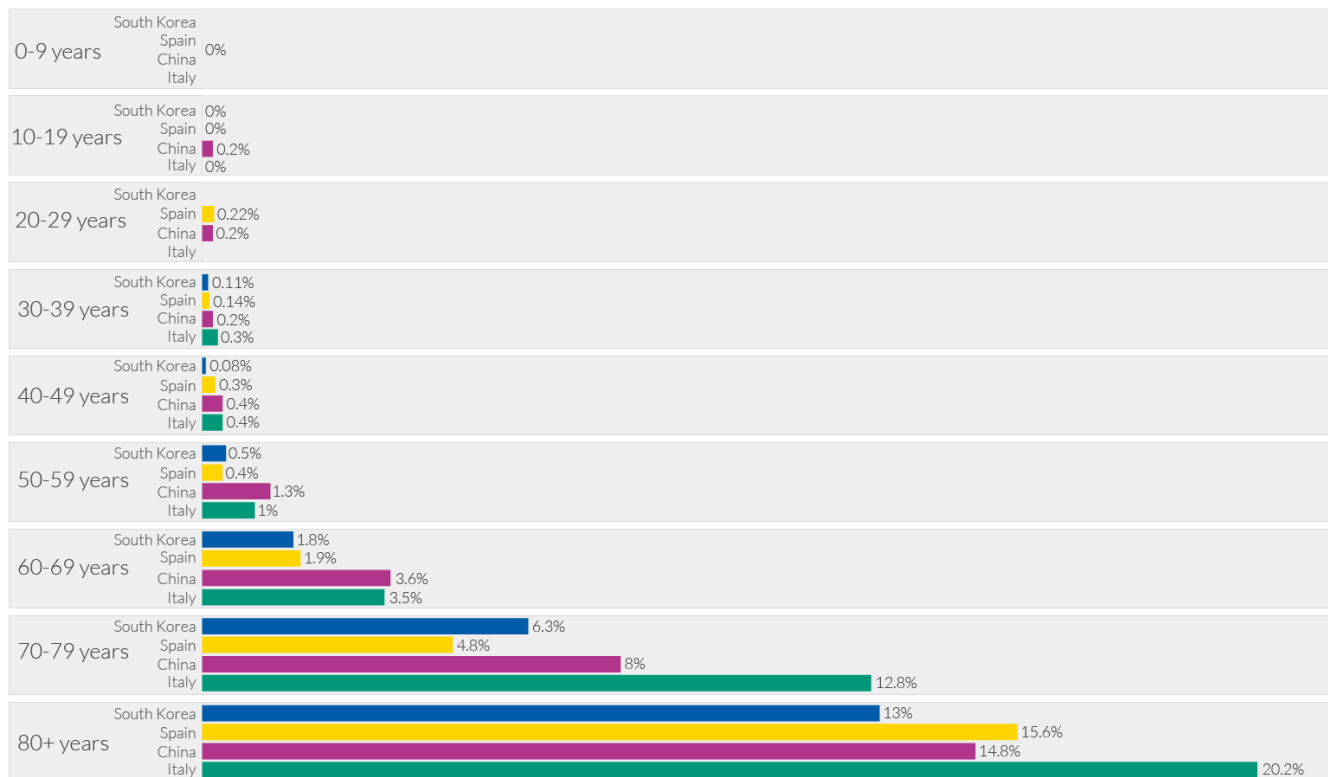
Introduction

In the first trimester of 2020, populations faced a worldwide pandemic whose severity was unimaginable for the quasi-totality of humanity, with exception of a minority of researchers and intellectuals who anticipated the risk of a catastrophic diffusion of a novel infectious agent whose aggressiveness could overcome the capacities of health, economic, and political systems to fight against and counteract deleterious consequences (Gates, 2020). Three months after the beginning of the outbreak, with worldwide diffusion affecting Western Europe and the US, which now both represent the heart of pandemic, people worry for individuals, families, and relatives, but more and more on possibility and timing of resumption of a (almost) normal life.

In the era of organ replacement possibilities, availability of effective treatments against cancers, HIV or hepatitis C infection, the realization that medicine could only offer supportive care, often in difficult settings, the case of severe COVID-19 infection has restored the disease/treatment debate to a level

not known by the less aged part of populations in high income countries. If one looks at websites of scientific journals, and public repositories of medical research, such as PubMed, or even at discussions shared in general or professional social networks, the feeling that all concerned experts are making huge efforts to fight against the spread and the mortality of COVID-19 infection is evident. Although the general belief is that only a vaccine can protect humanity from a second wave of infection, more and more is known about the biology of the virus, host-parasite interaction, risk factors for severe disease, and optimal strategies to be employed for supportive care. In particular, the awareness that children and young adults are not likely to develop severe disease and die (see Figure 1) has provided some solace in this battle.

However, despite the rapid medical progress made in the first trimester of 2020 in the world battle against COVID-19 infection – enabled by information sharing among international teams of medical researchers – concerns about the social and economic impact of the pandemic on everyday life are more and more critical. Furthermore, current lockdown measures



Note: Case fatality rates are based on confirmed cases and deaths from COVID-19 as of: 17th February (China); 24th March (Spain); 24th March (South Korea); 17th March (Italy).

Data sources: Chinese Center for Disease Control and Prevention (CDC); Spanish Ministry of Health; Korea Centers for Disease Control and Prevention (KCDC). Onder G, Rezza G, Brusaferro S. Case-Fatality Rate and Characteristics of Patients Dying in Relation to COVID-19 in Italy. *JAMA*.

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Figure 1. COVID-19 mortality: case fatality rates by age as of March 24, 2020 (South Korea, Spain, China and Italy)

inevitably impact physical and intellectual well-being. Indeed, the worldwide institutional requirement to be patient and stay inside one's own home has imposed social distancing and drastically limited any human contact. Such constraints have forced humans to change their habits, without notice, and is currently altering people's health status as well as their perceptions of health risks. It does not take long to foresee the consequences of prolonged physical inactivity, social isolation, behavioral addiction, impatience, and so on (Lippi et al., 2020).

For all of the above reasons, current and future access to health services is object of rising concerns. In this contribution, we discuss from a European perspective the implications for health economic policies of the most urgent issues caused by the behavioral distortions linked to COVID-19. Our interdisciplinary approach combines insights from academic surgery and psychiatry on the one side and behavioral and political economy on the other side.

Quality of health relies not only on the availability of diagnostic and therapeutic tools but also on access to healthcare systems, willingness of patients and caregivers to adhere to guidelines of disease management established over several decades, the possibility of the healthcare system of assuring management of all diseases except COVID-19 whilst also

ensuring continuing care of COVID-19 cases even whilst the diffusion of COVID-19 over next few months cannot be predicted. All these issues are discussed in the first section of this work.

The second section complements the first one by exploring the issue of the sustainability of financing and organization of national hospital systems, framing the discussion within the financial problems that the European Community is facing, which have been exacerbated by the current COVID-19 infection spread. We enrich the discussion by focusing on whether behavioral economic insights can be any use in designing specific policies aimed at supporting health systems in their fight against COVID-19, in the view of likelihood of new waves of the pandemic.

Although life has no price, sustaining health has important costs, and a guarantee of best-available care is the best option to avoid *health-system costs* due to delayed management of serious illness, and *societal costs* linked to impossibility or delay in regaining an active life after timely medical and surgical management of severe diseases. We are aware that the urgent debate should take into account, not only the social measures necessary to contain infection and avoid a second wave, but also medical and psychological issues, as well as a macroeconomic and healthcare system issue.

COVID-19 direct and side-effects on health

The number of infected individuals, deaths, and recoveries are being updated and shared continuously on institutional academic or government sites and on social networks since the beginning of the pandemic. These figures vary largely among countries and within the same country. For instance, in Italy more than half of COVID-related deaths in the first trimester of 2020 have been reported in Lombardy, the most populous, richest and most productive region in the country, while many less cases have been recorded in the South of Italy. The same situation has been observed in France and Spain with Paris and the Grand Est, and Madrid being at the heart of the epidemic, respectively. Interestingly, the number of COVID-19 deaths in Germany is much less than reported in neighboring countries, despite a slightly higher number of COVID-19 tests per 1,000 people in the first three months of the virus spread.¹ In fact, Figure 2 shows that, besides being among the 10 countries most affected by COVID-19 worldwide, Italy, France, Spain and the United Kingdom present a mortality rate per number of cases (i.e., total confirmed cases within a country) much higher than in Germany, where the rate is only 4.5% as of May 20 2020. The same holds if considering mortality per 100,000 people (i.e., a country's general population, with both confirmed cases and healthy people) – with Italy, France, Spain and the United Kingdom showing 53, 42, 59 and 53 per 100,000 respectively, and Germany only exhibiting 10 as of May 20 2020.²

While waiting for deeper mechanistic studies on host-disease interactions, to date these differences have been explained by the higher efficiency of the healthcare systems in Germany versus the other European countries, with a special focus on organizational aspects including the higher number of intensive care beds in Germany (34 over 100,000 inhabitants) as compared with the other four biggest Western European countries (13 over 100,000 inhabitants in Italy, 12 in France, 10 in Spain, and 7 in the United Kingdom).³ The same holds if looking at the number of acute care beds over 1,000 inhabitants in Germany (6) as compared to the other four biggest Western European countries (2.5 on average), as reported in Figure 3.

The cross-European variation in the health impact of COVID-19 has also been explained by demographic factors, including differences in prevalence of old people amongst the national population,⁴ and by sociological patterns. Among the latter, social networks and social norms have been attributed with having opposite effects. The former would foster spread of the virus through culturally rooted social contacts between

old and young in countries such as Italy (Mosson et al., 2008). The latter plays on the historical gap in respecting social norms between Germany and the other aforementioned countries, with the citizens of Germany not really needing formal restrictive measures in order to implement social distancing in the country.⁵ Other hypotheses awaiting confirmation include the differences in the use of some antihypertensive drugs belonging to the sartans family, the atmospheric pollution and the polymorphisms of the ACE2 enzyme (the receptor for the coronavirus on the host cells) that might confer an increased susceptibility to contract and develop a severe form of the SARS COVID-19 (Alifano et al., 2020).

These differences will have to be investigated with sound scientific methods in order to identify the reasons for the reduced mortality recorded in Germany in the first three months of COVID-19's recorded spread. Special attention should be given to assess whether this is due to (i) the organization and resources of the German healthcare system, (ii) the timing and type of health policies implemented by government and local institutions, (iii) the behavioral responses of citizens to these policies according to their psychological and social attitudes, or a combination of these three factors. If this proves to be the case, then the German model could be taken as an example to overcome the weaknesses of other less well-performing healthcare systems in the face of the unfolding crisis in the next months.

The COVID-19-linked mortality, however, deserves to be defined more precisely than the crude number of deaths in patients with proven infection as demonstrated via swabs and/or serologic tests and/or imaging (chest computed tomography), which can identify direct mortality. Indeed, the pandemic is responsible for other deaths, defined as *indirect mortality*. The latter includes those individuals for whom appropriate care is not provided because healthcare system efforts are polarized to fight the epidemic. In developed western countries, doctors are claiming that the number of visits to emergency rooms for both medical and surgical emergencies have dropped dramatically. Patients come to the hospital long after the onset of symptoms and this may prove to be fatal in the context of a heart attack or a peritonitis due to spontaneous perforation of a hollow viscus, to cite two frequent clinical situations in any emergency room. These deaths are obviously to be ascribed to the pandemic.

All elective surgical procedures have been canceled in most if not all hospitals in countries in lockdown mainly based on studies reporting a high mortality rate for elective surgery in the context of COVID-19 pandemic (see Diaz et al., 2020 for the US, & Tuech et al., 2020 for Europe, in particular for France). Medical academic societies have recommended delaying elective cancer surgery and privileging chemotherapy or alternatives to surgical treatment whenever possible (Liang

¹Source: www.ourworldindata.org: highest positive gap detected on April 5 2020, with 17/1,000 in Germany vs. 12/1,000 in Italy.

²Source: John Hopkins University & Medicine, Coronavirus Research Center, coronavirus.jhu.edu/data/mortality.

³Source: Financial Times, "European countries search for ventilators as virus cases surge", March 15 2020: www.ft.com/content/5a2ffc78-6550-11ea-b3f3-fe4680ea68b5.

⁴See www.populationpyramid.net, based on United Nations Data.

⁵E.g., the German Prime Minister announced on April 24 that Germany's Schools will start opening from May 4, 2020, while the Italian Prime Minister announced on April 26 that the Italy's Schools will not reopen until September 2020.

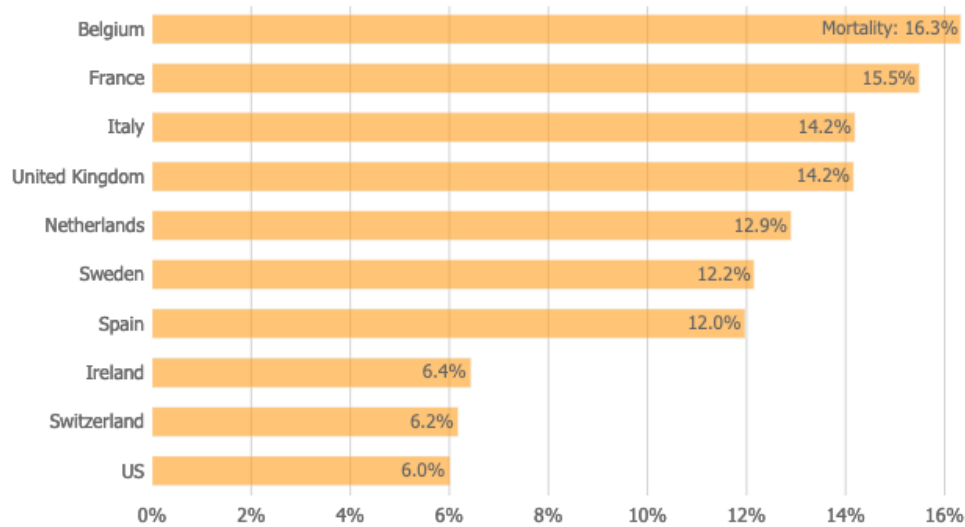
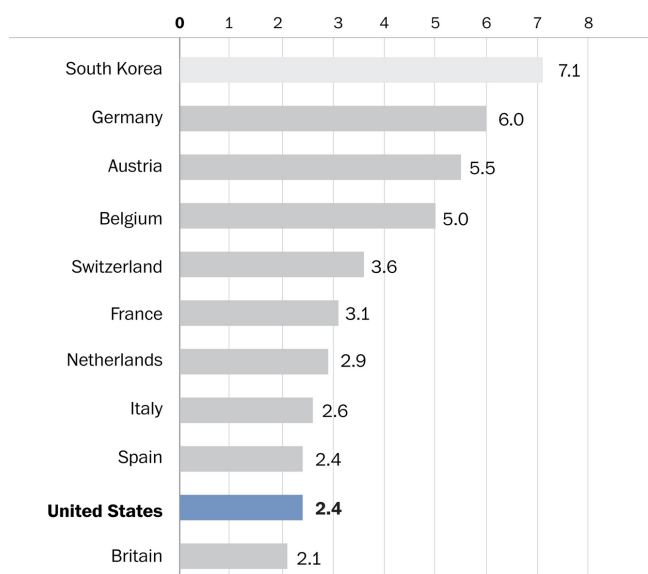


Figure 2. COVID-19 mortality: case fatality rates for the 10 most affected countries worldwide as of May 20, 2020
Source: John Hopkins University & Medicine, Coronavirus Research Center



China and Iran omitted because they are not included in OECD data.
Source: OECD THE WASHINGTON POST

Figure 3. Acute care beds per 1,000 inhabitants (2018 data) in countries hardest hits by COVID-19

et al., 2020; Peng et al., 2020; Schrag et al., 2020). However, chemotherapy is not a substitute for surgery for most cancers such as lung and colon, to cite only two of the most common cancers. Cancer has been shown to be a COVID-19 risk factor determining intensive care needs and mortality (Wang & Zhang, 2020; Xia et al., 2020), thus chemotherapy is also administered with caution in terms of dose and type of drugs in order to reduce toxicity side-effects. These changes will have evident consequences on malignant diseases pro-

gression and prognosis, thus contributing to indirect death. Patients with vital organ failure of the liver, heart and lungs and awaiting transplants are dying because of grafts shortage as intensive care units are overcrowded due to the pandemic and so transplantation surgery is almost stuck.

Patients with chronic diseases such as diabetes and psychiatric illnesses which need medical follow-up are also being impacted by the pandemic. Elderly individuals are particularly impacted by isolation due to lockdown, precipitating depression and insidiously leading to death. Lockdown may precipitate addictive behaviors including increased smoking, alcohol consumption, and is also associated with changes in eating habits with a sharp increase in binge and compulsory eating and overall weight gain (Cherikh et al., 2020). Obesity is a public health problem worldwide with 13 billion people being obese through the world (Ng et al., 2014). Expectancy and quality of life are both impacted by obesity especially because of the obesity-related comorbid conditions such as type-2 diabetes, blood hypertension, cardiovascular diseases, and sleep apnea syndrome, to cite a few. Eating is a simple way to control stress and anxiety and it can be predicted that the prevalence of obesity will increase sharply due to the epidemic. Surgical management of obesity has become a standard of care in selected patients with morbid obesity. Up to 60,000 patients underwent surgery for morbid obesity in France in 2018 but this surgery has been interrupted since the pandemic, leaving thousands of patients on standby. Other addiction-prone individuals will relapse or aggravate their addictions to drugs, tobacco and alcohol. Lockdown keeps family members together for weeks often in confined spaces, precipitating violence and aggressiveness especially against women and children.⁶ The psychic trauma linked to

⁶As for women, one week after the beginning of the lockdown in

this exceptional crisis and the economic injury deriving from the loss of employment due to bankruptcy of small, medium-sized and large enterprises will lead most fragile people to burnout, eventually increasing the number of suicides.

While the health care system and the society will have to face all this burden in a short space of time, it can be anticipated that this will increase the indirect death toll linked to the COVID-19 pandemic. The only reliable way to determine the whole death toll linked to the pandemic is to compare the crude number of deaths in a country over the pandemic period with the mean of deaths recorded over the five years preceding the crisis. National statistical institutes will provide these figures in the next months; deeper analysis of causes of death through analysis of death certificates will answer the question about whether possible excessive mortality rates are due to non-diagnosis of COVID-19 (direct mortality) or non-diagnosis of other diseases for which standard-of-care management could have prevented death if not for the COVID-19 pandemic (indirect mortality).

Policy implications from a financial, organizational and behavioral point of view

With no shadow of doubt, the COVID-19 pandemic is hitting and will hit hard the European and global economy at least through the remaining months of 2020. How much the European economy as a whole will be hit, is a matter of debate and it is still questionable as it depends on several factors which are expected to evolve over time. First of all, there is a lot of uncertainty about how long the lockdown will last across European countries and worldwide. In a globalized economy, sectors are deeply inter-connected and a shortage somewhere will affect an industry somewhere else. This holds *a fortiori* across the five biggest European economies that we mentioned in the Introduction, namely France, Italy, Germany, Spain and the United Kingdom. Besides economic linkages across the production sector, are additional human connections reflecting physical proximity. Therefore, even a few weeks delay in the end of the lockdown or a rise in the number of new COVID

France, law enforcement interventions following reports of domestic violence have increased by 32% (Source: France Télévisions, LCI, Population, March 28 2020: www.lci.fr/population/confinement-et-coronavirus-les-violences-conjugales-en-hausse-de-plus-de-30-l-interieur-propose-de-donner-l-alerte-dans-des-pharmacies-2149240.html). A similar tendency was detected in Italy during the same timeframe (Source: Più Europa, April 22 2020: piueuropa.eu/2020/04/22/covid-19-violenza-domestica-e-risposta-internazionale). As for children, the number of calls to the child endangerment hotline in France during the first three weeks of lockdown has increased by 20% as compared to a similar period in February. Urgent calls to the same number have also increased by 60% (Source: France Télévisions, France 2, April 10 2020: www.francetvinfo.fr/societe/enfance-et-adolescence/confinement-les-femmes-et-les-enfants-victimes-de-violences_3908645.html). The Italian coordination of services against ill-treatment and abuse at childhood (CISMAI) confirms that lockdown has increased the risk of child abuse in Italy (Source: CISMAI, May 09 2020: cismai.it/minori-maltrattati-cismai-il-lockdown-ha-innalzato-il-rischio-di-abusi).

cases in a given time period might lead to closure of borders to goods and persons, with huge regional economic shocks.

Second, the volume of European resources and financing dedicated by public authorities to deal with COVID-19 will be crucial. For the time being, Europe has not been capable of giving a coordinated response to the crisis. Some countries are willing to use MES (Mechanism of European Stability), some others like Italy, Spain and Portugal would be keener to use Eurobonds. The key difference is that Eurobonds are guaranteed by the entire European Community and would better serve the scope to support those countries, like Italy, already facing an enormous public debt (currently around 135% of GDP and set to increase to over 150% because of the incoming recession). MES would better fit asymmetric shocks like Greece in 2012. Furthermore, MES normally comes with specific covenants (i.e. keeping public debt/GDP ratio under a specific level) in order to prevent a potential default on public debt. Countries like Italy, Spain, Portugal and France to a less extent are reluctant to adopt even a “diluted MES” (with light covenants) also because this would be hard to digest in terms of the public opinion which remembers that Greece, after going through MES procedure, was forced into a prolonged austerity (privatizations, cuts in healthcare and welfare, etc.) with a marked worsening of life conditions in that country. Recently, the idea of using a specific European COVID-19 dedicated fund of around €500 billion to support the entire Eurozone economy has been launched. This might be a good compromise between Eurobonds and MES although it is still unclear how it would work and what the decision mechanism to allocate the resources within the different countries would be. What is certain is that an agreement within the European Community must be found quickly as the incoming recession is expected to hit hard across Europe. This is a crucial test of whether Europe is a real union or a simple common market.⁷ Here European leaders will shape the future of Europe. Failing to reach an agreement would open the door to populism and might be the end of the European Community.

Third, the way in which each European country allocates the resources within its national system will be decisive. Although 2020 recession in Europe due to impact of COVID-19 is not expected to have the same impact across all affected countries (it could range from -3% GDP in Germany to -10% in Italy according to rating agencies), recessionary forces might be mitigated if national authorities provide a “safety net” to the economy. In fact, were an agreement reached across Europe, each European country should support, as a matter of priority, the national health services and the labor market, the latter by funding specific categories of workers (e.g., self-employed), companies which are facing financial and credit constraints, and in general providing incentives to preserve employment. At the same time, each European

⁷Obviously, the European Central Bank would play a crucial role. It is expected not only to provide abundant liquidity to the banking system but also to continue buying sovereign-bonds to avoid distress in sovereign bond markets, which would cause a chain effect on the banking system, giving banks plenty of sovereign bonds in their balance sheets.

country should support the recovery with local fiscal policies as there is no coordination across the European Union as far as fiscal policies are concerned.

Our view is that the economic sustainability of managing COVID-19's impacts across European countries will crucially depend on how the aforementioned funds will be used in supporting the national health services. In most European welfare states, the national health system funding is not tax-based because health is not a regalian function.⁸ Public hospitals cannot go bankrupt, because they are public institutions; the State can therefore intervene by allocating credits and, in particularly serious cases of deficit, a recovery procedure under the responsibility of the State can be applied. However, private-for-profit hospitals, which provide an extremely important percentage of the care offer, could go bankrupt. If one considers that approximately half of public French hospitals experience annually a deficit and with Italian hospitals suffering financial cuts of more than €37 billion across the last ten years (Armocida et al., 2020), a drastic reduction of medical and surgical activities over a period of some months would inevitably result in a huge reduction in hospital revenues without significant reduction of expenditures (mainly represented by salaries). In private-for-profit hospitals, financial consequences of a reduction of activities would be more dramatic, without the possibility (theoretically) of State intervention. However, the latter would likely be necessary in practice, since bankruptcy of private hospitals would increase the demand for public hospitalization, thereby increasing the (already) huge deficit of public hospitals. As a general rule, another pandemic will require funding to private hospitals and additional funding to public ones in a period which will be characterized by a significant loss of national GDP.

At the same time, extensive restructuring and reorganization of the whole health system is needed to face side-effects of COVID-19 spread. Indeed, as anticipated above, the management of diseases other than COVID-19 will be a key issue through to the end of the ongoing pandemic, and the end of lockdown phase. This does not only concern the institutional health system, but also agents' psychological attitudes and behavioral responses to the unforeseen contingencies that the spread of COVID-19 has brought with it.

Medical staff should be helped to adhere to pre-crisis schema of disease management – in terms of prevention of asymptomatic cases, and diagnosis and treatment of symptomatic ones – under changed social contexts and patient attitudes. In fact, unchanged lifestyles alongside falling incomes and deteriorating employment status might lead to additional

morbidity and mortality of patients (e.g., Stronks et al., 1997). Detecting on time the higher rates of morbidity and mortality under unchanged patients' lifestyles might be complicated. Therefore, hospital datasets should be quickly updated and shared via artificial intelligence. Caregivers (especially treating physicians) should also be continuously briefed about new trends in diseases and their correlations with patients' idiosyncratic features.

Furthermore, patients could continue to be afraid of the *risks of facing infection* when visiting medical facilities, as they showed in February-March 2020 across all European hospitals. In that case, a clear identification of structures and pathways for COVID and non-COVID diseases is mandatory and information should have widespread diffusion. This would require a thorough re-organization of hospitals' specializations in each region of a country, and of first aid within each hospital. Similarly, caregivers, while participating in the efforts of separating pathways, should adhere to pre-crisis standards of care whenever conditions of safety are fulfilled.

As for the management of patients' risk attitudes, insights from behavioral economics may be very useful in reshaping treating physicians' and hospitals' approach toward patients. In fact, as experimental studies in economics have shown, individuals are usually risk-averse (i.e., they prefer prospects with lower outcome variance, under known outcome probabilities) and ambiguity-averse (i.e., they prefer prospects with known to prospects with unknown probabilities).⁹ However, these two psychological features are usually not correlated across individuals (see Attanasi et al., 2014, and the literature therein) and therefore should be treated separately when designing policies that may affect them.

As for *risk attitudes*, a variety of experimental studies have testified to human insensitivity to mass tragedies (Slovic, 2000), hence the same might occur in the face of the hundreds of thousands of deaths linked to COVID-19, with a too low perception of the risks of facing infection. This would lead to risk-taking behavior by disregarding basic hygiene rules and/or interfacing with the medical sector too late (e.g. not calling first aiders or treating physicians in the face of COVID-19's initial typical symptoms). Behavioral economics offer several policy instruments to restore subjects' innate risk aversion in order for them to follow exogenously imposed hygiene rules and timely interactions with the medical sector. Two of these instruments are worth discussing here. First, *information*: Slovic (2010) has detected subjects' difficulties in understanding health risks and catastrophic events when information is presented in the form of statistics about large negative impacts, as it is usually done for COVID-19 new cases and deaths during the lockdown. Slovic (2010) also proposes a solution to mitigate these difficulties, namely stimulating subjects' experiential mode of thinking: providing detailed information about single identified victims and their own likely

⁸Focusing on the French healthcare system, the reimbursement of public, private no-profit, and private-for-profit hospitals is based on a diagnosis related group (DRG) – based payment system introduced 15 years ago with the objectives of improving hospital efficiency, transparency and fairness in payments. The payer is represented by the national health insurance (“Assurance Maladie”), whose main funding is in turn represented by employer or self-employed contributions. In Italy the healthcare system is regionally based, with local authorities responsible for the organization and delivery of health services. Over the period 2010–2019, the Italian healthcare system experienced a progressive privatization of health-care services.

⁹For a theoretical discussion of the different definitions of risk aversion and ambiguity aversion and their disentanglement within non-expected utility models, see Attanasi & Montesano (2012).

COVID-related path – rather than reporting cold statistics about all victims. This strategy can help to intensify subjects' affective reactions and identification with the victims, thereby restoring appropriate risk-avoidance behaviors. Second, *fear*: Caplin (2003) has introduced a game-theoretical model where fear is used as a policy instrument in health-related issues. In fact, as it is currently occurring for COVID-19, public health authorities know far more about the physical dangers involved in a health threat than the typical private citizen. Therefore, appropriate messages can be publicly sent in order to promote fear of COVID-19 spread (e.g. in the estimation of a non-negligible number of COVID-19 unrecordable cases and hidden deaths, besides the official ones), thereby increasing individuals' judgements of their subjective probability of facing serious infection (i.e., risk perception) and thus stimulating socially beneficial behavior.

As for *ambiguity attitudes*, Slovic (2010) provides evidence that a recent major catastrophic event leads to an overestimate of the probability of future self-relevant negative events, and consequently to an underweighting of life expectancy, which is individually unknown despite all the available information displayed in Life Tables. Along the same lines, Cutler & Meara (2004) have reported changes in the distribution of survival probabilities at each age in the last century due to opposing factors such as medical progress versus the emergence of new epidemic diseases. In this regard, d'Albis et al. (2019) have experimentally shown how aversion to ambiguous survival probabilities leads to puzzling self-insurance behavior. Therefore, private firms and public authorities should reshape current financial instruments of self-insurance taking into account the greater uncertainty about survival probabilities for older age groups generated by COVID-19's emergence. As an example, ambiguity-averse investors might prefer financial products that combine an annuity and a life insurance, thereby hedging across different ambiguous states of the post-COVID-19 world. Furthermore, it is well known in behavioral decision-making that when relying on one's own previous experience subjects tend to under respond to rare events, that is, rare events may have less impact on decisions than their objective probabilities warrant (see Hertwig & Erev 2009 in the psychological literature and Abdellaoui et al., 2011 in the economic literature). In extreme cases, rare events are completely neglected, a pattern known as the "Black Swan effect" (Taleb, 2007). This especially occurs when dealing with unexpected and unpredictable rare events that carry an enormous impact, as is the case with the sudden spread of COVID-19. Combining the "Black Swan effect" underweighting with the aforementioned overweighting of the probability of future self-relevant negative events (Slovic, 2010), one can understand how ambiguous is the probability that a second wave of COVID-19 arises. De Palma et al. (2014) have shown that behavioral distortions in decision making in the face of rare negative events are not only connected to experience *per se* but also to the way in which information concerning the ambiguous probability of these events is learned by subjects

sensitive to such ambiguity. Applying these findings to the case of COVID-19, the constant reminders by epidemiologists and the EU coronavirus chief¹⁰ – that Europe should brace itself for second wave – is a suitable policy for helping EU citizens to determine that the probability of "meeting another black swan soon" is not negligible.

Finally, *social distancing and limited human contacts*, imposed by the nationwide lockdowns for more than one month for the time being, might have increased European citizens' addictions, e.g., from tobacco consumption to online shopping. Home quarantine and isolation might also lead to impatience and risk-seeking behavior: the latter psychological factors have been recently found to increase the likelihood to be obese (de Oliveira et al., 2016). Nonetheless, results of a recent survey implemented three weeks after the beginning of mass quarantine in France have shown that more than a quarter of the respondents had no physical activity, corresponding to another quarter feeling that they lost control of their usual alimentation habits (Cherikh et al., 2020). All these psychological and behavioral distortions suffered by potential users of the health services should be taken into account in the re-organization of the health system. Specific interventions might go from including ad-hoc questions in first-screening questionnaires to strengthening psychiatric consultation services.

Despite the negative externalities of lockdown social distancing on subjects' psychological health status, its benefits in terms of reduced COVID-19 spread and mortality are undoubtful.¹¹ Therefore, insights from behavioral economics should be used to incentivize subjects maintain social distancing in the post-lockdown "phase 2." In this regard, behavioral decision-making experiments have shown that nudges are particularly effective in improving health behavior (Thaler & Sunstein, 2008; Li & Chapman, 2013). As for the COVID-19 case, this means that messages with compelling social norms such as "the overwhelming majority of people in your community believe that everyone should stay home" (Van Bavel et al., p. 463) could be equally or even more effective than coercive means such as police fines. In this regard, Reisch & Sunstein (2016) have reported strong consumer support in European countries (including in France, Germany, Italy, and the United Kingdom) for nudges related to health topics. However, to be effective, nudges require majority approval by the population: Loibl et al. (2018) point to means for effective targeting and increased knowledge about the types of nudges likely to obtain public support. Indeed, the actual impact of COVID-19 mitigatory social distancing in different EU countries should crucially depend on country-specific age and social contact structures (see Singh & Adhikari 2020 for India). As for the latter, Van Bavel et al. (2020) postulate that people centrally located in social networks should be targeted,

¹⁰See, e.g., www.theguardian.com/world/2020/may/20/top-eu-doctor-europe-should-brace-itself-for-second-wave-of-coronavirus.

¹¹For a first assessment of economic benefits of social distancing policies in response to the COVID-19 epidemic in the US (in terms of reduced fatalities), see Greenstone & Nigam (2020).

making their norm compliance visible and salient to others. In fact, on the one side, coming into contact with more people, they are often among the first to be infected; on the other side, they may be instrumental in slowing the disease because of indirect effects in terms of their social contacts copying their pro-social distancing behavior.

However, we insist on reaffirming that the effectiveness of all the previous behavioral economic insights is conditional to the implementation of a broad health economic policy. Until then, national health systems cannot be assured of their medium-term prospects for organizational and financial sustainability taking into account the behavioral distortions provoked by COVID-19 and the probable new waves of the pandemic, and it will not be possible to seriously plan for a restart of national economies and of the European economy as a whole.

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