"A Tale of Two Crises: Covid-19 (2020) and the Mortgage Meltdown (2008)"

By

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Abstract

The causes and consequences of the two crises were quite different as one reflected infection of the financial system due to excess leverage and poor quality mortgage loans and the other reflected medical contagion inducing a substantial global economic shock to try fighting the disease. Yet they shared many elements in the financial and medical systems. Among these themes were opacity and interconnectedness, adequate buffers and reserves, the import for asset pricing, moral hazard (though only in the Great Recession was that the cause of the crisis), the government as a systemic actor and the import for economic concentration.

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1. Introduction

Many commenters in the aftermath of the onset of the Covid-19 crisis have highlighted some of the substantial economic and financial differences with the mortgage meltdown (Great Recession) of more than a decade ago. Of course, there are substantial differences, but crucially there also are important similarities and much we can learn by highlighting these and considering the two crises together. In effect, while two observations do not provide a traditional empirical sample, nevertheless two examples can lead to much more insight than a single event by facilitating the ability to step back from some of the event specifics to appreciate broader perspectives.

At a high level, the underlying causes and stresses of the two crises were dramatically different, as broadly recognized and appreciated. In the mortgage meltdown (2007-2009) the financial system was infected and financial institutions were dramatically overleveraged and often held excessive exposure to mortgage-related instruments that had been dramatically overvalued or had declined substantially in value. In contrast, the financial system had been strong at the onset of the COVID-19 crisis. While vulnerability of the financial system to large economic shocks and the potential for significant default quickly emerged in 2020, infection of the financial system was not the root of the underlying problem. Instead, medical infections from the coronavirus were the cause of the adverse shock. Of course, these could infiltrate the financial system and have adverse implications for the balance sheets of financial institutions and the availability of funding (though financial intermediaries in the United States began the recent crisis with a

relatively strong capital base).[1] Indeed, provision for loan losses began to increase at the end of the first quarter of 2020.

Economic principles point to some of the basic similarities between the two crises. Of course, at its route the COVID-19 crisis was medical and the various "stay-at-home" and quarantine orders were intended to "slow the spread" of disease—but with obviously strong import for economic activity as well as contagion. At its route, it is helpful to reflect upon the medical aspects from the lens of economics—this will help shed on the parallel between the COVID-19 crisis and facets of the Great Recession.

In Section 2 we examine the importance of interconnectedness and opacity in the two crises, examining these issues with respect to mortgages and financial institutions on the one hand and disease on the other (including issues of efficient allocation of testing). The importance of reserves, buffers and stress tests of the adequacy of these in the two crises (equity capital and medical reserves) is discussed in Section 3. The nature of various risks and the import for asset pricing is discussed in Section 4. The differences in the role of moral hazard in the two crises are examined in Sections 5 and 6, the latter focusing upon specific challenges in real estate. We explore the theme of the government as a systemic actor in the two crises in Section 7. Section 8 examines the impact of the crises upon economic concentration and Section 9 concludes with a brief summary and identification of some of the open economic challenges suggested by the underlying medical shock created by the coronavirus.

[1] Over the past decade European financial institutions did not build up their financial strength to a similar degree, but since the COVID-19 shocks are global, these organizations certainly face similar challenges.

2. Interconnectedness and Opacity

One of the most fundamental aspects of COVID-19 is the incredible ease of its spread to those nearby (especially for extended periods) or even who touch the same surfaces. At the route of the contagion is what economist think of as interconnectedness. While interconnectedness is often desirable economically,[2] in this context it also leads to dramatic contagion. In effect, one's presence leads to an "externality." Externalities are central to some basic aspects of economic activity such as the liquidity externality (liquidity attracts liquidity) and the externality associated with a well-functioning payment system.

A second crucial aspect of COVID-19 is the opacity (lack of transparency) about who might be a carrier. This reflects several important underlying situations such as the serious potential for asymptomatic spread of the coronavirus (i.e., transmission by someone who does not have symptoms, but is nevertheless contagious), the potential for extensive delay in getting test results and limited availability of testing. While some tests provide results almost immediately (e.g., within five to 15 minutes), others have been associated with delays of close to a week, which limit greatly their utility (though such stale results provide partial information about who is contagious and are at least helpful in documenting the earlier state of the world).

[2] The move towards globalization over the decades has reflected the traditional perceived desirability of interconnectedness (e.g., in facilitating the development of markets for one's products) and the focus on the principle of comparative advantage, which has led to reductions in the costs of various imports.

Given the extraordinary economic harm induced by the considerable opacity, a vigorous testing strategy with timely tests and an appropriate scale of testing would appear fundamental to the restoration of economic health due to its importance in encouraging economics actors to more willingly engage with one another.[3] One illustration of this is that rapid response testing can be an alternative to costly two-week quarantines, if the probability of a positive result is not extremely high. More specifically, Nobel Laureate Paul Romer (2020) has called for approximately 20 million tests daily. Rather than suggesting that these be deployed in a uniform fashion (which itself could be extremely useful), Romer proposed deploying the tests based upon the risk facing the various individuals and the central importance in protecting both individuals and the society/economy. For example, under Romer's plan testing would be especially frequent for front-line health care workers (due to the importance of identifying their coronavirus status to protect them and their potential contacts) and nursing home residents (due to their vulnerability), among others. Contact tracing also would be used to identify potential subjects for testing or isolation. The dynamic nature of the opacity, which emerges because one's COVID-19 status can change so rapidly, highlights the importance of the frequency of testing. In a sense testing (to the extent medically and economically viable) could provide a solution to the opacity that might have been difficult in the Great Recession (2007-2009), where the presence of adverse selection (private information by the seller of the securitization or mortgage) would have been more fundamental.[4] On the other hand,

[3] The continuing shock to economic activity reflects in substantial part significant changes in behavior by economic actors. Much greater transparency and isolation of those sick at a point in time would go a long way toward restoring economic activity near the prior levels.

[4] This raises an interesting issue—to what degree is adverse selection important during the COVID-19 crisis? While it was generally recognized to be a crucial issue in the mortgage meltdown as the mortgage seller would have considerable private information relative to the buyer, the question also arises whether a

the challenge in the COVID-19 context is that the information state changes so rapidly. This highlights both the importance of testing over time and identifying the centrality of differential test frequencies, because the disease state will change with different frequency for various people and the societal costs of the disease are different across individuals. This reflects the differential extent of contacts and the medical vulnerability of individuals, who directly or indirectly experience the spread of the disease.

An interesting alternative approach to address opacity is to undertake modest numbers of randomized tests to establish via statistical methods the frequency of the disease in various sub-populations using information from questionnaires (see Kaplow (2020)) in order to allow decision-makers to make informed decisions with respect to relevant sub-populations. The advantage of this approach is that it does not rely upon frequent testing of much of the population, which would impose substantial resource challenges on the testing front. Nevertheless, this approach would facilitate thoughtful decision-making because it would offer informative estimates of the prevalence of COVID-19. In contrast, standard estimates of the proportion of test-takers who have the disease are not very useful or comparable to one another because of the tremendous selectivity in who is allowed or willing to take the test. For a long time, only the sickest individuals were tested; ironically for those individuals the test results may not have been particularly important because those individuals required intense care anyway (and would continue to do so, even if their test outcomes were negative). In an environment in which the test became more widely available over time, but only those who are relatively sickest or perceived likely to be sick

person has private information about his health status. As suggested in the insurance literature (e.g., Rothschild and Stiglitz (1976)) adverse selection would arise in the health context.

are tested, then one would expect that the frequency of positive outcomes over time would decline even without a decline in the incidence of the disease. Yet some government guidelines view a declining fraction of positive tests as an important indicator of progress.

While the discussion above focused upon opacity and testing for the presence of the coronavirus, another important aspect of opacity is the lack of information about who has antibodies to the virus (and presumably had the disease previously) and would presumably not be contagious. However, there are antibody tests also available. This is relevant for a number of reasons—those who are immune may be better positioned to take on activities or responsibilities with greater risk of exposure (whether to travel or work in hospital emergency room or as supermarket cashiers, etc.), could donate plasma to fight the disease or could be low priority for a vaccine. However, it is important that the antibody testing is considered less reliable than testing for the disease, which could limit the usefulness of these tests in the applications suggested above. Furthermore, it is unknown how quickly the extent of protection afforded by the antibodies will decline over time.

Both interconnectedness and opacity played important roles in the Great Recession as well. It was not clear during the mortgage meltdown as to the extent of problematic holdings and which holdings were substantially overvalued, but there was concern that sellers understood their own situation better than buyers (the classic Akerlof (1970) "lemons" problem). In effect, there was considerable opacity (e.g., investors and counter-parties didn't know which holdings were problematic). More broadly, there was considerable adverse selection about the financial status of various firms and their need for funding.

This induces considerable counterparty risk that manifests in a variety of ways (e.g., in 2007-2008 AIG was providing considerable insurance of the mortgage sector, but its precarious financial situation was not fully appreciated). Interconnectedness and opacity are at the heart of the counterparty risk experienced during the Great Recession.

3. Reserves, Buffers and Stress Testing

An important feature facing our medical system in 2020 is the adequacy of reserves and buffers. This applies to many different types of equipment such as ventilators, hospital space and beds, PPE (personal protective equipment) and masks. To a degree the issue may be about having a flexible enough (or even just-in-time) supply system, but to a degree it also is about having adequate reserves in place in advance (this is now referred to as "just-in-time" vs. "just-in-case"). Of course, stocking such reserves may be costly—especially if they are true reserves with very low likelihood of usage. This is part of the challenge associated with preparing for a pandemic of unknown intensity and unknown form. To a degree, the counterpart of this in the mortgage meltdown was whether financial firms had adequate reserves through sufficiently robust financial capital, i.e., equity.

Equity provides a buffer that debt does not offer; equity capital, unlike debt, limits the financial obligation of a firm in the event of financial stress and does not create obligations that can lead to bankruptcy and the potential reorganization of the firm or its liquidation. Increases in required equity capital were an important portion of the response in the aftermath of the Great Recession. Such increases were mandated by both federal authorities and international regulators in the Basel Process. The additional required equity

was intended to provide greater reserves subsequently. The nature of the incremental costs of equity relative to debt have been subject to considerable debate. For example, Admati and Hellwig (2013) argue from a Modigliani-Miller perspective that equity is not more costly than debt from a social viewpoint (though it may be from a private perspective taking into account the protection against bankruptcy offered by too-big-to-fail and the presence of heavy debt), while bankers assert that the cost of equity is substantially higher than the cost of debt. In contrast, in the case of medical equipment it is unambiguous that that there are real costs associated with reserves (or at least large reserves that are not likely to be called upon over a long time).

An interesting example, is the case of ventilators—which one could consider from both an ex ante and (somewhat) ex post perspective. Despite a recommendation in the case of a study of its preparedness in 2015, New York did not purchase ventilators for its reserve, but as its situation deteriorated in March 2020 requested 40,000 ventilators from the federal stockpile (far in access of the total federal stockpile). The federal government suggested that the request was unnecessarily large, but provided sufficient number to meet the realized "need." Many facets of this suggest interesting dimensions for defining the level of necessary reserves; one additional challenge with federal reserves is that they are ostensibly trying to meet the (correlated) demands from various portions of the country. The choice of optimal reserves depends upon the level and demand of the various users (including hedging multiple users), the nature of lead times (to what degree can flexible production be a substitute) and the uncertainty about model parameters. Unquestionably

reserves are costly and it would not be practical to have reserves sufficient for the largest potential shocks. Still, this leave open the question of optimal reserves.

Reserves and buffers were important in the Great Recession—much of the financial system was clearly inadequately capitalized. This was a central dimension during the financial crisis and the degree of leverage was undoubtedly a cause of it. Still, the issue of reserves and buffers may have been less challenging then due to the fungibility of alternative funding, as opposed to the diverse medical equipment and supplies needed to fight pandemics of alternative forms.

What should we take away from this about the governance of reserves? In the case of banks this was a relatively straightforward—as the key regulator with respect to supervision of banks and financial stability it was natural to assign this supervision to the Federal Reserve. Yet the lack of adequate buffers and reserves recently was in the medical system, so that would need to be reviewed and evaluated in a different manner. It also highlights a broader aspect of the economy; while states have some degree of oversight over hospitals, many aspects of our economy do not have much oversight and so are dependent upon the decentralized decisions of those who run the various organizations. Another twist on this theme is to observe that much of "Main Street" lacks substantial reserves—indeed, the bias in our marketplace is to encourage the distribution of "free cash flow" (Jensen (1986)). In fact, many have been operating on tight margins—one can cast that as operating "month-to-month." This phenomenon of operating on tight margins with limited savings ("month-to-month") is a characteristic of many small businesses as well as employees living on

limited incomes. There are not obvious mechanisms to require the availability of greater reserves throughout the economy, especially in light of the limited overall supervisory opportunities.

That the COVID-19 shock was an extreme tail-event on some dimensions, does not suggests that tail-events collectively do not arise reasonably frequently. It is important to recognize that there are many dimensions on which tail-events can arise. Obviously, the extreme circumstances of our pandemic, the mortgage meltdown of 2008 and the terrorist attacks of Sept. 11, 2001 illustrates the diversity in the types of such shocks that might arise (and of course, such a list is far from exhaustive). In effect, the fundamental point is that the label of "1 in 100-year" event is misleading in many ways. For example, it does not account for the joint probability of an extreme event on various dimensions. Furthermore, it is biased about events that have not occurred by focusing only on events that we have observed. In economic policy and asset pricing this is often referred to as a peso-problem and can help explain basic asset pricing puzzles, e.g., Rietz (1988) and Barro (2006), in that traditional analyses don't account directly for risks that were not experienced within sample. A fundamental implication is that extremely adverse shocks can occur with meaningful probability. In turn this highlights that during booms the government fiscal policy or perhaps even by extension monetary policy, should be oriented towards reducing the debt/GDP ratio (to create scope for addressing the future challenges of substantial adverse shocks). That's an important sense in which financially the society had not set up adequate financial buffers in advance of the COVID-19 crisis. While the United States does not have the highest debt/GDP ratio across countries, its debt/GDP ratio now exceeds

100%. One caveat is that the burden of the debt may be limited at present due to very low interest rates, especially if government chooses to lock in such funding costs over time by the use of long-term debt financing (however, with a positively sloped yield curve the temptation may be to use shorter-term funding).

Of course, another dimension about the potential inadequacy of governmental reserves is the inadequacy of reserves at the state and local government level. State and local governments have balanced budget provisions, but that does not capture the entire story involving state and local governments. These entities do have debt, not all of which reflects true investments. Furthermore, that does not include the massive sizes of state and local government pension underfunding. The COVID-19 crisis led to both large budgetary holes for state and local governments (the House of Representatives recently passed legislature providing for $1 trillion to attempt to plug such holes) and dramatic changes in the underfunding of state and local pension plans. For example, one published report suggested that the extent of underfunding in the government's Illinois plan almost doubled and increased by more $100 billion as a result of COVID-19 and another pointed out that Illinois borrowed $ 1.2 billion from the Federal Reserve for one year at 3.82% (when one-year Treasuries were yielding less than .2%), reflecting very high risk and risk premium.[5]

Many observers have pointed to the prior economy as a benchmark for the economy's potential recovery. Both the 2008 and 2020 examples suggest that this is a flawed

[5]Kozlowski (2020) cites a Moody's post--COVID-19 estimate of a recent Illinois adjusted net pension liability of $241 billion and a June 30, 2019 filing from Illinois that provided an estimate of $137.3 billion. Gillers and Timiraos (2020) describes the borrowing by Illinois from the Federal Reserve.

perspective. For example, prior to the Great Recession the economy reflected housing and mortgage transactions with easy subprime financing, too much leverage in the financial system and too strong an incentive to add leverage. With hindsight that clearly reflected an inflated or biased benchmark. While the nature of the shock was different in 2020 and the economy was not as obviously overheated, the economy was running $1trillion deficits and arguably reflecting insufficient recognition of the possibility of adverse shocks (quite apart from whether the economy should have been creating medical reserves that would have been appropriate for the actual shocks). This again suggests an inflated or biased benchmark. In that sense the growth rate and success of the prior economy is biased as it didn't internalize or reflect the costs of the optimal extent of reserves and flexibility.

Closely related to the issue of reserves and buffers is the notion of stress testing,[6] which became a key tool in the aftermath of the Great Recession. This notion was first implemented by the Federal Reserve in 2009; the initial round of stress tests helped buoy the financial markets because of the relatively modest amount of additional capital identified as needed by the major banks. The provided considerable reassurance, especially since it pointed to only limited capital raising needs suggesting that there would likely be Federal Reserve support later in adverse circumstances. In light of the success of this round of stress tests, the Dodd-Frank Act incorporated annual stress tests starting in 2012. One criticism of the implementation of stress testing by the central bank has been its focus on one of two stress scenarios selected by senior regulators. The choice of stress scenario

[6] The initial impetus for the term "stress testing" comes from cardiac stress testing, which involves an evaluation of the heart under stressed conditions. More broadly, one of the themes underlying this article is the close connection between the financial and medical systems and the application of similar concepts to both, particularly in light of the fundamental medical nature of the shocks in 2020.

inherently is a difficult and important one, but especially challenging because almost by definition big shocks tend to be a surprise and unexpected by the regulator. An interesting observation is that the stress scenarios have not been based upon a pandemic and arguably reflected more modest shocks than the COVID-19 experience. In fact, in the context of COVID-19 the bank supervisors faced an interesting challenge in light of the dramatic stress event facing the real economy—should the bank supervisors move forward for the stress test with the stress scenario that was not based upon the pandemic or just focus upon the realized stress and observe how financial institutions handled the real challenges from the actual stress? The Federal Reserve decided to move forward with the hypothetical stress scenario, while taking notice of risk management by the major banks in the real economy; in contrast, the European Central Bank decided to focus on the actual economy. It also is worth noting that one individual, Bill Gates (2015) in his remarkable Ted Talk, did identify a pandemic as an important ex ante challenge.

While stress testing has been a focus in the aftermath of the Great Recession, it has not been a major focus in the non-financial economy. Though hospitals undertake various preparedness testing and review, it is not obvious that they undertake systemic stress testing with respect to their supplies in a systematic way—and whether there are natural mechanisms throughout the economy to undertake such analyses. Because of the multi-dimensional aspects of stress preparation by hospitals, being prepared with ample buffers and reserves is challenging due to the range of tail events confronting the medical system and the diverse needs that these would imply. Of course, the COVID-19 crisis was an extreme tail event along *some* dimensions, there also are many alternatives for which one

should be somewhat prepared (this is not to suggest that one can be fully prepared for all tail events that one could envision). Relatedly, one criticism of the implementation of stress testing by the central bank has been its focus on one of two stress scenarios.

4. The Nature of Risk and Asset Pricing

The two crises teach similar lessons about the nature of risk and asset pricing. When many members of the public are investing they tend to think about risk as reflecting some stocks going up more than others and so does not discourage equity investments to a material degree—or at least how commonly thought prior to the Great Recession. Such cross-sectional variation highlights the import of idiosyncratic risk and in fact, arguably minimizes it since there is not material downside. Furthermore, financial theory teaches that idiosyncratic risk is diversifiable in forming portfolios and so in that sense does not contribute to expected return. In contrast, aggregate or systematic risk, cannot be eliminated by forming portfolios. Such economy-wide factors are priced and in that sense they contribute to expected return. Both 2008 and 2020 are cases in point in that the capital markets experienced declines (strongly correlated across assets) of 35% to 50% (relative to peak). Furthermore, in light of the declines in interest rates during these crises the declines in asset values (which reflects the present value of future cash flows) understates the decline in value of the consumption stream or an annuity that can be purchased or consumer. At the same time it also is helpful to recognize that credit spreads (e.g., for corporate bonds) and risk premia would widen substantially in the event of a crisis. In some instances the systematic sources of risk described above could reflect risk to the financial system and lead to systemic risk. Both 2008 and 2020 highlight the importance

of such system risks and protecting against the vulnerability to shocks of our financial system.

The systematic (and systemic) aspect of risk highlights an important facet related to the nature of an insurable risk. To be fair it would be challenging to ensure such risks if they are too large. Insurance companies are typically not in a position to ensure broad societal risks, though sometimes offering to do so despite not possessing the necessary resources and sometime challenged to do so. For example, it was striking that some casualty companies insured municipal bonds prior to the Great Recession (see Nanda and Singh (2004)). The defaults of municipal bonds would likely have been strongly correlated raising the question about whether that would have reflected an insurable risk. In light of the lack of claims, these "monoline" insurers (such as Ambac and MBIA) extended their efforts to also insure the mortgage sector, along with AIG, which issued credit default swaps to ensure huge amounts of mortgage exposure held by investment banking firms. As is well known the insurance companies essentially collapsed from providing this mortgage coverage (unlike the prior insurance of municipal bonds). For example, AIG's downgrade on September 15, 2008 triggered collateral requirements in its swap contract that AIG was unable to satisfy, essentially requiring Federal Reserve support to avoid a bankruptcy filing. An interesting insurance twist in the COVID-19 crisis is that business interruption insurance typically (though not always) has exclusions for pandemics (sometimes explicitly identifying disease, viruses and/or bacteria)—reflecting the difficulty of insuring systemic risk. Often these policies require a physical loss of property

rather than just a property loss. Such examples reflect a more proactive approach in the COVID-19 context by insurers to avoid the systemic risk that emerged later.

5. Moral Hazard

One of the central features in the Great Recession was the extent of leverage and excesses of financial institutions, particularly in holdings of mortgage-backed securities in various forms (including considerable subprime origination). Yet despite their instrumental role in seeding the crisis, many of these same institutions were protected and viewed as "too big to fail," receiving special funding or bailouts through the Federal Reserve and Treasury. Many/most observers would have viewed this as producing moral hazard, by encouraging and rewarding excess risk taking in the future. In contrast, in the COVID-19 crisis the overall role of default is widely acknowledged to be more muted. But at the same time, there are a broad range of moral hazard and incentive challenges in the policy response to COVID-19, as in the Great Recession. A central aspect of controlling moral hazard is to suitably align induced preferences and bring about efficient decision-making under the relevant constraints.

Of course, there was considerable urgency to the economic policy response to COVID-19 in the aftermath of the economic lockdown, leading to surprisingly rapid decision-making by Congress. The decisions were motivated by a variety of goals in managing the "closure" of the economy including (a) restoring aggregate spending power, (b) alleviating potential human suffering and (c) facilitating the restoration of incentives in the underlying economy. The resulting underlying policy issues are complex and challenging.

Understandably (especially given the rapidity of enactment), there were various awkward and arguably inefficient aspects to the design that emerged. Perhaps the most obvious and visible problem was the provision in the CARES Act which set up federal unemployment bonuses of $600 per week (through July 31, 2020, when under the current statue the bonus would expire) above the state unemployment payment, which led many unemployed to receive replacement income that substantially exceeded their regular income. In fact, Ganong, Noel and Vavra (2020) use microdata to show that (a) the median replacement rate was 134%, (b) 2/3 of the eligible workers received unemployment benefits that exceeded their lost earnings and (c) 20% of those eligible received benefits that are at least double the lost earnings. Obviously, these are very generous benefits (for low compensated workers) and help induce a basic moral hazard problem. The purpose of unemployment insurance is to provide some replacement income, while still incenting (as best as feasible) individuals to look for employment and to accept suitable offers. Given the temporary nature of many of the COVD-19 induced separations, it also is important to encourage laid-off workers to accept offers of re-employment—that's challenging to do with the observed extraordinary replacement compensation rates. This is moral hazard in its simplest form.[7] Advocates of the bonus compensation would argue that the workers will lose the unemployment benefits if they turn down their prior job when reoffered it, but this can be

[7] Despite the terminology "moral hazard," this is not intended as criticism of workers who are following their economic incentives. Indeed, the relative attractiveness of unemployment relative to employment is further reinforced by the potential health risks associated with employment due to the contagion.

challenging to monitor and enforce[8] and does not directly address the issue of the intensity of the job search that they undertake.[9]

A striking aspect of the Payment Protection Program (PPP) is that funds were allocated on a sequential service basis ("first come, first serve") with a limited pool of funding; ultimately, this lead to a second round of funding. The eventual availability of the second round mitigated the queueing aspect to the original allocation, but otherwise it would have been difficult to justify allocation by queue.[10] The economic policy response to the COVID-19 crisis also reflected a complex web of eligibility criterion, timing windows, incentives and decisions. Federal support and assistance was targeted to a variety of firms and individuals to accomplish particular goals. However, the structure can create crucial incentives that distort behavior in order to qualify. To some extent that may reflect the goal of a particular program (such as the encouragement of a firm to retain its workforce), but it also can lead to unintended consequences and significant adverse aspects of the particular goals (e.g., encouraging a firm to retain its full workforce, especially in industries such as airlines or hospitality that are likely to need significant downsizing, does not facilitate the adjustment of the economy and the redeployment of talent). Initially, in order to obtain forgiveness of loans under the PPP program the funds needed to be spent within two months and no later than June 30, 2020 and at least 75% would have to have been used

[8] One reason to not turn down the job is that the federal bonus was scheduled to expire at the end of July 2020. Of course, that deadline may be extended and workers would recognize that too.
[9] In the context of the COVID-19 environment one could argue that job search is secondary because so many of the layoffs are temporary.
[10] Allocating by queue is directly suggestive of government selecting winners and losers. Additionally, since the PPP applications were processed by banks, allocation by queue potentially led to a mechanism biased towards bank customers.

for payroll expenses. The use of "cliff incentives" and eligibility criterion can create sharp discontinuities in response that are far from the programmatic intent. Indeed, given the restrictive nature of the PPP Congress later reduced the minimum fraction for payroll to 60% and the time window for expenditures opened to 24 weeks. These changes may help facilitate making the loan forgiveness less closely tied to employment and thereby facilitate the ability of the firm to rebound.

Another example of the awkwardness of discontinuous policy designs under the CARES Act concerns the airline loans. Under the program the Treasury and the airlines agreed that 70% of certain airline loans (billions of dollars) will be converted to grants provided that the airline does not lay off workers or cut wages rates through September 30, 2020 (leaving some discretion to reduce hours and still satisfy eligibility for conversion to a grant[11]). There is a huge discontinuity associated with this design at October 1st and one would expect many layoffs then (and none earlier if the value of forgiveness of 70% of the loans is sufficient) unless the path of airline demand rises to an unexpectedly rapid degree. This raises the question as to whether this type of cliff design and discontinuous hurdle leads to an economically efficient outcome. Given the extent of demand destruction for airline travel, retaining the full workforce for the full six months would not appear to be efficient—compared to a somewhat more modest combination of unemployment and severance compensation, especially for workers who would find that especially appealing and interested in exploring other possibilities. On the other hand, perhaps from a macroeconomic perspective this reflects a desire to spread the pain of aggregate

[11] When United Airlines cut the hours of some workers there was considerable controversy about whether that was consistent with Congressional intent.

unemployment over time (so that the individuals laid off by the airlines would incur their dislocation subsequent to other layoffs), but why that would be desirable is not being articulated.

One of the important ways in which moral hazard issues are especially important in the economic management of the COVID-19 crisis is related to the financial instruments provided for the advancement of federal funding. This is arguably much more of an issue in the recent context of the coronavirus rather than in the Great Recession because of the extraordinary extent of the shock and uncertainty about its duration (and overall scale), which leads to the potential for solvency challenges for at least some firms needing funding. Much of the federal support during the Great Recession could solely be provided by the Federal Reserve because of the presence of good collateral and the lack of substantial credit risk, but in the recent context such collateral was more limited relative to the interest in borrowing given the extent of uncertainty. Consequently, it was important for the Treasury to backstop a portion of the lending in programs with significant potential credit risk (to try to limit the risks to Federal Reserve independence and limit the extent to which the Fed is engaging in fiscal policy).[12] This in turn raises the question of the design of the resulting instruments. Hanson, Stein, Sunderam and E. Zwick (2020) and Philippon (2020) identify the importance of the debt overhang problem that could emerge without structuring the repayment in an efficient manner. To limit the problem of subsequent over leverage one could want to structure repayments to limit the severity of the debt obligations and

[12] A counterpart to this during the Great Recession was funding from the Troubled Asset Recovery Program (TARP) that was advanced by the Treasury, but the solvency challenge and credit risk uncertainty was relatively more modest.

instead (at least in part) use less senior claims (which also could help ensure the viability of future funding). Hanson, Stein, Sunderam and Zwick (2020) also point to a number of additional factors to enhance the design of the financial claims, such as using staged finance to provide credit in order to facilitate the dynamic re-evaluation or further credit extensions, given the extent of the uncertainty of the shock.

Some of the discussion of moral hazard indirectly points to some of the challenges associated with interventions in the capital markets by the Federal Reserve. It was remarkable how quickly the Fed rolled out some of its initial steps (such as intervention to head off fears of money market and commercial paper runs), armed with the Fed and governmental playbook from the financial crisis and dealing with liquidity disruptions in the repo market since fall 2019. Over time, it took further steps—such as expressing a willingness to buy municipal bonds, corporate bond ETFs and "fallen angels" to deal with some further new challenges created by the more recent disruptions. One of the related (but very important) challenges is that to the extent that the Fed is perceived as the buyer "of last resort" the role of risk sensitive pricing would be undercut, leading to inefficient and excessive risk taking.

6. <u>The Challenge of Real Estate and Moral Hazard</u>

Many observers have highlighted the central role of housing finance in the Great Recession including overleveraging by many borrowers and financial institutions.[13] In significant part the excess risk-taking that this reflected was at the root of the mortgage meltdown and

[13] For example, see Mian and Sufi (2014).

overall crisis. In contrast, the financing of housing and real estate was not the underlying cause of the economic dislocations in the COVID-19 crisis (of course, the root cause was medical and reinforced by efforts to fight disease, such as social distancing).

In this recent context the moral hazard issues in real estate relate to both rental and mortgage payments for both residential and commercial real estate and the impacts on the mortgage servicing business. In some cases individuals and commercial renters do not have the available funding to make payments immediately (e.g., due to the absence of business) and in other situations commercial renters are pointing out that they could not use their facility due to state closure orders (e.g., Gap suspended rent payment on stores that were closed). This raises interesting legal questions about the enforceability of the leases outside bankruptcy in the event of a government ordered closure and the distinction between a lack of business due to health concerns and government mandated closures. The non-payment of rents may be motivated by efforts to negotiate lease concessions, at least for the immediate aftermath of the initial coronavirus shock.

Another important facet of moral hazard in real estate finance around the coronavirus has been the structure of servicing arrangements. Loan servicers are often required to continue to pay the investors who own the underlying loan instruments for four to twelve months when payments are delinquent. Despite this obligation, non-bank servicers are not (carefully) supervised as part of the regulatory process (so do not hold significant reserves) and indeed, have resisted oversight. This raises an interesting question as to the assignment of the payment risk to the servicers rather than to the lenders/investors. Most simply, this

can be viewed as putting the servicers (who also are often the originators) in the position of bearing first losses, which would cause them to take actions and make decisions that would be efficient (in effect, the structure of imposing this risk on the originator/servicer is an attempt to resolve moral hazard). One important question that the COVID-19 crisis raises is whether this structure for allocating first losses is workable without adequate reserves or oversight. One of the background challenges associated with the allocation of payment risk is the role of forbearance (delaying foreclosure rights), which encourage payment delays for borrowers in tight payment circumstances. This is motivated in significant part by several themes that we learned about in the aftermath of the Great Recession--a recognition of substantial deadweight losses associated with foreclosure (and a desire to avoid those) and the adverse neighborhood spillovers that foreclosures create. Finally, an additional source of dislocation in the mortgage market in the early days of the COVID-19 crisis was the disruption in originator hedging of "rate locks" that came about as a byproduct of Federal Reserve purchases of mortgage-backed securities.

7. Government as a Systemic Actor

One of the common messages from the two crises is the extremely important role of government policy and regulatory actions and how these are a major source of systemic risk. Systemic risk refers to risks to the system; it is hard to identify any large private agent whose actions could pose more risk to the system than government. This is not to say that the optimal government policy is obvious, but that because it is a central player in the system its actions would be at the core of systemic risk broadly defined. Even outside crisis circumstances, financial market participants are extremely focused upon government and Fed decisions (e.g., consider the extent to which interest

rate decisions are discussed in the financial press). Such policy decisions as bailouts in financial crises and bank equity/capital requirements, which influence risk taking, have obvious systemic consequences.

While the optimal decision rule may be unknown, it can be helpful to identify situations in which policy decisions appear to be inconsistent over time. Of course, in a crisis as uncertainty or strategic aspects of the context evolve there may be learning, which would influence the optimal decisions. Still, it is important to ask whether decisions are predictable or ad hoc and in the language of economics to what extent are they time consistent (e.g., Kydland and Prescott (1977)).

Many of the key decisions in the Great Recession would have been hard to predict and to a degree involved changing circumstances. These include the differences between Bear Stearns (whose debt was full protected due to the JP Morgan Chase guarantee) and Lehman Brothers (which went through bankruptcy), between Lehman Brothers and AIG (whose debt was protected), the awarding of bank holding company status to Goldman Sachs and Morgan Stanley, the customized guarantees to Citigroup and Bank of America and the use of the Troubled Asset Recovery Program (see Spatt (2016)). Arguably, the merger between Bank of America and Merrill Lynch may have increased systemic risk.

The systemic concerns with government policy during the COVID-19 crisis in the medical space are illustrated by a range of perspectives such as inadequate prioritization of testing (see earlier discussion), inadequate prioritization of availability of personal protective equipment, ambiguity about the value of ventilators (early in the COVID-19 crisis there was extraordinary demand, which reflected limited (and perhaps inadequate) reserves, concern about the projected number of cases as well as possible overuse of the device before doctors learned that it was often counterproductive), inconsistent guidance about the use of masks (which changed dramatically

around the start of April), and inconsistency about the lack of adherence to social distancing (a number of public health professionals changed their stance from when the focus was on reopening the economy to when the issue was related to civil protest). In many situations the idea of "science" has been invoked—often in support of a scientifically grounded hypothesis, but sometimes to create popular justification. Of course, the scientific knowledge about certain practices may have changed (e.g., if the prior beliefs were not strong) or other priorities shifted. The shift in perspectives also may have created a new type of challenge by undercutting the credibility of some of the key principles, such as the power of social distancing, in the eyes of some of the public. Ultimately, the success of such policies is heavily dependent upon popular adherence.

8. Economic Concentration

   While changes in economic concentration would not be one of the primary short-term consequences of the two crises, it is useful to address from the long-term perspective how the crises impacted concentration and especially how the regulatory system influenced that. I view the two most significant impacts related to COVID-19 and concentration as the distinction between "essential" and "inessential" firms and activities and the heightened role of technology. During the crisis most states declared many activities as essential and others as not essential, effectively requiring the inessential to close for a few months. While some of the distinctions were clear-cut (e.g., grocery stores), other aspects were far from clear-cut and arguably even arbitrary. For example, should Walmart have been allowed to operate *fully* because it sells groceries, but also many other goods—while forcing smaller merchants in other locations to be closed. In this sense the a priori decision to sell groceries was a valuable strategic decision for Walmart, for example. This will lead

to greater concentration in selling various products. Of course, many of the tech companies (and especially those that facilitated working at home) performed extremely well. To some degree these are operating in "winner-take-all" spaces, as many of the underlying business models are essentially natural monopolies. This is illustrated by such companies as Facebook, Amazon, Apple, Netflix and Google ("FAANG" stocks) as well as such companies as Zoom, which have reflected transformation in the allocation of time. The importance of delivery in the COVID-19 era and selling of goods through Amazon as well as the decisions by states to designate only certain businesses as essential is likely to lead to much greater long-run concentration and market power.

Analogously, the Great Recession led to somewhat greater concentration in banking and financial services. First, the "too big to fail" perspective in financial services led to the survival of larger players (with the exception of Lehman Brothers) as illustrated by the federal support to AIG, Fannie Mae, Freddie Mac, Citigroup and Bank of America. Furthermore, during the financial crisis regulators encouraged firms to buy smaller players who were struggling, as illustrated by the purchase of Merrill Lynch by Bank of America, the purchase of Bear Stearns by J.P. Morgan Chase and on a smaller scale the acquisition of National City by PNC Bank. All of this has led to greater concentration in financial services in the aftermath of the mortgage meltdown and the Great Recession. Despite the strong differences in the settings, both 2008 and 2020 have in common the greater ability of larger firms to survive the respective shocks. Our discussion highlights that this reflects a mix of factors, including the decisions of regulators. During the Great Recession they wanted to avoid the collapse of too-big-to fail institutions and so provided bailouts or

facilitated mergers without much attention to the resulting impact on market power. The artificial (and somewhat varying) definition of essential services (determining which firms could remain open) during the pandemic of 2020 is playing an important role in the future success of these enterprises. These designations could easily enhance market power and help create institutional arrangements that enhance the vulnerability of the economy to future systemic risk. This is a subtle economic parallel between the contexts of the two crises.

9. Concluding Comments

Crises are especially important events in an economy and there is much that we can learn from them and the ongoing response. In this paper we highlight and emphasize some of the similarities between the crises of 2008 and 2020, though the events were certainly different in fundamental respects. We address the question of what we can we learn by comparing the two crises, focusing upon various economic principles and aspects of the environment—including the application of these principles to the underlying medical context. Our analysis focuses upon such themes as opacity (lack of transparency about risks—whether mortgage or medical), interconnectedness, the adequacy of reserves and buffers, moral hazard (in 2008 it was at the root cause, but in 2020 moral hazard is important in some of the consequential behaviors), the nature of risk taking, the government as a systemic actor and the important of the crises for economic concentration.

Going forward from the COVID-19 crisis the economy will face new challenges as society sorts out how to adapt from this shock to what we have learned along so many dimensions.

Some of the ramifications are intermediate-term ones (until society more fully puts COVID-19 behind through a vaccine or herd immunity) and others are longer terms one that reflect past under appreciation of the potential for a pandemic. What lessons can we learn from the handling of the COVID-19 crisis? What were the overall impacts of lock-downs, the distinction between essential and inessential work and social distancing? How should we change business models to adapt to changing preferences with respect to social distancing in such sectors as hospitality (restaurants, hotels, airlines, etc.), education, large-scale entertainment (sporting events, theater, movies, etc.), medicines, mass transit and office space (more remote work vs. more space for workers who remain in the office)? What are the consequences for density, relative property values, the structure of supply chains and globalization more broadly? How can we improve the structure of overall risk-sharing in society to better account for aggregate systemic shocks on an ex ante rather than ex post basis?

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