Learning from the COVID-19 pandemic: How to better prepare for the next global crisis

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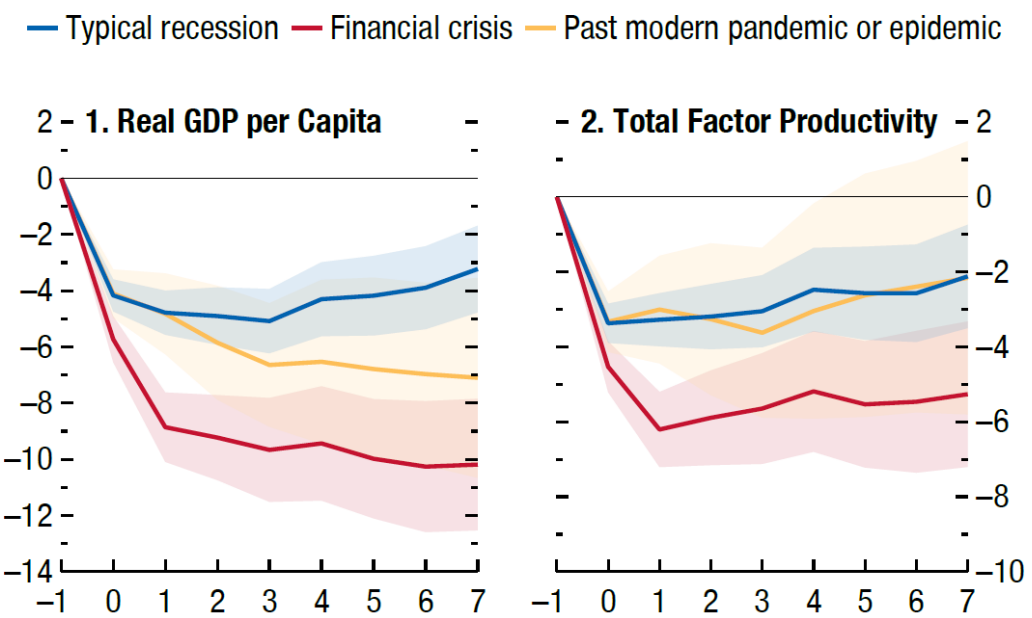
Time will tell, but today, one and a half years after the outbreak of the COVID-19 pandemic, the "gloom-and-doom" predictions of world-wide recession, major disruptions in international trade, and rapidly rising unemployment appear to have been exaggerated. As the International Monetary Fund pointed out, the 2008/2009 financial crisis had a much more negative impact on the economy than either a "typical" recession or past "modern" pandemics (see Figure below).[1] Of course, the current COVID-19 pandemic is severe in its global impact and is not comparable with previous modern pandemics[2], but nevertheless, it appears to have affected the world's economy less severely than originally feared. The world's economic system seems more resilient to health crises than to financial crises.[3]



In contrast to the overestimated macro-economic "gloom-and-doom" fears, the COVID-19 pandemic had an extremely varied impact on the literal and figurative health of individuals, companies, and entire sectors. Some benefitted from lock-down while others suffered disproportionately from being "locked out" of work, income, and social contacts. While government financial support may have alleviated some of the immediate pain for those suffering most from confinement, it did not address the long-term inequalities that COVID-19 caused.

The policy questions we wish to address here relate to another crisis confronting the world: the climate crisis. Will the global economy prove as resilient to the climate crisis as it has to the COVID-19 pandemic? Further, will a similar lasting inequality also result from the impact of the climate crisis?

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[1]The solid lines represent the estimated cumulative impulse response functions and shaded areas represent 90 percent confidence intervals. Time since the shock (in years) is shown on the x-axis. Past modern pandemics and epidemics include Hong Kong flu, SARS, H1N1, MERS, Ebola, and Zika (International Monetary Fund, 2021).

[2]As the IMF notes, "The COVID-19 crisis is global and more severe than those previous pandemics and with greater early signs of scarring."

[3]At the same time, as the IMF notes in its most recent update, the "resilience" of the world economic system to the COVID-19 pandemic is heavily dependent on vaccination, with vaccine access emerging as "the principal fault line along which the global recovery splits into two blocs: those that can look forward to further normalization of activity later this year (almost all advanced economies) and those that will still face resurgent infections and rising COVID death tolls" (International Monetary Fund Update, 2021).

Open science saves lives, closed health policies sacrifice lives

Within its mandate, the European Commission has been particularly active in trying to address these emerging inequalities: first, by helping to establish the Next Generation Europe financial recovery framework for a post-COVID-19 "green deal" recovery; second, by helping to coordinate fast access to vaccines for all EU member states; and third, by contributing as the largest donor to COVAX, while keeping a close eye on the emerging global inequalities in vaccine access.

However, the balance between national and international governance of global crises is likely to become a major policy issue. Global pandemics can create externalities that are globally beneficial for the public. The most positive side-effect of the COVID-19 pandemic is the bolstering of the important role **open science** plays in addressing global health challenges. It could even be argued that this pandemic represents a point of irreversibility in "openness", as almost all publications on COVID-19 are open access, and data is available in reproducible formats. As a result of this massive sharing[4] and the use of FAIR principles[5] by private industry (Wise et al., 2020), global scientific collaboration has resulted in ground-breaking advancement in vaccine development: in less than one year, 5 vaccines were developed.[6] In short, as Jean-Claude Burgelman puts it, ***"Open science does save lives…"*** (Burgelman, 2021).

This scientific openness contrasts sharply with the dominance of national health policies that differ substantially between countries. This was strikingly illustrated by the diversity in (de-)confinement policies across Europe, demonstrating the intrinsic limits of 'science for policy' in crisis situations. Scientific rationale is based, at least in principle, on the search for a truth. In contrast, political rationale is based at best on values, and, at worst, on prejudice and myths. Political rationale is thus intrinsically pluralistic, and Europe is also culturally pluralistic, which results in a wide variety of responses in terms of social behaviour. The interplay between scientific and political rationales led to vastly different levels of mandatory confinement during the first outbreak of the pandemic, ranging from highly restrictive to relatively relaxed (Soete, 2020). In the second and third waves, on the eve of widespread vaccination, the fear of an uncontrollable spread of COVID-19 and its new variants became the main driving force behind stricter confinement policies, but again these were implemented quite differently.

At the end of 2020, Yuval Hariri described humanity's battle with COVID-19 as, "a scientific triumph coupled with a political fiasco." He went on to explain, "A year into the pandemic, we still don't have any global leadership or global action plan. Hopefully, in 2021, our politics will finally catch up with our science."[7] Unfortunately, in 2021, the processes of vaccine production and distribution seem to have only reinforced the dominance of varied national policies in addressing the pandemic. The dominance of national health policies has effectively meant ***sacrificing lives at the global level.*** As noted by the IMF's director of research, Gita Gopinath, "Multilateral action is needed to ensure rapid, worldwide access to vaccines, diagnostics, and therapeutics. This would save countless lives, prevent new variants from emerging, and add trillions of dollars to global economic growth" (Gopinath, 2021).

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[4] More than 1 million SARS-CoV-2 genome sequences are present in a GISAID repository: https://www.nature.com/articles/d41586-021-01069-w?utm_source=Nature+Briefing&utm_campaign=bb0ab2520d-briefing-dy-20210423&utm_medium=email&utm_term=0_c9dfd39373-bb0ab2520d-44923949

[5] FAIR stands for **F**indability, **A**ccessibility, **I**nteroperability, and **R**euse of digital assets.

[6] For July 20, 2021, The New York Times worldwide Corona Virus Tracker reports 8 fully approved vaccines, 11 authorized for early or limited use, and 98 vaccines in clinical trials for use on humans, with 32 in the final stages of testing (https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html).

[7] https://twitter.com/harari_yuval/status/1344538372124143616

There is no vaccine for climate change[8]

In many ways, the COVID-19 pandemic and the resulting variety of policy (in)actions represent a time-compressed "pilot" of what we might expect with the ongoing climate crisis. The immediacy of the COVID-19 crisis sharply focused the ensuing policymaking, both timewise and geographically. However, when confronted with long-term crises, humans tend to adapt by changing their point of reference every generation. Each new generation sees the state of the environment as "normal", despite living in an environment that is less biodiverse and more degraded than that of their forebearers. We are now at the turning point in what environmental scientists call the Anthropocene epoch, with the looming possibility of massively reduced biodiversity and the frequent occurrence of pandemics threatening the very survival of human civilization. However, in the case of both COVID-19 and the climate crisis, the "local dimension" represents only the surface of the problem, while *the deeper drivers are global*. Together, COVID-19 and the climate crisis bring to the fore that, while crises might first be observed locally, their impact rarely remains local. Given our highly interlinked, global-economic world, crises naturally become global in nature, respecting no boundaries. The rapid world-wide spread of such initially local crises is the driving force behind the need for global COVID-19 vaccination if we hope to fully eradicate all new variants of the SARS-CoV-2 virus. Countries that were successful in limiting the spread of the virus during the first wave are now facing this paradox.

There is, however, no vaccine for climate change. While many scientists believe in the possibility of geo-engineering solutions to the climate crisis, it seems reasonable to assume that, contrary to the COVID-19 pandemic, the climate crisis will have to be addressed first and foremost by all of us: by humanity, not by a manna-from-heaven solution falling from the "open-science" blue sky.[9] However, as with the COVID-19 pandemic, one can expect that increasingly open science will also come to dominate environmental research. Interestingly, the commercial world-wide vaccine market is also providing insights into the development of green industrial technologies.

Lessons for green technologies

The vaccine-production business model typically discriminates between high-income markets for which high prices are charged even though much of the research is funded through public means, and low-income markets in which low prices are charged (often at zero profit), as part of the Global Alliance for Vaccines (GAVI) established in 2000.[10] GAVI established procurement power for low-income countries that need vaccines, often saving the lives of millions of children. During the COVID-19 pandemic, new techniques such as viral sequence analysis and mRNA-based vaccines dramatically reduced the time needed for vaccine development and approval, with high-income countries such as the US, the EU, and the UK bearing most of the development and regulatory risks. Unfortunately, once COVID-19 vaccines were developed and approved, the old vaccine-production business model appeared totally inappropriate. As Luc Debruyne put it, "When vaccines were successfully developed, we went from uncertainty to certainty. Suddenly, a whole market emerged, and everybody wanted to do a deal – first for themselves, then leaving a bit on the side for the rest of the world" (Debruyne, 2021).

From this perspective, the current international policy debate[11] is overly focused on world-wide access to the intellectual property behind the COVID-19 vaccines, and too little focused on the development of greater

[8] The origin of this slogan is unclear. Fazlun Khalid, advisor to UNEP, mentions it an opinion piece on April 15th, 2020. Ursula von der Leyen launched her tweet, "Sooner or later we will find a vaccine for the #coronavirus. But there is no vaccine for climate change. Therefore, Europe needs a recovery plan designed for the future" on May 13th, 2020.

[9] As implied, I do not believe in geo-engineering solutions to the climate crisis.

[10] For a good overview see https://ig.ft.com/coronavirus-vaccine-tracker/?areas=gbr&areas=isr&areas=usa&areas=eue&cumulative=1&doses=full&populationAdjusted=1

[11] In the report **COVID-19: make it the last pandemic**, the Independent Panel for Pandemic Preparedness and Response proposed, "The World Trade Organization and WHO should convene major vaccine-producing countries and manufacturers to agree to voluntary licensing and technology transfer for COVID-19 vaccines. If actions do not occur within three months,

vaccine production capacity in low-income countries. The diffusion of green technologies into developing countries should also be focused on the effective use and application of those technologies, including knowledge transfer in all its forms, rather than just the provision of intellectual property waivers. Most of these green technologies are processes that, for example, enable energy-saving housing, or that accelerate the transition towards clean energy production and distribution. Grassroots innovation and tapping into local, informal knowledge can contribute to sustainable development goals in low-income countries, such as reduced CO_2 emissions. In contrast, in high-income countries, the costs of transition from historically centralized, fossil fuel-dependent energy production and distribution networks are likely to be high, with large industrial sectors (oil, steel, cement, chemicals, motor cars, aircraft, etc.) locked into fossil fuel-dependent energy. Not surprisingly, the current "green deals" in both the EU and the US, which are designed to support industries in their energy transitions, appear to have earmarked astronomical amounts of public funds for these transitions.[12]

Yet at the same time, we may all question whether national or supra-regional "green deals" in high-income countries will be sufficient to combat the global climate crisis, while at the same time contributing to the "green competitiveness" of those countries. If green competitiveness can be translated into local, clean-energy transitions and circular economy principles across the globe, irrespective of high- versus low-income location, global value chains will emerge and contribute to global sustainable development. If not, growing inequality and unsustainable global development will undermine most countries' attempt at green competitiveness.

In contrast to the rapidity of COVID-19 vaccine development, time is not on our side in addressing the climate crisis. Three years ago, I walked with youngsters through the streets of my hometown, in support of school strikes for climate action; I even urged research-funding agencies such as the European Commission's Horizon 2020 programme to exclude travel costs from research grants so that we, academics, would also have to take responsibility for our own unsustainable excessive traveling. In retrospect, it appears little progress has been achieved on the climate front over the intervening years, with the COVID-19 crisis overtaking the attention of media and policymakers. Yet, as a recent IPSOS poll for the IMF points out, people appear more worried today about climate change than they were before the COVID-19 pandemic. It is as if fear of the health crisis ignited fear of the climate crisis, "of the power of nature", as the IMF authors put it (Celasun et al. 2021). Will this new level of concern be sufficient? Time will tell.

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a waiver of intellectual property rights under the Agreement on Trade-Related Aspects of Intellectual Property Rights should come into force immediately."

[12]At the same time, such transitions will be crucially dependent on how CO_2 and other emissions are priced, providing opportunity for new green technologies to become profitable. Interestingly, the EU's Emissions Trading System carbon price recently hit a record of just above €50 per tonne. One may expect that this price will further increase in the coming years, triggering further investments in innovative green technologies.

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