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Emerging Evidence of a Silver Lining: A Ridge Walk to Avoid an Economic Catastrophe in Italy and Spain[*]

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April 2020

The White Paper is updated on a regular basis, please find the latest working paper version here.

Summary

1. *The coronavirus has led to a human tragedy, but it need not end up in an economic catastrophe.*

2. *In Southern Europe there are signs of a silver lining: the growth rate of the total number of deaths attributed to the coronavirus has been decreasing for weeks in Italy and Spain.*

3. *While the effect of the connement measures aim at limiting the spread of the virus is at best uncertain, the economic and social costs of a prolonged lockdown are much less ambiguous and potentially huge. Importantly, these costs can be very unequally distributed.*

4. *We argue that it is therefore time to start thinking about how to **gradually** unlock these countries, and we make some suggestions along this line starting with large-scale testing and continuous retesting as the most useful pre-condition.*

I. A Human Tragedy

The uncertainty around the impact of the coronavirus spreading around the world is huge, as we still know little about both the actual infection rate and fatality rate of the virus. At the same time there is little disagreement that the epidemic has led to a human tragedy almost everywhere we look. Europe (prominently Italy and Spain) and the U.S. are unambiguously the two current global hot spots.

II. Evidence of a Silver Lining

There seems to be a silver lining for Southern Europe, however. First, for some time now, although the number of deaths attributed to the coronavirus in Italy and Spain has been increasing, it is doing so at a slower pace. In Figure 1, we show the growth rate of the accumulated number of deaths attributed to the coronavirus in Spain and Italy. Currently, Italy already shows a growth rate in the stock of deaths

of below 10% and Spain is closely following with some lag - the growth rate of the stock of deaths in Spain has been decreasing over the past two weeks from a peak around 60% to figures below 15% (see panel (a)). This pattern mirrors the one in Italy (see panel (b)), and both countries show some similarity to the Hubei region, even though the decline there happened somewhat faster (see panel (c)). South Korea also follows the same pattern with what seems a lower peak, around 20%, and current values below 5% (see panel (d)). We are still far from the goal of zero growth, but it all indicates we will get there. It is then plausible to assume that the same will follow for the rest of the EU, the U.S., and the globe. Currently, the U.S. is still at early stages of the epidemic with an increasing pattern in the growth of accumulated corona deaths (see panel (e)), and the same pattern arises for the globe after removing the effects of China (see panel (f)).

We take the reported death toll at face value but note that there is a big debate on its measurement (e.g., see here or here). However, note that if the measurement error in the number of deaths is classical (e.g., in France dying at home from corona is consistently not reported as a corona death by now), then this should bear no impact on the growth rate that we show in Figure 1. Therefore, and given the notorious and frustrating lack of testing for the virus in the general population, we argue that the growth rate of deaths attributed to the coronavirus is a more accurate measure to consider than the number (or growth rates) of infections. We also find the death growth rate to be a more preferable measure given the difficulties of estimating a mortality (or case fatality) rate during an outbreak. Note that in order to compute mortality (or case fatality) rates for coronavirus one needs not only to correct for incubation periods between infection and death (knowledge of which is currently imprecise), but also control for the number of asymptomatic cases that recovered (which is currently unknown without testing). Without proper widespread testing, we simply neither know corona prevalence nor new corona infections (see the discussion here). In summary, while acknowledging caveats in this measurement, we find it more reasonable to base policy on a peak in death growth rates than on a not measurable peak of coronavirus infection prevalence.[1] In this context, we consider Italy and Spain (also Hubei and South Korea) mature in the corona epidemic in the sense of having already surpassed the peak of cumulative deaths growth.[2] In addition to the growth rate, Figure 2 directly shows the development of the number of deaths per day. For Italy and Spain, the emerging pattern is an S-shape which further indicates that the epidemic is at a mature stage: the typical epidemiological curve implies that we should expect a fall of the number of deaths per day, which corresponds to the dynamics seen in Hubei.

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[1] We owe our perspective on the growth rate of the number of deaths to Ritschl (2002).
[2] The term of a mature epidemic usually refers to the stability around (or the surpassing of) the epidemic prevalence peak (see this). Given the inaccuracy of the prevalence of the current corona outbreak and our discussion of the cumulative corona deaths growth rate as a preferable measure, we define the maturity using this statistic.
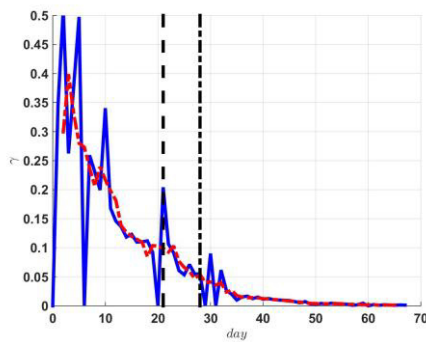
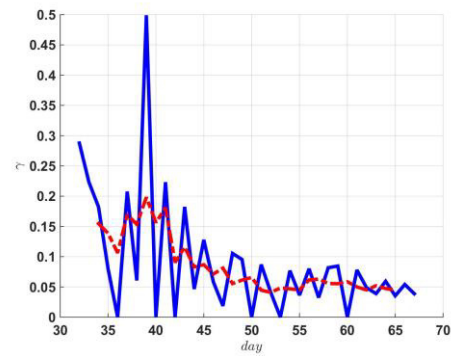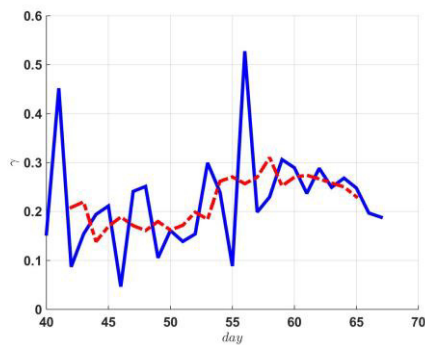**Figure 1: Growth Rate of Accumulated Number of Deaths**
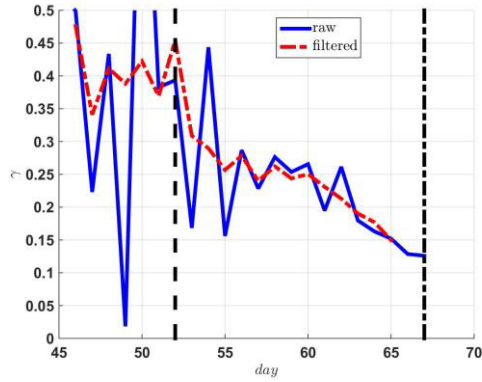
(a) Spain
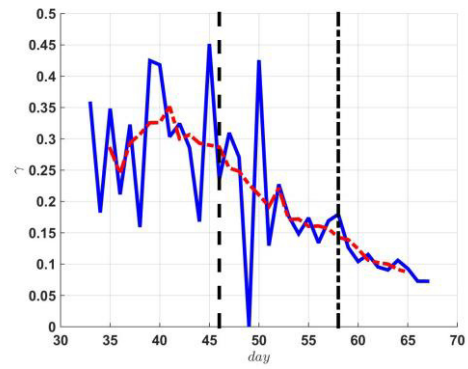
(b) Italy

(d) Hubei, China

(c) South Korea

(e) United States
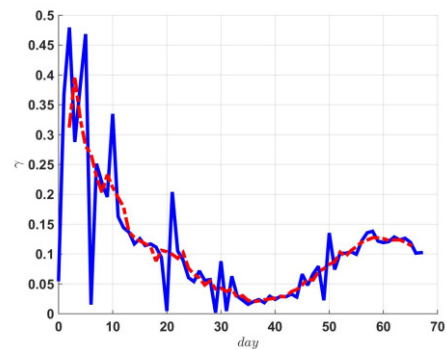
(f) Global

Notes: Growth rate in the number of deaths reported as caused by coronavirus disease 2019 (COVID-19) by day since January 22, 2020 corresponding to day 0 in the graph. *Sample selection criterion:* number of deaths exceeds 5. The solid line shows the raw data, the dashed line is a smoothed series by applying a 5-day moving average filter. Vertical lines in the plots for Spain, Italy and Hubei show the dates of confinement measures in the respective country/region. *Source:* Own calculations based on data from the COVID-19 (2019-nCoV) Data Repository, Johns Hopkins University.

Of course, besides the development of the epidemic itself, what matters for the assessment of the current situation is the number of active cases, calculated as the number of confirmed infected cases minus number of dead or cured. While the number of confirmed infected cases is problematic to assess the stage of the epidemic (given the problem of not having information for the population or a representative sample) and while the number of cured cases is also measured with error, we view the calculated number of active cases as a good proxy for the number of patients in need of hospitalization, which is crucial to assess the implications for the capacity of the hospital system. Figure 3 shows the log of the number of active cases, and while it is still increasing, the slope is clearly flattening out in Italy and Spain. The number of daily confirmed cases is shown in Figure 4. Similar to the number of deaths, it follows an S-shape pattern for Italy and Spain, which we view as a good lead indicator for the active cases to soon start dropping, as observed in Hubei. We can thus conclude that there is a silver lining in Italy and Spain. In summary, while acknowledging caveats in this measurement, we find it more reasonable to base policy on a peak in death growth rates than on a not measurable peak of coronavirus infection prevalence.

III. Public Health Policies to Contain the Spread: Very Heterogenous

Given the severe symptoms of some infected persons that necessitates treatment with ventilators in intensive care units, a huge challenge for health systems is to avoid hitting the capacity limit during an epidemic. The degree of public health policies to contain the spread is very heterogeneous across the globe. A common denominator of the various policies is the introduction of policies that limit social contact (*social distancing*), which are based on the understanding that the virus spreads through contact with infected individuals. These policies followed the example of Hubei, China, where the government cut-off the capital Wuhan on January 23, followed by the shutdown of all non-essential companies, including manufacturing plants on February 13, which was extended on February 20, additionally including school closures. Importantly, China also quickly increased hospital capacity by setting up emergency hospitals. Over the course of March, all European countries introduced school closures. In both Spain and Italy, the two most affected European countries as of now, strict exit restrictions for the population have been in place for the last weeks. In Spain, this lockdown has been in place since March 15, and was extended to a complete shutdown of "non-essential" economic activity starting March 30. Spain thereby follows the Italian lockdown policy, which enacted a nation-wide lockdown on March 9 and the shutdown of "non-essential" economic activity on March 21, after first implementing regional quarantine measures. Looking at other countries in Europe, e.g., France followed the same route, whereas Germany has introduced strict contact restrictions without prohibiting citizens to leave the house. In the U.S., policies vary across states, e.g. California announced a state-wide stay at home order on March 19 and New York on March 21. Once the look turns to Asian countries, policies vary

even more as measures do not only relate to exit and contact restrictions, but also include measures that aim at precisely confining the epidemic. For example, South Korea resorted to using CCTV footage and GPS tracking data of the population in order to identify networks of infection.[3]
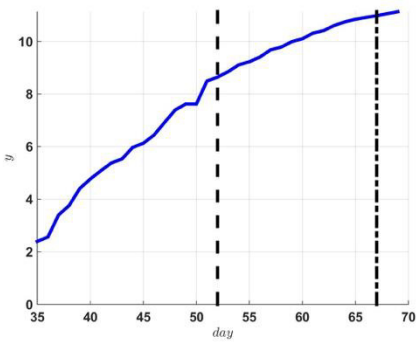
Figure 2: Number of Daily Deaths

(a) Spain

(b) Italy

(c) Hubei, China
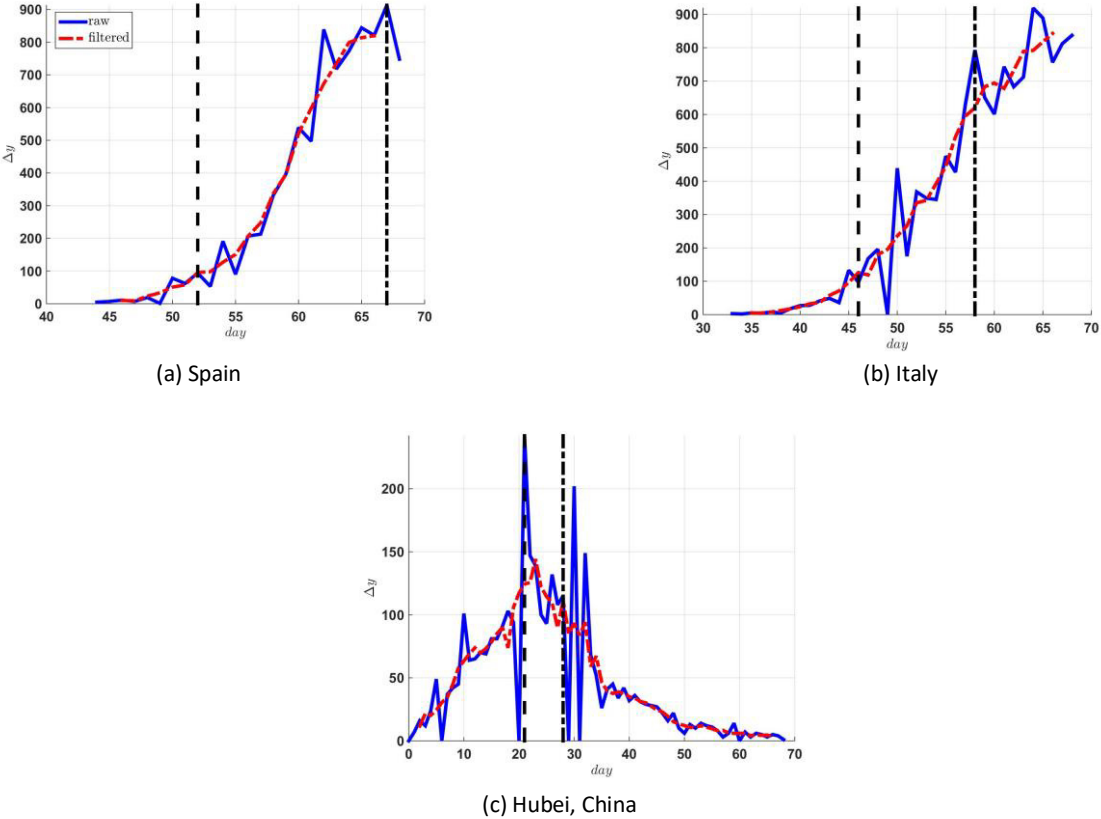
Notes: Deaths reported as attributed to coronavirus disease 2019 (COVID-19) by day since January 22, 2020 corresponding to day 0 in the graph. Sample selection criterion: number of infected exceeds 5. The solid line shows the raw data, the dashed line is a smoothed series by applying a 5-day moving average filter. Vertical lines in the plots for Spain, Italy, and Hubei show the dates of confinement measures in the respective country/region. *Source:* Own calculations based on data from the COVID-19 (2019-nCoV) Data Repository, Johns Hopkins University.

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[3] See also this for a nice and detailed description of implemented public health policies.

Figure 3: Number of Active Cases (in Logs)

(a) Spain

(b) Italy
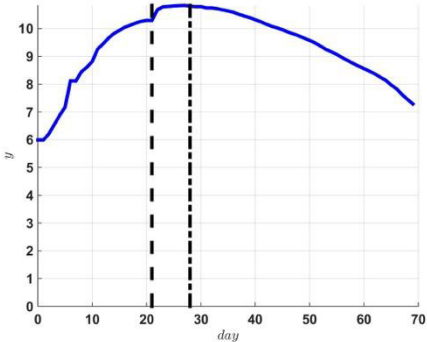
(c) Hubei, China

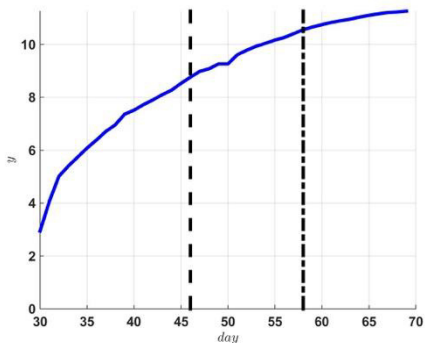*Notes:* Log of number of active cases infected with coronavirus disease 2019 (COVID-19) by day since January 22, 2020 corresponding to day 0 in the graph. Active cases is number of infected minus number of dead or cured. Sample selection criterion: number of active cases exceeds 5. Vertical lines in the plots for Spain, Italy, and Hubei show the dates of confinement measures in the respective country/region. *Source:* Own calculations based on data from the COVID-19 (2019-nCoV) Data Repository, Johns Hopkins University.
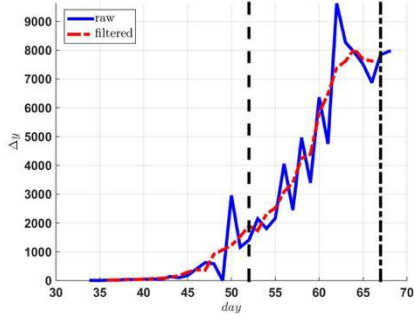
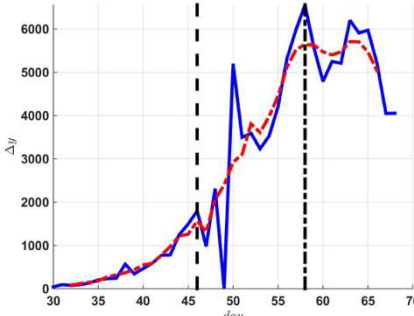**Figure 4: Number of Daily Confirmed Cases**

(a) Spain

(b) Italy

(c) Hubei, China

Notes: Daily number of newly infected by coronavirus disease 2019 (COVID-19) by day since January 22, 2020 corresponding to day 0 in the graph. Sample selection criterion: number of infected exceeds 5. The solid line shows the raw data, the dashed line is a smoothed series by applying a 5-day moving average filter. Vertical lines in the plots for Spain, Italy, and Hubei show the dates of confinement measures in the respective country/region. *Source:* Own calculations based on data from the COVID-19 (2019-nCoV) Data Repository, Johns Hopkins University.
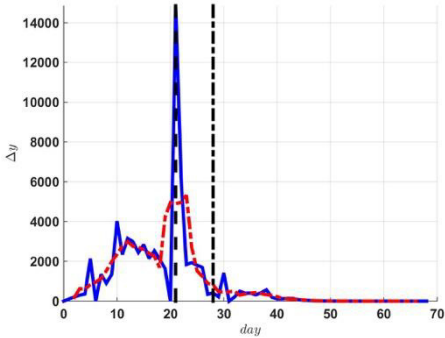
IV. Are the Currently Implemented Lockdowns Containing the Within-Country Corona Deaths and the Spread of the Virus?

The evidence that is slowly emerging suggests that the answer to this question is a tentative *no*, at least in Italy and Spain. First, putting together the dates when first measures of confinement and lockdowns were implemented (see vertical lines in Figure 1), it is clear that this happened when the growth rate of accumulated deaths was already declining in both Italy and Spain. Second, the primary goal of a lockdown is the reduction of infections (*flattening the curve* of corona prevalence) in order to avoid the collapse of hospitals - as already witnessed in Spain and Italy. For this reason, and despite our concerns regarding the measurement of infections stated above, we show in Figure 2 the growth rate of the number of confirmed COVID-19 cases in Spain, Italy and Hubei, China. Taking an incubation period of 2 to 14 days into account, the graph of neither country/region, especially not the one of Hubei, lead us to conclude that the measures were particularly successful: the growth rate of confirmed cases in Italy and Spain had been decreasing for many days before the first measures were taken. However, in Hubei, already before enacting strict stay home orders by mid-February, the government called for citizens to stay home and keep social distance. Thus, the lockdown measures that have been implemented at early stages of the epidemic may possibly show a more direct effect – other than those in Italy and Spain, where the implementation happened only at mature stages of the epidemic. Compliance with the call for staying at home prior to the actual lockdown in Hubei could point in that direction. At the same time, a large number of disease transmissions appears to take place inside households or healthcare institutions, and a large fraction of infected individuals show few symptoms, if at all, so that it is likely that the virus had already spread substantially before any confinement measures were taken and continued to spread thereafter (Mizumoto et al., 2020). Further, general lockdown measures are a very non-targeted policy that does not help to protect those in need - e.g., the virus has already spread to nursing homes (see, e.g., here).

We can thus conclude that (any extensions of) general confinement measures are decisions in the dark with no (or at best very uncertain) evidence of success.[4] It seems that the race for public health policies through confinements and lockdowns to contain the spread is somewhat lost in countries like Spain and Italy, and the important race that should have *all* the spotlight and efforts is that of policies that rapidly increase ICU and hospital capacity as well as the required equipment (e.g. ventilators) to deal with the upcoming tsunami of corona sick individuals.

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[4] An alternative to the study of the empirical behavior of the epidemic that we pursue is the use of models to contagion to see the effects of social distance policies; see Casares and Khan (2020) for the case of Spain, and Donsimoni et al. 2020 for Germany.

Figure 5: Growth Rate of Accumulated Number of Confirmed Cases
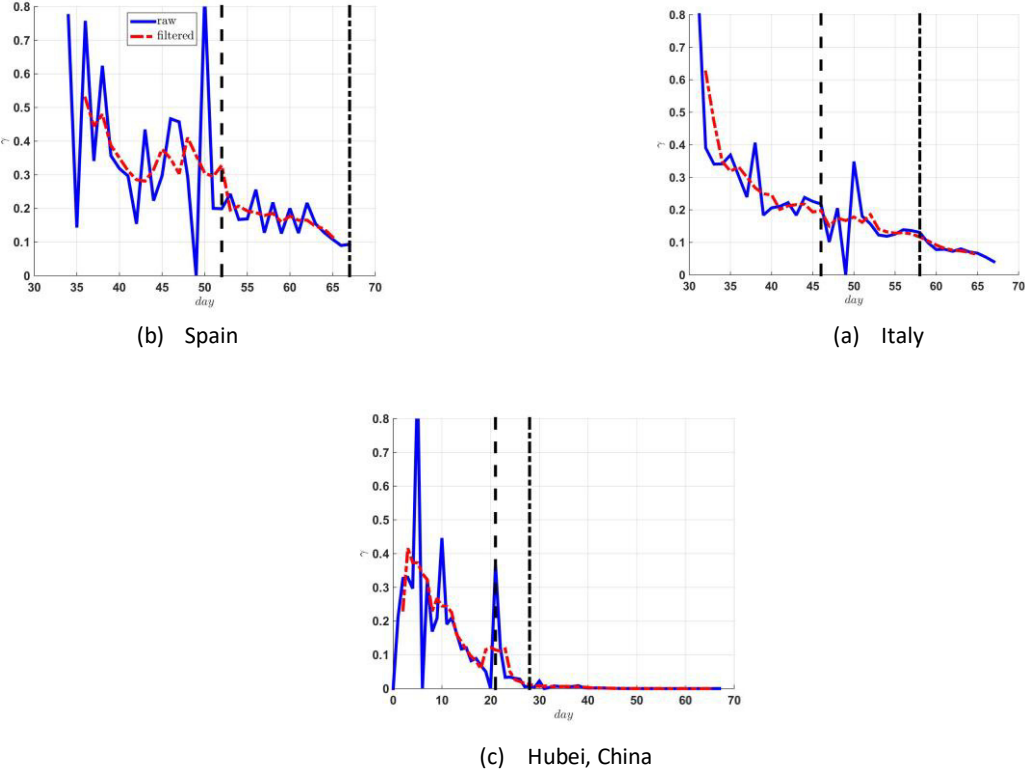
(b) Spain

(a) Italy

(c) Hubei, China

Notes: Growth rate in the number of deaths reported as caused by coronavirus disease 2019 (COVID-19) by day since January 22, 2020 corresponding to day 0 in the graph. Sample selection criterion: number of deaths exceeds 5. The solid line shows the raw data, the dashed line is a smoothed series by applying a 5-day moving average filter. Vertical lines in the plots for Spain, Italy, and Hubei show the dates of confinement measures in the respective country/region. *Source:* Own calculations based on data from the COVID-19 (2019-nCoV) Data Repository, Johns Hopkins University.

VI. Fueling an Economic Catastrophe: A Lockdown Plus its Remedy

While the success of the (well-intended) lockdown measures initiated to contain the epidemic is at best uncertain, they can be expected to generate high cost - both direct economic costs associated with the shutdown of economic activity and manifold indirect costs, e.g., due to foregone schooling, detrimental effects on physical and psychological health, etc. This poses a clear and hard-to-balance trade-off between public health policies that target reductions in infections (or deaths) and the economic costs associated with these policies (e.g., Atkeson, 2020; Alvarez et al., 2020; or Eichenbaum et al., 2020, Piguillem and Shi, 2020).

(a) Aggregate and distributional effects: There is a growing wealth of studies estimating the impact of public health policies aimed at containing the corona epidemic (i.e., lockdowns) on macroeconomic performance. For instance, a study for Germany has computed that the annual costs of a two-months shutdown may lead to a reduction of annual GDP growth by 7.2 to 11.2 percentage points (see here). The lower bound estimate is comparable to the costs of the financial market crisis which reduced per capita GDP in Germany by 5.1 percent in 2008. Effects in Spain and Italy

can be expected to be of at least the same or even larger magnitude. For example, the Spanish economy relies more heavily on the service sectors that are particularly vulnerable, e.g., tourism which represents 11.7% of Spanish GDP (see here), while in some regions this figure is much higher (e.g., 44.8% in Mallorca, see IMPACTUR).

In addition to being high, the costs are not borne by everyone equally, and thus the lockdown can be expected to have very undesirable distributional consequences. While some employees can move their desk job to the home office, many others lose their jobs, self-employed risk losing their businesses, small enterprises are forced to close down and some sectors, such as services, arts or tourism, will be particularly affected. Similarly, prolonged school closures will have particularly bad consequences for children from families with low income and less education. These children do not receive the same time input into schooling as others, which increases social disparities. Further, let us not forget that a lockdown also largely kills the underground economy, which is not a trivial component of the economic activity (e.g., above 15% of GDP for France and Germany, above 20% for Spain and above 25% for Italy and Greece, see here) and used by many individuals to make ends meet at the end of the month.

There is a similar uncertainty around the many indirect (not necessarily economic) costs of the lockdown measures. The channels are manifold and range from psychological costs of social distancing, over adverse health consequences of financial stress, possible increases of alcoholism, domestic violence and suicides due to factual confinement in a stress situation, to detrimental health effects of reduced physical activity. Like the economic costs, the indirect costs are unequally distributed as well. Some are directly triggered by the economic costs and thus hit those who also suffer economically. Other health costs are a consequence of restrictions to leave the house. Such a restriction is, of course, more severe for a family that lives in a small at than for one that can enjoy the amenity of a garden and it is particularly severe for the elderly - and thus the group that is intended to be protected the most – whose health status can be expected to deteriorate from the lack of physical activity. At the very least the very high and unequally distributed costs should play are more dominant role in the public debate, which is currently dominated by metaphors of war (see, e.g., here).

(b) *Insurance policies that bite you back down the road:* The foreseen negative economic impact of prolonged lockdown policies - an unprecedented negative supply shock - is making governments enact various countermeasures which will increase government debt. In Spain, the planned direct economic aid amounts to 100 billion euros, which is approximately 7.6% of Spanish GDP. That would mean that the government debt-to-GDP ratio, which currently stands at about 100%, could increase to about 120% in total: suppose that an economic lockdown of two months leads to a reduction of GDP by 10%. This by itself will increase the government debt-to-GDP ratio to 111%.

The additional fiscal package will further lead to an increase to about 120%. While this may be sustainable, it will imply an increase of taxes paid by future generations of workers to reduce the level of outstanding debt. This ratio will increase further if the government, reasonably, forgives taxes to businesses without economic activity (in particular, small businesses and self-employed) during the lockdown period.

VII. Unlocking the Economy: A Ridge Walk Policy

In light of the previous discussion, it appears important that policymakers do not only consider the direct health costs associated with the corona epidemic, but also the potentially very large costs triggered by the economic lockdown and the social restrictions. Given the large uncertainty around both, all policy decisions are made in the dark and policymakers enacted policies under the impression of a worst-case scenario. We argue that in countries like Spain and Italy, we should start to think about ways of gradually unlocking the economy. Clearly, this needs to be done very carefully, given that there are still infected and infectious parts of the population that could keep the outbreak alive. Our suggestions for this ridge walk to unlock the economic activity are as follows:

1. *Aggressive and widespread testing. Now!*

   To learn the source of the problem (who are the infected and infectious in the population?), widespread representative testing of persons is a must and just cannot wait. As of today, we are effectively clueless about corona prevalence (and infection) rates since official numbers are almost invariably based on non-random samples. An essential reason for widespread testing is to capture the undocumented contagious infected individuals (see Li et al., 2020). This can be done with drive-through stations (see [this](#)).

   As a first cut at this, we should administratively test the entire medical staff, which, given their high exposure, should provide us with an upper bound estimate of the corona prevalence (and infection) rate for the working-age population.

   E.g., Germany is on the way of conducting large-scale testing. Even if the testing cannot be done for the entire population, large representative samples can be useful to identify subsets (occupations/industries) where economic activity can be unlocked. To learn about these dimensions the testing should be accompanied by survey questions related to labor market activities (e.g., occupations) that help infer the volume of interactions at work as well as questions on household composition (and family) that helps infer the volume of off-work social interactions.

   Subsequent waves of representative samples should oversample groups with high prevalence. Further, there should be re-testing to keep track of the dynamics of the infected (whether symptomatic or not).

2. *Return to economic activity after testing (under some conditions)*

   Informed by the representative tests, economic activity should be unlocked. To begin with, those from groups with low prevalence should be allowed to return. If representative tests point to large parts of the population already being infected, then lifting of the lockdown should be considered.

3. *Commuting and Public Transportation*

   A critical aspect of returning to economic activity is the use of public transportation for commuting. In order to avoid high risk of contagion, we argue for the re-establishment of public transportation at full capacity. To keep social distancing in place, firms should be demanded to spread the work day from, say, the regular 8 hour period to 16 hours. The work schedule of employees should be adjusted accordingly, such that, say, 1=6 of employees starts working (and thus commuting) every 30 minutes and correspondingly returns home to work every 30 minutes. Temperature checkpoints (with perhaps mandatory random checks) should be stationed in the public transport.

4. *Protect the elderly, the weak and the highly exposed*

   Since social distancing leads to high psychological costs and reduced physical activities by the elderly, allow for visits by tested persons. To those elderly for which visits by tested family members is not possible, tested (volunteer) social workers must be employed as a substitute. In addition, body temperature screening checks for those accessing these vulnerable populations should be conducted before contact (at least, on daily basis).

5. *Education*

   Given the potentially large aggregate and distributional consequences of closed schools, they must reopen. Education personnel and students should be tested and show credentials of negative testing. Further, body temperature screening on any person (child or adult) must be conducted before the person is allowed to enter the premises. The same holds for kindergarten, since supervision of young children cannot be maintained by parental households who return to work or who are facing time constraints because of hospitalization of some of their adult members. In contrast, universities can remain closed for a longer time since the switch to online training systems is less costly in this case.

6. *Social activities*

   Allow non-quarantined citizens to walk and exercise outside (at least in pairs of the same household as it is done, e.g., in Germany). If necessary, this could be restricted to non-overlapping neighboring public areas (or streets). The goal here is to diminish the physical and mental health costs of confinement which can be huge for large part of the population.

Furthermore, restaurants and bars should be allowed to reopen but require visitors to keep distance, following the current practice in China, see here.

7. *Fines*

Since there do likely not exist sufficient capacities to monitor business-related and leisure-related activities after the economy starts to unlock, the violations of the above must be sanctioned with very huge fines. In Spain, fines can legally go up to 30,000 euros, and the average fine tends to be around 600 euros which is 1/50 the average annual income. For sure, with limited capacities for monitoring, large fines need to be in place, in particular, for those individuals placed in quarantine.

8. *Summer vacation*

Unions, business owners and the government should coordinate on a partial suspension of the August summer vacation to partially compensate the loss of economic activity.

9. *Coordination and cooperation*

Local authorities within countries should coordinate closely to contain the crisis. This is a time for cooperation and support.

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