DYNAMIC REGULATION

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There is widespread consensus that the Great Recession did not have to be as “Great” as it was; had regulators acted earlier, its consequences would have been less severe. Two explanations are typically offered for early inaction. The first is that crises occur unexpectedly, so there is little time to respond aggressively. The second is that even regulators who suspected a downturn was imminent lacked the legal authority to intervene. This Article disputes these myths. First, empirical evidence demonstrates that more than a year elapsed between the first tremors in financial markets and the crash. Second, legal analysis illustrates that regulators had at their disposal significant authority to bolster banks. In fact, they used this authority with respect to small banks but not with large, systemically important firms.

There is an alternative explanation for the tepid initial response to the crisis. Regulators’ default rule is inaction until regulatory measures of bank health signal distress. These measures are slow to update—in many cases, the day before banks failed, their regulatory capital measures suggested no cause for concern. In the absence of significant change, regulators will inevitably be firefighting future financial crises ex post rather than successfully policing financial markets ex ante. The reticence to forestall capital disbursements as the COVID-19 crisis has raged is a testament to difficulties faced by regulators today, in which the default rule as a crisis begins is inaction rather than action.

The next crisis can be prevented, but to do so will require changing the default rule. This Article proposes a way forward, advocating for automating aggressive action when financial markets indicate distress is likely. Such reform will finally make costly bank failures a relic of the past.

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INTRODUCTION

The average American family lost one-third of its net worth during the Great Recession. One in ten families lost their homes. One in ten workers lost their jobs. The consequences of the crisis still reverberate today, reflected in distrust of large financial institutions, dissatisfaction with politics as usual, and concern that capitalism is no longer working for the American people.

It is possible to draw a line from the crisis to the election of Donald J. Trump as the 45th President of the United States. Further, in the most recent presidential election cycle, much of Senator Elizabeth Warren’s case for her electability was tied to her work in the Recession—arguing that she, unlike Republicans (and many Obama Administration officials), was focused on putting consumers first after the worst downturn since the Great Depression.

While much has been written on the ways in which financial regulation has been overhauled since the crisis, little research has been done on whether this overhaul was sufficient, or whether the system is still at risk. This Article steps in to fill this void. I argue that, despite regulators’ statements to the contrary, the vulnerabilities that led to the Recession remain in our financial sector. Without a course correction, the next time will be the same, and the consequences for ordinary Americans likely even more dire.

This Article differs substantially in tone from the calm espoused by


those in the financial regulatory community of late. For example, in a speech in July 2019, Federal Reserve Vice Chair Randal Quarles announced that “banks have now built enough capital to withstand a severe recession.” He further stated that it was now appropriate to deregulate large financial institutions because, since the crisis, large banks have addressed the “substantial deficiencies in their ability to measure, monitor, and manage their risks”—deficiencies that led to the Great Recession.

Vice Chair Quarles is not alone in his optimism. Federal Reserve officials have claimed repeatedly in recent years that financial crises are behind us due to substantial reforms enacted in the aftermath of the Recession. These reforms include decreasing banks’ ability to make risky bets and designing a plan for how to unwind large financial institutions with minimal harm to consumers. Perhaps most importantly, banks are now subject to annual stress tests that are intended to measure their ability to cope with a crisis-like event. For the last several years, all large financial institutions have cleared the stress tests with flying colors, suggesting that the system today is well equipped to weather the next storm.

At the same time, the market has not been so sanguine. In fact, in August 2019, only weeks after passing the stress tests, all large banks lost ten percent of their market value. Their probability of defaulting on borrowers, assessed from the cost of buying insurance that pays out if the firm defaults, skyrocketed. Analysts attributed this steep decline in value to an increase in bank risk: The business of banking involves borrowing short term and lending long term. In 2019, revenues from lending (long-term interest rates) fell below the costs of borrowing (short-term interest rates). This threatened the business model of large financial institutions and also prompted fears that a recession was imminent. Concerned credit analysts

8. Id.
10. Yield-curve inversion has preceded every recession since 1955. See Jonnelle Marte, Recession
downgraded financial firms, and large financial institutions themselves advised their clients to begin to prepare for a recession.

While industry participants, observers, and market signals were sounding alarms, regulatory measures of bank health were static. It is plausible that the market overreacted in August (in fact, it experienced a partial recovery in subsequent weeks), but it is unlikely that the risks in the financial sector were unchanged during this period as regulatory measures of bank capital suggested. Market measures provide a more dynamic assessment of the evolution of financial stability during this period. Regulators can, and should, monitor this information. Yet they do not.

Since the 1980s, capital regulation has been the primary form of bank regulation. Banks fail when the total amount of money they owe (their liabilities) exceeds the total value of the assets they have. The difference between a bank’s assets and liabilities is known as equity capital. Capital helps banks absorb losses that decrease the value of their assets and is measured by regulators as the difference between book values of bank assets and liabilities, known as book or “regulatory” capital.

However, this information is reported only quarterly and is prone to manipulation by sophisticated firms. Because regulators rely solely on backward-looking, static, and manipulatable measures of capital, their assessments paint an inaccurate picture of bank health. I show this empirically in two ways.

First, I subject large banks in the United States to a hypothetical “market-based” stress test based on the value financial markets assign a bank’s business. These measures are dynamic and forward-looking, unlike the book-capital measures regulators have relied on historically. The results of a market-based stress test demonstrate that large financial institutions


would experience cataclysmic losses in the event of a crisis like the Recession. Despite policymakers’ statements to the contrary, it is unlikely that these banks would be able to continue to intermediate as usual in the absence of substantial government assistance (that is, bailouts) during the next crisis.

Second, I document the failure of regulatory capital measures during the Great Recession and show that these measures were lagging indicators of bank health. Only days before some of the largest banks in the country failed, capital ratios indicated that all was well. In the case of Bear Stearns, Securities and Exchange Commission (“SEC”) Chairman Christopher Cox even testified before Congress after the firm had failed that it was healthy and well capitalized based on regulatory measures. In contrast, market measures of bank health signaled cause for concern an entire year before the bankruptcy of investment banking giant Lehman Brothers sent the economy into free fall. In addition to being slow moving, regulatory capital measures also proved inaccurate: it was impossible to distinguish between healthy and doomed banks based on their reported capital levels. In contrast, there was significant divergence in the market’s perception of risk at these institutions, and its prediction of bank failures proved prophetic.

Our very recent experience illustrates the consequences of misplaced reliance on book capital as a measure of bank health, yet the post-crisis overhaul of financial regulation did not include a rethinking of the role this information plays in our assessments of large financial institutions. There has been no move toward incorporating more accurate market information into the regulatory regime.

This is an unforced error with significant repercussions. Large banks remain vulnerable to a crisis, and these risks are unacknowledged by the regulatory community. The singular focus on regulatory capital has also fueled a misunderstanding of the causes of the Great Recession and the tools policymakers had at their disposal to address them at their onset.

Policymakers typically offer two responses when asked about their failure to act more aggressively in the early stages of the crisis—that is, before Lehman’s bankruptcy—to forestall the catastrophe that ensued. The first is that the crisis could not be foreseen; illustrated, for example, by former Treasury Secretary Henry Paulson’s 2018 statement that his “strong belief is that these crises are unpredictable in terms of cause or timing or the

severity when they hit.” The second is that regulators lacked the legal authority to bolster struggling institutions. For example, as former Treasury Secretary Timothy Geithner stated in 2014: “The Fed didn’t have the legal authority to force Bear Stearns, Lehman Brothers, or other investment banks to raise more capital. We couldn’t even generate stress scenarios bleak enough to force the banks we regulated to raise more capital.” Neither of these explanations, however, is accurate.

As to the unpredictability of financial crises, as this Article will show conclusively, substantial time existed between the first tremors in financial markets in the summer of 2007 and their eventual collapse in the fall of 2008. I assemble data on a variety of market-risk measures (including stock-price volatility, credit default swap (“CDS”) spreads, and market-based capital measures) and compare these with regulatory capital indicators. Market-based risk measures for large financial firms raised red flags for an entire year before the system collapsed. However, regulatory measures are slow to update—thus, failing banks were well above regulatory requirements for minimum capital ratios, not because they were healthy, but because these measures are flawed.

As to the lack of legal authority to intervene with financial institutions, this Article reviews the substantial legal authority at the disposal of financial regulators and demonstrates that lack of authority was not the binding constraint to action. Some pieces of evidence from this novel analysis are especially dispositive: First, regulators in fact did rely on their substantial legal authority to strengthen small financial institutions once risks emerged in the financial sector in the fall of 2007 and early 2008. This same authority could have simultaneously been wielded to bolster large, systemically important financial firms. Second, once the crisis was underway, regulators found ways to intervene and prevent even worse damage. By 2009, they forced banks to stop paying dividends and to raise new capital, which prevented additional failures. No new legal authority emerged between 2007 and 2009, which proves that lack of authority cannot explain the failure to respond more aggressively to the crisis at its onset.

In fairness to regulators, hindsight is twenty-twenty. It was impossible to predict with certainty in the summer of 2007 that a Lehman-size catastrophe was a year away. However, in the months leading up to Lehman,

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and especially after the collapse of Bear Stearns in the spring of 2008, the probability of a systemic collapse increased dramatically. In February 2008, academics presenting to Federal Reserve officials estimated that the losses that followed the collapse of the housing market would total about $500 billion, with half being borne by large and heavily leveraged financial institutions. This, they estimated, would imply a $2.3 trillion contraction in bank balance sheets—a substantial decrease in lending to households and businesses that would have immediate real consequences. The way to prevent this contraction was to increase banks’ capital levels so they would not fail or to stop lending to households and businesses when imminent losses began to accumulate.

Yet instead of hoarding and raising capital to buffer against imminent asset losses, more than $100 billion of bank capital left the financial system in the form of dividend payouts to bank shareholders in the year before Lehman’s catastrophic bankruptcy. In fact, Lehman increased its dividend by thirteen percent in January 2008—six months before it collapsed and months after industry observers were aware of significant problems at the firm. This is akin to deflating an airbag exactly when the risks of a crash are rising. The same occurred in the lead-up to the COVID-19 crisis—regulators allowed capital to be paid out to shareholders in the form of dividends and share buybacks at the same time monetary and fiscal authorities were contemplating economic interventions of unparalleled scope.

If not wanting for time or authority, what caused regulators to underreact to the initial stages of the crisis? This Article attributes this failure to reliance on regulatory capital, which painted (and continues to paint) an overly optimistic picture of financial stability.

Specifically, regulators failed to act in the early stages of the crisis because the default rule was inaction until book-capital levels signaled distress. Many looked at banks’ high regulatory capital ratios and concluded that there were few risks in the system: in the month before Lehman’s collapse, one Federal Reserve official guessed “that the level of systemic risk has dropped dramatically and possibly to zero.” Others believed that,

although it would be helpful for banks to have more capital, they were unlikely to do so while well above regulatory capital minimums, pointing to banks’ assertions that “now is not a good time” for equity-raising. Still others believed that acting aggressively—for example, by restricting banks’ dividend payments—would fuel a panic rather than prevent one.

It is inaccurate and unfair to equate today’s regulatory regime to that in place in the summer of 2007. Capital requirements are higher, so banks have more of a cushion in place to bolster themselves when their assets begin to lose value. But the exercise of stress testing highlights the vulnerabilities that remain—that is, should a situation arise in which losses are so large that banks need to recapitalize, regulators will be slow to force them to do so because our tools of measuring banks’ risk, despite their known unreliability, have yet to be overhauled.

This Article provides a way forward, arguing that supplementing our understanding of financial stability with market information will paint a fuller picture. It also makes a case for automating regulatory action when banks appear undercapitalized—either based on regulatory or market measures. If in place during the crisis, such a regime would have forced banks to hoard and raise new capital in the year leading up to Lehman Brothers’ collapse, decreasing the need for costly government bailouts. The regulatory innovations advanced in this Article will prevent the next recession from becoming a “Great” Recession.

I propose different approaches to incorporating market information into the financial regulatory regime. The most extreme form would automate an aggressive response to market indicia that distress is imminent. This approach, which I label “dynamic capital regulation,” would quickly recapitalize banks the market deems to be on the brink. This recapitalization could be accomplished through: (1) a market-based stress test whereby failure requires new capital-raising; (2) the requirement that banks purchase capital insurance; (3) the conversion of some proportion of bank debt to equity, which eliminates the risk that creditors will be able to withdraw funds and push the bank to failure; or (4) a market trigger that forestalls capital leaving the financial system when bank equities experience drastic moves.

These market-based approaches will increase the dynamism and the transparency of financial regulation. However, dynamic capital regulation will also highlight concern about death spirals—that is, that market speculators will short financial firms when dilution appears imminent.

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20. GEITNER, supra note 16, at 138 (“We considered forcing banks as a group to stop paying dividends in order to conserve capital, but we were concerned, perhaps mistakenly, that doing so might do more harm than good.”).
Properly designed regulation can address these concerns, as I describe.

Still, dynamic capital regulation is not a panacea. The result will be fewer Great Recessions but also more false positives, which create unnecessary pain for the financial sector and its shareholders. For example, banks may be disallowed from paying dividends in periods when distress is not actually imminent, despite market signals to the contrary. However, concerns about false positives may be overblown: the analysis in this Article demonstrates that the simplest market-based indicator (bank stock performance) correctly identifies the two financial crises that have occurred since 1990 and results in no false positives. Deciding on the type of errors we prefer—false positives that are unfairly harsh to banks and their shareholders versus false negatives that result in costly losses to the government and taxpayers—is a tradeoff that requires thoughtful deliberation.

This Article favors dynamic capital regulation based on a premise that our regulatory regime should favor the protection of ordinary citizens over the protection of bank shareholders. Incidentally, given the more extreme alternatives, this approach is also likely to be favored by large financial institutions; it will allow them to intermediate efficiently with low levels of capital in normal times and only require them to bolster themselves in extraordinary moments when distress appears likely. In contrast, approaches like a thirty percent capital requirement proposed by Professors Anat Admati and Martin Hellwig,21 or even more extreme discontinuation of financial intermediation full stop, as proposed by Professor Adam Levitin, are less efficient and more punitive.22

The right approach to bank capital is ultimately a question of policy, which regulators must decide. The main objective of this Article is to force a debate that is currently missing in the financial regulatory community due to misplaced confidence in regulatory measures of bank health. Given the known failure of these measures to provide useful and timely indicia of distress during the Great Recession, our continued sole reliance on them is puzzling. Market data are plentiful and informative; ignoring them would be extremely ill-advised for our regulatory regime.

This Article proceeds as follows. Part I begins by demonstrating the importance of bank capital to the financial system and describes how financial crises begin. Part II tells the story of the Great Recession, arguing

that the severity of the crisis could have been mitigated by more aggressive regulatory action in 2007 and 2008. Although authority for intervention existed, inaction was the consequence of a regulatory regime that fails to respond until regulatory measures of bank health—which are static and often inaccurate—signal cause for concern. Part III calls for overhauling the regulatory default to make action, rather than complacency, the automatic response to the early stages of a downturn. This approach would have forced banks to stop paying dividends and required raising new capital at the beginning of the financial crisis. This approach will prevent the next downturn from being “Great.” Part IV concludes.

I. BACKGROUND ON BANK CAPITAL

This Part provides a simple framework to help understand why capital structure matters for financial institutions. The business of banking entails reliance on short-term debt financing to make longer-term investments. In good economic times, banks are useful intermediaries. In downturns, excessive reliance on short-term runnable debt can lead to systemic panic. We examine the role that lack of capital has historically played in precipitating crises and how the government has repeatedly intervened to quell panic as a backstop to ensure that banks’ creditors will be repaid. This cycle leads to concerns about moral hazard, as financial institutions are incentivized to take on excessive leverage if they will be bailed out by the government in downturns. Academics have long proposed alternatives such as extraordinary capital requirements (of one hundred percent, in the extreme) to address concerns. This is unnecessarily distortionary because it requires higher capital requirements always rather than our preferred approach of forcing banks to hold more capital exactly when downturns appear likely.

A. UNDERSTANDING CAPITAL STRUCTURE

Firms often need external funds to finance their operations and future investments. They can finance either using debt (borrowing funds they are required to repay with interest) or by issuing equity (selling off an ownership stake in the firm). If a firm knows it will generate significant profits, it will prefer debt financing so it can pay off its loans and keep all of the surplus. If a firm anticipates that times will be tough, it may prefer to raise capital to fund itself, because the obligation to repay debtholders could lead to costly bankruptcy if cash flows are not sufficient to cover required repayment.

Under a set of (unrealistic) assumptions, firms should be indifferent
between debt and equity financing. But asymmetries that distort this foundational notion of capital-structure irrelevance abound: For example, the fact that debt is tax-advantaged—because deductions are allowed when firms repay debt obligations but not when they pay dividends to equity holders—may lead firms to favor debt funding. Conversely, debt is undesirable, as these obligations can also discourage profitable investment because they create “overhang” problems. Imagine a project that would generate one hundred dollars in cash flows and require a ninety-dollar investment. The firm should easily be able to raise ninety dollars to fund this project. But if the firm is required to pay back fifteen dollars in unpaid debt, no one would provide equity funding because they would receive no portion of the positive profits their investment generates.

Firms weigh the benefits of debt and equity investment and come to myriad decisions about desirable capital structure. There is significant heterogeneity across industries. Banks tend to be highly leveraged relative to nonfinancial firms. Given our basic conception of how banks operate, this fact is not surprising. Debt financing is core to the business of banking—taking money from customers that banks are required to pay back and using this money to fund its investments. However, bank funds do not just come from customers’ deposits, and additional funds that banks secure are also more likely to be short-term liabilities than they are to be new equity issuances. This has led many academics to speculate both theoretically and empirically on why banks may prefer debt. Some argue that it is because bank managers are especially prone to agency problems and may take risks that are not in the interests of investors, so debt obligations provide needed discipline. Others point out that transacting with U.S. government treasuries comes with a “money premium” because of the safety and surety of this investment. To the extent bank liabilities are perceived as money-like safe claims, debt funding is preferable.

23. This point comes from Franco Modigliani and Merton Miller’s analysis of the irrelevance of capital structure, known as the Modigliani-Miller theorem. See generally Franco Modigliani & Merton H. Miller, The Cost of Capital, Corporation Finance and the Theory of Investment, 48 AM. ECON. REV. 261 (1958). Both Modigliani and Miller were awarded Nobel Prizes for this insight.

24. See generally Stewart C. Myers, Determinants of Corporate Borrowing, 5 J. FIN. ECON. 147 (1977). This is known as the “debt overhang” problem.

25. See, e.g., ADMATI & HELLMAN, supra note 21, at 111 (“[S]ome of the main functions of banks are tied to their borrowing . . . . However, banks typically have a lot of debt other than deposits.”).


27. See generally Samuel G. Hanson, Andrei Shleifer, Jeremy C. Stein & Robert W. Vishny, Banks as Patient Fixed-Income Investors, 117 J. FIN. ECON. 449 (2015). The authors note, Our starting point is the liability-centric view of banks, which holds that an important part of banks’ value comes from their ability to manufacture safe money-like liabilities. This view helps
Despite the debate on the cause of debt reliance for financial institutions, the consequences of this reliance are well understood. During a downturn—when bank assets start to lose value—leverage magnifies crises.

B. MODELS OF BANKING CRISSES

The appropriate response of regulators to a financial crisis depends on the cause of crises. Economists have long considered this question and propose different models to explain how financial crises begin.

1. Random Panics

The earliest crisis model, proposed by Professors Douglas Diamond and Philip Dybvig, ascribes panics to essentially random “sunspots” that lead depositors to run on otherwise healthy institutions. Because banks borrow short-term and make longer-term investments, a panic can bring down an otherwise healthy firm. Consider the following example.

Imagine you deposit your life savings at Savings Bank, and the bank uses your funds—and other funds—to make loans to farmers. There is a bad fire that wipes out this year’s crop. The farmers have another year before they have to pay back their loan, and they will be able to pay them back next year. Since you do not need your deposits immediately, there is no reason to panic. But then your neighbors tell you they are not sure the farmers will ever pay Savings Bank back, and they have heard rumors that the bank will be forced out of business. You rush to Savings Bank to withdraw your deposits, and all the bank’s other customers run as well. The bank liquidates its assets but does not have enough money to pay everyone back. It closes its doors.

What Savings Bank needed was time for its assets to mature (for the farmers to pay back their loans). The government can stave off panics like these by providing cash to institutions to help them meet the demands of their short-term borrowers or by reassuring borrowers that there is no need to run. In essence, this is the story of the Great Depression. Although the market crashed in 1929, the real trouble began with a series of four banking panics that began in October 1930 and did not end until President Roosevelt declared a bank holiday and the Emergency Banking Act (passed during the
holiday) created de facto one hundred percent deposit insurance once banks reopened.29 The extension of deposit insurance ended conventional bank runs because customers’ deposits were insured (up to a cap), so there is no reason for panicked individuals to run, no matter how precarious their banks’ financial conditions.30

This traditional model has had significant influence on how policymakers even today think of the causes and appropriate responses to financial crises. Former Federal Reserve Chair Ben Bernanke is a leading scholar of the Great Depression, and this impacted his diagnosis of the Recession and the appropriate response. He thinks of the crisis as a Diamond-Dybvig style panic: “ ‘What we didn’t recognize immediately was the vulnerability of the system to a run of short-term funding . . . This crisis involved a 21st century electronic panic by institutions,’ rather than depositors lining up at bank doors.”31 Instead of a run by depositors (now insured), the panic shifted to other noninsured bank liabilities. Furthers Bernanke, “It was an old-fashioned run in new clothes.”32

29. See generally William L. Silber, Why Did FDR’s Bank Holiday Succeed?, 15 FED. RSVR. BANK N.Y. ECON. POL’Y REV. 19 (2009). Milton Friedman and Anna J. Schwartz made the now conventionally accepted point that the banking panics of the 1930s were a “contagion of fear” leading to a liquidity shock for fundamentally solvent institutions. Although once asset prices started falling, bank assets could not cover their liabilities during the panic, these institutions were solvent—meaning in normal times, there would be no cause for concern. The liquidity crunch had real consequences, explains Bernanke: The basic premise is that, because markets for financial claims are incomplete, intermediation between some classes of borrowers and lenders requires nontrivial market-making and information-gathering services. The disruptions of 1930–33 . . . reduced the effectiveness of the financial sector as a whole in performing these services. As the real costs of intermediation increased, some borrowers (especially households, farmers, and small firms) found credit to be expensive and difficult to obtain. The effects of this credit squeeze on aggregate demand helped convert the severe but not unprecedented downturn of 1929–30 into a protracted depression.


32. Id.
2. Nonrandom Panics

More recent models of banking crises highlight how banking crises can also be driven by rational behavior in response to solvency concerns. Economists Itay Goldstein and Ady Pauzner adapt the Diamond-Dybvig model to explain how banking crises can result from reasonable borrower concerns of banks’ viability. In their model, economic fundamentals determine whether a bank run occurs, because borrowers cannot know with certainty whether their bank is healthy (a reasonable assumption) and receive only a noisy signal of health based on the overall state of the economy. When borrowers see the economy trending downward, they are not sure what this means for their bank. But they know that other depositors observe this same negative signal and are likely to run, so they run too to avoid losses. In the absence of a coordination mechanism that allows borrowers to coordinate their run decisions, rational panics then bring down banks. Subsequent work adapts this framework to help describe the dynamics of the Great Recession.33

Like traditional “random” panic models, these models attribute bank failure to a run by depositors. Large losses for banks are the direct consequence of being forced to liquidate their assets early to meet the demands of depositors. Banks would be solvent and able to continue to intermediate in the absence of borrowers’ running. This framework helps us understand why regulators may have been reluctant to suggest, or even discuss, the possibility of a solvency crisis between the summer of 2007 and Lehman’s collapse. Solvency crises can be self-fulfilling: As Secretary Geithner explains when describing this period, “There was an element of self-fulfilling prophecy at play. If the markets thought the administration thought the banks were doomed, the markets could doom the banks.”34

3. Crises With or Without Panics

An extreme view of some financial academics is that financial crises are caused by banking panics. As economist Gary Gorton suggests, “All financial crises are at root bank runs, because bank debt . . . is vulnerable to sudden exit.”35 If this were the case, crises would be well addressed by the provision of liquidity or guarantees that either convince or prohibit borrowers from running.

However, another class of theoretical models—and a host of empirical

34. GEITHNER, supra note 16, at 875.
35. Gorton, supra note 33, at Abstract.
evidence—suggests that this is an overly simplistic view of crises. Nobel Laureates Bengt Holmström and Jean Tirole explain how undercapitalized financial institutions are forced to rein in the loans they make to households and firms. This undercapitalization causes recessions because restricted credit supply has negative implications for economic output. Mark Gertler and Nobuhiro Kiyotaki apply this insight to the Great Recession to suggest it as a canonical example of how disruptions in financial intermediation induce crises. Recent work by Matthew Baron, Emil Verner, and Wei Xiong makes this point more broadly by closely examining historical data for nearly 200 years and across nearly 500 countries. These authors highlight how large declines in bank equity predict undercapitalized banks that subsequently restrict credit to borrowers, resulting in recessions. This can be—and has been—true even in the absence of financial panics. Government interventions—like guarantees that borrowers will be repaid—can stave off bank runs. But, without recapitalization, banks will fail to adequately perform their intermediation function, and the result will be real economic harm suffered by individuals and firms.

The implication of this line of work is that it would be a mistake to believe that liquidity infusions alone will be sufficient to address all financial crises. As discussed infra in Part II, one interpretation of the missteps at the early stages of the Great Recession is that the problems plaguing the financial sector were misdiagnosed as liquidity problems alone, rather than as potential solvency problems. This is at least partially attributable to a mis-reliance on regulatory measures of bank capital, which suggested that banks were fundamentally healthy even though market indicia made clear that they were dangerously undercapitalized.

C. AVOIDING FINANCIAL CRISES

Given the consequences of undercapitalized financial intermediaries, policymakers have proposed alternatives aimed at restricting the capital structure of financial firms. These include ideas like one hundred percent equity-financed banks and higher capital requirements. This Section details the advantages and disadvantages of these alternatives. One solution is to restrict debt financing altogether. Returning to the Savings Bank example, imagine this bank was not funded by consumer deposits but was instead funded by the Bank issuing shares to the public. It made the same

37. See generally Matthew Baron, Emil Verner & Wei Xiong, 136 Q. J. ECON. 51 (2020).
38. See generally id.
investments in the farming industry, and one year the crops were all wiped out by a fire. What now?

Nothing. The shareholders will certainly be upset that Savings Bank made a bad investment (at least in the short term), but there is no panic, because Savings Bank is not obligated to pay shareholders anything. Professor John Cochrane discusses this difference between equity and debt financing:

'The 2000 stock market bust was not a crisis, because it was not a run. Yes, there were huge losses. But when stocks plunge, all you can do is go home, pour a drink, yell at the dog, and bemoan your dumb decisions. You can’t demand your money back from the issuing company, and you can’t drive the company to bankruptcy if it does not pay. Panic selling, even if “irrational,” even if it causes “herding” by others, even if it drives prices down, is not a crisis, and it’s not a run, because the issuing company doesn’t have to do anything about it.'

So, one solution to avoid financial crises is to transition to one hundred percent equity-financed banks, as Professor Cochrane suggests. He is not alone; Professor Adam Levitin has made a similar proposal for “safe banking” that decouples deposit-taking from lending and creates banks with one hundred percent reserves. These are not new ideas: Irving Fisher was the leading voice behind a movement in the aftermath of the Great Depression to transition to full-reserve banking. He argued that “[o]ur government has, in a significant sense, allowed the commercial banks to usurp its primary function of controlling the currency.” To solve this problem, it would not be sufficient to specify the kind of lending or collateral banks needed to hold, but instead, as Henry Simons proposed, we need “the outright abolition of deposit banking on the fractional-reserve principle.”

Merton Miller revived this proposal in the early 1990s:

Why not just scrap the whole costly system of deposit insurance, capital requirements plus risk surveillance in favor of a variant on Irving Fisher’s 100 percent money proposal, under which insured deposits—and no limitation need be placed on the size of the accounts—must be invested only in short term Treasury bills or their close equivalents? That will surely

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guarantee the safety of the payment system and head off any future taxpayer bailouts.  

If capital structure were truly irrelevant from the bank’s perspective, a one hundred percent equity-financed bank would seem to be an easy way to stave off financial crises. Professors Anat Admati and Martin Hellwig propose a less radical alternative: twenty-five percent capital requirements. They argue this would capitalize banks at historical levels that existed before the too-big-to-fail subsidy, when banks still worried that high leverage could bankrupt their firms. Although less extreme than one hundred percent equity financing, raising capital requirements to these levels would still represent a sea change from the perspective of the banking industry.

While maintaining higher capital levels would decrease the risk of costly bank failures, it would also create inefficiencies. Having to raise capital is perceived as a negative signal of a firm’s health. This means that, in the face of higher capital requirements, banks may simply decide to lend less—even when lending is a good investment—because of the stigma associated with financing investments through equity-raising. Many studies show that equity is expensive from the perspective of regulated banks and that higher capital requirements have real effects, like decreasing consumers’ access to credit.

One hundred percent reserve banking is even less appealing: Fractional-reserve banking allows banks to use resources that are otherwise idle (for example, consumer deposits) to fund profitable behavior (for example, starting a business or opening a new factory). In a world with one hundred percent reserve banking, who will play this intermediation role? Either there will be less investment or risky unregulated entities (for example, “shadow banks”).

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44. In 2018, average Tier 1 capital levels for U.S. banks were around thirteen percent. See FED. RSRV. BANK OF N.Y., QUARTERLY TRENDS FOR CONSOLIDATED U.S. BANKING ORGANIZATIONS: FIRST QUARTER 2018, at 1 (2018), https://www.newyorkfed.org/medialibrary/media/research/banking_research/quarterlytrends2018q1.pdf?la=en [https://perma.cc/MTN4-59BA]. The Admati and Hellwig proposal thus represents a significant increase for financial institutions that are already much less leveraged (on a book equity basis) than they were prior to the crisis.
45. See generally, e.g., Shekhar Aiyar, Charles W. Calomiris & Tomasz Wieladek, Does Macropru Leak? Evidence from a UK Policy Experiment (Bank of Eng., Working Paper No. 445, 2012). Compare with Anat Admati, who finds these arguments against higher capital requirements unpersuasive: Bankers and others often argue that the benefits of requiring significantly more equity funding of banks must be traded off against the costs of such requirements . . . . However, the cost of significant increases in equity requirements relative to the status quo are entirely private and due to banks’ ability to shift some of their costs to others.
banks”) will gain prominence, and we will push risk out of one sector of the economy that we somewhat understand—the traditional financial sector—into the shadows that are both understudied and underregulated.\textsuperscript{46} If the latter, in the next crisis the government will face a run in the shadow-banking sector and, as in all crises, be forced to dedicate resources to stemming it.

Full-reserve banking and higher capital requirements are also undesirable conceptually because these approaches are the financial regulatory equivalent of using a boulder to plug a dike: too blunt and unwieldy a tool to address a specific problem. The issue is that as bank assets begin to lose value, financial institutions risk becoming undercapitalized. The consequence is that less credit is supplied to the economy, and the economy declines. In these instances, runs by panicking uninsured depositors can exacerbate banks’ capital woes, amplifying crises.

The solution in the minds of the critics above is to make banks hold more capital always, so they will never find themselves undercapitalized. The solution this Article advocates is to make banks hold more capital at exactly the moment when creditors are concerned. Just like one hundred percent reserve banking, such dynamic recapitalization means the end of costly panics and financial crises. But this approach is minimally distortive because it does not restrict banks’ intermediation generally—only in the precise moments when distress appears likely. Dynamic recapitalization must be automatic because, as the experience of the Great Recession demonstrates, reliance on regulators to affirmatively act is problematic. Even those charged with policing the financial sector underestimate risks of systemic collapse as cautions emerge.\textsuperscript{47} Thus, an approach to automatic and timely recapitalization is developed infra.\textsuperscript{48}

\textsuperscript{46} Admati explains exactly this phenomenon in detailing opposition to such narrow banking proposals:

Narrow banks . . . would likely constitute a very small part of the financial system, as seen by the migration of deposits to money market funds that pay higher interest. . . . [U]nless they are regulated effectively, non-deposit-taking institutions can again become subject to runs as well as systemic and harmful failures. The [aftermath of the] Lehman Brothers’ bankruptcy, which was an investment bank, are clear examples. Admati, supra note 45, at S53–54.

\textsuperscript{47} See, e.g., NICOLA GENNAIOLI & ANDREI SHLEIFER, A CRISIS OF BELIEFS 57 (2018) (“Our best judgment is that for a year after the summer of 2007, neither investors nor policymakers fully appreciated the tail risks that had built up in the financial system.”).

\textsuperscript{48} See infra Part III.
II. THE GREAT RECESSION AND THE COVID-19 PANDEMIC

In this Part, I dive deeply into a case study that is both recent and relevant to our understanding of capital and crises—the Great Recession. This Article’s thesis is that a system of dynamic recapitalization would have limited the severity of the Recession. Those who dispute this claim may argue that (1) there was not sufficient time for banks to recapitalize, or (2) regulators lacked the legal authority to force recapitalization, for example, by restricting dividend payouts or forcing capital-raising. Here we consider the early stages of the financial crisis to illustrate that neither claim appears true: there was time to act, and regulators had the authority to do so. It suggests that the reasons for regulatory inaction are varied. Some in positions of power appeared fundamentally unaware of the risks of crisis; others appeared aware but lacked imagination of how bad the Recession could be.49 I also draw early lessons from the COVID-19 pandemic, in which the same reticence of the financial regulatory community limited aggressive action to preserve bank capital at a time of great uncertainty.

A. LACK OF DYNAMIC REGULATION EXACERBATED CRISIS

The subprime mortgage crisis became the Great Recession because of a failure to quickly recapitalize financial institutions when the market was signaling distress. One might think that the crisis came about quickly and so there was no time to recapitalize. In the aftermath of the Recession, some policymakers made exactly this argument.50 This Section makes clear the errors of this view of the Recession. Regulators missed opportunities to act to shore up the financial system and even let capital leave the system—for example, in the form of dividends paid to shareholders—at the same time that government funds were being used to push capital into these same banks. The crisis would have been much less severe if some of the missteps detailed in this Section had been avoided.

In order for dynamic recapitalization to have any bite as a policy tool, it is imperative that there be a period of time between the onset of a potential crisis and the inevitability of a downturn like the Recession for such recapitalization to occur. The prevailing view of the Great Recession is that

49. See, e.g., BEN S. BERMANE, TIMOTHY F. GEITNER & HENRY M. PAULSON, JR., FIREFIGHTING: THE FINANCIAL CRISIS AND ITS LESSONS 24–25 (2019) (“We were worried something terrible could happen, but even in the months leading up to it, we didn’t foresee how the scenario would unfold. . . . These failures of anticipation were in part a failure of imagination and in part a failure of institutional organization within the government.”).

50. Id. at 25 (“One lesson for crisis detection is that it’s incredibly hard to predict a financial meltdown. Some people might be prescient about some things, but you can’t count on prescience as a realistic crisis avoidance strategy.”).
it was an unpredictable panic; regulators tend to describe it as such.\textsuperscript{51} The popular press also tends to refer to the downturn as triggered by Lehman’s September 2008 bankruptcy filing; as John Cassidy wrote in a September 2018 retrospective titled \textit{The Real Cost of the 2008 Financial Crisis}, “September 15th marks the tenth anniversary of the demise of the investment bank Lehman Brothers, which presaged the biggest financial crisis and deepest economic recession since the nineteen-thirties.”\textsuperscript{52}

Many academics subscribe to the view that Lehman’s failure was the proximate cause of the crisis—explains Professor John Cochrane:

The signature event of this financial crisis was the “run” . . . that started in late September of 2008 and receded over the winter. . . . If that panic had not occurred, it is likely that any economic contraction following the housing bust would have been no worse than the mild 2001 recession that followed the dot-com bust.

. . . .

Why was there a financial panic? There were two obvious precipitating events: the failure of Lehman Brothers investment bank in the context of the Bear Stearns, Fannie Mae, Freddie Mac and AIG bailouts; and the chaotic days in Washington surrounding the passage of legislation establishing the Troubled Asset Relief Program (TARP).\textsuperscript{53}

Professors Adrian Vermuele and Eric Posner compare the onslaught of the Recession (which they date to September 18, 2008—immediately following Lehman’s failure) to September 11, 2001. While they acknowledge the differences between the worst terror attack and the worst financial crisis in our lifetime, the authors seem to suggest that the unpredictability of both events reflects the same pattern of what they call “crisis governance”—in which “[p]olitical conditions and constraints, including demands for swift action by an aroused public, massive

\textsuperscript{51} See, e.g., Ben S. Bernanke, \textit{The Real Effects of Disrupted Credit: Evidence from the Global Financial Crisis}, \textit{Brookings Papers on Econ. Activity}, Fall 2018, at 251, 303 (“Although the panic was certainly not an exogenous event, its timing and magnitude were largely unpredictable, the result of diverse structural and psychological factors.”).

\textsuperscript{52} John Cassidy, \textit{The Real Cost of the 2008 Financial Crisis}, \textit{New Yorker} (Sept. 10, 2018), https://www.newyorker.com/magazine/2018/09/17/the-real-cost-of-the-2008-financial-crisis [https://perma.cc/CP75-XDLW]; see also John Authers, \textit{In a Crisis, Sometimes You Don’t Tell the Whole Story}, \textit{FIn. TIMES} (Sept. 7, 2018), https://www.ft.com/content/1cb4d60-b1df-11e8-99ca-68cf89602132 [https://perma.cc/QT2U-5CAV] (describing how Lehman caused a (conventional) bank run and brought the financial system to the brink). Authers recalls not publishing reports of the queues of customers who lined up to withdraw funds that were above the FDIC’s deposit insurance limit:

Such a story on the FT’s front page might have been enough to push the system over the edge. Our readers went unwarned, and the system went without that final prod into panic. Was this the right call? I think so. All our competitors also shunned any photos of Manhattan bank branches.

\textit{Id.}

uncertainty, and awareness of their own ignorance leave rational legislators and judges no real choice but to hand the reins to the executive and hope for the best.”

The idea that the crisis was (1) precipitated by Lehman and (2) largely unpredictable fits with how policymakers conceive of the Recession and pushes against the notion of an optimal moment when the dynamic recapitalization can occur. In 2018, former Treasury Secretary Henry Paulson argued that “crises are unpredictable in terms of cause or timing or the severity when they hit.” Former Treasury Secretary Timothy Geithner similarly notes that “[f]inancial crises can’t be reliably anticipated or preempted, because human interactions are inherently unpredictable.”

The view of crises as fundamentally unpredictable is reinforced by reading assessments by many of the policymakers in charge of monitoring financial markets in the months leading up to Lehman’s bankruptcy. They are, for the most part, unaware of the scope of the catastrophe that was to come. It is not that the regulators were oblivious to the change in market conditions; they understood well that the housing market was declining (home prices peaked in 2006 before trending downward), which caused runs to begin as early as the summer of 2007 in the asset-backed commercial paper (“ABCP”) market.

Still, many seemed confident in the months leading up to Lehman’s bankruptcy that the worst of the crisis had passed. In the fall of 2007, Bill Dudley, then at the Federal Reserve Bank of New York, noted that “[t]he general sense is that the U.S. banks are very healthy and . . . well capitalized.” In the same meeting, the President of the Federal Reserve Bank of Chicago argued that the Fed should be wary of letting concerns about tail risk (low probability but very bad potential outcomes, like the crisis ended up being) shape policy too significantly: “[W]e have to continue to ask, What happens in the more likely event that things turn out better than these tail events? That’s why they’re called tail events. . . . If we respond aggressively to address financial conditions beyond our dual mandate goals, we should be prepared to retrace that pattern . . . .”

55. Interview by Andrew Ross Sorkin with Ben Bernanke, supra note 15, at 8.
58. Id. at 109.
March 2008 was another watershed moment in the crisis that in retrospect was a harbinger of the calamity to come: Bear Stearns, a large investment bank with significant exposure to subprime mortgages, failed and was subsequently merged with JPMorgan. And yet, Federal Open Market Committee (“FOMC”) transcripts in the immediate aftermath of Bear reveal relatively little concern. Rather ironically in light of what was to come, Dudley pointed out that investment banks looked better post-Bear than they had prior and, specifically, that although “Lehman’s stock price fell 19 percent, . . . its CDS narrowed by 20 basis points, to 450 basis points, yesterday.” His view was that Bear’s resolution as well as a ratcheting up of Federal Reserve liquidity decreased the risk of future insolvencies. Secretary Geithner, then Vice Chairman of the FOMC, argued that “[i]t is very hard to make the judgment now that the financial system as a whole or the banking system as a whole is undercapitalized.”

And in August 2008, in the last FOMC meeting before Lehman collapsed, many appeared unaware that a global financial meltdown could be on the immediate horizon (Lehman eventually declared bankruptcy a mere six weeks later). Federal Reserve Bank of St. Louis President James Bullard called for the FOMC to “begin to de-emphasize systemic risk worries” because, since the crisis had been ongoing for some time, “all of the major players have made adjustments as best they can to contain the fallout from the failure of another firm in the industry,” and “the level of systemic risk has dropped dramatically and possibly to zero.” Federal Reserve Bank of Richmond President Jeffrey Lacker agreed with Bullard’s assessment and argued that concerns about systemic risk were not a useful guide for policy and tended to be overblown.

This conventional view of the Great Recession—as triggered by Lehman’s bankruptcy and unexpected until the fall of 2008—is dismal. It means there is no moment for dynamic recapitalization—no time between warning signs of market distress and wholesale panic. Thus, the only option to prevent the possibility of costly bank runs is distortionary capital requirements (in the extreme, one hundred percent reserve banking).

59. Andrew Ross Sorkin, JP Morgan Pays $2 a Share for Bear Stearns, N.Y. TIMES (Mar. 17, 2008), https://www.nytimes.com/2008/03/17/business/17bear.html [https://perma.cc/58UR-DERJ]. To be clear, this was not a normal-times merger for Bear: JPMorgan agreed to pay only two dollars a share to buy the firm on Monday—one-tenth of what the firm was worth on the Friday prior.


61. Id. at 74–75.


63. Id. at 70.
This dismal view is bolstered by the fact that not only did many fail to appreciate that the financial system, broadly, was undercapitalized prior to fall 2008, but regulators and industry participants that were in the best position to judge these institutions also often proclaimed that the firms that failed (or almost failed before costly government-assisted mergers) were well capitalized even at the moment their failure was imminent. Christopher Cox, then Chairman of the SEC, testified before the Senate Committee on Banking, Housing, and Urban Affairs in the weeks after Bear’s collapse that what happened to the firm was unprecedented:

For the first time, a major investment bank that was well-capitalized and apparently fully liquid experienced a crisis of confidence that denied it not only unsecured financing, but short-term secured financing, even when the collateral consisted of agency securities with a market value in excess of the funds to be borrowed.64

Erin Callan, then Chief Financial Officer of Lehman, announced in June 2008 that the firm was “extremely well capitalized to take advantage of...new opportunities.”65 In July, before a September bailout, James Lockhart, the director and regulator of the government-sponsored enterprises (“GSEs”), proclaimed them “adequately capitalized, which is hour [sic] highest criteria.”66 And when the Federal Reserve rescued AIG immediately after Lehman’s failure, the insurer noted that “AIG is a solid company with over $1 trillion in assets and substantial equity” and that the loan was “backed by profitable, well-capitalized operating subsidiaries with substantial value.”67

This is a conundrum for dynamic recapitalization. If financial crises are unpredictable, and if the Great Recession was the byproduct of irrational panicked runs on institutions with sufficient capital, there was no opportune moment for measured crisis response. And more importantly, going forward, there will be no such moment in the next downturn. Financial markets function well until they do not; just as there is no way to stop an avalanche as it races down a hill,68 a tail-risk event is realized is a function of luck, not policy.

64. Cox, supra note 14.
66. Id.
68. ELIJAH KELLEY, JOHN TRAVOLTA, QUEEN LATIFAH, NIKKI BLONSKY, ZAC EFRON & AMANDA BYNES, You Can’t Stop the Beat, on HAIRSPRAY: SOUNDTRACK TO THE MOTION PICTURE (New Line Records 2007).
1. Not a Consequence of Insufficient Time to Respond

Fortunately, this view of the Recession—and crises in general—is inaccurate. Tremors in financial markets began more than a year prior. During this period, market indicators of bank health revealed sufficient stress. Figures 1A and 1B show the market capitalization of the largest financial firms (Bank of America, Citigroup, Goldman Sachs, Morgan Stanley, JPMorgan, Wells Fargo, Bear Stearns, and Lehman Brothers) between January 2007 and December 2008.\(^69\) Figure 2 shows price movements on aggregate for a one-hundred-dollar portfolio equally invested across these firms in January 2007.\(^70\) Important inflection points of the crisis, including the suspension of three of BNP Paribas’s subprime mortgage funds in August 2007, the collapse of Bear in March 2008, and the bankruptcy of Lehman in September 2008, are highlighted.

During the period between these early ABCP runs and Lehman’s collapse, the market capitalizations of large financial institutions fell by an average of sixty-four percent. Figures 3A, 3B, and 4 show how CDS spreads, which measure the cost of insurance against default, changed during this period.\(^71\) The cost of insuring against Goldman’s default, for example, more than doubled between the summer of 2007 and the spring of 2008. Other financial institutions followed this same trend. While Lehman’s trajectory is certainly the worst of this lot, it is a mistake to say it is a massive outlier. The problems in financial markets were not problems of one rogue firm, but rather, skepticism about the viability of the entire industry.

In November 2007, Thomas Russo, then Vice Chairman and Chief Legal Officer of Lehman, presented to the Group of Thirty about the problems plaguing the financial sector. He estimated that the next two years would result in the foreclosure of two million homes, highlighted that bank capital ratios were significantly reduced relative to June 2007, and suggested that “[c]apital needs to be raised, but the market is concerned about the underlying assets . . . Consequently, the cost to raise capital becomes high and for some prohibitive.”\(^72\)

So, both market indicators and industry participants signaled that distress was likely. These signals led many to call for more action to shore up banks: Former Treasury Secretary Lawrence Summers wrote in March 2008, in the aftermath of Bear’s collapse, that “a priority for financial policy

69. See infra Appendix, Figures 1A–1B.
70. See infra Appendix, Figure 2.
71. See infra Appendix, Figures 3A–4.
72. Thomas A. Russo, Credit Crunch: Where Do We Stand?, 76 GRP. THIRTY: OCCASIONAL PAPER 2008, at 1, 12, 23–24.
has to be increases in the level of capital held by financial institutions. Economists Anil Kashyap and Hyun Song Shin, writing with industry experts, predicted that losses to institutions with exposure to subprime mortgages would total almost $400 billion and result in a substantial contraction in credit for American consumers and businesses. They also advocated for shoring up the capital positions of large banks: an “effective means to attack directly the financial turmoil would be to facilitate the raising of new equity capital by the banks and to encourage them to retain cash flow by cutting dividends if necessary.” Said in the parlance of economics, Lehman’s bankruptcy was far from an exogenous shock. The market’s view of these financial institutions’ stability had been trending downwards for months prior.

This is a simultaneously comforting and distressing fact—comforting, because it suggests there is a period between when cracks in financial markets begin to show and the market collapses. In the case of the Great Recession, more than a year elapsed between tremors in the ABCP market and the collapse of Lehman—and nearly six months between tremors and the failure of Bear. But this fact, while hopeful for the potential of dynamic recapitalization approaches, is also concerning with respect to the Recession because it suggests more could have been done in the months before Lehman.

This Article argues that time existed to limit the severity of the crisis, and policymakers did not respond rapidly enough. Specifically, at a time when the market’s assessment of banks’ capital positions was falling

73. Lawrence Summers, Steps that Can Safeguard America’s Economy, FIN. TIMES (Mar. 30, 2008), https://www.ft.com/content/073802f2-fe6c-11dc-9e04-000077b07658 [https://perma.cc/4C58-B3BS]. Summers continued:

Capital infusions to date fall far short of prospective losses. Without new capital, the financial sector will operate with too much risk and leverage or will put the economy at risk by restricting the flow of credit.

As part of its dialogue with financial institutions, the Fed should push for further efforts to raise capital.

Id.

74. GREENLAW ET AL., supra note 17, at 54. The authors furthered that “the cutting of dividends will need to overcome the considerable stigma attached to doing so. On this score, ministers of finance and central bankers may have a role to play in facilitating coordinated action so as to overcome the stigma across regions.” Id.

75. There are raging debates about whether, even immediately prior to Lehman’s failure, regulators should not have bailed out Lehman as it did AIG only two years later. This Article does not delve into this debate but rather suggests that early and targeted capital interventions could have forestalled an event like Lehman from even being on the horizon. See Panic, Fear and Regret, MARKETPLACE, https://features.marketplace.org/bernanke-paulson-geithner [https://perma.cc/R6NJ-WT49] (transcribing an interview with Timothy Geithner, Ben Bernanke, and Henry Paulson). Contra Laurence Ball, The Fed and Lehman Brothers: Introduction and Summary (Nat’l Bureau of Econ. Rsch., Working Paper No. 22410, 2016).
precipitously, banks were not forced to recapitalize. And rather than hoard the relatively little capital they did have, during this period, astoundingly, large banks paid out dividends and repurchased shares. In 2008, sixty-one components of the S&P 500’s stock index cut their dividends. However, banks—for which markets were concerned about capital deficiencies—continued to disburse capital rather than shore up their institutions. Between January 2007 and August 2008, the crisis knocked out more than half of the market value of banks’ equity. The cumulative dividends these firms paid out during this same period were as large as their losses.

The anecdotal evidence is striking. Lehman announced a thirteen percent increase in its dividend and a $100 million share repurchase in January 2008, nine months before filing for bankruptcy and after its market cap dropped by thirty percent in the prior year. All large financial institutions continued to pay out dividends even after receiving capital infusions by the government. Banks argued that any decision to cut dividends for their particular institution would signal weakness to the market and hasten their downfalls. While there is theoretical and empirical support for this signaling proposition for individual institutions, the failure of coordination by regulators to stop costly capital disbursements for the sector as a whole is harder to understand. Because most large banks received equity infusions from TARP, continued dividend payouts amounted to preferencing wealthy bank shareholders at the expense of ordinary taxpayers.

Perhaps unsurprising given that banks did not even hoard the capital they did have, when they were encouraged to raise new capital, they resisted.

76. See infra Appendix, Figure 7.
78. Id. at 8. This was likely mechanical because most corporate debt has covenants which prevent banks from paying out dividends in quarters with negative earnings.
79. Acharya et al., supra note 18.
81. Id.
82. David S. Scharfstein & Jeremy C. Stein, Opinion, This Bailout Doesn’t Pay Dividends, N.Y. TIMES (Oct. 20, 2008), https://www.nytimes.com/2008/10/21/opinion/21stein.html [https://perma.cc/95YK-HN84]. The authors make this point quite clearly:
   Although dividends should be a matter of near indifference to shareholders of healthy companies, when companies are financially distressed there is a conflict of interest between shareholders and bondholders that leads shareholders to prefer immediate payouts.
   Here’s why: Each dollar paid out as a dividend today is a dollar that cannot be seized by creditors in the event of bankruptcy. For a distressed company, dividends are not in the interest of the enterprise as a whole (shareholders and lenders taken together), but only in the interest of shareholders. They are an attempt by shareholders to beat creditors out the door.
Id.
In early FOMC meetings, regulators noted that despite pressure on banks and GSEs to raise capital from the outset of the crisis, banks repeatedly objected:

[N]ow is not a good time to raise capital.

This desire to postpone capital raising stems in part to the fact that bank executives often do not want to dilute existing shareholders, which of course include themselves. . . . The self-interested thing to do is avoid the dilution and hope for a good state of the world.83

In these cases, what was bad from the perspective of current shareholders (new common-equity issuance) was good from the perspective of society (financial-sector capitalization), even from the perspective of new shareholders (who benefit from buying a share of the firm at a relatively low value). Decisions about capital were being made by firms maximizing with respect to their existing shareholders, rather than governments maximizing with respect to overall social welfare. The result was too little capital raised despite substantial cause for concern and a long windup to the crisis’s climax.

The market data this Article marshals are confirmed by primary source material that is Professor Kathryn Judge’s focus in an important essay on the year leading up to Lehman’s collapse. Professor Judge also points out that the crisis was not an unexpected shock like September 11th.84 Instead, many realized that markets were instable, and her work documents how these prescient regulators used their power creatively during this “first year.”

However, the important question for this Article—and financial regulation more broadly—is why, despite warning signs to the contrary, regulators did not act forcefully enough, and did not force recapitalization of financial institutions sooner and instead allowed capital to leave vulnerable

83. Henny Sender, Dudley Hits Out at Banks’ ‘Self-Interest,’ FIN. TIMES (Mar. 6, 2009), https://www.ft.com/content/4d988356-0aab-11de-95ed-0000779fd2ae [internal quotations omitted].

84. Kathryn Judge, The First Year: The Role of a Modern Lender of Last Resort, 116 COLUM. L. REV. 843, 846 (2016) (noting that unlike an exogenous terror attack, there was time before the crisis escalated). David Skeel makes a similar point in a Brookings piece in which he calls this the “Lehman myth”:

In the 10 years since Lehman Brothers filed for bankruptcy . . . a standard narrative about the implications of not bailing Lehman out quickly took hold. According to this narrative, the failure to rescue Lehman was the defining event of the 2008 crisis, the match that started the conflagration. . . .

institutions, as outlined supra. Much of the severity of the crisis could have been avoided if banks had been forced to recapitalize sooner—or at the very least, if regulators had forced banks to retain capital rather than pay it out in the form of dividends.

I consider two possible explanations for why regulators failed to act more aggressively in the early crisis period: (1) Regulators lacked the legal authority to force recapitalization, and (2) regulators did not fully appreciate the risks in the financial sector that were related to undercapitalization.

2. Not Caused by Lack of Legal Authority

Secretary Geithner muses about issues of legal authority in his book *Stress Test*:

I wasn’t confident that our rules would ensure that Fed-supervised banks had enough capital to survive a severe crisis. But I knew many non-banks had much less capital, even though they didn’t have the safeguard of insured deposits and wouldn’t have access to Fed loans in an emergency.

... The question was what to do about it. The Fed didn’t have the legal authority to force Bear Stearns, Lehman Brothers, or other investment banks to raise more capital. We couldn’t even generate stress scenarios bleak enough to force the banks we regulated to raise more capital.85

To the Financial Crisis Inquiry Commission, Secretary Geithner, then President of the Federal Reserve Bank of New York, reported that he was “consumed” in the months leading up to Lehman to find a way that the firm might “get more conservatively funded” but lacked the legal tools to force action.86

This view has become mainstream with respect to bank capital in the financial crisis. Even in taking issue with the lack of aggressive policy action in the early stages of the financial crisis, economists Nicola Gennaioli and Andrei Shleifer suggest that the defense of “lack of legal authority” for inaction “has many merits; after all, banks until the summer were in compliance with formal regulatory requirements, and bank regulators had no legal power to force them to stop dividends or raise equity.”87

It is worth considering these claims about the importance of legal authority with respect to banks and nonbanks separately.

87. Gennaioli & Shleifer, supra note 47, at 63.
i. Legal Authority Existed to Force Banks to Quickly Recapitalize

First, with respect to banks, the legal-authority argument suggests that the Fed lacked the ability to force the commercial banks under its purview to raise capital because these institutions were above requisite capital ratios. It is true that one constraint on banks’ leverage is that they must stay above regulatory-mandated thresholds. If this were the only way to constrain banks’ leverage, then the issue of legal authority is clear: Banks can be either above or below mandatory capital ratios. If above, this requirement is met. There is then not much room for adjustment of the required capital level based on risks that emerge differently across the financial industry.

But setting and enforcing a singular capital ratio is not the only authority bank regulators had at their disposal, and in the months leading up to the crisis, they could have demanded recapitalization of banks and restricted dividends and share repurchases even when banks were above regulatory capital thresholds.

The clearest such authority comes from the International Lending Supervision Act (“ILSA”). ILSA was passed in the aftermath of the less-developed-country debt crisis in the early 1980s, which was triggered by Mexico’s inability to service an $80 billion debt obligation that was primarily due to U.S. commercial banks.88 This crisis prompted banking regulators to review and enhance their existing supervision of banks’ international lending. One result of ILSA and the rules thereunder was the imposition of minimum capital-adequacy ratios on commercial banks. Another result—even more relevant in the context of Secretary Geithner’s remarks—was the decision to allow regulators to set capital requirements that vary by institution depending on what regulators “deem[] to be necessary or appropriate in light of the particular circumstances of the banking institution.”89

To be precise, contrary to popular (mis)conception, regulators do (and did during the crisis) have the authority to force banks to raise bank capital levels above regulatory-minimum thresholds. Additionally, they have (and had during the crisis) the discretion to set different capital requirements for different institutions depending on their perception of a particular firm’s risks. While there are procedures in place that allow banks to contest such

requirements. In practice, few banks ever challenge capital directives.

It is worth noting that ILSA, though the clearest authority for bank-specific capital requirements, is not the only authority regulators had at their disposal to force at least commercial banks to recapitalize during the crisis. The Bank Holding Company Act explicitly provides the Federal Reserve Board with broad supervisory authority to issue “regulations and orders, including regulations and orders relating to the capital requirements for bank holding companies, as may be necessary.” Similarly, the National Bank Act provides the Office of the Comptroller of the Currency (“OCC”) this same authority over the banks it regulates. In fact, even as it sets minimum capital thresholds, the OCC is explicit that setting these ratios for the industry as a whole should not be construed as limiting the “authority of the OCC to take action under other provisions of law, including action to address unsafe or unsound practices or conditions, deficient capital levels, or violations of law or regulation.” Also, the Federal Deposit Insurance Act gives banking agencies the authority to take “prompt corrective action” to determine which depositories are troubled and resolve them appropriately.

As Professor Julie Hill notes, regulators have historically asserted this discretionary authority to set bank-specific capital requirements. The Federal Deposit Insurance Corporation (“FDIC”) points out that it “is not precluded from requiring an institution to maintain a higher capital level based on the institution’s particular risk profile,” and that such levels are justified when “the future earnings prospects of a bank are not adequate, or where a bank has sizeable off-balance sheet or funding risks, significant risks from concentrations of credit or nontraditional activities, . . . or a significant volume of assets classified substandard, doubtful or loss or otherwise criticized.” The Fed asserts that heightened capital levels are justified when

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90. For example, regulators must provide the opportunity for notice and comment on proposed capital directives. In exigent circumstances, this period of review can be shortened. Specifically, “[t]he bank[ or] bank holding company . . . shall be allowed at least 14 days to respond, unless the Board determines that a shorter period is necessary because of the financial condition of the bank[ or] bank holding company.” 12 C.F.R. § 263.85 (2021).
92. The issue of investment banks is a little more complicated, as discussed below.
94. 12 C.F.R. § 3.1(b) (2021).
95. 12 U.S.C. § 1831o. Since Dodd-Frank, regulators have even more tools at their disposal to force capital raising and restrict disbursements. As I discuss infra Section III.C.1, stress-test failure (at least in principle) mandates that banks abandon planned capital disbursements. Furthermore, section 165 of the Dodd-Frank Act permits the Federal Reserve to mitigate risks to financial stability that could arise from the failure of large, interconnected banks by “prescribing more stringent prudential standards.” Id. § 5365.
96. Hill, supra note 91, at 656 (internal quotations omitted).
banks have “inordinate levels of risk.” 97 The OCC suggests that it may be appropriate to consider the “overall condition, management strength, and future prospects” of the bank when determining bank-specific capital levels. 98 The Office of Thrift Supervision recommended consideration of the “overall condition, management strength, and future prospects” of banks, as well as liquidity levels and overall financial stability. 99

After determining that banks require additional capital, regulators have a variety of formal and informal tools at their disposal. 100 Formal actions include Prompt Corrective Action (“PCA”) directives that force banks to take any action regulators deem necessary to capitalize struggling financial institutions 101—that is, capital directives to any bank that “fails to meet the required minimum level for any relevant capital measure” determined by a regulator; cease-and-desist orders directing banks to refrain from “unsafe or unsound” banking practices (like operating with capital ratios below the bank-specific minimum levels that regulators mandate); and formal supervisory agreements requiring banks to increase capital levels. 102 Softer, less formal approaches are also possible—for example, informing banks that failure to raise capital levels will result in the issuance of a capital directive or a cease-and-desist order.

Why, then, were these enforcement actions not used to encourage banks to hoard and raise capital rather than pay excessive dividends at the outset of the crisis? One concern perhaps was that higher capital requirements for the riskiest banks would lead to asset fire sales and thus push more banks to the brink. Imagine that regulators directed Wachovia to increase its capital ratio to twelve percent in 2007. 103 Capital ratios are (simplistically) the ratio of a bank’s equity levels to its total assets. Wachovia would have had two options to meet this twelve percent requirement: raise new equity or sell off assets. Perhaps regulators did not subject large banks to heightened capital requirements because they were concerned that to meet these requirements,

97. 12 C.F.R. pt. 208, app. A (2006). As Professor Hill notes, “[h]igher capital requirements might also be appropriate when the bank has significant interest rate risk, liquidity issues, poor earnings, portfolio risk, or risk from nontraditional activities.” Hill, supra note 91, at 657 n.74.
98. 12 C.F.R. § 3.403(c) (2021).
100. The difference is that while violations of formal actions can result in fines, removal of bank management, or, in extreme cases, regulators directly taking over banks, violating an informal action does not provoke as severe a punishment. In most cases, failing to comply with informal actions prompts more formal requirements like forced capital raising. See Hill, supra note 91, at 660–61.
101. PCA directives result when banks become “undercapitalized, significantly undercapitalized, or critically undercapitalized” (explicit regulatory thresholds) but can also be triggered by banks’ failure to meet bank-specific capital requirements. Id. at 653.
102. 12 U.S.C. § 1831o(b)(1)(C), (g)(1).
103. In reality, there were no formal enforcement actions for Wachovia or Washington Mutual despite their collapses in the early stages of the crisis. Hill, supra note 91, at 691.
banks would sell off assets. These fire sales would lower the value of the assets being sold, not just for Wachovia but for all banks, and this spillover effect would have debilitated an already-weakened financial sector. This is the concern Professors Robin Greenwood, Samuel Hanson, Jeremy Stein, and Adi Sunderam voice about heightened capital requirements during downturns:

[I]f in the midst of a crisis, banks are given the option of improving their capital ratios by shrinking assets, rather than by raising new dollars of equity capital, they will likely do a good deal of the adjustment on the former margin, thereby exacerbating the economy-wide problems associated with fire sales and credit crunches.104

A related concern is that the ability to set bank-specific capital ratios may not mean that regulators could have shut down dividend payments by troubled institutions. Higher capital requirements for Bank of America, Citigroup, JPMorgan, and Wells Fargo could have encouraged these firms to “fire sell” assets to meet higher capital ratios while still sustaining their planned capital disbursements.

Such fire-sale concerns are not valid because regulators have the explicit authority to require banks to meet heightened capital requirements by raising new dollars of equity capital and not making planned capital disbursements. Specifically, ILSA gives banking regulators the authority to cause banks to achieve and maintain adequate capital by establishing minimum levels of capital, not minimum capital ratios. PCA authority similarly allows regulators to direct banks to raise new dollars of equity capital and restrict capital distribution until troubled banks submit satisfactory capital restoration plans.105 Thus, regulators could have been explicit that to meet heightened capital requirements, banks could not disburse capital or would have to raise new dollars of equity capital, rather than simply sell off assets to reduce capital ratios to the requisite levels and fan the flames of the crisis along the way.

The reason we know regulators have the authority to (1) set bank-specific capital requirements and (2) force banks to meet these capital requirements by restricting planned disbursements and requiring new capital be raised (rather than meeting capital ratios by selling existing assets) is that they did exactly this for small banks during the financial crisis. The number of formal capital-enforcement actions tripled as the crisis began, from 2007 to 2008, and tripled again from 2008 to 2009.106 The vast majority of these

106. Hill, supra note 91, at 672.
crisis-enforcement actions (nearly 75%) contained bank-specific minimum-capital requirements, the mean of which (9.2% Tier 1 capital ratio) was more than double the 4% required at the time to be considered adequately capitalized.\textsuperscript{107} In addition to imposing bank-specific capital requirements, crisis-enforcement actions regularly mandated that banks agree to suspension of planned dividends. For example, an April 2008 cease-and-desist order agreed to by Greater Atlantic Bank required the savings association to reach a risk-based capital ratio of twelve percent before July 2008 and mandated that the firm “shall pay no dividends or make any other capital distributions . . . without receiving the prior written approval of the [Office of Thrift Supervision] Regional Director.”\textsuperscript{108} Similarly, the Fed required in June 2009 that Amcore Bank in Illinois increase its risk-based capital ratio to twelve percent in the following two months and forbade the bank from paying out any dividends without receiving prior written approval from its regulator.\textsuperscript{109}

Interestingly, regulators shied away from exercising this authority with respect to large banks. During the crisis, such a directive was leveled only once against one of the fifty largest financial institutions in the United States: In June 2009, the Federal Reserve Board announced a cease-and-desist order to maintain the financial soundness of Colonial BancGroup. It required that Colonial raise its risk-based capital ratio to twelve percent (higher than the ten percent required to be well capitalized at the time) and forbade the bank from declaring or paying dividends without prior written approval of the Reserve Bank, the Director of the Division of Banking Supervision and Regulation of the Board of Governors, and the Superintendent.\textsuperscript{110} It also forbade Colonial from purchasing or redeeming shares of its stock without the prior written approval of the Reserve Bank and the Superintendent.\textsuperscript{111} At the time it consented to this cease-and-desist order, Colonial was the forty-seventh-largest bank holding company in the United States. The Federal Reserve issued no such decrees to Washington Mutual, the sixth-largest bank holding company, before its failure in the fall of 2008; or Wachovia, the third-largest bank holding company, which nearly failed before its distressed purchase by Wells Fargo; or Citigroup, whose stock price dropped by eighty

107. \textit{id} at 679–80. One bank was even required to meet a twenty-eight percent leverage ratio, seven times the standard regulatory requirement. \textit{id} at 680.


111. \textit{id} at 6.
percent in 2008 before the firm finally decided to slash its dividend;\footnote{112} or JPMorgan and Wells Fargo, which continued to pay out capital to shareholders even after they received emergency capital infusions from the federal government in the fall of 2008.\footnote{113}

This big/small bank heterogeneity in regulators’ capital approach is confusing. It is not only an artifact of the crisis, however. Philip Wellons studied PCA directives issued between 1993 and 2001 and found that no large bank—not a single “major” financial institution—received a PCA directive.\footnote{114} One plausible explanation is that regulators find larger banks to be less risky than their smaller counterparts. However, this seems implausible given that only failure of the “too-big-to-fail” financial institutions could have ripple effects throughout the financial sector; the failure of the $203 million Greater Atlantic Bank could never have destabilized the entire financial system.\footnote{115} In fact, in recognition of large banks’ contribution to the crisis, in May 2009 the FDIC chose to collect an outsized share of the FDIC insurance levy from the largest institutions because “as a group, [they] have posed much greater risks to the banking system than small banks have.”\footnote{116}

Capital directives to the largest financial institutions would have prevented billions of dollars in capital from leaving the financial system at a time when regulators understood that the industry was starving for capital.\footnote{117} The legal authorities were in place to allow for that requirement—and even used with respect to less systemically important financial institutions. Why

\footnote{112}{Author’s calculations.}
\footnote{113}{Acharya et al., supra note 18.}
\footnote{114}{Philip A. Wellons, Enforcement of Risk-Based Capital Rules, in CAPITAL ADEQUACY BEYOND BIS: BANKING, SECURITIES, AND INSURANCE 284, 300 (Hal S. Scott ed., 2005). In general, the incidence of PCA directives was very low, only twenty-seven during this time period, which is only four percent of the number of problem and failed banks. Id. While PCA directives and capital-enforcement actions were more commonly used during the crisis, regulators still were reluctant to use these tools to restrict the behavior of the largest financial institutions.}
\footnote{116}{Binyamin Appelbaum, Big Banks to Pay Larger Share of FDIC Levy, WASH. POST (May 23, 2009), http://www.washingtonpost.com/wp-dyn/content/article/2009/05/22/AR2009052203442.html [https://perma.cc/EM2A-UP7R] (quoting FDIC Chair Sheila C. Bair). Comptroller of the Currency John C. Dugan noted that this was a “frankly perverse” move given that the insurance fund was primarily being drained by the failures of small banks. Id.}
the reluctance to use these tools where they could have been most helpful?

Another possibility is that regulators were reluctant to stigmatize large financial institutions with public-enforcement actions. Declaring in 2008 that Citigroup’s risk profile required that it raise more capital to weather the financial crisis would have triggered depositors above the FDIC’s insurance limit to run to withdraw their cash. This, the argument goes, would have hastened rather than slowed Citigroup’s demise. A version of this argument was presented by bank supervisors to the Financial Crisis Inquiry Commission. They noted that they avoided the issuance of formal, public supervisory action taken under the federal banking statutes in part out of fear that “financial markets would overreact to public actions, possibly causing a run.”

While plausible, on examination, a rather perverse result: regulators did not use the tools they had to quickly recapitalize the largest banks because they were concerned that using those tools—meant to make the banking sector safer—would actually make the largest banks less able to withstand the downturn. Such perversity could have been avoided if regulators acted quickly with respect to these large financial institutions. Pushes to raise capital in 2007 could have helped large financial institutions build up a capital buffer that would have better prepared them for the downturn and ultimately lessened the severity of the crisis. Also, concerns about stigma could have been avoided by exertion of private pressure on institutions to recapitalize under the threat of enforcement action.

Regulators’ reluctance to force banks to raise capital was likely related to the complaints they were hearing from the financial institutions under their purview: in the year leading up to Lehman’s failure, banks repeatedly told the Fed that it was not the right time for banks to raise capital and that scaling back on planned disbursements would stigmatize vulnerable financial firms.

FOMC transcripts show that many regulators understood that recapitalization would be beneficial but seemed sympathetic to dilution and stigma concerns. The transcripts also show regulators growing increasingly concerned and trying to persuade banks to raise capital rather than

118. FIN. CRISIS INQUIRY COMM’N, supra note 86, at 307 (internal quotations omitted).
119. A more cynical view is that regulators were captured and beholden to banks. This view is consistent with George Stigler’s Nobel Prize–winning work, offering a theoretical framework and early empirical analysis of the incidence of regulatory capture. In his view, regulation is undesirable because it is inevitably a byproduct of industry and interests with the means to shape it to achieve their ends: “[A]s a rule, regulation is acquired by the industry and is designed and operated primarily for its benefit.” George J. Stigler, The Theory of Economic Regulation, 2 BELL J. ECON. & MGMT. SCI. 3, 3 (1971). I do not have this view of regulators and view crisis policymakers as well intentioned.
contemplating the use of their authority to force recapitalization. For example, in March 2008, member of the Board of Governors Kevin Warsh speculated about the banking sector:

It strikes me that this broad class is systematically undercapitalized, and we need to use all our tools to persuade them that it is in their interest and in the interest of the broad economy for them to raise capital.

But finding capital, certainly over the next six months, will be a very real challenge. The capital markets are not in a very strong position to satisfy issuer needs at present.\textsuperscript{120}

Bill Dudley highlighted that because of the “sharp decline in the equity prices,” banks were “reluctant to raise new capital, despite the prospects of higher-margin new business, because additional share issuance at the current share prices would lead to massive dilution for existing shareholders.”\textsuperscript{121}

The dilution concerns were significant: In April 2008, Governor Warsh pointed out that “[the Fed] and the Treasury have been calling for some months for capital-raising across all types of financial institutions. The questions then were whether financial institutions were willing to take the dilution and go raise capital. At least equally as important was whether there would be sufficient investor demand.”\textsuperscript{122} Governor Frederic Mishkin also pointed out that the system would be better if more capitalized but cautioned that banks would be reluctant to act: “When we think about the long-term solution to the problems in the financial markets, cleaning up the mess and raising capital is going to be absolutely critical . . . . But it is going to very much involve the large financial institutions, which will have to solve the agency problems . . . .”\textsuperscript{123} In August 2008, Governor Elizabeth Duke reiterated the concerns of the banks that regulators were subtly encouraging them to recapitalize:

No matter why they are trying to raise capital, capital issuance is viewed as a sign of weakness. It is scarce. It is expensive. The short selling has been just amazing. It has really driven down the prices. For some of the larger banks, it is running anywhere from 10 to 15 percent of total float.\textsuperscript{124}

While concerns about bank capital levels were raised at various points between the summer of 2007 and the summer of 2008, so too were discussions of the pain of dilution for shareholders and stigma from raising

\textsuperscript{120} March 18, 2008, Meeting, \textit{supra} note 60, at 62.
\textsuperscript{121} \textit{Id.} at 5.
\textsuperscript{123} \textit{Id} at 85.
\textsuperscript{124} August 5, 2008, Meeting, \textit{supra} note 19, at 93.
new equity. The Fed transcripts reveal no contemplation of the possibility of forcing dilution or demanding banks limit disbursements.

Perhaps stigma concerns with respect to large financial institutions were more pronounced than with smaller counterparts. Additionally, forcing large banks to raise capital in this environment felt weighty because it would have diluted thousands of shareholders. This seemed unfair to those in the regulatory community who agreed with banks that the market was overreacting and undervaluing their firms. Shoring up small banks and hurting their owners was presumably an easier choice precisely because it impacted a much smaller swath of the financial sector.

ii. Soft Power Existed to Intervene in Nonbanks

The critique that regulators failed to exercise existing authority to force recapitalization is not fully fair because the legal authority described existed only with regard to commercial banks and bank holding companies, and not with respect to the investment banks that were at the forefront of the financial crisis. This conundrum is detailed explicitly in Firefighting: The Financial Crisis and Its Lessons: “Outside the commercial banks, oversight was even less stringent. . . . No one had the authority to step in to avoid a chaotic bankruptcy of a major nonbank during a crisis.”  

It is true that the crisis started on the periphery of the financial sector where regulatory authority was much less developed. Although the proximate cause of the September 2008 tailspin was Lehman’s collapse, had the traditional commercial banks been forced to hoard and raise new capital in the preceding year, it is unlikely that Lehman’s collapse would have been as significant. So, although the Federal Reserve may have struggled to directly force the nonbanks to increase their capital buffers, their collapse would not have ricocheted through the financial sector had the commercial banks that were very clearly under the Federal Reserve’s oversight been bolstered between the summers of 2007 and 2008.

Even with respect to the nonbanks, regulators could have threatened to restrict nonbanks’ access to liquidity or used “softer” power to more forcefully encourage investment banks to recapitalize at the onset of the crisis.

As Professors Andrei Shleifer and Nicola Gennaioli point out, the Fed did, even for investment banks, control access to liquidity through the Term Auction Facility and the Primary Dealer Credit Facility, which gave it significant influence over investment banks—which would not have

125. BERNANKE ET AL., supra note 49, at 23–24.
survived until the fall of 2008 without these interventions.\textsuperscript{126} After Bear’s collapse, the Fed could have threatened to signal to the market that the remaining investment banks were dangerously undercapitalized unless they agreed to restrict dividends and raise new equity.

And while Lehman and Bear were not under the Fed’s purview, investment banks were not unregulated. The SEC should have done more to exercise its own supervisory authority over undercapitalized investment banks to set higher capital requirements ex ante and encourage recapitalization ex post, especially in light of Bear’s March 2008 collapse. And all regulators could and should have pressured Lehman CEO Dick Fuld more aggressively to a merger or a dilutive equity issuance. One moment when the crisis could have gone differently: In August 2008, Lehman was in talks with Korea Development Bank for purchase of fifty percent of the firm. Lehman set a price higher than the only interested private party was willing to pay—a week before Lehman’s failure, when straits were even more dire, the Korean bank came with another offer, only to be rebuffed yet again.\textsuperscript{127} The threat of public shaming could have encouraged the firm to accept capital investment on the terms being offered.

Beyond softer interventions, the Fed did get the remaining investment banks under its regulatory umbrella as Goldman Sachs and Morgan Stanley became bank holding companies in September 2008. This could have been done earlier.

The objective of this Article is not to suggest that the Fed failed on the job or even to argue that the SEC should have set much higher capital requirements—the latter appearing in retrospect to be broadly indisputable. Instead, the relatively limited pressure exerted on investment banks—despite their being the proximate cause of the Recession—provides two important warnings for the next crisis. First, it is not surprising that the least regulated aspects of the financial sector are where the crisis began to percolate. The same will certainly be true in the next crisis—not for investment banks, which have now been brought under the Federal Reserve’s umbrella, but for

\textsuperscript{126}\textsuperscript{127} Genaro & Shleifer, supra note 47, at 64.

To me, the biggest risk of all has not been adequately addressed. What I learned from the Lehman experience is the importance of governance. Leadership is about doing the right thing, and no one should go unchallenged when they are about to make a questionable decision. This culture of checks and balances is still lacking in many organizations.

\textit{Id.}
the hitherto unregulated shadow-banking sector. Regulatory balkanization, though not the subject of this Article, remains a concern.

Second, the lack of energy around recapitalization in general, and the lack of creativity with respect to the recapitalization of investment banks in particular, in the year leading up to Lehman is quite distinct from the period following—in which regulators managed to demand both banks and investment banks raise new capital no matter how little authority they had and how painfully dilutive these measures were. The result was quick action that forestalled another Great Depression. But it suggests that while regulators will be nimble in preventing a recession from becoming a depression, they will not be sufficiently motivated to prevent a downturn from becoming a recession. They will act with force but only when crises are sufficiently severe. Thus, the decision to recapitalize earlier is best left not to discretion but instead should be automated by thoughtful financial regulatory design.

3. Failure of Imagination and Inaction Default Explains Lack of Aggressive Early Crisis Response

Thus far, this Article contests certain points of conventional wisdom. The first point is that the Recession was fundamentally unpredictable, leaving little room for well-designed regulation to curb its severity. This is untrue. The period between the first signs of distress in the financial sector and the collapse of the economy lasted more than a year. Understanding what we now do about the severity of the Recession, it is indisputable that the regime could have and should have demanded much more drastic recapitalization, and more capital could have prevented the worst of the crisis.\(^\text{128}\) The second point is that regulators could not have done more because they were constrained by legal authority. However, legal authority to force bank recapitalization and restrict capital disbursements exists and in fact was used by regulators with respect to small financial institutions, but not with respect to their larger and more systemically important counterparts. This is puzzling but can be rationalized by the lack of desire on the part of regulators to force large, consequential, and painful dilutions in response to a crisis that many viewed as substantially addressed by creative liquidity infusions.

So, while it is possible that regulators did not appreciate their sizeable legal authority, it is also likely that they simply misunderstood the magnitude of the crisis and were not as alarmed as they should have been in the months

\(^{128}\) See Judge, supra note 84. This is why, following the crisis, Secretary Geithner’s mantra is “capital, capital, capital.”
leading up to Lehman’s failure. Regulators themselves acknowledge this, noting that the “failures of anticipation were in part a failure of imagination.”\textsuperscript{129}

There is significant heterogeneity in these failures of imagination that predated Lehman’s bankruptcy, which are discussed \textit{infra}.\textsuperscript{130} Some policymakers were simply ignorant of the risks in the system, despite mounting evidence that a major disruption was on the horizon. But those at the forefront of the crisis were not so naive. Some believed the crisis was an “old-fashioned run in new clothes,”\textsuperscript{131} and so liquidity, not recapitalization, was the appropriate response. Some overextrapolated from the success in unwinding Bear and believed the same playbook would work again if necessary, without being fully cognizant of the deterioration in financial markets that occurred in the next six months.

Detailing the reasons regulators underestimated the severity of the crisis is not meant as an indictment of the policymakers whose creativity and aggressive crisis response averted a Great Depression. Instead, the intent is to illustrate the many ways in which human judgment can err in the early stages of a downturn. Bernanke, Geithner, and Paulson made exactly this point in their joint memoir \textit{Firefighting: The Financial Crisis and Its Lessons}: “[I]t’s . . . important to have humility about the ability of human beings to anticipate panics, because doing so requires them to anticipate the behavior of other human beings interacting in complex systems.”\textsuperscript{132} Because well-intentioned regulators will inevitably err in myriad ways at the outset of a crisis, the only hope for early action is having a regulatory infrastructure in place that requires it.

i. Some Policymakers Were Ignorant of Risks

Careful examination of the available evidence suggests that some regulators, even in the days leading up to Lehman’s collapse, lacked any cognizance that the worst financial disruption since the Depression was on the horizon. The FOMC transcripts between the summer of 2007 and the fall of 2008 are littered with statements about how healthy and well capitalized the banking sector was. For example, in September 2007, after the first tremors in the ABCP market, Federal Reserve Board Governor Randall Kroszner declared that “[t]he banking system . . . is in a good state . . . As was mentioned, a lot of capital is above the regulatory minimums . . .”\textsuperscript{133} In

\textsuperscript{129} BERNANKE ET AL., supra note 49, at 25.
\textsuperscript{130} See infra Sections II.A.3.i–ii.
\textsuperscript{131} The Financial System Will Survive, Says Ben Bernanke, supra note 31.
\textsuperscript{132} BERNANKE ET AL., supra note 49, at 7–8.
\textsuperscript{133} SEPTEMBER 18, 2007, MEETING, supra note 57, at 87.
that same meeting, Bill Dudley, who went on to become President of the Federal Reserve Bank of New York, noted that “[t]he general sense is that the U.S. banks are very healthy and . . . well capitalized.”134 Months later, after the collapse of Bear, Geithner assessed the state of the financial system:

It is very hard to make the judgment now that the financial system as a whole or the banking system as a whole is undercapitalized. . . . Based on everything we know today, if you look at very pessimistic estimates of the scale of losses across the financial system, on average relative to capital, they do not justify that concern.135

Days before Lehman collapsed, St. Louis Fed President James Bullard estimated that “the level of systemic risk has dropped dramatically and possibly to zero.”136

This extreme confidence in the face of significant market evidence that the system was on the brink is also reflected in regulators’ forecasts of the likely trajectory of the economy. As economists Nicola Gennaioli and Andrei Shleifer point out, forecasts of economic growth as late as the summer of 2008, and even immediately after Lehman’s bankruptcy, reveal little cognizance of the scale of the meltdown to come. As late as the third quarter of 2008, the Survey of Professional Forecasts’ prediction for the subsequent year’s real GDP growth averaged 1.36%. In reality, that “growth” was negative 3.90%.137 And in July 2008, in preparation for the August FOMC meeting, forecasters were asked to estimate credit losses that would accrue as a result of “severe financial stress.” They anticipated that unemployment in this worst-case outcome would peak at 6.7% in 2009. It actually peaked at 10%.138 Bernanke attributes this underprediction as reflecting “excessive optimism about the evolution of financial conditions” and suggests that the forecast evidence is reflective of an “important blind spot” of regulators.139

It is important to acknowledge that many at the forefront of the crisis were much less optimistic about the health of the financial sector, and Lehman specifically, in the months leading up to its collapse. Although when testifying about the collapse of the subprime mortgage bubble in 2007, Bernanke and Paulson were both sanguine (Bernanke said that “the impact on the broader economy and financial markets of the problems in the

134. Id. at 11.
138. Id. at 59–60.
139. Bernanke, supra note 51, at 264.
The subprime market seems likely to be contained,” and Paulson agreed, noting that Treasury was monitoring the situation but “it appears to be contained.” By the spring of 2008, worldviews had shifted.

For example, Geithner reported to the Financial Crisis Inquiry Commission that he spent the months leading up to Lehman’s collapse “consumed” with trying to force the bank to become more conservatively funded. Fed Vice Chair Donald Kohn told Bernanke that in the wake of Bear’s collapse, institutional investors believed Lehman’s failure was imminent. Eric Rosengren, President of the Federal Reserve Bank of Boston, used the spring and summer FOMC meetings as an opportunity to try and caution his colleagues that the worst was yet to come: In the March meetings, he warned that “[t]he rise in credit default swaps for companies like Washington Mutual and Lehman Brothers indicates increased concerns for the solvency of other large financial institutions with large exposures to mortgages. The potential for a further episode of financial market dysfunction and for runs on additional financial firms is significant.” In June, he voiced skepticism about the reliability of Lehman’s capitalization despite its 12.5% regulatory capital ratio and noted that he “continue[d] to be concerned that we have more, significant difficulties ahead for many financial institutions.”

And by August 2008, while some were naively celebrating “zero systemic risk” in the financial sector, Federal Reserve officials decided Lehman’s collapse was so likely that they needed a “game plan” that would identify activities of Lehman that “could significantly harm financial markets and the economy if it filed for chapter 11 bankruptcy.” Perhaps with this in mind, Bernanke refuted those who appeared unconcerned with systemic risks at the August FOMC meeting, warning that a year into the crisis “we are... facing a situation of greater fragility, of much lower capital, and fewer shock absorbers” and cautioning presciently that the largest banks were about to take very significant hits that would restrict credit.

142. Fin. Crisis Inquiry Comm’n, supra note 86, at 325.
143. Id.
144. March 18, 2008, Meeting, supra note 60, at 29.
146. Fin. Crisis Inquiry Comm’n, supra note 86, at 328.
access for households and small businesses, further exacerbating the crisis. It is true that in the pre-Lehman months, some had not learned the lesson of the Bear collapse and believed the tools the Federal Reserve had successfully deployed to avert panic in March would be viable six months later. This view was bolstered by the fact that the market stabilized after JPMorgan’s federally assisted acquisition of Bear, as seen in Figures 1 through 4. However, this turned out to be untrue for several reasons: Lehman was larger, and “the system was much more fragile, so the universe of plausible buyers was much more limited. And there was nobody really strong enough to be willing to step in, even with the prospect of some assistance.” Although a decade of retrospection has led to this conclusion, ex ante, it was much less obvious at the time that increased systemic fragility would thwart the Lehman rescue efforts. By all accounts, as Lehman was entering its final days, most anticipated that the firm would inevitably be acquired by a private buyer propped up by government funds.

Some were even overly optimistic about the state of the financial sector after Lehman’s collapse. The New York Times editorial page celebrated the desire of the government not to intervene to bolster Lehman: “Government intervention would have been seen either as a sign of extreme peril in the global financial system or of extreme weakness on the part of federal regulators.” Further, Bernanke testified that the Federal Reserve and Treasury decided against intervening in Lehman because of the view that fallout would be limited because the market had significant time to prepare for Lehman’s collapse.

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148. See also Fin. Crisis Inquiry Comm’n, supra note 86, at 292 (quoting Morgan Stanley’s Treasurer David Wong that “[i]n hindsight, the markets were surprisingly stable and almost seemed to be neutral a month after Bear Stearns”); infra Appendix, Figures 1–4.
149. Interview by Andrew Ross Sorkin with Ben Bernanke, supra note 15, at 20.
150. The Financial Crisis Inquiry Commission provides a thorough timeline of the days leading up to Lehman, which contains information on how regulators evaluated the crisis in real time. For example, a September 10, 2008, email from Federal Reserve Assistant General Counsel Mark Van Der Weide to Federal Reserve General Counsel Scott Alvarez notes that “Geithner seemed to think that Lehman would survive into the weekend, but may need some . . . help.” Fin. Crisis Inquiry Comm’n, Chronology of Selected Events Related to Lehman Brothers and the Possibility of Government Assistance, in Lehman Brothers Chronology and Documents 1, 7 (2010), https://fraser.stlouisfed.org/files/docs/historical/ftc/fic/ficdoc_lehman_20100901.pdf [https://perma.cc/U3HN-MMDG].
152. Prepared Text of Bernanke’s Statement, N.Y. Times (Sept. 23, 2008), https://www.nytimes.com/2008/09/24/business/24txtbernanke.html [https://perma.cc/N49Y-J2JJ] ("In the case of Lehman Brothers, a major investment bank, the Federal Reserve and the Treasury declined to commit public funds to support the institution. The failure of Lehman posed risks. But the troubles at Lehman had been well
The divergence of regulatory views between summer 2007 and fall 2008 discussed above is pivotal to understanding the lack of aggressive regulatory response to the first year of the crisis. The Federal Reserve and regulators more broadly are bureaucratic, slow-moving, consensus-driven groups. It is important to note that the crisis response this Article critiques as lackluster was, at the time, attacked by many as too aggressive, unorthodox, and rash. Specifically, the liquidity interventions that had been piloted by regulators with some understanding of financial-sector risks were resisted by some who thought them unnecessary and considered it inappropriate for the Federal Reserve to extend liquidity to nonbanks outside its direct regulatory purview.\footnote{\textit{\textsuperscript{153}}} 

It is thus an oversimplification to say that the errors at the early stage of the crisis arose from regulators underappreciating financial market risks, although it is true in some cases. However, a broader problem—and one this Article seeks to address—is that very little regulatory will existed for earlier and even more aggressive crisis response because there was no broad agreement about the magnitude of these risks and the likelihood of a recession. It is implausible to expect such consensus at the onset of a crisis. This means that without a change to the regulatory default that precipitates action in the face of skepticism of its necessity, the next crisis will follow the same pattern.

\textbf{ii. Even Policymakers Who Understood Risks May Have Misdiagnosed the Problems}

In Diamond and Dybvig’s canonical model discussed \textit{supra}, a bank that is forced by the panic of its depositors to liquidate assets early is subsequently forced into failure—but before depositors panicked, no problems existed for this institution. The provision of liquidity would be sufficient to bolster the financial system because troubled institutions will be fine as long as they do not have to liquidate assets early.

Former Federal Reserve Chair Ben Bernanke is a leading scholar of the

\begin{flushright}
\textit{\textsuperscript{153} For example, see the comments of Richard Fisher, then President of the Federal Reserve Bank of Dallas, in response to the proposed Term Securities Lending Facility in March 2008:}
\text{\textquote{I guess the real question is that we can fly blind for a little time and we can try something—and I am for trying something—but if this doesn’t lead to some broader regulatory authority or some change in the nature of the regulatory authorities, if we are indeed going to have counterparties in this sense that are outside our realm of regulation, I just wonder what the end game here is.}}$
\end{flushright}
Great Depression. His academic work makes clear that the Depression was exacerbated by the reluctance of regulators to follow the Diamond and Dybvig playbook by providing more liquidity to troubled institutions as bank failures began. Had enough liquidity been provided to the system—even before the extension of deposit insurance—panic could have been averted.

It is perhaps unsurprising that Bernanke’s view of the Great Recession is shaped by his academic insights on the Great Depression. He believes that “the Diamond-Dybvig model describes what happened in the financial crisis extremely well”154—“[l]ike the classic financial panics of the 19th and early 20th centuries, the recent panic—in wholesale funding markets, rather than in retail bank deposits—resulted in a scramble for liquidity and a devastating credit crunch.”155

It is too simplistic—and unfair to regulators—to suggest that nothing was done in the year leading up to Lehman, as financial markets showed signs of distress. But because many in the regulatory community shared Chair Bernanke’s view that the tremors in financial markets in 2007 and 2008 were traditional panics in “new clothes,” early responses were focused on the provision of liquidity to large financial institutions. For example, after the failure of Bear Stearns in March 2008, the Federal Reserve introduced the Term Securities Lending Facility and the Primary Dealer Credit Facility to provide liquidity to primary dealers as opposed to commercial banks alone.

But if banks have or may have deeper solvency issues—that is, issues that threaten their viability even if they are able to meet short-term borrowers’ demands—then liquidity infusions alone could not have been sufficient to bolster the financial sector.

It is extremely difficult to know in the midst of a crisis whether liquidity or deeper solvency problems are driving borrowers’ panic. Recent evidence hints that the latter is a better description of the Great Recession and of financial crises more broadly: large declines in bank equity suggest that the financial sector is undercapitalized and a large credit contraction is imminent.156

The market signaled exactly this in the year leading up to Lehman. Large financial institutions’ market-based capital ratios (the ratio of the market value of their equity to total assets) plummeted in the fall of 2007 and declined more precipitously following the collapse of Bear. And yet

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154. GENNAIOI & SHLEIFER, supra note 47, at 68.
evidence suggests that regulators did not seriously contemplate recapitalization through restriction of dividends, forcing new equity issuance, or, at the extreme, direct capital provision, because they viewed it as unnecessary.

In the three FOMC meetings leading up to Lehman, the word “solvent” appears only once each time in the transcript;\(^1\) and “liquidity” appears twenty-six times in September, twenty-nine times in August, and fifty-nine times in June.\(^2\) While a host of new liquidity facilities emerged in the immediate aftermath of the Bear collapse, regulators warned not to raise solvency concerns, let alone try to address them: Geithner cautioned against “casting broad aspersions about solvency . . . . May we get to the point where those concerns are justified? Of course we may get to that point. If we systemically mismanage policy, we may get to that point. But please be careful in that context.”\(^3\)

It appears even policymakers who were attuned to vulnerabilities in the financial sector did not grapple much with the possibility that recapitalization was necessary. This foreclosed discussion of policies that could have mitigated the severity of the crisis. As the Financial Crisis Inquiry Commission concluded: “[R]egulators either failed or were late to identify the mistakes and problems of commercial banks and thrifts or did not react strongly enough when they were identified.”\(^4\)

Outside observers were quicker to raise the possibility that financial institutions were soon to suffer large losses that would threaten their solvency and wreak havoc on the financial sector. Economist Nouriel Roubini famously prophesied in speeches to the International Monetary Fund in the years leading up to Lehman that the financial sector was on the verge of collapse. In September 2007, he noted the issues explicitly:

The point is that in addition to this liquidity crunch right now we are facing a situation in the U.S. . . . in that there are meaningful solvency issues . . . .

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3. March 18, 2008, Meeting, supra note 60, at 75. This is unfair to Geithner, however, who was likely making a point about stigmatizing large financial institutions that was rightfully at the forefront of regulators’ minds as they contemplated the appropriate response to the crisis. Policymakers publicly raising solvency concerns was likely to trigger widespread panic.

You have about hundreds of thousands of U.S. households that are going to go to foreclosure.

... [There will be losses of] $50 billion, $100 billion, or $150 billion on subprime alone. 161

Economists David Greenlaw, Jan Hatzius, Anil Kashyap, and Hyun Song Shin estimated in February 2008—even before Bear Stearns collapsed—that losses on the order of $500 billion would accrue to leveraged financial intermediaries, with the result being a $2.3 trillion contraction in bank balance sheets. 162 They described in detail how the imminent decrease in credit supply for households and businesses would cause a sharp decline in the U.S. economy.

Former Treasury Secretary Lawrence Summers called in early 2008 for recapitalization of the banking industry to address large financial institutions’ losses. In January 2008, he wrote that the “essential element, if there is to be more transparency in the financial system without a major credit crunch, is increased levels of capital. ... A critical element of regulatory policy should be insisting on increased capital in existing financial institutions.” 163 In March 2008, after Bear Stearns’s collapse, he repeated his calls:

[A] priority for financial policy has to be increases in the level of capital held by financial institutions. Capital infusions to date fall far short of prospective losses. Without new capital, the financial sector will operate with too much risk and leverage or will put the economy at risk by restricting the flow of credit. 164

In retrospect, these observers appear prophetic, and the depths of the crisis could have been averted had their warnings been heeded. But at the time, regulators watching these financial-market developments had a herculean task—whether a crisis is driven by solvency or liquidity concerns is a difficult judgment.

Geithner’s caution that regulators be “careful” in making claims about insolvency reveals yet another dimension of their challenge. Regulators’ active acknowledgment that solvency problems may exist could itself have precipitated a panic that exacerbated rather than addressed underlying

162. GREENLAW ET AL., supra note 17, at 8, 11.
164. Summers, supra note 73.
solvency issues. The Goldstein and Pauzner model of a nonrandom panic described supra reveals how bank runs can be rational reactions to incomplete information about bank fundamentals, as statements about possible solvency issues for large financial institutions would invariably have been. In these models, the panic that results from incomplete information drives banks to insolvency that would not have occurred but for a bank run. Regulators had to be cautious about fanning the flames of panic with their reaction to the early stages of the crisis.

This discussion illustrates the difficulty of even identifying the possibility of catastrophic downturns as they emerge in the financial sector, let alone responding to them appropriately. A 2013 speech by economist and then-Federal Reserve Board Governor Jeremy Stein makes exactly the same point:

"It seems indisputable that the severity of the crisis would have been mitigated if policymakers had clamped down on these [dividend] payouts earlier, and had compelled substantial new equity raises. . . . [T]he conflict between the interests of the firms, acting on behalf of their shareholders, and those of the broader public became particularly acute once the crisis got underway, because of the debt overhang problem. Cutting back on dividends and issuing new shares might have been strong positives for the banks’ overall set of stakeholders, as well as for society more broadly, but were clearly negatives for shareholders, given that such actions would have entailed large transfers to underwater creditors.

This conflict of interest can make it hard for even the best-intentioned regulators to muster the conviction to take full advantage of either the appropriate legal tools or the resources available under the existing institutional framework. Under what circumstances does one tell a firm that is still well above its regulatory capital requirement that it must do a share issue that will be helpful for the economy as a whole, but highly dilutive to its existing equity holders?\footnote{Jeremy C. Stein, Member, Bd. of Governors of the Fed. Bsv. Sys., Speech at the National Bureau of Economic Research Conference: Lessons from the Financial Crisis for Monetary Policy: Lean, Clean, and In-Between 4–5 (Oct. 18, 2013), https://www.federalreserve.gov/newsevents/speech/stein20131018a.pdf [https://perma.cc/U7PP-V2XH].}

The answer to former Governor Stein is that a regulator cannot reasonably be expected to force painful recapitalization, no matter what legal authority the regulator has, until downturns become “Great.” As Citigroup’s stock price fell by eighty percent in ten months in 2008, the regulatory default should have been forced recapitalization. Legal authority is not sufficient because it relies on regulators choosing to act to force painful dilution that, if successful, will appear unnecessary ex post because a crisis will have been averted. Further, individual regulators will be rationally
concerned that their choosing to wield extraordinary authority to recapitalize some banks could in fact trigger other banks’ insolvency. This is why automating recapitalization would have been the only way to shore up banks quickly between the summers of 2007 and 2008, and why, going forward, our regulatory regime would be enhanced if it did not require the affirmative action by well-intentioned regulators. Designing such a system of dynamic recapitalization is challenging, and the focus of most of the remainder of this Article.

B. COVID-19 CRISIS REVEALS SAME DEFICIENCIES IN REGULATORY REGIME

As of the publication of this Article, it remains too early to glean complete insights about the successes (and failures) of financial regulators’ responses to the COVID-19 pandemic. But considering the actions of the regulatory community thus far is a valuable lens into the deficiencies of the current regulatory regime.

Prior to this most recent crisis, regulators would regularly celebrate stress-test results as confirming the strength of the financial system. As recently as July 2019, Federal Reserve Vice Chair for Supervision Randal Quarles remarked that the “capital-building phase of the post-crisis era is now complete.”¹⁶⁶ Years of across-the-board stress-test passage in fact led to less pronounced regulatory scrutiny of the financial sector: for example, in 2018 Congress raised the threshold for annual stress testing to only those institutions with assets greater than $250 billion.¹⁶⁷ Even after the pandemic began, Vice Chair Quarles celebrated that “[t]he banking system has been a source of strength during this crisis, . . . and the results of our sensitivity analyses show that our banks can remain strong in the face of even the harshest shocks.”¹⁶⁸

But this exuberant optimism hides a more complicated story about the impact of the pandemic on the financial sector, which in turn indicates the deficiencies of the current regulatory regime. First, the financial sector was not immune to this most recent downturn. Indeed, market measures of bank

¹⁶⁶. Quarles, supra note 7.
¹⁶⁷. Ed Young, With Easing of Stress Tests, Bank Risk Teams Have to Step Up, AM. BANKER (June 6, 2018, 9:30 AM), https://www.americanbanker.com/opinion/with-easing-of-stress-tests-bank-risk-teams-have-to-step-up [https://perma.cc/8VZG-LTWK]. Although banks with $100 billion to $250 billion in assets will still be tested periodically, the new rules also eliminated the requirement for company-run stress tests for a large swath of banks—those with assets of $10 billion to $250 billion. Id.
risk reached levels not seen since the Great Recession (Figure 5).\footnote{See infra Appendix, Figure 5.}

Second, the crisis revealed that the centerpiece of post-crisis regulation, the stress test, meant to ensure banks could weather a severely adverse downturn, was not sufficiently adverse. By April 2020, the market was faring worse than the worst-case scenarios the Federal Reserve had designed—for example, unemployment, expected to reach ten percent over nine quarters of stress, was already at nearly fifteen percent in April.\footnote{Unemployment Rate (UNRATE), FED. RSRV. BANK OF ST. LOUIS, https://fred.stlouisfed.org/series/UNRATE [https://perma.cc/482V-AFKM].} This made the baseline stress tests fairly uninformative, and regulators moved to try to quickly organize a more severe supplemental stress test.\footnote{This was an imperfect exercise. In efforts not to spook the markets, the Federal Reserve did not release bank-specific results, despite the importance of transparent disclosure being one of the most important lessons of the original stress tests. See Natasha Sarin, The Fed Just Bungled Its Bank Stress Tests, BLOOMBERG OP. (June 26, 2020, 7:15 AM), https://www.bloomberg.com/opinion/articles/2020-06-26/the-fed-just-bungled-its-bank-stress-tests [https://perma.cc/J649-S469].}

Finally—and perhaps most importantly—the COVID-19 crisis is revelatory on the statism of the current regulatory regime and the tendency of the system to err against restricting banks and potentially harming shareholders, despite the possible negative consequences of inaction for broader financial stability.\footnote{Professors Michael Blank, Jeremy Stein, Samuel Hanson, and Adi Sunderam call this regulatory strategy one of “watchful waiting” and argue that, just as in the Great Recession, it “poses unnecessary risks to the financial system and broader U.S. economy.” Michael Blank, Jeremy C. Stein, Samuel G. Hanson & Adi Sunderam, How Should U.S. Bank Regulators Respond to the COVID-19 Crisis? 1 (Hutcheson Ctr. on Fiscal & Monetary Pol’y at Brookings, Working Paper No. 63, 2020).} Throughout the spring of 2020, despite calls from commentators\footnote{See, e.g., Natasha Sarin, Protect Banks, Not Their Shareholders, BLOOMBERG OP. (Apr. 21, 2020, 3:30 AM), https://www.bloomberg.com/opinion/articles/2020-04-21/protect-banks-not-their-shareholders [https://perma.cc/RX2T-U7LX].} and policymakers\footnote{See, e.g., Nour Al Ali, Fed’s Kashkari Says Banks Should Raise Money, Halt Dividends, BLOOMBERG (Apr. 16, 2020, 3:12 AM), https://www.bloomberg.com/news/articles/2020-04-16/fed-s-kashkari-says-banks-should-raise-money-halt-dividends [https://perma.cc/IL2S-BGKZ] (reporting Federal Reserve Bank of Minneapolis President Neel Kashkari’s plea to banks to discontinue dividends and raise new capital in April 2020).} alike, regulators did not forestall capital disbursements, despite clear authority to do so. To be sure, banks themselves agreed early in the crisis to restrict share buybacks,\footnote{Financial Services Forum Statement on Share Buybacks, FIN. SERVS. F. (Mar. 15, 2020), https://www.fsforum.com/types/press/releases/financial-services-forum-statement-on-share-buybacks [https://perma.cc/TV47-FJJF].} and once the stress-test results were finally released in July 2020, restrictions on dividends were also introduced. But regulatory restrictions came only months after the pandemic began and still allowed capital to leave the financial system: indeed, Federal Reserve Board Governor Lael Brainard dissented from the disbursement restrictions because she believed them...
insufficiently prudent at a time of great uncertainty.\textsuperscript{176}

Later, in December 2020, the Federal Reserve loosened these late-arriving restrictions on banks, allowing buybacks to resume in the first quarter of 2021. Banks responded by announcing aggressive buyback programs within minutes of the pause being lifted.\textsuperscript{177} Figure 6 showcases two of the largest banks in the United States (JPMorgan and Morgan Stanley) that responded by immediately announcing planned disbursements for 2021 that exceed 2017–2019 levels.\textsuperscript{178}

The crisis has induced much creative action on behalf of Federal Reserve officials whose nimble response in the early days of the crisis to bolster financial markets prevented much deeper economic distress. But the default regulatory rule is to permit capital to leave the financial system—even when distress may be on the horizon. This is why too little has been done during the pandemic to bolster financial institutions against potential uncertainty.

This statism is somewhat perplexing given that current and former Fed officials who have been observing the crisis are concerned about the state of the financial sector. In fact, former Federal Reserve Chair and current Treasury Secretary Janet Yellen suggested that the need for aggressive Federal Reserve intervention to stabilize financial markets in spring 2020 highlights the importance of a “new Dodd-Frank” that will be better equipped to weather storms like the one we are currently experiencing.\textsuperscript{179}

\textsuperscript{176} Specifically, Governor Brainard focused on the post-pandemic risks if banks did not preserve capital:

It is a mistake to weaken banks’ strong capital buffers . . . . This is a time for large banks to preserve capital, so they can be a source of strength in a robust recovery. I do not support giving the green light for large banks to deplete capital, which raises the risk they will need to tighten credit or rebuild capital during the recovery. This policy fails to learn a key lesson of the financial crisis, and I cannot support it.


\textsuperscript{177} For example, JPMorgan Chase, the largest U.S. bank, announced in the minutes after the Fed’s stress-test results that its board had approved a $30 billion repurchase program starting in 2021. Thomas Franck, Fed Allows Banks to Resume Share Buybacks, JPMorgan Stock Jumps 5%, CNBC (Dec. 18, 2020, 5:03 PM), https://www.cnbc.com/2020/12/18/fed-to-allow-big-banks-to-resume-share-buybacks-with-limitations.html [https://perma.cc/UEP5-45HK].

\textsuperscript{178} See infra Appendix, Figure 6.

\textsuperscript{179} Former Fed Chair Yellen Wants New Dodd-Frank, DODD FRANK UPDATE (July 17, 2020), https://www.doddfrankupdate.com/DFU/ArticlesDFU/Former-Fed-chair-Yellen-wants-new-Dodd-Frank-79789.aspx [https://perma.cc/4XB8-CVVE] (“When we do (recover), I think we should reflect on the lessons from the crisis. I personally think we need a new Dodd-Frank . . . . We need to change the structure of FSOC (Financial Stability Oversight Council) and build up its powers to be able to deal more effectively with all of the problems that exist in the shadow banking sector. I think the structure is inherently flawed. I think the agencies need a definite financial stability mandate.”).
While it is true that we have not yet seen a COVID-19-induced financial crisis, it is important to appreciate that ex-ante risks were significant (and it is hard to predict the future of the pandemic or the economy). In a worst-case scenario, it was possible that regulators could have regretted their decision to allow banks to resume share buybacks in December 2020, enriching shareholders at the expense of future financial stability. Given substantial uncertainty and the pain of a tail outcome, allowing capital to leave the financial system at that stage was a real risk.

III. APPROACHES TO DYNAMIC CAPITAL REGULATION

The lack of a swift regulatory response to the early stages of the Recession was not due to a lack of time to address an unpredictable panic nor to a lack of authority to require financial institutions to hoard capital. Instead, regulators—and many in the financial industry—suffered from a “crisis of beliefs” and underestimated the likelihood of a systemic collapse. This Article pushes for the creation of a regulatory regime that automates recapitalization of the financial sector when market indicia of distress appear, as they did in 2007 and early 2008. Stress tests are the appropriate tool to facilitate dynamic recapitalization.

This Part proposes a spectrum of approaches to increase the dynamism of the financial regulatory regime, ranging from extreme (conversion of all debt to equity in moments of distress) to mild (a requirement that bank executives explain differences in market and regulatory capital levels). The animating principle behind these proposals is that the market contains valuable information on the health of large banks that must be incorporated into regulatory assessments of financial stability.

A. CONVERTING DEBT TO EQUITY: A RADICAL APPROACH

One can think of incorporating market information into the financial regulatory regime in a variety of ways. The most extreme approach would be to automate recapitalization in response to a market indicator of bank distress. A simple possibility along this vein would be to focus on bank equity returns. As Professors Matthew Baron, Emil Verner, and Wei Xiong illustrate, a thirty percent decline in bank equities in a year is a signal that the financial sector is undercapitalized and a severe credit crunch is on the horizon.

One way to end financial crises would be to automatically convert all bank liabilities to equity when some market trigger (for example, Baron, 180. GENNAIOI & SHEIEFER, supra note 47. 181. Baron et al., supra note 156, at 54.
Verner, and Xiong’s thirty percent decline in bank stocks) is realized. This approach is based on the premise that financial crises can occur only when banks’ debts exceed their underlying assets. If debt is extinguished or converts to equity during moments of distress, from the creditor’s perspective, this debt is risky; but from the taxpayer’s perspective, the system is completely safe. No bank could ever fail, and no bailout ever ensue, because its debtholders’ claims would be extinguished in moments of distress.182

Although mandatory conversion of all bank liabilities to equity may not be on the horizon, convertible debt instruments are growing in popularity, especially outside of the United States. Professors Charles Calomiris and Richard Herring suggest the possibility of a minimum requirement that ten percent of all debt be convertible to equity during distress.183 Had this requirement been in place during the crisis, equity capital would have automatically increased for half of the large U.S. financial institutions before Lehman collapsed and for the rest in the immediate aftermath of the September 2008 bankruptcy. The result would have been an immediate recapitalization of the financial sector without the need for politically and financially costly direct government investment.

A related approach would be to force systemically important financial institutions to purchase “capital insurance,” as proposed by Professors Anil Kashyap, Raghuram Rajan, and Jeremy Stein;184 another would require withholding of a large share of bank managers’ total compensation for several years to fill any capital holes that may arise in the financial system.185

Some contend that automating recapitalization in response to market triggers may lead to self-fulfilling death spirals. Imagine shareholders who

182. It is actually not obvious from a financial-stability perspective whether the right design for convertible instruments is for them to be written off or converted to equity in moments of distress. Outside of the United States, both models exist: principal write-down bonds represent approximately fifty-five percent of issuances, with the remainder consisting of contingent convertible capital securities (“CoCos”). See Stefan Avdjiev, Bilyana Bogdanova, Patrick Bolton, Wei Jiang & Anastasia Kartasheva, CoCo Issuance and Bank Fragility 76 fig.4 (Bank for Int’l Settlements, Working Paper No. 678, 2017). Some argue that debt instruments that are written off entirely are preferable because ex ante shareholders are more likely to issue convertible claims that will not dilute them; they do not create the risk of a “death spiral”; and “they are more suited to fixed-income investor mandates and limit the risk of fire sales following a trigger.” Boris Vallée, Contingent Capital Trigger Effects: Evidence from Liability Management Exercises, 8 REV. CORP. FIN. STUD. 235, 236 n.2 (2019).


185. See Hanson et al., supra note 6, at 12.
observe their firm is close to the thirty-percent threshold for conversion. Dilution may well be on the horizon, and to hedge this risk, shareholders could go short themselves, putting further downward pressure on the share price. This could trigger conversion, which becomes self-fulfilling as equity prices begin to fall. These concerns are not the death knell for contingent capital instruments, however, and are addressed by designing write-off debt instruments rather than those that convert to equity in moments of distress. This is perhaps why contingent capital plans in existence today have been based on regulatory capital triggers. But such an approach is inefficient given the empirical evidence that market measures contain information about distress that leads regulatory indicators.

The possibility of self-fulfilling downward spirals is a complexity but one that well-designed regulation can address. For example, regulators could base conversion on aggregate losses rather than individual bank performance, reduce gaming incentives by attaching triggers to average market performance over a longer interval, and set a conversion price that is not overly dilutive to existing owners.

Another concern with automating recapitalization in response to market triggers is that the market may be wrong and overreact. At the core of canonical models of financial crises are bank runs. In early models of banking, panics occur even when banks are fundamentally stable. Such irrational panics bring down banks that are forced to liquidate their long-term assets at low prices to satisfy their depositors. This model of a bank run,
developed by economists Douglas Diamond and Philip Dybvig, is illustrated by the near collapse of George Bailey’s “Bailey Bros. Building & Loan” in *It’s a Wonderful Life*. Bailey’s bank was nearly brought down by a rumor, despite the existence of no fundamental problems at the institution. If this was the story of banking crises, recapitalization in response to an imminent downturn would indeed be an overreaction. Instead, banks would really need a way to comfort irrationally panicked depositors. This was the rationale for the FDIC’s provision of deposit insurance during the Great Depression, as well as regulators’ first response to the Great Recession. These concerns push in favor of less extreme approaches discussed infra.

It is worth noting, however, that despite being the favored view of some in the regulatory community, empirical evidence casts doubt on whether such random events, or “sunspots,” cause bank runs and crises more generally. Large increases in market-based measures of bank risk are predictive of undercapitalization of financial institutions that results in those institutions limiting the supply of credit to households and businesses.

To get a sense for how many false positives our trigger will precipitate, Table 1 and Figure 7 examine the performance of the S&P Bank Index since 1990. In the last three decades, there were only two instances of bank equity declines greater than thirty percent in magnitude in a year. One was the Great Recession (2007) and the other the aftermath of the Savings and Loan Crisis (1990). Although banks will complain that they are being forced into dilution on the basis of noisy market information, the data suggest we should be skeptical of such complaints.

Even assuming that, on occasion, banks will be forced into dilutive recapitalization on the basis of noisy market information (an assumption the data decidedly do not corroborate), banks will, in some instances, be forced into dilutive equity issuance. This will be painful for their shareholders in the short term, although they can and will buy back shares in the future. The alternative is a regime that results in costly taxpayer bailouts. From a policy perspective, it is hard to argue that short-term inequity to financial firms’...
shareholders should outweigh the costs of taxpayer-funded bailouts and the long-term consequences of recessions.

B. PUBLICIZING DIFFERENCES IN MARKET AND REGULATORY CAPITAL MEASURES: A MILD APPROACH

In February 2016, Deutsche Bank was in free fall. Its share price dropped by ten percent in a single day, and its risk of default jumped to crisis levels. In a message to company employees, Deutsche Bank CEO John Cryan reported that, despite market information to the contrary, Deutsche Bank “remains absolutely rock-solid, given our strong capital and risk position.” In fact, Cryan reported Deutsche Bank was so strong that it chose to use a significant portion of its capital buffer to pay coupons to investors.

This scene was eerily reminiscent of the financial crisis, when bank executives regularly highlighted discrepancies between regulatory capital levels and market assessments. Just five days before Lehman Brothers filed for bankruptcy, Lehman’s Chief Financial Officer, Ian Lowitt, reported that its third-quarter capital levels were stronger than those one quarter prior and that it held substantial liquidity reserves to help mitigate future losses.

In retrospect, it was clear that Lehman, and likely other large institutions, used accounting tricks to move assets around and improve its reported capital positions. This created a misleading discrepancy between regulatory and market measures of health, enabling executives to attribute accurate market signals of distress to noise or aggressive speculation.

After the firm’s bankruptcy, Lehman’s CEO, Dick Fuld, was eventually called upon to explain these discrepancies. In congressional testimony, Representative Brian Higgins asked Fuld how he could have stated publicly that Lehman had never been in a stronger capital and liquidity position when internal documents made evident that the market’s assessment of the firm’s troubles was accurate—and its current operations were “not sustainable.”

194. Id.
196. See Stephanie Kirchgaessner & Greg Farrell, Fuld Says Lehman Victim of Short Sellers, FIN. TIMES (Oct. 6, 2008), https://www.ft.com/content/f59fdd00-93b0-11dd-9a63-0000779fd18c [https://perma.cc/KE7P-YX89].
A better time for this line of inquiry would have been prior to Lehman’s bankruptcy, not ex post. Should policymakers believe that automating capital increases in response to market triggers is too extreme, at the very least, financial executives can be asked to reconcile differences between the market’s assessment of their firms’ stability and regulatory reports.

A simple way to accomplish this objective would be to require quarterly reporting and reconciliation of market-based and book-capital ratios. Although this reporting would still be only quarterly—and thus quite static—gaming market capital ratios is more challenging than using accounting tricks to manipulate book reporting. Arguing for dual reporting does not assume that the market assessment of bank health is correct, as John Vickers has argued in related work:

The market could well be taking an unduly pessimistic view, but there is a chance that it is not. We just don’t know. The sensible response to uncertainty, to ignorance putting it bluntly, is to be pluralist. Neither assume that the market is right nor that accounting numbers are right. Look at things on both bases, and compare them.\(^{198}\)

Should deviations between the market and regulatory indicia of bank health arise, financial executives are best positioned to help elucidate the differences, and the market is well suited to judge whether these explanations are credible.

C. MARKET-BASED STRESS TESTS: A MIDDLE-OF-THE-WAY APPROACH

By the time President Obama took office in January 2009, the economy was on the verge of collapse. Many industry commentators and academics believed the only way forward was nationalization of the largest banks.\(^ {199}\) The approach eventually adopted by the Administration was a series of stress tests that aimed to restore confidence (and consequently capital) to the industry.

The basic idea behind the tests was that Federal Reserve examiners would investigate the books of the largest financial firms—those with more than $100 billion in total assets—representing roughly two-thirds of the U.S. banking system. The examiners would determine how much extra capital banks would need to weather a downturn, if that downturn continued at current levels, and how much excess capital would be needed to weather a catastrophic downturn. The plan was complicated, resting on examiners


\(^{199}\) Bernanke et al., * supra* note 49, at 98 (noting that many in the Obama Administration believed that nationalization was inevitable).
being able to reliably measure (1) how much banks had already lost in the crisis and (2) how much they would lose going forward if the crisis accelerated. Projected capital ratios would be compared to minimum targets, and banks with post-stress capital ratios below the targets would be given the opportunity to raise this capital; if they could not attract sufficient new equity, the government would invest in these firms directly to avert system-wide failures.

Such a deep dive into banks’ financials was unheard of, and the market was skeptical of the efficacy of this approach. The stock market plummeted by five percent when Geithner announced the plan, which was panned by industry experts as “convoluted, obfuscating and clouded.”

When announced in May 2009, the stress-test results revealed a capital shortfall of $75 billion in the largest financial institutions. Within a month, the institutions raised $66 billion of that shortfall without additional taxpayer dollars. While, at the time, regulators were criticized for being too easy on banks and understating their woes, in retrospect, the crisis stress tests are regarded as “one of the critical turning points in the financial crisis. [They] provided anxious investors with something they craved: credible information about prospective losses at banks. Supervisors’ public disclosure of the stress test results helped restore confidence in the banking system and enabled its successful recapitalization.”

Given their success during the crisis in both identifying and addressing capital deficiencies at large financial institutions, post-crisis, annual stress testing became core to the overhaul of financial regulation that Dodd-Frank provided.

The objective of a forward-looking stress test is to precipitate precisely the dynamic recapitalization this Article envisions. Imagine if banks were subject to stress tests a year earlier, in the spring of 2008. Regulators would have been forced to assess the losses likely to accumulate for large financial institutions as a result of their subprime market exposures. They may have

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201. Geithner was aware of the criticism:
Most Americans never heard about the stress test, and for many of those who did, it sounded like another Washington joke. Saturday Night Live had a field day with it, having an actor playing me open the show by earnestly announcing that we had given every bank a passing grade, since we didn’t want to “unfairly stigmatize banks who scored low on the test because they followed reckless lending practices or were otherwise not good at banking.”

Id. at 351.
concluded, as did academics who performed a contemporaneous evaluation, that these institutions were likely already or soon to be undercapitalized.

Post-crisis stress testing is meant to provide knowledge of the capital holes facing large financial institutions as well as serve as a tool for regulators to directly and quickly address these issues. Banks that fail stress tests are prohibited from making capital disbursements. This, at least in theory, would have kept the $100 billion in dividend payouts that left large financial institutions in 2008 within the financial sector to buttress these firms against imminent losses.

Stress tests today are not achieving their potential, due largely to their overreliance on regulatory measures of bank health. However, a market-based stress test could be a tool for dynamic capital regulation. How would this operate in practice?

1. Stress-Test Failure Should Automatically Force Recapitalization

The first innovation is to amend the stress-test rules to automate capital hoarding and new-capital raising. In 2011, the Federal Reserve Board adopted a capital plan rule that required each bank holding company with more than $50 billion in total assets to submit an annual capital plan.\(^{203}\) Comprehensive Capital Analysis and Review ("CCAR") uses these capital plans to determine whether large financial institutions will be able to weather a crisis shock even while making planned disbursements. The rules allowed, but did not require, the Board to object to capital plans if banks had not demonstrated “an ability to maintain capital above each minimum regulatory capital ratio . . . under expected and stressful conditions throughout the planning horizon.”\(^{204}\) Amending these rules to say that the Board will object to capital plans when banks fail the quantitative aspect of the stress test will automate the halting of capital disbursements when an institution shows signs of being ill-equipped to withstand a crisis.

Automating the objection to capital plans means that when a bank fails the stress test, it will no longer be able to make planned dividend payouts or share repurchases without the express approval of the Board.\(^{205}\) The current stress-testing regime should be amended to mandate that, if a bank is not able to meet minimum-stress capital ratios through changes to its distribution policy alone, its revised capital plan must include a plan to raise new dollars of equity capital within some prespecified period (for example, three months). Following the capital-directive language, the failure to propose and

\(^{204}\) Id. § 225.8(f)(2)(i)(A).
implement an adequate capital plan can trigger judicial remedies ("the Board may seek enforcement of the directive, including the capital adequacy plan, in the appropriate . . . court") as well as administrative remedies ("[t]he Board . . . may also assess civil money penalties for violation of the directive"). An alternative to amending the stress-test rules to require recapitalization is to amend the existing rules for recapitalization of banks to include stress-test failure as a trigger for action. For example, ILSA stipulates that banks failing to meet minimum regulatory capital ratios may be issued a "directive . . . to submit and adhere to a plan acceptable to the appropriate Federal banking agency describing the means and timing by which the banking institution shall achieve its required capital level." As discussed supra, ILSA directives can also be issued at the discretion of banking agencies to particular institutions that fail to meet capital levels the agency deems "necessary or appropriate in light of the particular circumstances of the banking institution." This ability to set bank-specific capital requirements that are responsive to the particular circumstances of banking institutions already gives the Federal Reserve authority to issue capital directives as a result of stress-test failure.

That said, amending ILSA to include stress-test failure as an explicit justification for a capital directive may increase the likelihood that regulators will use this authority in response to stress-test failure. However, ILSA still requires regulators to affirmatively act to force recapitalization. An automatic system is preferable because it will change the default to recapitalization unless regulators intervene, instead of vice versa. This pushes in favor of automation of capital hoarding and even the raising of new capital through the stress-testing regime. An alternative is to automate ILSA capital directives, which would require new legislative action.

2. Current Stress Tests Are Ill-Suited to Trigger Recapitalization

Several caveats to these approaches are worth noting. The first is that the policy prescriptions for automating recapitalization through the stress tests necessarily will work only for banks that are subject to regular stress testing.

206. Id. § 263.84(a)(1)–(2).
208. Id. § 3907(b)(2)(B)(i).
209. Id. § 3907(a)(2).
testing. Although the Dodd-Frank Act mandated that the Federal Reserve Board create a stress-testing regime for banks with more than $50 billion in consolidated assets, in 2018 this threshold was raised to $250 billion, leaving only thirteen banks subject to requisite annual stress testing. If stress tests are the mechanism by which to enforce dynamic recapitalization, we will be able to recapitalize only the largest banks in the financial sector. This is less worrisome than it appears, as these banks cover more than seventy percent of total domestic banking assets. The goal of dynamic recapitalization is to ensure that financial institutions have sufficient capital to withstand an adverse shock so that their potential failure does not trigger a debilitating run on the industry. The adverse systemic consequences of a large firm’s failure are much more severe than those of a small firm, so it seems reasonable to focus dynamic recapitalization on the largest financial firms.

Even if a combination of regulatory and legislative changes were to increase the likelihood that financial institutions would automatically recapitalize after failing stress tests, the success of this approach depends on the stress-testing regime painting an accurate picture of banks’ capital deficiencies. This is not the case today because stress tests require banks to meet a minimum regulatory capital ratio during a moment of distress while ignoring market information entirely. This creates an overly optimistic view of bank health.

In Table 2, I present the results of a simple market-based stress-testing

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210. The stress-testing requirement was removed for banks with $50 billion to $100 billion in total assets, and the Fed has discretion to determine whether a financial institution with assets equal to or greater than $100 billion must be subject to such standards.


212. This makes the story of the financial crisis even more puzzling. We did avail of existing legal authorities to encourage capital hoarding (for example, dividend bans) and capital raising (for example, bank-specific heightened capital requirements), but only for small firms—those whose failures would be least risky from a financial-stability perspective.

213. The problems with regulatory capital ratios are threefold. First, they are a backward-looking measure of bank health—that is, they measure the leverage of financial institutions as of the beginning of the prior quarter. Second, they are static—they do not adjust throughout the quarter despite the fact that banks’ balance sheets change continuously. Third, they are not reliable measures of bank health—as Andy Haldane reported, there is no difference in regulatory capital ratios for banks that failed versus those that did not fail, although there is substantial variation in their capital ratios measured based on market values (market value of equity/total assets). Andrew G. Haldane, Exec. Dir., Fin. Stability, Bank of Eng., Speech at the Federal Reserve Bank of Kansas City’s 366th Economic Policy Symposium: The Changing Policy Landscape: The Dog and the Frisbee (Aug. 31, 2012), https://www.bis.org/review/r120905a.pdf [https://perma.cc/U5BS-ESXJ]. The current stress-testing regime addresses only one of these problems—the tests are a forward-looking indication of bank health based on projections of what could happen to financial institutions during a crisis. However, they are not dynamic, and they rely on the same regulatory capital ratios that we know paint a less-than-accurate picture of banks’ stability.
exercise.\footnote{Infra Appendix, Table 2. This is based on joint work with Lawrence Summers, former Treasury Secretary and the Director of President Obama’s National Economic Council. NATASHA SARIN & LAWRENCE H. SUMMERS, HANDBOOK ON FINANCIAL STRESS TESTING (forthcoming) (unpublished manuscript) (on file with author).} We take bank betas, which measure the degree to which their equity valuation will fall with the market; for example, beta of one means a five percent decrease in the market will result in a five percent decrease in equity values. We use these betas to ascertain the impact of a fifty percent decline in the stock market (the 2019 severely adverse stress scenario) on banks’ market capitalizations. Four of the six largest banks in the United States would fail this market-based stress test, falling to a (market-based) capital ratio of under four percent. This is a substantial discrepancy with the regulatory exercise. Interestingly, beyond the vast difference in magnitude, even the order of the firm risk shifts significantly with a market exercise. There is relatively little discrepancy between the performance of the pure investment banks (JPMorgan and Goldman Sachs) on a regulatory or market-based test, at least partially because these banks mark their losses to market, which paints a more dynamic and accurate picture of financial stability.\footnote{See, e.g., Bulow, supra note 13.}

While an admittedly naive exercise, the point is to illustrate how a more market-based exercise leads to a significantly more pessimistic assessment of banks’ ability to withstand a crisis than the regulatory stress test. If stress-test results are not credible, there is reason to be skeptical that the largest financial institutions will continue to intermediate in the event of a downturn. As discussed above, there is reason to believe the stress tests paint an overly optimistic picture of bank health: a simple market-based stress test suggests that three of the six largest financial institutions will find their capital buffer totally depleted in the event of the stress test’s 2018 severely adverse scenario and that the rest will all be far under the requisite minimum threshold. The regulatory stress-test results suggest the opposite—that banks will continue to intermediate as normal and not a single large institution will require government support.

3. A Market-Based Stress Test Could Help

Having a market-based component of stress testing would create a dynamic regulatory regime. Imagine that the stress-testing regime required the Federal Reserve to restress banks whose stock returns had fallen by more than thirty percent or whose CDS spreads had doubled in the last year.\footnote{This is the trigger that Baron, Verner, and Xiong focus on in their paper. Baron et al., supra note 156.} They would have conducted these supplemental stress tests based on the
firm’s balance-sheet data at the moment its CDS spread spiked and prevented any capital from leaving the firm (for example, immediate suspension of dividend disbursements and share buybacks) until the Board determined it was sufficiently well capitalized to successfully navigate severely adverse stress. The secondary stress test could have been tailored to stress asset classes in which the struggling firm was highly invested to determine whether the bank was well equipped to handle a sudden shock in these markets.

Such a policy would have caused regulators to stress every large financial institution in the year leading up to the collapse of Lehman (including Bear Stearns, Citigroup, Goldman Sachs, JPMorgan, Morgan Stanley, and Wells Fargo, and of course Lehman itself, by the fall of 2007). Of course, stress testing did not exist then, but when such patterns emerge going forward, this market-based component to stress testing will force banks to stop paying out dividends and perhaps to raise new capital immediately as the next crisis begins.

In essence, I propose forcing banks into the Supervisory Capital Assessment Program (“SCAP,” which established the stress tests) exercise earlier. SCAP was a success because it forced regulators to estimate the size of the capital hole in the midst of the actual crisis. By forcing banks to measure this capital hole earlier, we could have filled it earlier.

Of course, this approach assumes that a 2007 SCAP would have been as successful as a 2009 SCAP in predicting how much extra capital was needed to stabilize the financial system. In 2009, the crisis stress tests were benchmarking against a crisis that was actually happening—the predictions they were stressing large financial institutions against (for example, a ten percent unemployment rate) were only weeks away from being realized. The reason the current stress-testing exercise paints a less realistic picture of bank health is that the “normal times” stress test does not come to realistic

217. More recently, this policy would have forced regulators to restress Deutsche Bank when its CDS spread spiked in February 2016, after its stock price dropped by nearly ten percent in a single day. As an illustration of the issues with regulatory capital ratios, at that moment, former CEO John Cryan pointed to the firm’s Tier 1 capital ratio (over eleven percent) as proof it was “absolutely rock-solid.” Myles Udland, Deutsche Bank’s CEO Says the Bank is ’Absolutely Rock-Solid’ in Memo to Employees, BUS. INSIDER (Feb. 9, 2016, 4:41 AM), https://www.businessinsider.com/deutsche-bank-ceo-john-cryan-memo-to-employees-2016-2 [https://perma.cc/ZK95-F62P].

218. This stress-test reform is but one way to force capital into the financial system in response to market signals of distress. Other possibilities exist and merit consideration. For example, Jeremy Bulow and Paul Klemperer propose “equity recourse notes,” or convertible bonds that will convert from debt to ordinary stock in response to market indicia of banks’ health, which is a market-based version of the “contingent convertible bond” approach that has been encouraged by Basel III. See Edmund L. Andrews, Jeremy Bulow: A Better Approach to Bank “Bail-Ins,” STAN. GRADUATE SCH. BUS. (May 22, 2014), https://www.gsb.stanford.edu/insights/jeremy-bulow-better-approach-bank-bail-ins [https://perma.cc/ZWV2-XNRV].
predictions of the accumulation of bank losses during a crisis. This is a complex exercise at any point in the business cycle, but it is simplified when regulators are able to see the trajectory of bank losses in an actual crisis. It is much more difficult to do ex ante, as the overoptimism of the current regulatory stress-testing exercise indicates. Adding a market-based component to the stress-testing regime, however, can and would help. Even the most naive approach (Figure 2) paints a very different picture of bank health than the current regulatory exercise. Focusing regulatory attention on this discrepancy and its causes will encourage more aggressive response to the onset of the next crisis—and would have decreased the severity of the last Recession.

   i. A Trigger to Foreclose Disbursements

Regulators successfully managed a SCAP-style exercise in the midst of the Great Recession. Thus, for crises going forward, the infrastructure appears to be in place for such a quick and thorough examination of individual banks’ capital deficiencies to be performed. This would allow regulators to home in on exactly those institutions that need to foreclose capital disbursements—or even raise new capital—to bolster against imminent losses.

   Should policymakers be concerned about the interim period while SCAP is being performed, an addendum to a market-based stress test would be to immediately foreclose disbursements when a market trigger is breached. A decline of thirty percent in bank equity prices within a year could trigger a blanket rule that shareholders cannot be paid out until a SCAP-like exercise has been performed. As with the more automated conversion of debt to equity discussed supra, the concern with such a market trigger is that it encourages death-spiral-like dynamics, in which speculators will have incentives to push banks that are near any trigger past it. But this can be ameliorated by tying restrictions to broader indices of financial sector health (rather than individual firm performance).

CONCLUSION

There is universal agreement that the financial sector—and global economy—would have been better off if more had been done earlier to mitigate the Great Recession. The reasons offered for lack of early response to the crisis are generally twofold. On one hand, many argue that crises are inherently unpredictable, and there was not sufficient time before the escalation of the crisis for well-designed policy to limit its effects.

219. See infra Appendix, Figure 2.
Conversely, some suggest that even those regulators who were prescient about the possibility of a calamity could not have done more because they lacked the authority to intervene aggressively.

This Article disputes these excuses. First, significant time existed between the onset of the crisis in the summer of 2007 and the collapse of the global financial system in the fall of 2008. Second, regulators did have significant authority to force financial institutions to hoard and even raise capital to stave off collapse. In fact, they exercised this authority with respect to small banks, but not to their large, systemically more important counterparts.

This Article offers a third rationale for insufficient early action. Our regulatory framework relies on policymakers making the affirmative choice to force banks to raise capital in moments of distress. Regulators are human; they are imperfectly prescient and can underestimate the probability of a severe downturn and underreact.

Thus, a system of dynamic recapitalization that automatically forces banks to hoard and raise new capital as signs of distress emerge in financial markets is desirable. Such a system does not rely on regulators choosing to act, but instead, is directly and automatically responsive to signals of distress as they emerge. This approach would have forced banks to stop paying dividends and even raise new capital in the fall of 2007, when instead more than $100 billion left the financial sector despite many indicators that all was not well.

By investing in crisis prevention, we can end the need for, rather than inevitably force, value-destroying firefighting once downturns pick up steam. The result may be occasional false positives—big banks will be forced to not pay dividends or issue new equity because of market noise rather than imminent distress. But the costs of these occasional false positives will be borne by financial firms and their shareholders, which is preferable to taxpayers bearing the costs of bailouts.

It is important to acknowledge that regulators are moving in the wrong direction. In recent months, in the name of transparency, the Federal Reserve chipped away at the usefulness of the stress-testing exercise by ending regular stress testing for many large banks. It has also begun providing financial firms with more information about the models it relies on to project bank losses, and it is contemplating changes to stress testing that will reduce the volatility of bank capital ratios.

The Federal Reserve is basing these changes on the premise that the
financial sector is sufficiently capitalized to survive the next downturn. Regulators point to performance on recent stress tests as dispositive on this point. However, market-based stress tests suggest that when the next crisis comes, financial firms will have large capital holes that regulators will need to find a way to fill.

There is no problem with this as the status quo: we need not force large banks ex ante to have so much capital that, without any changes to their disbursements or baseline capital levels, they will be able to withstand a Recession-like shock. These shocks are rare, and it is inefficient to require such high equity levels that undercapitalization will never be a concern, as some scholars, like Anat Admati and Martin Hellwig, have advocated.

However, in the absence of one-hundred-percent equity-financed banks, the only way to safeguard the financial system is to overhaul regulation to create a regime that will quickly bolster banks when distress appears likely. There is significant danger in assuming, incorrectly, that the system has reached “reasonably full capitalization,” because doing so breeds complacency: regulators today are failing to invest sufficiently in policing financial markets because of an errant belief that the system is already safe enough to weather the next storm.

In this Article, I offer a menu of options to change the regulatory default rule from inaction to action early in a crisis. I encourage a move away from underrestricting banks in moments of distress to more aggressive action to force banks to safeguard themselves against potential distress. Policy options in this space range from extreme (automating new capital raising or restrictions on dividends and share buybacks in response to market triggers) to modest (requiring banks to publicize and explain the difference between market-based and regulatory measures of health). The middle-ground approach would build on the successes of the original Great Recession stress tests to encourage a SCAP-like exercise to ascertain banks’ capital holes early in a potential downturn. To err on the side of prudence, this exercise could ascertain capital shortfalls based on both regulatory and market measures and adopt the most restrictive approach.

220. See Press Release, Bd. of Governors of the Fed. Rsrv. Sys., supra note 9 (quoting Governor Jerome H. Powell) (“This year’s results show that, even during a severe recession, our large banks would remain well capitalized . . . . This would allow them to lend throughout the economic cycle, and support households and businesses when times are tough.”).

221. See ADMATI & HELLWIG, supra note 21.

Unless we are quick to course-correct, we will again fail to act sufficiently early to forestall systemic panic when indicators of the next crisis appear. We may already be making these mistakes in the context of the COVID-19 pandemic. The results, either in the imminent future or down the road, will be costly bank failures and devastating losses to average Americans. We can do better by creating a more dynamic, faster-moving regulatory regime. Recent deregulatory headwinds appear to have forgotten the lessons of the financial crisis. This Article hopes to revive them.
APPENDIX

FIGURE 1A. Price and Volatility of Large Financial Institutions

- Bank of America
- Citigroup
- JPMorgan
- Morgan Stanley
FIGURE 1B. Price and Volatility of Large Financial Institutions

- **Bear Stearns**
- **Goldman Sachs**
- **Lehman Brothers**
- **Wells Fargo**
FIGURE 2. Price and Volatility of Large Financial Institutions, Average

Volatility is average (equal-weighted). Price is price movement for a portfolio of $100, equally invested across these firms.
Figure 3A. CDS Spreads of Large Financial Institutions

Bank of America

Citigroup

JPMorgan

Morgan Stanley
FIGURE 3B. CDS Spreads of Large Financial Institutions
FIGURE 4. CDS Spreads of Large Financial Institutions, Average

CDS spreads are average across all firms (equal-weighted) for 5-year tenor.

FIGURE 5. Bank Volatility in COVID-19 Relative to Great Recession

Volatility (30 day)

Corona Trough — Today (2021-04-21)
FIGURE 6. JPMorgan and Morgan Stanley Disbursements, 2017–2021

JP Morgan Disbursements (quarterly $ millions)

Morgan Stanley Disbursements (quarterly $ millions)
FIGURE 7. S&P Bank Index Performance over Time
<table>
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<tr>
<th>Year</th>
<th>Percent Change</th>
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<tbody>
<tr>
<td>1991</td>
<td>34%</td>
</tr>
<tr>
<td>1992</td>
<td>58%</td>
</tr>
<tr>
<td>1993</td>
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<tr>
<td>2018</td>
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</tr>
<tr>
<td>2019</td>
<td>-17%</td>
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*Note: Bolded emphasis indicates years in which a decrease would meet the thirty-percent threshold for secondary stress tests.*
TABLE 2. Comparing Regulatory and Market-Based Stress Tests

<table>
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