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REVIEW ARTICLE

COVID-19 and the Principles of Economics

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ABSTRACT

Several fundamental principles in economics help enhance our understanding of COVID-19, including opacity and externalities. COVID-19 is a contagious disease whose spread has been difficult to manage due to opacity, as the disease is contagious prior to the presence of symptoms and in some instances testing results for the disease require a considerable time lag before they become available. This highlights the importance of alternative testing strategies to limit the extent of opacity and to manage the costs associated with accurate testing. In addition to individual tests, such strategies would include testing employees in small groups and testing for concentration of the disease in wastewater. Diminishing returns to scale, depreciation, and shocks to the underlying disease also all play an important role in understanding the effectiveness of vaccines. Externalities are central to the mechanism for transmitting contagious diseases. The strength of the externality can be reduced potentially by various preventive measures such as social distancing and masking, though quantitative studies of the efficacy of such measures can be enhanced. Further, efforts to undertake randomized trial studies of various questions related to vaccines and prevention would be helpful, especially in light of the magnitude of economic costs that have been imposed by contagious disease, such as COVID-19.

COVID-19 and other contagious diseases also have had considerable effects on the structure of the economy. This has resulted in great development of technologies to support online meetings and work and the ability to work remotely, which in turn highlights dramatic challenges to the five-day work week, the potential for stay-at-home work, the relationship between residential and office real estate and the value of contractual flexibility in the face of dramatic shocks. Some of the effects arise during the period of acute societal disease, while other aspects reflect long-term learning. The nature of societal shocks to work and income generation also has led to important questions regarding the use of societal resources and potential shocks to the overall macroeconomy.

Economics and Covid

Economic principles teach much about the spread of contagious diseases, such as COVID-19, while the spread of contagious disease (COVID-19) in recent years has taught much about economics. A prior paper of the author¹ focused upon the comparison of the twin crises—the Financial Crisis (2008) and COVID-19 (2020).

In light of this, along with the importance of economic ideas for understanding basic features of COVID-19 as well as the dominant role over the last several years that this disease has played in society, this paper examines how economic thinking enhances understanding of both the transmission of the disease and the substantial consequences for asset prices and the broader economy. While epidemiologists focus upon the evolution of transmissible disease, the tools of economics and asset pricing in particular, potentially bring a unique lens and toolkit to bear—one that has been insufficiently emphasized in societal discussion and decision-making, as well as by the economics and finance discipline. Economists bring a valuable conceptual framework and empirical designs to explore such questions and extraordinary respect for both the importance of data and appropriate theoretical framing. The notion of applying economic ideas and tools to situations arising from other disciplines has a long history, as illustrated, for example, by the classic work of Gary Becker². The aim of our study is to highlight the lessons from economic principles for the COVID-19 pandemic, including those for the evolution of the continuing epidemic and for future pandemics and other mega shocks, as well as

what we have learned from COVID-19 about economics. There has been insufficient past emphasis on such themes.

Opacity and Externalities

What are some of these frameworks and ideas? The lack of transparency, i.e., opacity, and more obviously, externalities, are central to understanding the transmission of this disease. In light of the externality, restricting interactions would fight disease transmission, but at a tremendous cost in limiting economic activity—as reflected in the societal approach to the disease in much of 2020; for example, recall in the United States the focus upon “two weeks” and then “six weeks” “to stop the spread.” Opacity also has been fundamental to COVID-19 due to the substantial incubation period as well as delays initially in receiving test results, during which the virus spread dramatically. While the incubation process reflects nature and is exogenous, delays in testing results were avoidable to a degree and a reflection of limited societal resources devoted to testing.

Testing

Promoting transparency, such as through various testing modalities and even conveying vaccination status, helped limit transmission, possibly at only modest cost relative to alternative ways to limit the spread of the disease. Frequent, substantial, and possibly targeted testing may be a fruitful approach given the nature of the benefits and costs, relative to the economic alternatives. Indeed, Paul Romer (2020) advocated for that early during COVID-19³ and indeed, subsequently the cost of testing fell dramatically. Alternative approaches that reflect sensitivity to the costs

of testing include testing wastewater concentrations of the virus, randomized testing in jurisdictions and simultaneous (joint) testing of a number of individuals and retesting individuals only in the face of a positive result¹. The value of testing is now broadly recognized, but early during COVID-19 and even at the end of 2021 the extent of testing was inadequate. In December 2021 President Biden mused about how should the government have known that they would have needed more tests? Early in 2022 the federal government did begin to supply free self-administered COVID-19 tests. This signaled to the public the relevance and importance of testing, though two years into the pandemic. One important aspect of the interpretation of overall test results is the focus on the extent of positive test findings, but that depends upon the extent and criteria for test-taking in society. If only the sickest individuals are evaluated, then selection considerations would lead to a very high frequency of positive results. In contrast, if the samples were truly random rather than selective, then changes in the frequency of positive results would lead to informative comparisons. One overlooked, but potentially important cost of random testing to the test takers, is the cost and consequences of an unexpected positive result (especially for individuals in transit).

In effect, at a relatively modest cost compared to the costs imposed upon the economy in 2020, one could have created considerable transparency, which would have been a direct way to challenge COVID-19. The development of accurate rapid home tests was an extremely important development by eliminating the delay in obtaining test results and promoting frequent re-testing when

indicated (e.g., for exposed individuals with elevated probabilities of positive test results). There would have been considerable benefits to mass (home) testing shortly after COVID-19 began and the existence of a simple home test at a low nominal cost⁴. Even with higher costs of testing, modest numbers of randomized tests can examine the frequency of disease in various subpopulations⁵.

Of course, the presence of a substantial and variable incubation period as well as modest test inaccuracy and the costliness of testing highlight that even home testing would not fully eliminate the opacity problem. Indeed, an important, but often overlooked cost of accurate and widely available home testing, is the reduction in societal information about overall test results. For example, in the presence of universally available home testing there is essentially no direct collection of societal information on the extent of positive test results. Indirect indicators, such as concentration of the virus in wastewater, may be particularly important under such circumstances.

Prevention

Such indicators are important for encouraging various protective measures, such as greater use of vaccines, masking, and social distancing, when there is considerable exposure to disease. As a result of the apparent recent declines in the incidence of the disease in early 2023, the use of such costly preventive measures declined dramatically. Indeed, it appears that one of the failures in the aftermath of the pandemic has been the lack of careful assessment of the extent of benefit from some of these protective measures under various conditions and circumstances, limiting the extent to

which society recognizes their value (e.g., there seems to be little consensus in society upon the value of masking and the associated trade-offs). This relates to the broader point of the importance of thoughtful empirical designs and analyses.

There are several interesting aspects of the use of vaccines from the perspective of economic principles. In a number of respects there are potentially diminishing returns. For example, if most of the population is protected then the risk of exposure becomes limited (“herd immunity”) and the marginal value of an additional vaccinated person is reduced. Additionally, the marginal value of additional doses in a person may be declining. Furthermore, over time the effectiveness of past doses could decline (similar to depreciation), encouraging boosters and newer vaccine designs that evolve to be more targeted to newer variants of the disease⁶.

With respect to the externality, limiting interactions to reduce disease transmission not only limits economic activity, but also limits the ability to regenerate and grow society through education in primary schools, universities and even the creation of corporate culture. Of course, there are now ways to limit transmissibility with only modest impacts on economic activity—such as vaccination. Some other approaches to manage the transmission externality can be useful as well, such as masking and especially in some contexts, social distancing of six feet or more, but at the cost of considerable reduction in economic activity. Given the costs of social distancing, there is much less emphasis on it recently in light of the high immunity levels that have emerged in society.

Social distancing had a profound impact in limiting the capacity of various institutions in society, such as airplanes and even schools (potentially even leading to closure in some instances due to limited effective capacity). Furthermore, the short-term closure of organizations in which the disease was present or spread (such as meat-packing plants and schools) illustrates the interplay of transmissibility and economic externalities. Perhaps the most extreme example is the case of a “Zero-COVID” policy in which organizations or even whole cities were shut down. Understanding this interplay seems fundamental. For example, in the context of the lockdown of cities in China there appears to have been an escalation of deaths from other causes and substantial declines in both consumption and production. While the Chinese “Zero-COVID” policy was not the only cause of the spring 2022 U.S. and global stock market rout (where the rise in interest rates and energy prices were more prominent), the Chinese Zero-COVID policy appears to have been a significant consideration, highlighting the various objectives of policymakers and the importance of policy decision rules.

All of this points to the challenge of identifying a suitable objective function for decision-making. This raises the broad question of what the goals of policymakers should be and how should those goals change over time. Should one simply focus upon disease and if so, only a single disease at the cost of reducing dramatically the use of other screening tests and leading to considerable medical illness as well as psychological harm and even mental illness in society? For example, some of the anti-COVID policies

had dramatic costs on such dimensions. A striking example is that COVID resulted in fewer stage 1 cancer diagnoses and more stage 4 cancer diagnoses⁷.

Similarly, an important component of the challenge is thinking about the control of disease within an equilibrium context in which people must still be located somewhere and don't simply disappear by sending them home from the universities or closing the primary schools, i.e., individuals sent home can still contract the disease and spread it to others. Of course, we can minimize the spread of disease, whether COVID or the common cold, within a particular school by closing that school—but, of course, that would not necessarily limit the spread of the disease within the broader society or even necessarily be the proper decision for society (e.g., it might lead to greater spread to more vulnerable individuals). In the case of schooling, indications suggest that for many individuals a year or more of remote education was relatively ineffective, especially for those with less access to resources⁸, and that much of the cost will only become clear eventually. From this perspective it is striking that primary education was not viewed by policy makers as an "essential" activity to be preserved during the pandemic (unlike the portions of Walmart that were not in the grocery business)⁹. Yet, at the same time, after a few months private and parochial schools figured out how to make their operations work, resulting in considerable incremental demand from students in public school systems. Indeed, the viability of private and parochial programs would have been in doubt absent tuition revenues, presumably explaining in part the different choices by

many public vs. private/parochial schools. A contributing factor to the differing decisions was the political power and incentives of public-school teacher unions in many jurisdictions¹⁰. Such an agency distortion seems especially troubling in a society which purports to pay so much attention to equity and inclusion. Another interesting example were the choices at many colleges and universities about how to manage COVID-19 after the initial phase (when there was tremendous learning and resolution of uncertainty). While most institutions converted to Zoom teaching for a while, they managed the "on campus" experience of students in diverse ways (including in many instances, effectively closing campuses to students and faculty). There is much that can be learned potentially by evaluating empirically the effectiveness of different alternatives, particularly after the early months of COVID-19.

Tools and Data

While many economic models rely upon stationarity, it is clear that the world is not stationary with respect to COVID-19. Of course, there has been tremendous learning and development of new tools and the underlying disease dynamics and state variables changed dramatically with changes in societal immunity levels, techniques for addressing COVID-19 and behavior. The learning is apparent at so many levels—such as the development of vaccines and therapeutics with high levels of effectiveness, changing emphases on masking (both higher and lower), much less emphasis on transmissibility by touching, appreciation of the value of high-quality air filters and recognition of the

costliness to society of shutting down. Meanwhile, society has learned much about how to obtain the medical benefit of greater separation including by (a) the power of technologies such as Zoom and (b) the ability of many white-collar professionals to work from home for a sizable portion of their efforts. Meanwhile, many of the ideas that society had and even many of the specific recommendations of epidemiologists have not stood the test of time nor aged gracefully. From a broader perspective this is not so surprising—learning is fundamental in medicine as well as to growth and economic prosperity. It is helpful to appreciate more fully how the decision rules of economic actors with respect to activities that would influence disease transmission will impact society more broadly. As economics emphasizes in many contexts, the decision rules of economic actors influence the data that will arise. The application of empirical and econometric methods should reflect this, at least in part. Interestingly, the range of tools that economists utilize routinely, such as structural estimation, time series and panel estimation seem well-suited to understanding disease transmission. Still, it has been surprising that there has not been even more attention to such analyses to better understand potential optimal behavior. Given the range of decisions undertaken and the range of outcomes, there is much that can be learned through thoughtful analyses of data. From this perspective it has been surprising and even dismaying that the Center for Disease Control and Prevention (CDC) has not been more forthcoming with data available to it (<https://www.nytimes.com/2022/02/20/health/covid-cdc-data.html>), even asserting that

the public would not understand the data¹¹. Engaging with experts from various domains would seem to enhance the quality of potential data analyses, while hiding important data would suggest an anti-scientific perspective and a desire to control the narratives that could emerge. Transparency about data and confidence in letting diverse perspectives challenge the data is fundamental to science and the scientific process.

In some contexts, structural estimation has been an especially useful tool in economics by focusing more directly on the hypothetical optimality of the underlying policy and its importance to the data generation process. It is striking that there appeared to be relatively little attempt to try to use such approaches to understand more about the nature of the optimal policy regime or to understand policy at a causal level. Analogously, an interesting effort to use policy decisions to quantify uncertainty in the context of climate change is given by Barnett, Brock, and Hansen (2021)¹². Even separate from choice of method is that there seems to be relatively limited efforts to use the data on disease transmission and severity to understand more deeply the lessons from the overall experience. One basic problem is that the circumstances of different jurisdictions are so different. If New York, California, and Massachusetts are more aggressive in limiting interaction, but also have more underlying exposure to disease (e.g., due to their circumstances such as the population density or how people engage) or a more vulnerable population (e.g., older population), it is challenging to make inferences about the effectiveness of various policies. A jurisdiction that was more exposed

might naturally find it optimal to undertake more aggressive policies. For example, at the beginning of the pandemic New York was in a particularly problematic situation—with very high case counts and hospitalization rates—one suspects because of transmission through its particular transportation systems, including commuter railroad, subways, and even high-rise elevators. In this sense the challenge is not simply to look at jurisdictions with more favorable statistics. Similarly, the retrospective analyses to date do not suggest that areas that were less locked down performed worse—to a degree different areas faced different problems and challenges. One interesting example which compares the performance of different states is given by P. Kerpen, S. Moore, and C. Mulligan (2022)¹³. Analogously, the zero-COVID policies from China seemed to have performed worse than alternatives, especially once one considers the other health costs and broader economic costs. Undertaking careful analyses of such questions is important.

COVID-19 and the Economy

There are many questions that have emerged in the aftermath of the COVID-19 pandemic, not only about the transmission of the disease—but also its impact on fundamental features of the economy. The COVID-19 pandemic is changing the way society functions and the value of many assets. At a fundamental level, the COVID-19 pandemic highlights the importance of risk and uncertainty in society. Unanticipated surprising events can play an especially important role in the evolution of the economy and society, especially when the ex-ante contingent contracting of agents often

does not address these issues. To some degree, though qualitatively different in their own ways: September 11, 2001, the Global Financial Crisis (Great Recession and financial crisis) in 2008 and the COVID-19 (2020) pandemic all reflect the importance and challenges of ex ante contracting and the fundamental importance of risk and uncertainty, which asset pricing is especially well suited to address.

This highlights the importance of a number of ideas that are fundamental to asset pricing—including the “Peso” problem, which emphasizes that there are a range of events that might arise in the future that have not appeared in a particular historical sample or have only appeared with especially low probability, the distinction between and importance of systematic as contrasted to idiosyncratic risk, systemic risks to the economic system, and the value of optionality and flexibility in the real economy. Events like COVID-19 emphasize the potential significance of events that are not reflected historically and the importance of out-of-the-box thinking. It also highlights that the true risks faced in the economy are systematic and systemic risks, which cut to the core of markets and the economy, rather than the routine risks reflected in idiosyncratic risk that is easily diversifiable. While September 11, 2001, should have highlighted the importance of addressing low likelihood societal events contractually, society may have become much less complacent on this front after COVID-19 and perhaps now economic agents have a greater understanding of the value of contractual flexibility. At a broader level, one of the true comparative advantages of economists as compared to lay members of

the society is a recognition of the value of optionality when offered in real or financial contracts. In simplest terms, there is more value to a party when a contract offers additional flexibility to meeting its contractual obligations. By highlighting in broader terms, the nature of the risk faced by society, it will be interesting to explore how in the aftermath of COVID-19 the structure of lease pricing responds due to the importance of optionality (including the term structure and embedded options).

The context surrounding COVID-19 points to many ways in which the real economy has changed—to a considerable degree in the long-run and even more dramatically in the shorter-term. For example, real estate properties and facilities became unusable or needed to be adapted dramatically—yet at the same time demand for some types of facilities rose substantially. There are indications of extremely low utilization of some properties—such as office space in some large cities. This reflects behavioral adjustments on many margins—the work at home (“Zoom”) movement and resulting ability to relocate to further from the center city or even to more distant “Zoom towns” or warmer climates as well as substitution to fewer days in the office, which in turn could suggest redesign of the traditional office. Of course, the greater use of homes for work (and schooling) has led to dramatic increases in the demand for at least certain types of residential property. In turn, this has led to relatively sharp movements in property asset prices and may have helped cushion the impact of dramatically higher interest rates on residential asset values, avoiding substantial decreases in these. While it would be natural

to anticipate conversions of office properties in the center cities to condominiums, such substitution may be limited in the near term by the challenges to supply that the economy faced due to the continuation of COVID-19, zoning complications, and incentive and liquidity changes that emerged earlier. In some situations, the conversion option itself may be limited due to such factors as the differing designs that are suitable for residential vs. office space (e.g., floor layouts and access to external lighting). The COVID-19 pandemic not only had short-run effects, but also long-run effects on fundamental aspects of the economy—including the nature of work and the physical deployment of real property and physical structures.

This discussion points to important quantity and implicit price responses as an economy adjusts to the pandemic. It is important that some of these impacts are short-term effects, while others reflect a long-term response to learning about the ability to be effectively employed while working from home at least part of the time and perhaps fully. The nature of the price responses in turn highlights the value of flexibility and optionality in the structure of leasing contracts with potential implications for the form of contracting and the value of flexibility and optionality^{14,15}. To some extent flexibility has been a hallmark of the U.S. economy, but the significance and the degree of flexibility that is relevant has changed substantially. From an asset pricing perspective and broader economic lens, one of the crucial ways to help achieve flexibility is through pricing and price adjustments to encourage private actors to redeploy assets in efficient ways. Such responses should occur over many margins and various horizons. The

duality between quantities and the potential ability to engage in price adjustments is fundamental to the ability of the economic system to respond efficiently to substantial shocks. More broadly, the skills of economists and economic principles were insufficiently used and recognized in fighting the pandemic.

The Macroeconomy

At a macroeconomic level, an important theme with fundamental asset pricing implications to emerge in the aftermath of COVID-19 has been the emergence of an extraordinary inflation in which the Federal Reserve allowed itself to get far “behind the curve.” At the root of the issue was an attempt to cushion the response to the initial closure of the economy, leading to extraordinary liquidity injections in spring 2020 supplemented by extraordinary degrees of fiscal stimulus (and as a result dramatic increases in disposable personal income) and further increases in early 2021 due to additional fiscal stimulus. As the COVID-19 threat receded, this led to huge increases in spending, due to both the direct effects of COVID-19 and policy responses that discouraged work by providing more resources for not working than working (creating both wealth and price effects), shortages and supply chain disruptions. There is much to be learned from the experience in 2020 and 2021 about how to provide more consistent incentives in the face of an economy-wide emergency.

While it is clear historically that inflation rates have been highly persistent, the leadership at the Federal Reserve and Treasury insisted until Thanksgiving 2021 that 2021’s inflation was transitory. Yet many prominent observers thought that the use of the “transitory” word

was odd, especially when applied to such a persistent series as inflation. Furthermore, there is a simple potential interpretation of persistence, namely the role of expectations in determining prices. Surprisingly, little is known about inflation—reflecting that for about a decade before the pandemic the Federal Reserve could not generate as much inflation as it desired to keep the economy away from the possibility of deflation. For so many years that was the great inflation puzzle. The Fed struggled with its exit strategy from Quantitative Easing after the Financial Crisis, despite the absence of inflation—and wondered how it would exit from the COVID-19 liquidity expansion in 2020.¹ This aspect has continued to be an important part of the challenge, but now with the complication created by the presence of huge (but receding) inflation. Perhaps the lesson from the inability to create more inflation in the many years when it was not present and the inability to readily snuff out extremely high levels of “transitory” inflation is the failure to appreciate the extent of its persistence and underlying that the importance of expectations in determining micro-economic price dynamics.

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References:

1. Spatt C. A Tale of Two Crises: The 2008 mortgage meltdown and the 2020 COVID-19 crisis. *Review of Asset Pricing Studies*. 2020; 10: 759-790.
2. Becker C. Nobel Lecture: The economic way of looking at behavior. *Journal of Political Economy*. 1993; 101: 385-409.
3. Romer P. Roadmap to responsibly reopen America. 2020.
4. Kotlikoff L, Mina M. A cheap, simple way to control the coronavirus. *New York Times*. July 3, 2020.
5. Kaplow L. If we can't test everyone for coronavirus, this is the next best thing. *New York Times*. April 24, 2020.
6. Reddy S. This fall's Covid variant might really be different. *Wall Street Journal*. August 28, 2023.
7. Wall Street Journal editorial, COVID lockdowns and cancer. August 13, 2023.
8. Goldhaber D, Kane T, McEachin A, Morton E, Patterson T, Staiger D. The educational consequences of remote and hybrid instruction during the pandemic. *American Economic Review Insights*. 2023; 5: 377-392.
9. Wall Street Journal editorial. Biden rewrites the history of Covid school closings. August 28, 2023.
10. Bloomberg M. Teachers union pushes for remote 'learning' — as in Chicago's walkout — hurt minority kids most. *New York Post*. January 5, 2022.
<https://nypost.com/2022/01/05/teachers-union-pushes-for-remote-learning-as-in-chicagos-walkout-hurt-minority-kids-most/>
11. Mandavilli A. The C.D.C. isn't publishing large portions of the Covid data it collects. *New York Times*. February 20, 2022.
<https://www.nytimes.com/2022/02/20/health/covid-cdc-data.html>
12. Barnett M, Brock W, Hansen L. Climate change uncertainty spillover in the macroeconomy. August 23, 2021.
13. Kerpen P, Moore S, Mulligan C. A final report card on the states' response to COVID-19. National Bureau of Economic Research Working Paper 29928. 2022.
14. Grenadier S. An equilibrium analysis of real estate leases. *Journal of Business*. 2005; 78: 1173-1214.
15. Dunn K, Spatt C. Call options, points, and dominance restrictions on debt contracts. *Journal of Finance*. 1999; 54: 2317-2337.