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Stress Testing During Times of War

Law Working Paper N° 529/2020
June 2020

Kathryn Judge
Columbia University and ECGI

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Abstract

The Covid crisis raises important questions about the role of stress testing during periods of systemic distress. Should stress testing of banks be abandoned? Modified? Proceed as scheduled? Different jurisdictions have taken different tacks, reflecting contestation over these fundamental issues. This essay argues that stress tests become more important, not less, in the midst of systemic distress, but only if the stress scenarios are modified to reflect the distinct challenges an economy is facing. Well-designed stress tests can provide critical information to policy makers and others, promoting more timely efforts to address underlying weaknesses. Given that regulators will rationally be hesitant to produce, much less disclose, information that could exacerbate the very crisis regulators are seeking to contain, crisis-time stress testing is only viable if regulators also have the tools needed to address any bad news the testing may reveal.

Keywords: financial crisis, Covid-19, stress testing, bank supervision, Federal Reserve

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Kathryn Judge
Harvey J. Goldschmid Professor of Law
Columbia University, Columbia Law School
435 West 116th Street
New York, NY 10027, United States
phone: +1 212 854 5243
e-mail: kjudge@law.columbia.edu

The Center for Law and Economic Studies
Columbia University School of Law
435 West 116th Street
New York, NY 10027-7201

(212) 854-3739

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Stress Testing During Times of War

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The Covid crisis raises important questions about the role of stress testing during periods of systemic distress. Should stress testing of banks be abandoned? Modified? Proceed as scheduled? Different jurisdictions have taken different tacks, reflecting contestation over these fundamental issues. This essay argues that stress tests become more important, not less, in the midst of systemic distress, but only if the stress scenarios are modified to reflect the distinct challenges an economy is facing. Well-designed stress tests can provide critical information to policy makers and others, promoting more timely efforts to address underlying weaknesses. Given that regulators will rationally be hesitant to produce, much less disclose, information that could exacerbate the very crisis regulators are seeking to contain, crisis-time stress testing is only viable if regulators also have the tools needed to address any bad news the testing may reveal.

Introduction

In the spring of 2009, the United States was mired in the greatest recession it had faced since the Great Depression. In March, the Dow Jones Industrial average had fallen to 6,594.44, a total decline of 53.4 percent from its peak in the fall of 2007. The official unemployment rate was over nine percent and still trending upward, eventually to exceed ten percent. With the support of Congress, the Federal Reserve and other financial regulators had launched an array of initiatives to contain the fallout of what had become a global financial crisis. These interventions, including a massive recapitalization of U.S. banks and the effective elimination of large, independent investment banks, had succeeded in stabilizing much of the financial system, but full functionality remained elusive. The crisis had revealed significant deficiencies in the banks' risk management systems and the capacity of regulators to detect those weaknesses. Fear and distrust remained the order of the day.

Against this background, the Federal Reserve and other bank regulators took a gamble. On May 7, 2009, they publicly announced the results of the Supervisory Capital Assessment Program (SCAP). As then-Chairman Ben Bernanke explains, "the SCAP marked the first time the U.S. bank regulatory agencies had conducted a supervisory stress test simultaneously across the largest banking firms."[1] The Fed further deviated from tradition in its decision to disclose the results of the SCAP. In providing an unprecedented level of detail regarding the methodology and inputs used in reaching those results, the Fed challenged the assumption that bank supervision should always be shrouded behind a thick veil of secrecy. Both gambles paid off. As Bernanke later observed: "The SCAP stands out … as one of the critical turning points in the financial

* Harvey J. Goldschmid Professor of Law, Columbia Law School, ECGI Research Member. The author would like to thank the editors of the Stress Test Handbook, Til Schuermann, Doyne Farmer, Alissa Kleinnijenhuis and Thom Wetzer, Nat Benjamin, and other participants of the IMF's Conference on Rethinking Financial Stability for thoughtful feedback on earlier versions of this chapter.

[1] Bernanke, Stress Testing Banks: What Have We Learned? (2013).

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crisis. It provided anxious investors with something they craved: credible information about prospective losses at banks."[2]

Most policymakers, academics, and industry participants share Bernanke's positive assessment of the SCAP. Stress tests have now become a core part of the supervisory and regulatory toolkit, and one of the most important post-crisis regulatory innovations. The Dodd–Frank Act requires large banking organizations to undergo stress tests, and regulators on both sides of the Atlantic have come to see stress testing as a critical component of their ongoing efforts to prevent another financial crisis. These successes have been sufficiently great that other regulators too have embraced stress testing. There are even proposals for yet other ways that stress testing may be used to detect weaknesses in the financial system before they threaten the health or stability of that system. (See, for example, Thurner & Poledna and Farmer et al in this Handbook]) These are important developments, and broad-based, regular stress testing is appropriately here to stay. These post-crisis developments, however, have shifted attention away from the distinct value, and risks, of the SCAP as a crisis-time intervention.

This Chapter shifts the focus back to crisis-era stress testing and other modes of just-in-time information production. Even with rigorous stress testing, the complexity and dynamism of the financial markets are such that regulators will always have incomplete information. These information gaps can prove particularly problematic during periods of distress. A lack of information can contribute to regulators' tendency to be too slow to recognize problems, exacerbating the size of a crisis and the long-term macroeconomic effects. Information gaps can also impede crisis containment efforts once a crisis takes hold. Without accurate information about the size and location of capital and liquidity shortages, regulators often have little choice but to over-supply or mis-shoot in their efforts to combat dysfunction. This can exacerbate moral hazard and public outrage, as large sums of taxpayer money seem to flow to the very financial institutions that are perceived to be the cause of the crisis.

The Covid-19 crisis has made these issues timely in new ways. Unlike 2008, the Covid-19 crisis grows out of changes to the real economy. The public health threat posed by the novel coronavirus coupled with policy changes designed to slow its spread caused massive, unanticipated changes to virtually every corner of the economy and society. Thanks in significant part to quick and aggressive actions by the Federal Reserve, boosted by aid from Congress, the early panic triggered by Covid-19 was quelled and the reckoning going on in the real economy has not yet triggered a full-blown financial crisis. But it is far too early to declare victory. This essay pulls on lessons from past crises and expert analyses of when and how stress testing can aid supervision to explain the distinct value of crisis-time stress tests.

This chapter argues that stress tests can play a critical role in crisis containment, and more should be done in advance to enable crisis-time stress testing. Once things have started to go awry, stress testing provides an array of benefits. When fault lines emerge, regulators have a much clearer sense of the type of adverse developments that may threaten stability, where weaknesses may lie, and the specific fears that they must

[2] *Id.*

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address to restore market functioning. Stress tests can provide much needed information about the size and location of fundamental weaknesses in the system and the mechanisms through which those weaknesses may trigger broader dysfunction. Moreover, as the SCAP demonstrated, producing credible information and using that information to shape substantive policy interventions, like recapitalizations, can reduce the relative size of the amount of government support needed to restore faith and functionality.

The analysis here rests on the assumption that crises are in part information events. Coordination challenges may exacerbate dysfunction, but runs are rare when the entire financial system is safe and sound, and everyone has credible information that it is so. Fragility, that is, dysfunction out of proportion to the triggering event, is in part the result of incomplete information about the ramifications or meaning of an adverse development. Stress tests can help address the unknowns that exacerbate fragility while providing guidance about how best to deploy other tools, like guarantees and capital injections, that may be needed to calm fears and restore health. Even if these dynamics are not yet on full display with Covid-19, they may yet prove troubling.

Recognizing the importance of crisis-era information production reveals critical shortcomings in the current toolset policymakers have at their disposal. Most importantly, regulators will hesitate to tread into the unknown and generate new information when doing so could destabilize an already fragile system. Without the passage of Emergency Economic Stabilization Act, which empowered the Treasury to recapitalize weak banks if needed, regulators may well have lacked the will to take on the risks that the SCAP entailed. The Coronavirus Aid, Relief, and Economic Security (CARES) Act passed by Congress in March 2020, provides a much bigger fiscal hit for the economy, but less discretion to regulators. Whether it will suffice as a backstop should panic set in remains to be seen.

Going forward, devising ways to vest regulators with the authority needed to contain, even if not resolve, a large-scale crisis is critical if we want regulators to produce the information required to reduce the size and scope of the next crisis. Time-limited guarantee authority, which I have advocated for elsewhere, is one to encourage regulators to probe into the unknown when the system next starts to gyrate. There may well be others.

This chapter proceeds in three parts. The first part provides background. It briefly reviews, in informational terms, how the SCAP contributed to the crisis recovery, why information production is likely to remain important during periods of systemic distress, and the challenge of isolating information production from substantive interventions. The second part shifts the focus from the SCAP to consider the conditions under which just-in-time information production can aid crisis containment. It expands the analysis temporally--to other stages in a crisis--and topically--to domains other than banks. The third and final part addresses the groundwork needed to aid crisis-era information generation, while recognizing that some improvisation is likely inevitable. It addresses the current situation but also the types of regulatory changes more broadly that may be warranted to promote just-in-time stress testing,

The most significant challenge moving forward lies in honing the relationship between the production of information and the capacity to address any weaknesses the analysis reveals. There is no easy way to resolve this tension. In a democratic system,

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fiscal decisions are usually reserved to the legislative branch or other elected officials, but these bodies are rarely equipped to act with the speed required to contain a growing financial crisis. In the United States, for example, it may well have been difficult to get Congress to act without the massive fallout triggered by the failure of Lehman Brothers, and even with that, it was not easy. Institutionalizing a guarantor of last resort is one way to bridge this gap, as it would allow regulators to act swiftly to contain a crisis while still reserving to the legislature the question of which banks should be recapitalized and on what terms. In this way, it could provide regulators both the incentive and capacity to generate information about the risks they are seeking to contain.

I. Information

A. The SCAP

The SCAP was a critical turning point in resolving the 2007-2009 financial crisis. The first round of stress tests provided high-quality information about the health of major financial institutions at a time when the lack of reliable information was continuing to impede market functioning. Subsequent analysis shows that the market already had a good sense of which banks were undercapitalized, but there was uncertainty about the degree of undercapitalization. (Peristani et al., 2010). By using a standardized approach across the nineteen financial institutions involved and providing market participants sufficiently detailed information that they could use to assess the credibility for themselves, the SCAP helped address lingering uncertainty about the health of major banks and their capacity to support the financial system. It also helped that the stress tests showed that the banking sector, as a whole, was healthier than expected.

Examining the success of the SCAP provides a foundation for considering the conditions required for information injections to aid crisis containment. Against this background, one factor distinguishing crisis era stress tests from tests conducted under less adverse conditions is the nature of the assumptions market participants are using to address the inevitable gaps in the information they have about the health of one another and other macroeconomic factors that might affect their willingness to engage in risk sharing and other activities. At the time of the SCAP, banks and other market participants remained hesitant to work with one another in ways that were impeding the recovery.

Throughout the year and a half between the start of the crisis and SCAP, regulators and market participants had frequently been behind the ball. For the first year of the crisis, many regulators had underestimated and downplayed the scale of the problems plaguing the financial system. Banks, meanwhile, continued to pay dividends and were slow to recognize losses or to set aside adequate reserves for bad loans and mortgage-backed-security-related liabilities (MBS), all while purporting to be well capitalized.

Information, or rather lack thereof, contributed to regulators' delayed recognition of the magnitude of the crisis they were facing. (Judge, 2017). Among the challenges was that the crisis emanated initially not in banks, subject to prudential oversight, but rather from the "shadow banking system"—a market-based system of intermediation that was similar in size and even more complicated in scope than the formal banking sector. Although regulators were aware of many of the pieces of this system, and the system was

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closely interconnected at various points with banks subject to their oversight, its role in maturity and liquidity transformation, and its corresponding exposure to the risks that come along with such activity, was not fully appreciated by anyone before the crisis struck. As Richard Clarida, now Vice Chair of the Board of Governors of the Federal Reserve, has observed: "It would seem that the supervision and regulation of US investment and commercial banks during the great moderation was based on an assumption about how the financial system was supposed to work, not upon sufficient knowledge about how the financial system actually worked."[3] Thus, a combination of insufficient information and a tendency to view the information available through an outdated lens seems to have contributed to the delayed recognition of just how bad things might get.

Eventually, as usually happens, problems that arose outside the banking sector made their way onto bank balance sheets. More than a year passed between when the crisis first hit and Lehman Brothers failed, during which time there were a series of adverse developments, including the failure of Bear Stearns, that made it clear that the situation remained fragile. Nonetheless, it was not until the failure of Lehman Brothers, that Congress passed the Emergency Economic Stabilization Act (EESA), giving Treasury broad, new authority to stabilize the growing crisis.

Treasury soon put that new authority to good use, although not in the way originally envisioned in EESA. According to a GAO Report issued in January 2009, before the SCAP, Treasury had already deployed $294 billion of the funds it was authorized to use pursuant to EESA, with the bulk of that money going into banks pursuant to the Capital Purchase Program. (GAO, 2009). The FDIC had also issued guarantees on a range of debt instruments far beyond those that would normally be eligible for FDIC insurance. Thus, by the time of the SCAP, the situation had already improved markedly, but only because of this series of broad, risky, and politically unpopular government interventions.

Moreover, despite these myriad interventions, all was not necessarily well in the financial system. Market participants continued to distrust banks' internal risk management capacities and questions lingered regarding how the system as a whole might fare in the face of a further adverse shock. It was at this time and in this environment that the SCAP, which both recapitalized the banks that needed it and allowed market participants to evaluate for themselves the accuracy of regulatory assessments of how much capital banks needed, proved so useful.

B. Some implications

Although it can be dangerous to extrapolate from a single example, the SCAP does suggest a couple of lessons. One thing to note is that the environment into which the results of the SCAP were released shaped their impact on market functioning. At the time of the SCAP, fear and distrust remained the default positions of many market participants. The proxies on which market participants had been relying pre-crisis, from credit ratings to faith in supervisors or their own capacity to assess the risk of other institutions, had proved wanting. As a result, the default level of market discipline was

[3] Clarida, "What Has – and Has Not – Been Learned about Monetary Policy in a Low Inflation Environment? A Review of the 2000s" at 9 (2010).

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excessively harsh relative to the actual health of banking organizations. The credible information contained in the SCAP results proved helpful, but largely because the gaps in what was known were being viewed with fear, rather than neutrality or lack of concern.

A second important element of the SCAP was that the information produced and disclosed addressed a real gap in what was known. The early stages of the financial crisis had revealed banks' internal mechanisms for identifying and assessing risk exposures to be deficient, and banks had lost faith in their own capacity to assess the health of counterparties. Subsequent analysis shows that market participants generally knew which banks were undercapitalized, but they did not know the size of the shortfalls or the types of circumstances that might tip them over the edge. Providing that information about that size, and reducing the variance in market participants' assessments of bank health generally, the stress-test results addressed a gap in the information otherwise available to market participants. Had the Federal Reserve merely provided information that was already incorporated into market participants' assessments of bank health, the value of the information content of the stress tests would have been negligible.

Third, and perhaps most obviously, the value of the information contained in the stress test was contingent on market participants' assessment of the reliability of that information. The importance of credibility was brought home by the European experience in their first round of stress tests in 2010. The 2010 European stress tests covered 91 banks spanning 20 countries, which in the aggregate held about 65% of the total assets in the European banking sector. In a spirit akin to the U.S. stress tests, European authorities declared that "[t]he overall objective of the stress-testing exercise is to provide policy information for assessing the resilience of the EU banking system."[4] To further this aim, they "decided to disclose a detailed report about the assessment of the resilience of the EU banking sector, the key results of the impact of the stress scenarios on each individual bank in the exercise, as well as their sovereign exposures, with a detailed breakdown between trading and banking book exposures."[5]

Unlike the experience in the United States, however, the disclosure of the results of the EU stress tests did not have the desired effect of restoring faith in the health of banks and market functioning more generally. Instead, the evidence available suggest that there was virtually no market response to the EU's disclosures. (Alves, 2013; Ellahie, 2012). Moreover, subsequent adverse developments at a number of the banks that received a clean bill of health by the EU authorities suggest that market participants were right not to trust the results provided by EU authorities. At least one of the explanations for why the EU provided such rosy results despite the deep problems that clearly persisted was that—in contrast to the situation in the United States—regulators had no authority to undertake a massive recapitalization should they engage in a truly robust set of stress tests and should the results reveal the need for significant additional capital. Put differently, the EU was facing the prospect of setting off a crisis it did not have the

[4] ECB Press Release, July 2010. "Questions & Answers: 2010 EU-Wide Stress Testing Exercise" at 1. https://www.ecb.europa.eu/pub/pdf/other/euwidestresstestingexercise-qaen.pdf?860c12759915bf0e3a8cd5486cb595a4

[5] *Id.*

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authority to readily contain if it provided more accurate assessments of the situation, and everyone was aware of these limitations.

This suggests broader lessons. First, that information generation and disclosure are most likely to promote healthy market functioning when market participants are filling in information gaps with overly pessimistic assumptions or when, because of coordination challenges, liquidity hoarding, or psychological biases, they are excessively hesitant to transact. Significantly, this does not resolve—and may work against—disclosure when times are good. The reasons the optimal disclosure policy may be state contingent are discussed in more detail by Itay Goldstein and Yaron Leitner in their contribution to this handbook and work cited therein. The considerations here are an extension of that already complicated matrix. (Goldstein & Leitner, 2018; Goldstein and Sapra, 2014; Flannery et al., 2017). Whether it is possible to make a change in disclosure policy at all is a difficult question, but it is clear that should there be any changes, they must go in the direction of more information—not less—as distrust increases. A related issue is that once a crisis takes hold, supervisory reputation is often already diminished, so disclosing not only results but also sufficient information to verify those results may be necessary for even the informational output to be seen as reliable. (Schuermann, 2016).

A second lesson suggested by the SCAP is that for information injections to be useful, the information generated must be otherwise unknown and must be credible. Given that there is likely permeability between what markets and governments know, the production of the information that is likely to be most useful may well entail the greatest risk, in that the process of generating that information might also yield bad news that could exacerbate market dysfunction if not accompanied by other stabilizing interventions.

C. Some limitations

The focus thus far has been on SCAP as a mechanism for producing information. But SCAP was never just about producing information. Another important component of the SCAP's success was the requirement that banks found wanting would be required to recapitalize. Banks had the option of raising private capital if they could or accepting capital infusions from Treasury if they could not. Either way, recapitalizing to a level that would allow each, and therefore all, of the largest banks to withstand further losses was mandatory. This was critical to overcoming a collective action problem, as the persistent weakness in the banking system had costs beyond those that any individual institution internalized as a result of its own undercapitalization. (Dudley, 2011).

Given the multiple, interconnected mechanisms through which the SCAP promoted recovery, it is difficult to cleanly separate the information it generated from the changes it brought about. These dynamics make it difficult analytically to draw any clean conclusions regarding the value of the information SCAP injected into the market in improving conditions apart from the other mechanisms through which it aided market functioning. Similar challenges arise with other examples of stress testing during periods of distress, like that undertaken by Japan in the 2000s, discussed further below. In these and other instances, however, the information generation was critical to tailoring the intervention and enabling the intervention to have the desired effect of restoring faith in the banks and financial system. This reflects the distinct challenges and opportunities that arise when stress testing after conditions and confidence have already started to

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deteriorate, but it does not provide a reason to discount the value of information production during such periods.

II. The life of a crisis

Reviewing the SCAP provides a helpful introduction to why and when just-in-time information production can serve as a useful crisis-time tool. This Part expands on that introduction by considering the information dynamics over the course of a financial crisis, and how stress testing may change what is known at the various stages of a financial crisis. It first considers the background setting, suggesting information gaps are pervasive in modern finance. It then considers, in turn the different ways that stress testing may facilitate crisis containment and resolution strategies. Because the Covid-19 crisis is still evolving, it is addresses in the implications section that follows this one.

A. In the beginning, information gaps

The importance of information generation during a crisis, and the particular type of information that a stress test can generate, depends a great deal on background information dynamics. Given space constraints, this chapter will do little more than summarize why unknowns loom large in modern finance, and why the import of these gaps can change during periods of distress.

As a starting point, because of the costs of information generation, frictions in the transmission of information, and the inherent dynamism of financial markets and the economy more generally, market participants and regulators today often operate with radically incomplete information. (Awrey & Judge, 2019; Gilson & Kraakman, 2014). Complexity is one of the greatest challenges. Even a cursory evaluation of the complexity of the largest banking organizations and the ever-evolving regime of market-based intermediation that continues to function alongside and interconnected with the banking system supports the view that massive information gaps are the new norm. (Flood et al., 2017; Pozsar et al., 2010). The largest banking organizations often continue to have 1,000, and sometimes upwards of 2,000, different legal subsidiaries. Moreover, these subsidiaries are often operating different lines of business, in different jurisdictions, and subject to oversight by different regulators. (Carmassi & Herring, 2016). Instruments too remain remarkably complex, and a growing body of literature suggests reasons, from rent extraction to excess demand for information-insensitive assets, to expect this complexity to continue. (Hanson & Sunderam, 2013; Holmstrom, 2015; Gorton, 2012). Simon Levin and Andrew Lo voice the view of many in their declaration that "the financial system has crossed a threshold of complexity where the system is evolving faster than regulators and regulations can keep pace."[6]

Accentuating the challenge and importance of these information gaps is that they do not arise arbitrarily, but rather systematically show up in some of the most fragile spaces within the overall financial system. A growing body of literature documents the demand for assets that holders will hold and trade at face value with minimal due diligence into the value of the underlying assets. The overlapping concepts of "money," "safe assets," and "information-insensitive assets," are used to describe assets, of varying

[6] Levin and Lo, "Opinion: A New Approach to Financial Regulation" at 1 (2015)

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maturities, that have this quality (Krishnamurthy & Vissing-Jorgenson, 2012; Gorton, 2016; Holmstrom, 2015). The commonality across all of these is that the assets play a functional role, like facilitating transacting or serving as a tool for liquidity smoothing, which means holders are willing to pay a premium for these assets above their risk-adjusted returns. Treasuries are a classic example, but when the supply of truly safe assets is insufficient relative to the demand, private actors step in to bridge the gap, often using structures that are intentionally opaque, like debt on debt, to encourage holders to trade without having to worry that anyone else has private information (Dang, Gorton, Holmstrom & Ordoñez, 2017). Information gaps are thus often greatest in precisely the domains undertaking the greatest liquidity transformation, making it all the more likely that information gaps will be large and will contribute to market dysfunction once holders start to ask questions about assets that had previously been treated as safe. (Judge, 2019; Judge, 2017).

Both the size of information gaps and their distinct importance when things go wrong are exacerbated by the constant shape shifting endemic to finance. Periods of stability induce behavior changes that change the structure of the financial system. (Minsky, 1992; Shiller, 2001; Geanakoplos, 2010). Regulation also brings about change, as market participants constantly seek out new ways to provide desired goods and services while minimizing the cost of regulatory compliance. Innovation, technological and otherwise, accentuates these dynamics and introduces an additional force toward change by sometimes enabling efficiency gains. As a result of this dynamism, even if regulators were to somehow develop a comprehensive picture of the entire financial system and all of the contingent obligations, explicit and otherwise, among the various bodies constituting that system, that picture would be outdated before it could be developed. Moreover, because regulatory arbitrage is one of the drivers of that shape shifting, regulators in particular will almost always be working at an information disadvantage when signs of fragility first emerge.

The importance of all of these dynamics and the ways information gaps can exacerbate fragility were on display during the early stages of the last crisis. The aggregate value of subprime MBS, for example, was relatively modest, but nonetheless led to widespread runs on asset-backed commercial paper ("ABCP"). (Covitz et al., 2013). ABCP were highly complex in ways that made it hard for holders to verify underlying asset quality, and given the low return such effort was almost never cost justified. The patterns of runs on ABCP suggest that some proportion were likely due to a lack of high-quality information about how subprime assets were allocated across the system and what the downgrades of subprime MBS might mean with respect to the value of other structured assets. Moreover, in contrast to the traditional bank setting, where bank managers and sometimes bank regulators understood the risks to which a bank was exposed, the complexity of the assets underlying many ABCP created a real possibility that even plan sponsors had incomplete information about the value of assets underlying a structured claim and the waterfall pursuant to which a particular instrument would be paid.

Although the specific series of events leading to the next crisis will inevitably look very different, there are broad patterns that do repeat. Fragilities often arise where liquidity transformation (and oftentimes maturity transformation) is taking place, which is

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often the location in the financial system where assets and institutions have been structured to discourage information generation. Additionally, as economic historian Hugh Rockoff has shown, the majority of financial crises in the United States have first emerged not in the banking sector, but in that day's version of a shadow banking system. (Rockoff, 2018). Putting these pieces together suggests that that there is a high probability that when the next crisis erupts, it will erupt in a space where both private actors and public regulators have only incomplete information about the value of assets and how risks are allocated. It further suggests that these information gaps will likely exacerbate the dysfunction, and that filling in some of that missing information should be among the aims of regulators seeking to contain the fallout.

This assessment further suggests that even if there are questions about the capacity of stress testing to produce novel information when being performed during times of peace, they may well remain useful as a crisis-fighting tool. Because crises so often erupt in shadows and in domains where market participants had been relying on assumptions or proxies rather than high-quality information, information gaps are often largest in precisely those spaces where cracks first begin to appear.

The post-crisis reforms make modest progress in addressing the challenge of information gaps. There were a number of proposals on the table to substantially reduce the size and complexity of financial institutions or to try to scale back significantly on market-based finance. None of these proposals were adopted. There have been some attempts, through mechanisms like the living wills, to scale back on the complexity of banks, and there have also been attempts, through efforts like centralized clearing, to improve transparency in other domains. Nonetheless, for the most part, Basel III, the Dodd-Frank Act and other post-crisis reforms have not resulted in a massive simplification of the financial system, nor have they shut down on the types of dynamism that contribute to information gaps.

Shifting from the nature of the financial system to the rules governing it and the institutions through which those rules are implemented and enforced reveals further reasons that information gaps are the norm. Title 12 of the U.S. Code, the provision governing banks and banking, is among, if not the, single most complex and convoluted areas of law in the United States today. (Li et al., 2014). Moreover, as Andrew Haldane and others have explained, the post-crisis regulatory regime is even more complex than predecessors, leading to new types of uncertainty about how it will operate in different states of the world. (Haldane, 2017). The regulatory architecture adds to the challenge. The United States has long had a particularly fragmented financial regulatory structure, one that not only separates the banking regulators from market regulators but also places multiple bodies in each of those categories.

The Financial Stability Oversight Council and the Office of Financial Research were intended to overcome some of the information generation challenges that arise from this siloed and fragmented regime. Similarly, the FSOC's authority to designate nonbank financial institutions systemically significant and hence subject to oversight by the Federal Reserve was similarly intended to enable the contours of federal prudential oversight to morph as institutions otherwise outside that perimeter evolved in ways that could threaten the stability of the financial system. These are helpful developments, but the intervening years has revealed them to be fundamentally incomplete. Other efforts that could help

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mitigate information gaps, like data standardization, are similarly underway but lack in scale and scope relative to what would be needed to meaningful reduce information gaps in the financial system. (Berner & Judge, 2019).

The discussion here is descriptive, not normative. Given the incredible complexity of financial institutions and markets, the rate at which finance continues to evolve, and the costs and other frictions that impede information generation, there remains large swathes of information that are perfectly knowable and pertinent (at least in some states of the world) that are not currently known to any actor, private or public. Information gaps are part of finance as it exists today. Technology may change these dynamics, and fintech and regtech are already changing how information is produced and disseminated. Nonetheless, there has yet to be any indication that technology is on the verge of overcoming the numerous costs and other frictions that prevent anyone from having a complete picture of the financial system, how risks are allocated therein, and the myriad mechanisms through which problems in one domain can spread to others.

B. Stress tests as tool for helping to identify and contain a crisis

Although sometimes modeled with a single shock, financial crises often grow over time. The crisis had been underway for more than a year when Lehman Brothers failed in September 2008. And as Frederic Mishkin reminded his colleagues in August 2008, "in the Great Depression, when . . . something hit the fan, [laughter] it actually occurred close to a year after the initial negative shock . . . . We are now a year into this."[7]

That crises are often underway for a meaningful period of time before things get really bad suggests this may be a window of opportunity for brave regulators. Among the key advantages of responding to the soft signals emitted during the early stages of a crisis is that those signals, those areas where the market response to news seems disproportionate to the news, can serve as a road map for the issues to investigate further. As Claudio Borio and co-authors emphasize in their own work explaining why crisis-time stress tests are more likely to succeed than peace-time efforts, when "the objective [of a stress test] is to support crisis management or resolution, the key risks are often apparent. For instance, if the crisis has originated in exposures to property markets, it is natural to stress them further."[8]

Borio's focus, which is helpful, is on the way the early signals of problems can provide useful guidance with respect to particular asset classes to watch. Currently, for example, there is growing concern about leveraged lending. A rise in corporate bankruptcies or a single corporate bankruptcy with large spillover effects on lending or the market for collateralized loan obligations (CLOs) could trigger stress tests focused on discerning the capacity of the financial system or firms within it to handle further deterioration in those markets.

Another way early indications of distress may helpfully inform stress testing is by identifying what it is that should be tested. As a number of the other chapters in this volume make clear, regulatory stress testing is not limited to banks. It can also be used to

[7] Mishkin, Statement at 2008 FOMC Meeting at 90 (2008).
[8] Borio, Drehmann, and Tsatsaronis, "Stress-Testing Macro Stress Testing: Does it Live Up to Expectations" at 4 (2014).

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assess the viability of an array of institutional arrangements and, perhaps, the system itself. This type of effort will likely require coordination and communication among multiple regulators, but as more is learned about stress testing and techniques continue to improve, so too will the range of ways that stress testing might be used early in a crisis to provide new information about threats that may be imminent and foreshadowed before they become manifest.

A final point to highlight about stress testing in the face of trouble is that the information produced may be helpful not only in identifying specific problem areas, but also in forcing market participants and regulators to acknowledge the nature and scope of the challenges that could well lie ahead. Although not talked about much in recent years, forbearance and its kin remain a real challenge. Regulators were not as quick to respond to the problems of 2007 as they could have been, and earlier intervention may have helped reduce the size of the crisis that followed. (Judge, 2017)

More to the point, history abounds with examples of regulators being even slower to fully acknowledge and address capital deficiencies, with adverse effects on the macroeconomy. The U.S. savings and loan crisis of the 1980s, Japan in the 1990s, and Europe emerging out of 2008 and the sovereign debt crisis that followed are just a few such examples. Although less dramatic than widespread panics, allowing a financial system to limp along can have disastrous macroeconomic consequences, leading to anemic or no growth for extended periods. Well-conducted stress tests can be a useful way to help avoid such situations by forcing an issue—making it plain that there are real problems or weaknesses that must be addressed sooner or later. Put differently, in addition to providing information that market participants and regulators appreciate the need for, stress tests can also force a change in mindset, compelling recognition that a situation may be more severe than anyone wants to admit. Hence the final section examines the value of stress tests after things have stagnated for a while.

C. Laying the road to recovery after the situation has devolved

The last section focused on the value of stress testing as an early-stage crisis-recognition and containment tool. SCAP represents a somewhat later stage intervention, one component of a multi-component, heavy-handed government effort to pave a road to recovery in the immediate wake of a panic. The other pattern that sometimes occurs is that regulators succeed in containing or averting a panic but lack the will or means to address the underlying problems, leading to a prolonged period of slow growth. Japan's lost decade (or two) starting in 1991 is a prime example, and one that shows how here too, stress testing can be useful.

The triggering event of Japan's prolonged malaise was the failure of Toho Sogo Bank, which revealed weaknesses that had been building in Japan's banking system for some time. Signs of trouble had emerged earlier, but a combination of wishful thinking and forbearance made it easier for banks to be too slow in recognizing losses. After first facilitating this wishful thinking by expanding deposit insurance and helping shield banks from market discipline, the government began to recognize a different tack was needed. The government started to intervene in more meaningful ways by injecting capital into *jusen*, specialized, nonbank housing loan companies, in 1995 and 1996. This was followed by a much more aggressive round of capital injections into banks in 1998. Even as regulators began to tackle the problem of capital deficiencies, unrecognized losses, and

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the need for more significant government intervention, however, they continued, for a while, to rely on banks' own, overly rosy assessments of their balance sheets.

It was not until the early 2000s, when the government stopped accepting the banks' assessments of their health and future capital needs and instead started undertaking their own, more accurate and more dire, assessments of bank loans' likely performance. Like the SCAP, this horizontal, supervisory exercise provided valuable new insights into where problems lied and what needed to be done to address them. Armed with these new insights, Japanese regulators finally forced banks to restructure or otherwise address troubled loans, thereby cleaning up the latent problems that had so long plagued the system and paving the way for future growth.

As with the SCAP, the production of more reliable information about the size and location of weaknesses was produced in conjunction with an effort to address those challenges, making it difficult to separate the value of the information production from the substantive actions. That the government had previously provided significant financial support without simultaneously compelling information production, and that such efforts failed to revive the system, nonetheless suggests that high-quality information is often a prerequisite to successfully bringing about a lasting inflection point once systemic distress takes hold.

Japan's lost decade also serves as a pointed reminder of the way information gaps can feed into tendencies to engage in forbearance and wishful thinking, patterns that can have lasting and detrimental effects on a country's economic health. In the face of stagnation or other indicators that a country's financial system is not performing as well as it could, targeted, forward-looking information generation could serve a helpful role in identifying the sites that require further attention and increasing confidence in those that do not.

Japan's experience is thus another illustration of the importance of accurate information about the location and size of losses in efforts to revitalize an ailing financial system. It is different in the sense that the production of information came far later into the crisis, when the situation was stable but still bleak. The role of the information was thus not to avoid runs by short-term creditors, but rather the information proved critical to breaking the feedback loop between the economy and financial system that was weighing heavily on both.

III. Setting the Stage for Success: Covid-19 and beyond

The analysis thus far has explored the value of just-in-time information production when crisis hits. During the early stages of a crisis, stress testing and related modes of information production can help regulators and others to recognize the magnitude of the change in state they are facing. As a crisis evolves, appropriately designed stress tests can provide valuable information about the actual capital deficiencies in the system. Stress tests can also be used to identify institutions that ought to be closed or even entire segments of the market that should be phased out. Furthermore, stress tests could be designed to identify interconnections or other mechanisms of contagion that must be addressed to restore calm. Depending on the stage produced, these types of information can also facilitate engagement, allowing legislatures and the public to provide

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more informed feedback, processes that can be critical to the legitimacy and public acceptance of the crisis management process.

This part first uses the lessons here to provide an early-stage assessment of the Fed's approach to stress testing in response to Covid-19. It then provides some general thoughts on the steps that ought to be taken to facilitate information generation during periods of systemic distress.

A. Covid-19

Covid-19 is a distinct type of crisis in many ways. The rapidity with which it hit the real economy and the speed with which both financial regulators, led by the Fed, and Congress responded with fiscal and other support are unprecedented. That so few were on the lookout for a global pandemic is itself a powerful illustration of why crisis-time stress testing will always be critical. There is simply no way that central banks can foresee in advance the array of exigencies that could threaten the health of banks and the broader financial system they help constitute.

Given the prompt response and the relative success of many of the efforts to stop widespread panic and contain the economic damage inflicted, it may be easy to think that the economic crisis will not morph into a financial one. But both the public health and economic crisis are still evolving, and the threat those developments pose to banks and other parts of the financial system remains far from clear.

Thus far, the U.S. response has been decidedly mixed. In contrast to the United Kingdom, for example, the United States went forward with the stress tests when scheduled in the spring of 2020. But having recently made changes that incorporated the results of the stress tests into banks' capital requirements, the Fed opted to proceed with stress test scenarios that had been developed before the global pandemic took hold. The result was that even the severely adverse scenario contained assumptions that mapped poorly onto the dramatic pace of the contraction in global economic activity throughout the spring of 2020. It chose to complement those stress tests with "sensitivity analyses" that seek to capture how banks will perform in one of three possible scenarios—a quick return to economic health (V shape), a more prolonged downturn before returning to economic health (U shape), or a double dip recession (the dreaded W). But it is not running a full stress test for any of the banks using those scenarios. Moreover, the Fed's Vice Chair for Supervision, Randal Quarles, recently announced that the Fed is not planning to release the results of these sensitivity analyses for any specific bank. Rather, it will release only aggregate results.

The analysis here suggests that the Fed was wise to proceed with the stress tests and to complement the original scenarios with sensitivity analyses designed to provide insight into how banks may fare under some of the, quite different, possible economic scenarios. Running these additional analyses should provide the Fed more insight into which firms are most likely to run into trouble and it may also help reveal sources of weakness or mechanisms of contagion that may not have been visible otherwise. Banks too should have better insight into the preparedness for what lies ahead, allowing them to plan accordingly.

At the same time, the analysis here also suggests that the Fed's response thus far has been far from sufficient. One of the reasons for not releasing individualized sensitivity

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analysis results, according to Quarles, is that these analyses are far less rigorous than the Fed's typical stress testing, raising questions about just how accurate the results and what they might miss. Moreover, the refusal to provide information about how individual banks are expected to fare could yet stoke fear among bank creditors, including counterparties and depositors. Even if there is no immediate run, should any individual banks report results that raise red flags, market participants may become concerned about what else the Fed may be trying to hide by only providing aggregate results.

The Fed's decision to make only minor modification to its stress tests despite the onslaught of a global pandemic that changes so much is a sign that the Fed has not yet fully embraced the need to be responsive in the face of changed circumstances. On the whole, the Fed has been far more quick to roll out new programs and shift to a more accommodative approach to monetary policy than it was in 2007 and 2008. Nonetheless, staying ahead of a crisis requires good information. The Fed has not taken all the steps it could to understand bank vulnerabilities in the face of Covid-19, and there is limited evidence that it is working as closely as it could be with other financial regulators, other than Treasury, to identify other potential sources of systemic weakness. More can and should be done.

B. Limited Safety Net

"If the primary objective [of a stress test] is to support crisis management and resolution, system-wide public-sector liquidity and capital backstops are essential. Without them, no exercise can be credible."[9] This declaration from Claudio Borio, Mathias Drehmann and Kostas Tsatsaronis reveals an important even if unstated assumption: Regulators are going to be rationally hesitant to produce information that could exacerbate an already fragile situation unless they have the tools in hand to contain the fallout their findings might trigger. Crises are in part information events. Bad news is often the trigger that leads to runs. It is unrealistic to ask financial regulators to produce timely information when the very process of doing so might trigger the crisis they are seeking to avoid. Hence, the most important policy take-away is that there must be safety nets specifically designed or otherwise able to accommodate the adverse systemic ramifications that could flow should the stress tests produce bad news about the state of the financial system or elements thereof.

A policy of nondisclosure might seem like a solution. After all, bad news must reach the market to trigger a market response. Given the long history of confidentiality in bank supervision, there may be some room for bank supervisors to expand their activities to produce some new types of information without that information getting out. Precisely because banks are so heavily regulated, however, the most pressing information gaps are unlikely to be information pertinent just to the health of individual banking organizations. And if the signals indicating a change in state reveal information gaps with respect to other sectors of the market, it is doubtful that bank supervisors will have the ability to devise a new form of stress test or related mode of information production without market participants getting a whiff that something is going on. Particularly given that for any exercise to be helpful, it will likely require significant information from and participation

[9] Borio, Drehmann, and Tsatsaronis, "Stress-Testing Macro Stress Testing: Does it Live Up to Expectations" at 10 (2014).

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by the relevant financial institutions, the observation from Borio and colleagues seems apt: We cannot expect regulators to have the courage to produce new and potentially quite scary information with the hope that the information will not leak and that failure to disclose will not itself trigger concern.

This creates a very real chicken-or-egg problem. Information is key to developing a plan for crisis management, but regulators will have a hard time producing the information they need to develop a plan without first having meaningful support mechanisms already in place. This problem is accentuated by a structural problem, common to the United States and many most democratic systems, that legislative approval—that is, approval by a diverse group of nonfinancial experts who are elected by the people—is required before the government can provide lasting fiscal support, like capital injections. So this is the rub: How can regulators provide elected officials meaningful information about the location of weaknesses in the system and the threats that those weaknesses pose when the very process of producing that information could trigger the crisis they want to avert?

Regulators have found ways to try to navigate around these challenges, but all have limits and each can raise concerns regarding regulatory overreach. For example, most central banks have the ability to provide liquidity support to banks and sometimes nonbanks. But because the run point for firms (and the financial system) is breached well before firms become insolvent, liquidity support alone is insufficient to deter runs and restore stability in most instances. There is also the possibility that the bad news produced in a stress test might limit a central banks' legal authority to provide support where it is most needed. This practical challenge is not new. It has at times led to central banks stretching the bounds of their legal authority. It has also led to uninformed "emergency legislation" pursuant to which a legislature grants exceptionally broad authority to regulators to use their discretion to address the problem. Although either mechanism can overcome the need for legislative approval, neither suffices to achieve the type of broad-based buy-in that a legislative check is designed to provide and which can be critical to minimizing popular backlash.

There have been a number of post-crisis reform proposals that would help address this challenge. Eric Posner, for example, has argued that the authority of the Federal Reserve should be expanded to include recapitalizations under appropriate circumstances. (Posner, 2017). The analysis suggests an additional advantage of such a reform: If regulators have the standing authority needed to address really bad news, they might be more willing to undertake innovative new forms of stress testing that are responsive to the crisis they are facing. The challenge—which is deeply rooted in the structure of the U.S. and other governments—is that such overt fiscal authority is hard to reconcile with the independence traditionally enjoyed by central banks, and central banks may well lose that independence if given such overt fiscal authority. (Tucker, 2018).

In other work, I propose trying to address this challenge by trying to separate crisis containment from crisis resolution. The aim here is to give regulators broad authority to take the actions needed to stabilize the financial system and absorb the shocks of further bad news while still protecting the legislature's prerogative to have a voice in how best to achieve lasting stability. One way to achieve this type of balance would be to vest the finance ministry, such as the U.S. Treasury Secretary, with broad,

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time-limited guarantee authority. By allowing the Treasury Secretary to guarantee any debt claims, without pretending to know whether the underlying assets suffice to cover the claim, the guarantee regime would aim to keep private capital in the system while regulators produce the information needed to identify and address weaknesses. This approach would have the advantage of enabling regulators to undertake stress testing and other just-in-time information production anywhere in the financial system, even if those problems arise in domains other than banks or other entities subject to prudential oversight.

Appropriately structured, such a regime might go beyond enabling crisis-time stress testing to, in effect, mandating it. In placing an outside limit of two years on the duration of any guarantee scheme and requiring regulators to provide Congress a detailed report of where problems exist and how they should be best addressed, an emergency guarantee regime could also incent crisis-time information production. Given how often regulators are slow to recognize the magnitude of the problems they are facing, this could be a distinct and related benefit of such a regime. This type of approach has numerous risks and challenges, including the inevitable moral hazard concerns that arise from government intervention and legitimate concerns about vesting too much authority in a Treasury Secretary beholden to the President. Nonetheless, starting with a realistic baseline of where things now stand, and recognizing the importance of producing new information once distress sets in and the practical challenges impeding regulators' willingness to produce such information suggests the benefits may outweigh the costs. (Judge, 2017)

Regardless of the approach taken, the inability to expect regulators to produce timely information about fragilities in the financial system without some capacity to address the fallout that information would trigger exemplifies what John Crawford has labeled the "moral hazard paradox of safety nets."[10] If the chicken of broad recapitalization authority must precede information production about how that authority ought best be used, legislatures will likely have to provide much broader authority and impose fewer checks on how it is used than if regulators could first produce an egg in the form of information about the location and size of losses in the system.

The success of the SCAP and the Japan's experience in the mid-2000s illustrates other ways that just-in-time information production brings this paradox to life. Whether the government provides broader support than is necessary or market participants run on more firms than the actual weaknesses would justify, indiscriminate behavior is at the center of crises and is a major factor contributing to the concerns about moral hazard that crisis responses so often trigger. Crisis-time stress tests can produce critical, credible information about the location of weaknesses and the mechanisms via which they might propagate dysfunction. With such information in hand, market participants can tailor their responses, resulting in less widespread dysfunction, and regulators can better tailor their responses, resulting in fewer concerns about moral hazard. But none of these benefits can be realized if regulators are too afraid to produce that information, and without more authority to contain the fallout of bad news, there are reasons to expect that the frequency and rigor of crisis-time stress tests will be far below the level that is optimal.

[10] Crawford, "The Moral Hazard Paradox of Financial Safety Nets" (2015).

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C. Preparing

Financial crises, like war, require lots of advanced planning, and a willingness to revise those plans and toss them out completely in the face of better information or evolving circumstances. Thus the final broad point to highlight is that even though successful crisis-time stress testing will likely require some creativity and willingness to respond to the unique exigencies of the circumstances posed, there are steps that can be taken in advance to enhance the institutional capacity of the financial regulatory system to engage in successful crisis-time stress testing. Two areas where advanced effort could help merit particular attention.

1. Regulatory coordination

That weaknesses may well first appear outside the formally regulated banking sector has important implications for the tools that will be needed for regulators to undertake appropriate just-in-time information production. Recall, the fragmented regulatory structure was among the features of the U.S. financial system that was changed only modestly after the crisis. Moreover, the DNA of the various regulators has not changed in any fundamental ways. The market regulators now have seats on the FSOC and a voice in crafting specific rules that are meant to address systemic stability, but their missions remain largely focused on protecting investors, combatting fraud, and facilitating capital formations—aims that are often orthogonal and sometimes contrary to effective crisis management. As reflected in the contentiousness and months of delay that characterized efforts for the Federal Reserve and Securities Exchange Commission to enter into a memorandum of understanding for sharing information once Bear failed and for the Fed to open two liquidity facilities to primary dealers subject to SEC oversight, crises cannot be trusted to produce kumbaya moments in which regulators magically overlook their differences and prerogatives for the sake of the collective good. In part because each often believes in the righteousness of their mission, and in part because no one has a view of the whole system and hence how weaknesses in one domain might spill over to others, effective coordination remains challenging.

In the United States, the creation of the FSOC makes some useful headway on these challenges. The regular meetings of the FSOC, for example, provide a setting for the heads of all of the federal financial agencies and some state representatives to get to know each other in an environment that does not have the stressful overlay that a crisis induces. These meetings and the requirement that each member of FSOC attest to the completeness of the annual report that FSOC must provide Congress outlining potential threats to systemic stability also serves the useful function of ensuring that all of the regulators stay attuned to the possibility of a systemic event and consider whether other developments within the domain of their agency might have systemic repercussions that they might not otherwise have ignored. The OFR is similarly helpful in theory, given its broad authority to collect and standardize data and its orientation toward addressing systemic risk, but it is not currently on course to become a powerful mechanism for generating timely information not otherwise known about the health and structure of the financial system. A number of other countries have gone further. The United Kingdom, for example, has formed a Financial Policy Committee and vested it with a range of complementary tools, including stress testing, to try to prevent, detect, and contain systemic disruptions.

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Nonetheless, particularly in jurisdictions like the United States where the regulatory regime remains exceptionally fragmented, further progress in promoting coordination, communication and trust among today's very different financial regulators could go a long way to enhancing their capacity to work well together when indications of fragility again arise. The more this is embedded deeply into these organizations—such that it is not just the heads but long-time employees who are likely to remain with an agency through changing leadership—the more likely it is that they will have the good will and common language needed to work productively even when facing new challenges. One way to do this would be through regulatory overhaul, but more modest steps could also be useful. Of particular relevance to this volume, regular stress testing that requires the involvement of multiple regulators may be one way to help forge these relationships. Working together during peace times to undertake macroprudential stress tests, for example, could help regulators develop shared understandings of how others approach data and testing issues in ways that may make it far easier to devise and implement crisis-specific stress tests when the time comes.

2. Skills and credibility

Another factor that will impact the capacity of regulators to design and undertake stress tests during periods of systemic distress is whether they already possess the relevant skill set. The spread of stress testing as a crisis preparedness and avoidance tool will likely help in this regard. Banks and their regulators are growing increasingly accustomed to, and seemingly sophisticated about, the process of conducting stress tests, improving the quality and reliability of the information they generate. As other chapters in this volume explain, other types of firms, like clearing houses, and other regulators, like the CFTC, are also starting to use stress tests with greater frequency, and could productively increase their use further for reasons apart from those addressed here. (Berner, Cechetti & Schoenholtz, 2019). Similarly, advances in macroeconomic stress testing and other innovative new forward-looking assessments of the capacity of firms, market structures, or the financial system, to bear particular types of adverse developments could further expand the tools readily available to regulators, even if they then must be deployed in ways that address the particular types of risks that emerging threats make more likely.

That said, the spread of stress testing as a peace time tool may be a mixed blessing. One of the reasons that the SCAP was so successful was that it employed a new technique for producing seemingly credible information about the health of large financial institutions and their capacity to withstand further adverse developments. Put differently, the information produced in the SCAP was credible in part because the accompanying disclosures allowed market participants to engage in some degree of verification, but also because the process looked different than the supervisory oversight that had proved wanting.

Once stress testing, with disclosure, is the norm, then the process itself can be tainted and discredited. The same regulators, running effectively the same stress tests but with some tweaks to address new information, are not likely to produce information that the market will see as credible when earlier stress testing had provided overly rosy assessments. The efforts by the Office of Federal Housing Enterprise Oversight (OFHEO) to conduct risk-based capital stress tests for Fannie Mae and Freddie Mac prior to the crisis bring this challenge to life. The failure of those stress tests to reveal problems

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that later became evident had been there for some time, and had been disguised rather than uncovered by OFHEO's stress tests, discredited both the techniques OFHEO used and OFHEO, itself. An autopsy of that failure by Scott Frame and co-authors demonstrates that errors with respect to model estimation frequency and specification and reliance on an insufficiently adverse house price scenario contributed to a stress test that was considered "state of the art" when implemented becoming a "spectacular failure."[11]

To be sure, there were specific flaws in the OFHEO program that reduced its efficacy and there have been attempts to learn from those mistakes. But, as the stress tests of Iceland's banking system reflect, this was not an isolated failure. (Borio et al., 2014). Stress testing will inevitably remain a work in progress, and will inevitably at times produce assessments that underestimate growing risks. When this happens, tweaking assumptions will not suffice to restore faith in the process or outcomes. Thus, while regular stress testing on the whole is a positive development, one that reduces information gaps and expands the skill set of regulators to produce valuable information, further attention to these dynamics may be warranted to try to address the ways that loss of regulatory credibility may exacerbate crises, creating yet more of a need for information market participants can trust while reducing the capacity of regulators to provide it. (Morrison & White, 2013).

Conclusion

When any crisis hits, regulators and market participants will inevitably lack some of the information that the events triggering the crisis reveal to be important. These information gaps can exacerbate market dysfunction and slow, and otherwise impede, appropriate regulatory response. Early in a crisis, stress testing can help compel regulators, as well as politicians and market participants, to acknowledge that they may be facing a bigger threat than they realize, leading to earlier intervention. After a crisis has taken hold, stress tests can provide helpful guidance about the location and size of capital deficiencies or other weaknesses impeding market functioning, allowing more tailored government interventions. Both dynamics may yet be important in connection with containing the fallout from Covid-19.

Stress test can also provide market participants credible information that underlying problems have been addressed or that the government has a plan for rectifying, further facilitating market functioning. However, none of the advantages that crisis-time stress testing can confer will be realized unless there is an adequate backstop in place to handle the fallout if the tests produce bad news. Time-limited guarantees, coupled with an appropriate affirmative investigation and reporting obligations, might be one way to incent and enable information production when it is most needed.

Regardless of whether such a step is taken, regulators should be on guard not to allow the results of stress tests or other supervisory efforts to make them too confident about the health of the financial system or institutions within it. This is one of the most critical lessons. The world is constantly evolving, and the financial system is shape shifting

[11] Frame, Gerardi, and Willen, "The Failure of Supervisory Stress Testing: Fannie Mae, Freddie Mac, and OFHEO" at 2 (2015).

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faster than many domains. No test can fully reveal the vagaries of the interplays through which an unexpected adverse development can trigger effects elsewhere in the system. Looking out for and responding to soft signals that something might be amiss and being willing to ask hard questions can go a long way in helping regulators identify and address a crisis before it topples the entire economy.

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