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Certified Coronavirus Immunity as a Resource and Strategy to Cope with Pandemic Costs

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I. CORONAVIRUS IMMUNITY AS A GROWING RESOURCE

It seems generally accepted that in most cases the course of the COVID-19 disease is mild, often resulting in no or few symptoms (asymptomatic cases). An estimated 80% of known COVID-19 cases are currently classified as mild,[1] and the number of unreported asymptomatic cases is thought to be high. The probability of full recovery is high for many people, especially for younger people and those without previous illnesses. Those who have survived the disease are, according to current knowledge, largely immune. The probability of contracting exactly the same virus a second time within a few years and passing the disease on is small compared to a first occurrence of the illness. Peter Doherty – recipient of the Nobel Prize for discovering how the immune system identifies cells that have been infected by a virus[2] – recently argued that reports of individuals contracting COVID-19 twice were unlikely to be correct. Furthermore, he suggested that even if it was a reinfection, prior infection would give an individual a degree

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1 https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200301-sitrep-41-covid-19.pdf?sfvrsn=6768306d_2 (accessed March 22, 2020)

2 https://www.nobelprize.org/prizes/medicine/1996/doherty/facts/ (accessed March 22, 2020)

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of immunity, allowing them to recover very quickly. In addition, the coronavirus causing COVID-19 has not rapidly mutated so far, which could indicate that immunity confers long-term protection[3].

There are now potentially millions of people who have been infected with the coronavirus and who are now immune. Their immunity makes each of them individually a valuable resource in the fight against the virus, and such resources multiply as the number of people infected increases. Antibodies from immune people might even be used to produce blood serum as a potential treatment. Moreover, from a societal perspective, the larger the stock of people with immunity grows, the lower becomes the risk of infection for the elderly and those with pre-existing medical conditions. As the number of immune people grows, restrictions on all but the most vulnerable can gradually be relaxed. Those who are already immune can go back to their economic and social activity immediately and may even provide active support to the health care system. Their engagement and contribution to society and the economy may reduce both the risk of overburdening the health care system and the potential for economic and social breakdown which might be caused by the measures set by decision makers against the virus. The resource of immune people is already much greater than we know: All those who have been infected with the virus are immune, but many whose cases were asymptomatic may not even have realized that they had the disease. Consequently, they have never been tested.

Thus, the vital resource of immune people must be *employed* effectively, it must be *certified*, it must be *searched for*, it must be *found*, and it may be even be *actively produced*.[4] Taking a resource perspective on epidemics allows the problem to be viewed through the lens of other standard allocation and distribution problems. This means that economists and other social scientists, well trained in handling such problems, should and will be able to provide useful solutions to cope with epidemic diseases and mass-infection outbreaks.

I.1. Employ immune people

Immune people can be reinstated to all activities and can pursue all social contacts as usual, but more importantly they could be employed in the care of the elderly and the sick without endangering particularly at-risk people. The quickest possible and most comprehensive engagement of immune people is therefore sensible from public health, economic, and social perspectives. Their employment is necessary for our society to return to normality.

3 https://www.abc.net.au/news/2020-03-22/doubt-over-contracting-coronavirus-covid-19-twice/12075878 (accessed March 22, 2020)

4 Relevant aspects and consequences of the resource view presented in this paper have been discussed in the following publications: Frey and Osterloh (2020), Eichenberger, Hegselmann and Stadelmann (2020), Eichenberger (2020) and in an interview with Reiner Eichenberger (see https://www.20min.ch/finance/news/story/---26853349 accessed March 10, 2020).

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I.2. Issue immunity certificates

To make full use of their power, people with immunity must once again be able to move freely, without any restriction and without fear. To do so, they must be certain that they are immune, and other people must be able to distinguish them from the non-immune. That is why they need a reliable immunity certificate, which can be based on having antibodies or having experienced the illness. This immunity certificate serves as a kind of "passport" to normality and certifies the value of the resource. Such certificates should not only be given to the domestic population, but coronavirus-immune doctors and nurses from, for example, China should also be certified accordingly. The same holds for immune people from stricken European countries such as Italy and Spain; these countries will soon have large stocks of immune people that other countries urgently need. This illustrates an additional reason why we should provide strong international support and resources to locations that are currently suffering the most from the epidemic; offering hospital equipment and other materials now will mean those areas can provide their certified immune people in the future as support when we reach peak healthcare demand. Many commercial planes that are currently not being used due to travel bans could quickly move immune people and necessary equipment in response to needs. The geographical trajectory of a pandemic can therefore be efficiently addressed if international collaboration is improved. That is the solidarity that the world can and should deliver during a pandemic and that is why coordinated global action is so vital. Immunity certificates facilitate such an important global exchange.

I.3. Search for immune people

Like other valuable resources, people immune from the novel coronavirus must be sought out, and this requires widespread administration of tests. Testing is not only about identifying virus carriers in order to protect society; it must also be to identify immune people, who can help to save society. On the one hand, tests for viruses can be used to identify people who are currently infected and who are then known to be immune around two weeks after infection, when potential symptoms and infectiousness have subsided. On the other hand, tests for antibodies can be used to find people who have never been tested but were infected without symptoms of the disease and are now immune. These people do not yet know about their immunity. Since the test capacity is still small today despite rapid growth in facilities, the first step is to search for immunity in infection hotspots. Over time, better tests will be introduced and searches can be conducted worldwide to find and certify immune people.

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I.4. Find immune people

The value of the immunity certificate facilitates the search for people who are already immune. Those who are certified immune no longer need be anxious about the disease, nor do they need to remain in isolation as they resume a reasonably normal life. This systematically provides incentives for healthy people who may have been infected to think about whether they may have had mild symptoms of the disease, such as loss of smell and taste. Active cooperation with authorities to obtain the immunity certificate becomes particularly rewarding. The same applies to patients with mild symptoms, who are currently suffering from fears of stigmatization, which prevent self-identification as potentially sick.

I.5. Produce immune people

Like other resources, immunity may even be actively produced. Individuals may want to seek immunity voluntarily (under medical supervision) through self-infection[5]. Maintenance or restoration of dignity can be important in this case, as people want to feel useful rather than a burden to society (Tirole 2017). Self-infection can be managed and organized by public and private health service providers and supported, if necessary, by government regulations. Thus, the *production* of immunity can potentially be organized without any major externalities, and actively increasing immunity can help in the fight against a pandemic.

Until a truly effective treatment or vaccination is available, immune people are the crucial resource in the fight against epidemics such as coronavirus that spread very quickly. This is true even under substantial uncertainty; moreover, it holds if current government measures are relaxed for the general population because of their enormous economic and social costs, or if we see a change in the assessment of the dangers of coronavirus[6]. After all, coronavirus is certainly dangerous for the elderly and for people with health problems. Understanding immune people as a resource is therefore essential and will enable a faster return to normality from a crisis.

5 Assuming that the spread virus of the virus can only be contained or slowed at immense social and economic costs, an early and voluntary infection of some people might be socially desirable (e.g. voluntary infection of some doctors or health workers). Similarly, some decision-makers might find it beneficial to self-infect to build immunity. This might even allow them to counteract and combat the negative effects of "behavioral infection" and fear in society.

6 The number of unreported asymptomatic or minimally symptomatic cases may be several times higher (even up to a factor of 20 times higher) than the number of reported cases of infection according to the Robert Koch Institut in Germany, e.g. https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Steckbrief.html#doc13776792bodyText7, accessed March 25, 20). In this case the direct health consequences of Covid-19 would be comparable to a severe seasonal influenza or a pandemic influenza. On March 19, 2020 the British Government declared COVID-19 no longer to be considered a high consequence infectious diseases in the UK (https://www.gov.uk/guidance/high-consequence-infectious-diseases-hcid, accessed March 20, 2020).

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II. BEHAVIORAL INFECTION INCREASES ECONOMIC AND SOCIAL MISERY

Many central features of our global society, such as connectivity, mobility, and social interactions, render the world more vulnerable to the challenge of pandemic diseases. Coronavirus is infecting people and affecting the health of individuals, but it is also quickly and dangerously infecting society as a whole through the mindset of citizens and decision-makers handling the crisis on a daily basis. The strong fixation on the virus is impacting collective consciousness, and many of the observed behaviors, hastily implemented policies, and sudden regulations demonstrate this in action. Snowden (2019) reports that historically, "major epidemics caught authorities unprepared, leading to confusion, chaos, and improvisation" (p. 77). Decision-makers may fail to see that the regulations they impose could directly or indirectly do far more harm the health system, the economy, and the lives that they may try to protect. In a situation of extreme healthcare worker scarcity, excessive regulations that affect the supply of doctors and nurses negatively (e.g., self-isolation of those who have been in contact with infected people but have not been tested) may prove counterproductive. Solutions based on rational calculation, even when faced with a situation of extreme uncertainty, are preferable to strategies driven by hysteria, confusion, or chaos. Similarly, decision-makers also often fail to see the quick warning signs of an economy starting to flatline or the long-run consequences that come with it.

Since the outbreak in northern Italy, the policy response of almost every government, with a few notable exceptions, has been ubiquitous: lockdown and self-isolation, no large gatherings, no social events (sporting, music or other), and eventually the closure of all non-essential businesses. Thus, the world is on the brink of a second very real crisis, but this crisis is not the one caused by the coronavirus.

It is a secondary or side effect caused by our overreaction to the pandemic, which could be far worse than the health crisis itself. As the coronavirus has spread around the world, so too has a behavioral contagion, which may spread even faster than the virus, and its insidious effects may end up taking a much greater toll on our economies and the social fabric of our societies. The economy, like culture and society, are amorphous structures that can grow, shrink, and die depending on the conditions under which they operate. Immense resources may be lost in the future due to behavioral contagion. From the financial crisis of 2008, we are keenly aware that bankruptcies can lead to banking crises, which lead to financial crises and economic crises. These potentially lead to government debt crises, as in the case of Greece during the ensuing Euro-crisis of banks, which in turn led to dire economic consequences; in short, contagion is also an economic and social phenomenon. There is, for example, strong evidence that banking crises also lead to major, widespread, and lasting psychological losses (Montagnoli and Moro 2018). Furthermore, a strong economy has always been

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closely linked to the health of its citizens and their life expectancy (Jetter, Laudage, and Stadelmann 2019). Populations with poor health are not very productive, and highly productive populations have good health. Similarly, high incomes are a good predictor of a long life, life satisfaction, and a good health system.

It is possible and even likely that institutions such as rule of law and executive constraints are threatened by societal overreactions to pandemics, similar to an allergic overreaction of the human body. Such a weakening of institutions may have negative and long-term effects, but those effects will become evident much later. Proper communication and optimal decision-making are an ongoing challenge as contextual factors are changing. The principle should be to derive intelligence from available information, but inferences can be challenging if information is subject to biases and fears; the terror of sudden death is hard to digest. Fear and anxiety distort decision-making during a pandemic (Gyrd-Hansen et al. 2008). Intelligence means effective adaptation to an environment, and effective adaptation requires resources, capabilities to use them, and knowledge about the world (March 2010). Ioannidis (2020) criticizes and illustrates the danger of exaggerated information and non-evidence-based measures. Policy analysis would benefit from seeing researchers expressing uncertainty about their findings and should be skeptical of studies that express certitude (Manski 2013). Often, early estimates of infections, community transmission, and fatality rates tend to be markedly biased. Policy needs to be based on available data, but it must always consider trade-offs. If clear evidence is lacking, impulsive actions can cause substantial harm (Ioannidis, 2020). Moreover, despite some serious and informative media coverage on policy analysis, overreach in general is all too common (Manski 2013).

In addition, we should not forget that economic meltdowns cost many lives too. Not only do essential institutions such as hospitals require a healthy functioning economy, but there may be a substantial number of "statistical lives lost" due to neglecting other facilities, infrastructures, and public good provisions through reallocation or misallocation of resources (Frijters 2020a, 2020b). Again, trade-offs need to be taken into account while remaining aware of the negative externalities they will cause in the future[7]. These externalities are currently less visible, and politicians are known to have a tendency to go for short-term strategies that provide political benefits – most importantly, a higher probability of getting reelected (Mueller 2012). Politicians also tend to be subject to action bias due to fear of being accused of negligence through inaction (Ioannidis 2020). In addition, the likelihood of imitating a particular policy depends on its perceived legitimacy, which itself depends on the number of other countries who have

7 When considering current death rates, we should not forget that road traffic accidents alone lead to 1.25 million deaths a year globally (World Health Organization 2015) and that the global burden of other diseases such as malaria remains high. Although improved tools have been successfully applied in the fight against malaria, with 445,000 deaths and more than 200 million cases (year 2016), the burden of malaria is still significant (Ashley et al. 2018).

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already adopted a specific practice, such as lockdown (March 2010). Learning about the external effectiveness of a policy is, of course, challenging. However, an obsession with the short-term problem of coronavirus contagion by "flattening the curve" fails to focus on future deaths as a result of the societal effects and economic meltdown. Thus, we need to take into account longer-term perspectives and take advantage of society's growing resource of immune people to reduce such negative societal externalities.

There is always uncertainty, and the unobservability of counterfactual outcomes is a challenge (Manski 2013). Policy strategies require systematic observation and broad analysis of all relevant impacts. However, at the start of a health pandemic, there is short-term uncertainty and a risk that actors focus mostly on the direct effects of the virus on its victims. Short-term effects on society and the economy of policy measures to contain the virus tend to be underestimated and weighted lower by decision-makers. Similarly, long-term societal damages tend to be underweighted, even though we know a lot about the long-term effects of pandemics and we also know that negative economic shocks have large negative consequences on health. Large economic shocks such as the financial crisis of 1929 have also been linked to mass unemployment, negative political consequences (e.g. stability of democracy) and lower public health. According to Snowden (2019), plague regulations have cast a long shadow over political history, leading to a vast extension of state power into diverse spheres of human life, at times marking a moment in the emergence of absolutism or promoting an accretion of power and legitimacy. This is not unrealistic even today: For example, Hungary's parliament is supposed to be considering an emergency bill that would give prime minister Viktor Orbán rule by decree. The government claims it is necessary to deal with the challenges of the pandemic, but critics see it as a further step in Hungary's political system towards an autocracy or illiberal democracy[8], stripping away citizens' democratic rights under the pretence of tackling the crisis[9].

III. INJUSTICE AND INEQUALITY OF INFECTION

The victims of COVID-19 are not truly random. The elderly, especially those with damaged lungs due to work-related hazards, smoking, or previous pneumonia, are more severely affected, and there is a higher mortality rate within this age group than any other. However, it is not only the risk of serious illness that is unequally distributed in society. The economic and societal costs of lockdown measures taken to slow the pandemic vary considerably: permanent employees and civil servants are far less affected than, for example, employees in the catering trade,

8 https://www.nytimes.com/2018/02/10/world/europe/hungary-orban-democracy-far-right.html (accessed March 22, 2020)

9 See, e.g., https://www.theguardian.com/world/2020/mar/23/hungary-to-consider-bill-that-would-allow-orban-to-rule-by-decree (accessed March 22, 2020)

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self-employed cultural workers, and most shop owners. While executives can often work from home, there is no home office for production employees. Career starters currently have few opportunities. Such disparities have the potential to turn into "societal explosives". Thus, the potential benefits of lockdowns need to be weighed carefully against psychological and societal costs. Studies exploring the psychological outcomes for people quarantined in the past (e.g., during the SARS epidemic) indicate that those quarantined were more likely than those not quarantined to suffer acute stress disorder or post-traumatic stress, exhaustion, emotional disturbance, depression, low mood, nervousness, confusion, detachment from others, anxiety, irritability, insomnia, poor concentration and indecisiveness, reluctance to work, and deteriorated work performance: all effects that can emerge after more than 10 days (for an overview, see Brooks et al., 2020). Only one study investigating an undergraduate cohort found no mental health issues due to being quarantined (Wang et al. 2011). However, that study relied on survey data completed at the end of the quarantine period, which reduces its potential relevance to long-term psychological effects. With respect to later psychological outcomes, feelings of anxiety and anger were still present 4-6 months after the Middle East Respiratory Syndrome epidemic, although they were substantially reduced (Jeong et al. 2016). Risk factors reported in that study were inadequate supplies, social network activities (email, text, Internet), financial loss, and history of psychiatric illnesses. Another study looking at consequences of the SARS outbreak among hospital employees still found alcohol abuse and dependency symptoms three years later (Wu et al., 2008). Core stressors during the quarantine were duration, fears of infection, frustration and boredom, inadequate supplies, and inadequate information. Post-isolation stressors were financial losses despite financial assistance, due to measures being insufficient and too late, and being stigmatized (Brooks et al. 2020). Allowing individuals with coronavirus immunity to go back to normal would help to mitigate the societal consequences of such negative psychological costs.

IV. CONCLUSION

It may at first seem logical to many of us in the grip of pandemic fever that we need to stop all groups congregating and go into isolation. While some may be happy to suffer the short-term inconveniences of self-isolation and lockdowns, in a matter of weeks this may turn into a true economic and social crisis. In a surprisingly short time, people may want their normality back, they will want deliveries, services, and the million other things that makes our lives livable. This applies especially to people who have already suffered the illness and who are therefore immune. For them, the health pandemic is less dangerous, but they may still suffer the costs of government intervention. Therefore, they may tend to oppose and undermine government intervention.

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There is a pathway back towards normal: We have to understand that immune people are a resource that is growing every day and that has to be certified with immunity certificates. As the resource grows, scaling back the current measures can be planned. Viewing immune people as a resource enables economists and other social scientists to apply powerful tools of thought to argue for the best employment of such a valuable resource in the fight against any pandemic. The resource view is central, as the challenges of pandemics cannot be solved efficiently without integrating knowledge and expertise from the natural sciences with that of the social sciences and humanities. The pursuit of consilience is an important enterprise that political decision-makers need to embrace.

We would like to highlight explicitly that pandemics and particularly reactions to them increase the general problem of scarcity that always exists in society. Consequently, economists and all other scientists who take a resource view can contribute systematically to solving the problems arising from pandemics. The important secondary effects must also be taken into account from the start.

During pandemics, some resources become scarcer, such as beds in hospitals, but some resources may also become more abundant over time, such as the number of immune people. At the start of the pandemic, there is an increase in scarcity, and decision-makers face trade-offs. For every decision made, there is an opportunity cost which has to be taken into account if total damage is to be reduced. Taking a resource view and keeping in mind the central principals of economics (see, e.g., Mankiw, 2017) is central to solving such a crisis. It also allows hypotheses to be derived and predictions to be made.

We would like to formulate four hypotheses, and it is easy to derive many more from our discussion:

1. Ceteris paribus, the fraction of elderly dying early due to coronavirus is expected to be lower in regions and countries with higher resources in general and with higher resources in the health sector in particular, i.e. with high gross domestic product and higher health spending per capita.
2. Ceteris paribus, in countries where the supply of health services is more elastic and where the regulation of labor markets and other factor markets is more flexible, we expect better crisis management and to see fewer deaths as a fraction of infected people. We expect the opposite effect in countries where government regulations decrease the supply of health services in times of crises (e.g. due to strict isolation requirements on health workers or other staff).
3. The side effects of societal infections could be vast. Unfortunately, it will be difficult to distinguish whether the cure may have been worse than the disease. However, there are sectors where the negative side effects of government measures against the crisis can be easily investigated. For instance, we expect online gambling, alcoholism, domestic violence,

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divorces, obesity, and suicides of non-infected people to increase. We also expect shadow market activities to increase.

4. Countries where where an economically inspired resource view is taken early by decision makers are expected to perform comparatively better over time than others.

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SUMMARY

A pandemic is not only a biological event and a public health disaster, but it also generates impacts that are worth understanding from economic, societal, historical, and cultural perspectives. In this contribution, we argue that as the disease spreads, we are able to harness a valuable key resource: people who have immunity to coronavirus. This vital resource must be effectively *employed*, it must be *certified*, it must be *searched* for, it must be *found*, and it may even be *actively produced*. We discuss why this needs to be done and how this can be achieved. Our arguments not only apply to the current pandemic but also to any future rapidly spreading, infectious disease epidemics. In addition, we argue for high awareness of a major secondary, nonbiological crisis arising from the side effects of societal and economic pandemic reactions to actual or imagined health risks. There is a risk that the impacts of the secondary crisis could outweigh that of the biological event.

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