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The evolving risks of the 21st century and their effective management☆

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Abstract

Risk management institutions can be reinvented in the 21st century in response to the changing nature of economic uncertainties and changing information technology. The COVID-19 pandemic and its effects on the economy provide an example of new kinds of uncertainties to be managed. National and international contracts should manage risks to claims on better-defined economic aggregates and prices of factors of human capital to make for better economic measurements and better risk management opportunities. The failures of international management of the COVID-19 pandemic, including failure to control the spread of misinformation, provide lessons for such new financial arrangements. © 2022 The Author. Published by Elsevier Inc. on behalf of The Society for Policy Modeling. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

The COVID-19 pandemic that was first acknowledged by the World Health Organization on March 11, 2020, can provide a useful lesson about the dynamics of business fluctuations more generally, and of failures to manage major risks. The pandemic was a major shock to the world

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economies. As of this writing in February 2022, 395 million people worldwide have tested positive for COVID-19 and there have been 5.7 million reported deaths. In the United States alone it has infected over 76.7 million people and caused nearly a million deaths to date. At the same time, from February to April 2020 in the U.S., we had a recession, the sharpest and shortest ever. The pandemic and the recession are not coincident. They are undoubtedly related to each other, but the timing was very different.

It is useful to describe these recent events in epidemiologists’ terms as a “co-epidemic.” Traditionally, co-epidemic models described the interaction between different pathogens, but in this case one is a set of coronavirus variants, the other a set of economic narratives. In a co-epidemic model, such as one involving both HIV and tuberculosis, the paths between the two pathogens do not need to coincide perfectly, even though the two epidemics are fundamentally related.

The COVID-19 pandemic was the biggest worldwide disease pandemic since the 1918–20 influenza pandemic. The first inkling of this pandemic came in December 2019 when a few people living in the city of Wuhan, Hubei Province, China, fell ill with a then unknown disease that superficially resembled SARS, Severe Acute Respiratory Syndrome, in China, that became epidemic, but not pandemic, in 2003. On Feb 11 the World Health Organization gave the new disease a name, COVID-19, for coronavirus disease, 2019. The pandemic then quickly expanded, into a succession of waves of infection.

Coincidentally, in 2019 I had just then published a book Narrative Economics that described economic fluctuations in general as epidemics, except that instead of a virus or bacterium, the vector is driven by popular economic narratives, by stories that embody a view of the world and a suggestion of economic actions to take, to bring some possible actions to center attention and likely implementation.

They are often called “thought viruses” or “memes.” The narratives tend to be story-like and to involve human interest, including reference to celebrities. Like diseases, narratives can become epidemic among the broad population. Like diseases, economic narratives are spread by contagion, through casual talk among friends, through the news media, books, sermons, and now the Internet, social media, and the metaverse. The contagion of narratives is hard to judge, just as with the growth of digitization in all our lives. Now people can form communities of like-minded people unbound to the ordinary “common sense” views that used to dominate nations.

There is an ongoing debate about the relationship between growth of the Internet and social media and the apparent spread of misinformation with the polarization of society into alternative camps which share an unbridgeable difference of opinion with the other. We can extrapolate these trends into the future as communications technology advance continues. Cass Sunstein, in his 2018 book #Republic: Divided Democracy in the Age of Social Media, argues that the new communication technology effectively sorts people into “echo chambers” that promote alternative realities. Evidence is not uniformly supporting this. There are critics, notably Boxell et al., 2017, but it is undeniable that polarization has widened in recent years, the

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1. https://www.google.com/search?q=daily+tally+of+covid+cases+in+world
2. See Long, Vaidya, and Brandeau (2008) for an example of a mathematical model of HIV-tuberculosis co-epidemics in the spirit of the standard compartmental model or SIR model for a single disease pioneered by Kermack and McKendrik (1927).
prevalence of misinformation has increased, and that there may be significant disruptions to the economy from this.

2. The economic narratives before and after COVID-19

Two years ago, just before the start of the COVID-19 pandemic, I wrote an article about narrative epidemics that was included in a session at the January 2020 American Economic Association annual meeting in San Diego, and soon thereafter published in the Journal of Policy Modeling. It attempted to chronicle the dominant economic narratives since the Great Recession and the financial crisis of 2007–2009 in the United States based on my searches of English-language articles digitized in ProQuest News & Newspapers. The most prominent economic phenomenon then seemed to be the prolonged U.S. GDP expansion, a U.S. stock market boom and a U.S. home price boom from right after the financial crisis recession 2007–2009. In fact, the real GDP expansion from June 2009 to peak was not to end until 128 months later, in February 2020, the month before the COVID-19 pandemic was recognized as such by the World Health Organization. This was the longest expansion since NBER recession dates start in 1857.

In my January 2020 paper just before the pandemic, I described six economic narratives that had a potentially significant impact in waves on economic behavior that drives real GDP. These were “Great Depression,” “Secular Stagnation,” “Sustainability,” “Housing Bubble,” “Strong Economy” and “Save More.” Some of these narratives were rising, some of them falling in frequency during the longest expansion, the expansion itself reflecting the sum of the effects of these narratives (and of yet other narratives as well). There was hardly an inkling then of a pandemic disease, coming, or of the politicizing of the pandemic story of loss of freedom inherent in lockdowns or mask mandates, another epidemic that interfered with mitigation efforts.

One of those popular narratives that was fading during the longest expansion was the Great Depression narrative, referring to the years 1929–1939. Since then, this narrative has never been forgotten, having reached legendary status. Use of the term “Great Depression” has been growing fairly steadily since the Great Depression itself. The narrative is potentially contagious not only because the story was about a real tragedy. Proximally, it was also the result of a report in April 2020 that unemployment had reached a record high since the Great Depression in 1932. Narratives are much more contagious if they can claim to be reporting on some record high or low. The narrative 2007–9 recession, had mutated to have better connection to then current events and set new records of public attention. At the peak of this boom, no photos of street sellers with 5¢ apples appeared in the news media, but there were plenty of new photos of people standing in line outside failed banks. Since 1952 the Michigan Survey Research center has been including on its regular survey of consumers a question asking for the respondents’ assessment of the likelihood of another period of widespread unemployment or depression. It has been shown that respondents who see a high risk of depression spend less on consumption than those who see a low risk (Souleles, 2004).
The Great Depression narrative affected the 2009–2020 longest expansion by gradually fading away as people found their attention on the Great Depression drifting away over a decade - until 2020 and the next depression scare.

It is striking how dramatic and sudden was the change in popular narratives starting February 2020. Most striking was the sudden return of the Great Depression narrative at the very beginning of the COVID-19 pandemic. Reviewer Tobias Grey noted in the Wall Street Journal in July 2020 that “several coming novels, TV series, films and video games are offering escape by holding up a mirror to the financial trauma of the early 1930 s” The name “the great depression” (without capitalization) had been applied to depressions of 1873–79, 1893–97 and 1920–21 without the vivid imagery and legendary status. The intensity of the recrudescence of the depression narrative was matched by the magnitude of the drop in the U.S. stock market.

3. Management of epidemic-like risks

If changing economic conditions tend to be driven substantially by epidemics of narratives, with new mutations of the narratives arriving in a manner that is driven by contagious elements that are largely inscrutable, that might seem to suggest that there can be no systematic risk management policy. But there is still a possibility of economic models that can inform policy.

Conventional Keynesian monetary and fiscal policy has a fundamental role to play in managing risks. But many policy makers have long been aware of the potential importance of paying attention to epidemics of economic narratives, without using those words. Regular meetings of the Federal Open Market Committee are supplied with the Summary of Commentary on Current Economic Conditions, usually referred to today as the Beige Book, consisting of reports from around the country. They describe the Beige Book with the words “It characterizes regional economic conditions and prospects based on a variety of mostly qualitative information, gathered directly from District sources.” The Beige Book was created in 1970 at the instigation of Fed chair Arthur Burns who wanted a more in-depth report on economic conditions. Often scoffed at by academic economists, the Beige Book is a repository of local statistics and narratives, distilled by interviews of local businesspeople. For example, the January 2022 St. Louis District Beige Book reported, “A Little Rock area construction contact reported that competitors have visited job sites to recruit his high-skilled craftsmen.” That sounds like a contagious narrative.

The Beige Book may seem like a relic from the past before modern econometric models. But the diagnosis is not so clear. Changing narratives may be quantified and modeled, relying on only a modicum of human judgment. Economics still stands to benefit from econometric methods. Alfred Marshall [1890] is often quoted for saying that economics is not an “exact” science, but that means only that there is usually a multitude of econometric models which needs some sorting through, some judgment.

Already, one of our most quoted macroeconomic statistics, the unemployment rate, is a quantification of a narrative involving a narrative description of intent. To be counted as unemployed in the U.S. it is not enough to be not working. One must have the intention to find a

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3 The Michigan survey question is: “Looking ahead, which would you say is more likely—that in the country as a whole we’ll have continuous good times during the next 5 years or so, or that we will have periods of widespread unemployment or depression, or what? [good times, good times qualified, pro-con, bad times qualified, bad times]”

4 https://research.stlouisfed.org/publications/regional/beige-book
job. Those who chose to quarantine at home to avoid the danger of COVID-19 contagion are not counted as unemployed.

Unemployment insurance, first begun in the United Kingdom in 1911, and copied into the United States in 1935, was one of the great insurance innovations of the 20th century. The risk of involuntary unemployment is one of the most grievous risks, for it concentrates its impact on randomly selected individuals. Truman Bewley discovered this in his book “Why Wages Don’t Fall in a Recession” (2001). The employers he interviewed did not want to make little cuts in pay to all workers but rather to concentrate all the suffering on a few and get them out of the workspace where their grumbling may not be heard. Robert Hall with Maryanna Kudlyak (2019) describe the pain suffered by those singled out for layoff: an initial shock of a massive loss of current income to pay the bills, a period of search for a comparable job, a necessity to take bad jobs for the time being.

But insuring unemployment is inherently difficult, for it runs the risk of moral hazard: that the claimant may not make a real effort to find a job, may be psychologically devasted by the loss of employment, and may try to go as long as possible without taking a job. Thus, the insurance in the U.S. involves a time limit (26 weeks - extended during the COVID-19 pandemic by another 13 weeks) and limits benefits to 50% of income for higher-income workers, and provides employment centers to encourage and assist the unemployed find a job. In the United States, there are currently almost 2400 local American Job Centers. Thus, risks created by the fluctuating Great Depression narrative are already partly insured by government policy.

The private sector can improve the impact of unemployment insurance by, for example, allowing individuals to purchase an augmentation of their governmental unemployment insurance, for which they would pay a premium. This would deal with the personal tragedy of a sudden halving of family income after losing a job. A private insurer, The Assura Group, attempted to piggyback onto government unemployment insurance by offering a policy, IncomeAssure®, to augment such government insurance with an add-on, for a premium, starting 2006. By making the add-on to a successful government program, they avoided some uncertainties in policy outcomes. But they were not particularly successful in selling such insurance.

Unemployment insurance may also be augmented from the private sector by more far-reaching career risk management tools. I have proposed that markets be created for occupational indices, so that individuals can hedge risks to their human capital. I called it livelihood insurance (2003). Futures markets for occupational incomes might allow people to hedge risks of going into an occupation whose future is uncertain, thereby making for more entrepreneurial spirit in choosing career directions.

The private sector can also reduce human suffering related to business fluctuations by offering some forms of home equity insurance that protect homeowners or would-be homeowners from the vagaries of the price of homes. The past 30 years have seen many mostly failed attempts to introduce such policies and programs, (Fabozzi, Shiller and Tunaru 2021).

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5 “In the Current Population Survey, people are classified as unemployed if they meet all of the following criteria:

They were not employed during the survey reference week.

They were available for work during the survey reference week, except for temporary illness.

They made at least one specific, active effort to find a job during the 4-week period ending with the survey reference week (see active job search methods) OR they were temporarily laid off and expecting to be recalled to their job.”

https://www.bls.gov/cps/definitions.htm#employed
Marketing insurance is always difficult since one must approach the potential insured before they have any hint that a loss is imminent, when the need is not urgent. Viviana Zelizer (2017) has detailed the long, slow history over centuries, of the development of the marketing of life insurance, progress which might be mirrored in the future with yet new insurance forms.

We need ways of sharing aggregate national risks with other nations. Sovereign GDP-linked bonds issued to a global investor community would have the effect of sharing country risk internationally. A nation facing an unexpected economic catastrophe mirrored in its own GDP could get debt relief that would make it easier for governments to give resources to those who suffer the most. This might go well beyond catastrophe bonds that help protect a nation from a named catastrophe, such as an earthquake, into a much broader definition of loss.

Jonathan Ostry, James Benford and I co-edited a book (2018) with several authors’ perspectives on this idea and its implementation. GDP was chosen to measure the welfare of nations because of its widespread familiarity to the public. Familiarity is important in gaining public acceptance of new financial products.

We should also be considering linking sovereign debt payouts to better measures of national welfare. GDP has an unfortunate tendency to increase dramatically when a country is attacked, either militarily or from natural disaster, and must step up production to deal with it. That is not a signal of an increase in economic welfare. Stiglitz et al. (2010) suggest some fixes to GDP that will create a better measure of economic welfare of a nation. Their simplest suggestion is just to base policy on a component of GDP, personal consumption expenditures. Developing better measures of economic welfare and hence of true economic growth is an open project still. We must avoid the “GDP fetishism” that Stiglitz (2009) deplores, or the “Tyranny of Metrics” that Muller (2019) described. That will likely mean that we must look at narratives of the life stories of individuals to understand better their true welfare.

There is reason for optimism that economic policy makers can in coming years respond to the COVID-19 pandemic in creative new directions leaving us in many ways with better economic growth, correctly defined.

References

Benford, J., J.E. Ostry and R.J. Shiller (2018). *Sovereign GDP-Linked Bonds: Rationale and Design*, CEPR. (https://cepr.org/content/new-ebook-sovereign-gdp-linked-bonds-rationale-and-design).

Boxell, L., M.G.J.M. Shapiro (2017). “Is the Internet Causing Political Polarization? Evidence from Demographics,” National Bureau of Economic Research Working Paper 23258 (http://www.nber.org/papers/w23258).

Grey, T., (2020). “Escape Stressful Times in the Great Depression? TV series and novels return to the 1930s for stories and characters reflecting a harder, tougher America,” *Wall Street Journal* (Online); New York, N.Y. July 6.

Hall, R.E. and M. Kudlyak (2019). “The Extreme Inequality of the Burden of Unemployment, Interim Jobs, and Brief Spells Out of the Labor Force” presented at the Wiener Center, Kennedy School, Harvard University. (https://inequality.hks.harvard.edu/event/robert-e-hall-extreme-inequality-burden-unemployment-interim-jobs-and-brief-spells).

Kermack W.O. and A.G. McKendrick. (1927). “A Contribution to the Mathematical Theory of epidemics.” *Proceedings of the Royal Society, 115*(772):701–21.

Long, E. F., Vaidya, N. K., & Brandeau, M. L. (2008). Controlling co-epidemics: Analysis of HIV and tuberculosis infection dynamics. *Operations Research, 56*(6), 1366–1381 https://pubsonline.informs.org/doi/pdf/10.1287/opre.1080.0571?casa_token=znBxaaLRtMgAAAAA:4k4zqi-yZlYRjxTqRXfqSZAr262kXQzf8ojMbzHQnhk7-Q3fHJh4q9_6BS1a91Hr54HlM2A.

Muller, J. Z. (2019). *The tyranny of metrics*. Princeton NJ: Princeton University Press.

Souleles, N. S. (2004). Expectations, heterogeneous forecast errors, and consumption: Micro evidence from the Michigan consumer sentiment surveys. *Journal of Money, Credit and Banking, 36*(1), 39–72. (https://www.jstor.org/stable/3839047).
Stiglitz, J. E. (2009). GDP fetishism. *Economists’ Voice, 6*(8), https://doi.org/10.2202/1553-3832.1651

Stiglitz, J.E., A. Sen and Jean-Paul Fitoussi representing the Commission on the Measurement of Economic Performance and Social Progress (France) (2010). *Mismeasuring Our Lives: Why GDP Doesn't Add Up.* (https://books.google.com/books?hl=en&lr=&id=eogVezBLULYC&oi=fnd&pg=PR34&dq=Stiglitz+on+GDP&ots=m480TtHPys&sig=NfZxL___9EkkPmAhlvUVn0pSddk#v=onepage&q=Stiglitz%20on%20GDP&f=false).

Zelizer, V. (2017). *Morals and markets: The development of life insurance in the United States.* New York: Columbia University Press.