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The Pursuit of Financial Stability: Essays from the Federal Reserve Bank of Richmond Annual Reports

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In 2007, as the financial system began to show strains stemming from mounting losses on mortgage-related securities, an often heard reassurance was that the banking system was well positioned to weather the storm. The regulatory capital of commercial banks at the end of 2007 was around 10 percent of assets, which was viewed as a cushion capable of absorbing all but the very worst shocks. But a combination of misplaced confidence in our capital regulation regime and the realization of shocks that were in fact worse than what was imagined in standard risk management exercises threw the financial system into deeper turmoil than we had seen in decades. By the end of 2008, losses at large commercial and investment banks had prompted the Federal Reserve and the Treasury to intervene at an unprecedented scale and scope, providing credit and capital support to a range of institutions.

The series of actions taken by the Fed and the government in the financial crisis are by now well-known—the subject of books and movies. In the thick of the crisis, these interventions were viewed as necessary to stop a free fall and restore confidence in financial intermediation. The crisis brought with it a deep recession followed by a slow recovery and a major legislative re-engineering of our approach to financial regulation.

The financial crisis could well prove to be the defining economic event for a generation of economists, as it raises fundamental questions

The views expressed are those of the author and not necessarily those of the Federal Reserve Bank of Richmond or the Federal Reserve System.

about the nature of financial fragility and the appropriateness of alternative policy responses. In particular, does financial intermediation, as it is practiced in modern economies, inevitably leave the economy subject to the potentially devastating effects of runs and fire sales? What are the characteristics of financial systems that create this fragility, and do those characteristics bring economic benefits that make them worth the risk? Much of the analysis of the financial crisis, as well as proposed policy responses, has been based on a presumption that financial instability is an inherent feature of a modern financial system. The policy implications of this view are that we should use regulation to do what we can to prevent crises. But this view also implies that when a crisis does occur, government or central bank financial support is necessary to keep a bad situation from getting worse.

At the Richmond Fed, both before and since the financial crisis, we have considered an alternative view, which focuses on the incentives created by the very government support that is often viewed as essential in the time of a crisis. Expectation of that support weakens the incentives of financial market participants to monitor and control risks. Broad belief in an extensive financial safety net, then, contributes to the creation and concentration of risks, making the financial system less stable. In 1999, Richmond Fed researchers attempted to assess the extent of the financial safety net and found that as much as 45 percent of financial sector liabilities were likely to enjoy perceived protection.[1] So the period before the financial crisis is one in which the market's ability to discipline risk-taking by financial firms was potentially significantly diminished. To call this period a test of the effectiveness of unregulated financial markets—a test that markets failed—is an incomplete characterization. The pre-crisis period was only a test of the effectiveness of markets in which there is a significant expectation of government support in times of stress. This series of essays represents our exploration of the second of these interpretations, and what it implies about appropriate interventions by the government and the central bank.

The first essay from our 2008 *Annual Report*, by Aaron Steelman and John Weinberg, was written while the financial crisis was still unfolding. As such, it represents a preliminary look at the factors that may have contributed to the severity of the episode, with particular attention to the incentive effects of explicit and implicit government backing of parts of the financial sector. While in the heat of the moment, it was tempting to focus on the turmoil as it unfolded; we thought it was also important to examine the conditions that could give rise to

[1] Available at https://www.richmondfed.org/publications/research/special_reports/safety_net.

such tumult. Our focus on the financial safety net as a feature that can induce instability by weakening market discipline stood somewhat in contrast to a more prevailing view that instability, or systemic risk, was an inherent feature of financial markets.

In our 2009 *Annual Report*, Kartik Athreya took a deeper look at the concept of systemic risk. To the extent that market disruptions are possible, in which one firm's financial distress has spillover effects on the economy beyond the distressed firm's counterparties, interventions that limit the losses of a distressed firm's counterparties have the potential to ex post (after-the-fact) efficiency improving. The essay argues, however, that ex ante (before-the-fact) efficiency is ultimately a preferable criterion for making policy choices. And it is before a crisis occurs when the distortion of incentives from expected government protection is relevant.

In 2013, the centennial year of the Federal Reserve Act, our *Annual Report* placed the central bank's concern for financial stability into historical context. The essay, by Jeffrey Lacker and Renee Haltom, examines the origins of the Fed's lending powers, which have come to be a main tool for public sector intervention in times of financial distress. The authors argue that the original vision for Fed lending was as a tool for flexibly varying the supply of currency—something today we might think of more as the pursuit of monetary rather than financial stability. They argue that a financial stability mandate for the central bank, and an expectation that it will use its lending authority liberally in times of crisis, can lead to interventions that distort the allocation of credit among private market participants. And such credit allocation is more properly thought of as fiscal action, which should be avoided by a central bank with monetary policy independence. Further, the discretionary nature of such interventions can itself be a contributor to market uncertainty and instability.

The central problem of the financial safety net is that ex post intervention is hard to resist at the moment of crisis but, over time, has undesirable incentive effects. What policy steps can we then realistically hope will help us move away from an environment in which people perceive a broad and extensive financial safety net? This is the question taken up in our most recent essay. In our 2015 *Report*, Arantxa Jarque and David Price discuss one potentially fruitful avenue opened up by the Dodd-Frank Act. Title I of the Act created a requirement for large financial firms to draft and maintain resolution plans, or "living wills." Such a plan is intended to show the way to resolve a failing firm through unassisted bankruptcy, thereby making such a resolution viable. As of today, the task of crafting living wills that are viewed by the market as a viable way to resolve firms in distress remains a

challenging one; however, with time and close collaboration between the firms and their regulators, living wills could become a powerful tool to diminish market participants' expectation of public sector assistance when one of these firms faces distress.

Taken together, these essays reflect much of the thinking we have done, some of it well before the financial crisis, on the sources of financial instability and the means by which public policy can promote stability. A unifying theme is that government interventions that protect creditors weaken the market discipline that might otherwise help to control risks in the financial system. This leaves us with recourse only to regulatory discipline. But as diligent and conscientious as we are in implementing financial regulation, our financial system will continue to face risks as financial market participants direct their innovative energies toward benefiting from perceived protection while circumventing regulatory controls. Ultimately, financial stability will be better served if we can scale back beliefs in a broad safety net and restore a measure of meaningful market discipline.

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The Financial Crisis: Toward an Explanation and Policy Response

Aaron Steelman and John A. Weinberg

The financial market events since August 2007—and especially those after September 2008—have raised a number of important issues. Some commentators have argued that these events demonstrate fundamental flaws in the market system, flaws that can be corrected only by large-scale intervention. The causes of the financial market turmoil are far from settled and may not be fully known for some time. This essay will offer one perspective. We will argue that, although there is some evidence of market failure, the current crisis does not represent a wholesale failure of financial markets. Instead, we will argue that the crisis stems from the difficulty of responding to large shocks, the roots of which are multifaceted, including past policy errors. While there are ways in which financial regulation can be improved, there is also a strong case to be made that the functioning of market discipline can be improved by constraining some forms of government intervention, especially those that dampen incentives by protecting private creditors from loss.

It will be useful to think of the essay as divided into the following components. First, what has happened in the financial markets. Second, why those events took place. Third, possible market imperfections that could produce turmoil in the financial markets and an assessment of the role they have played in this case. And, fourth, how policymakers should respond in these difficult and uncertain times.

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Again, it is important to note that the thesis offered is only tentative. Financial economists, no doubt, will examine this period for many years to come and debate the merits of competing explanations. In doing so, they will refine those ideas and come closer to a comprehensive understanding of what has occurred. This research, hopefully, will be more than an academic exercise. It should provide insights to financial market participants and policymakers so that similar events do not arise in the future.

1. WHAT HAPPENED: A BRIEF TIMELINE

In the first half of 2007, as the extent of declining home prices became apparent, banks and other financial market participants started to reassess the value of mortgages and mortgage-backed securities that they owned, especially those in the subprime segment of the housing market. In early August 2007, the American Home Mortgage Investment Corporation filed for Chapter 11 bankruptcy protection, prompting concern among financial market participants. At its August 10, 2007, meeting, the Federal Open Market Committee (FOMC) stated that in "current circumstances, depository institutions may experience unusual funding needs because of dislocations in money and credit markets. As always, the discount window is available as a source of funding." The following month, the FOMC lowered the federal funds rate 50 basis points to 4.75 percent, the first in a series of rate cuts that would ultimately bring the target to a range of 0 to 0.25 percent in December 2008.

The autumn of 2007 saw increasing strains in a number of market segments, including asset-backed commercial paper, and banks also began to exhibit a reluctance to lend to one another for terms much longer than overnight. This reluctance was reflected in a dramatic rise in the London Interbank Offered Rate (LIBOR) at most maturities greater than overnight. LIBOR is a measure of the rates at which international banks make dollar loans to one another. Since that initial disruption, financial markets have remained in a state of high volatility, with many interest rate spreads at historically high levels.

In response to this turbulence, the Fed and the federal government have taken a series of dramatic steps. As 2007 came to a close, the Federal Reserve Board announced the creation of a Term Auction Facility (TAF), in which fixed amounts of term funds are auctioned to depository institutions against any collateral eligible for discount window loans. So while the TAF substituted an auction mechanism for the usual fixed interest rate, this facility can be seen essentially as an extension of more conventional discount window lending. In March 2008, the New York Fed provided term financing to facilitate the purchase of

Bear Stearns by JPMorgan Chase through the creation of a facility that took a set of risky assets off the company's balance sheet. That month, the Board also announced the creation of the Term Securities Lending Facility (TSLF), swapping Treasury securities on its balance sheet for less liquid private securities held in the private sector, and the Primary Dealer Credit Facility (PDCF). These actions, particularly the latter, represented a significant expansion of the federal financial safety net by making available a greater amount of central bank credit, at prices unavailable in the market, to institutions (the primary dealers) beyond those banks that typically borrow at the discount window.[1]

Throughout the summer of 2008, the stability of the housing finance government-sponsored enterprises, Fannie Mae and Freddie Mac, came under increasing scrutiny. While their core businesses have historically been in the securitization of less risky, "conforming" mortgages, they had in recent years accumulated significant balance sheet holdings of less traditional mortgage assets. In September, both companies were placed in conservatorship by the newly created Federal Housing Finance Agency.

In the fall of 2008, financial markets worldwide experienced another round of heightened volatility and historic changes for many of the largest financial institutions. Lehman Brothers filed for Chapter 11 bankruptcy protection; investment banking companies Goldman Sachs and Morgan Stanley successfully submitted applications to become bank holding companies; Bank of America purchased Merrill Lynch; Wells Fargo acquired Wachovia; PNC Financial Services Group purchased National City Corporation; and the American International Group received significant financial assistance from the Federal Reserve and the Treasury Department.

On the policy front, the Federal Reserve announced the creation of several new lending facilities—including the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), the Commercial Paper Funding Facility (CPFF), the Money Market Investor Funding Facility (MMIFF), and the Term Asset-Backed Securities Loan Facility (TALF), the last of which became operational in March 2009. The TALF was designed to support the issuance of asset-backed securities collateralized by student loans, auto loans, credit card loans, and loans guaranteed by the Small Business Administration, while also expanding the TAF and the TSLF. The creation of these programs resulted in a tremendous expansion of the Federal Reserve's balance sheet. Furthermore, Congress passed the Troubled Asset Re-

[1] The term "bank" is used broadly to refer to all depository institutions—including banks, thrifts, and credit unions—with routine access to the discount window.

lief Program (TARP) to be administered by the Treasury Department. And in February 2009, the president signed the American Recovery and Reinvestment Act, a fiscal stimulus program of roughly $789 billion.[2]

2. WHY THE CRISIS?

The proximate cause of the financial distress since 2007 has been the decline in the housing market, which imposed substantial losses on financial institutions and led to disruptions throughout the credit markets. These disruptions have spread to the real economy, leaving the United States in the midst of a significant recession and prompting many of the measures described earlier.

What caused the boom in the housing market and its subsequent decline? Again, the answers are not obvious and various explanations will need to be vetted by economists over time. While multiple factors likely contributed to the cycle, some of which we will discuss below, a key factor involves the risk-taking incentives facing market participants.

First, there were what could be called "fundamental" factors. From roughly 1995 to 2005, the U.S. economy experienced a significant increase in productivity growth and thus real household income. Insofar as households saw these conditions as likely to continue, they increased demand for housing and thus housing prices. Indeed, housing investment and prices continued to rise through the 2001 recession, unlike most postwar business cycles. Those gains in productivity and household income began to weaken in 2005—and with it, consumers' ability to repay their loans. Another plausible explanation involves technological advances in retail credit delivery. As financial institutions were able to more efficiently gather information about potential borrowers, they were able to more carefully craft loans to a wider segment of the population. In retrospect, some of those decisions may have been suspect—but, again, insofar as lenders believed economic conditions would continue on the trajectory they were then following, there was good reason for financial institutions to expand lending to people who in the past may not have received mortgages. One might argue that both borrowers and lenders "overshot" or behaved irrationally. But, given the information available to them at the time, their behavior seems less like mania and more like the actions of reasonable, foresighted actors, who happened to make an error in judgment about future trends in economic conditions. In addition to what we may consider explana-

[2] For a comprehensive timeline of the financial crisis, see the Federal Reserve Bank of St. Louis' website, "The Financial Crisis: A Timeline of Events and Policy Actions," at http://www.stlouisfed.org/timeline/default.cfm.

tions based on economic fundamentals, there were also a series of public policy decisions that probably fueled the housing boom to levels inconsistent with market conditions. First, the Federal Reserve pursued an accommodative monetary policy following the terrorist attacks of 2001. This was especially true in 2003 and 2004 when the target for the federal funds rate was held between 1 percent and 2 percent, as the economy began to rebound from the earlier brief recession. Such policy created an environment in which credit grew quite freely.[3] Others have argued that beyond the effects of monetary policy, long-term interest rates were held down by a "global savings glut."[4] This may have heightened investors' interest in "reaching for yield" by taking on greater risks.

Moreover, in an effort to expand access to housing credit, especially for people at the lower end of the income distribution, Fannie Mae and Freddie Mac increased their purchases of subprime securities.[5] Many of the underlying loans in these securities proved problematic and, as noted earlier, contributed to Fannie and Freddie being placed under federal conservatorship. Why have problems in the housing market caused substantial turmoil throughout the banking sector, leading many institutions to become more cautious about their current lending actions and investors to be cautious in their dealings with banks? There are at least three possible explanations, all having to do with uncertainty.

First, there is uncertainty about the aggregate magnitude of the losses financial institutions are likely to suffer. Many of the mortgages they issued are of relatively recent vintage, so how those borrowers—and, in turn, the lenders—will fare is unclear. Also, the extent of mortgage defaults and foreclosures will depend on the size of the decline in house prices—an ongoing process as of this writing.

Second, financial market participants are unsure about the distribution of those losses. Mortgage risks were spread widely, through securitization and use of the insurance capabilities provided by credit derivative contracts. Thus, institutions are concerned about how their counterparties' mortgage-related losses will affect their own viability.

Third, there is policy uncertainty. After the onset of the crisis, the Federal Reserve and the Treasury took several actions to help stabilize the financial sector. However, these actions appeared to evolve on a case-by-case basis. Some institutions received support, while others did not, making it more difficult for market participants to discern the governing principles and to make predictions about future policy moves.

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[3] Taylor (2008).

[4] Bernanke (2005).

[5] Meltzer (2009).

These institutions were already facing an uncertain economic environment, which contributed to relatively sparse lending opportunities.

Coupled with an uncertain public policy environment, it is not surprising that many have been hesitant to lend and that many have had trouble raising private capital.

Any narrative of this boom-and-bust cycle must take into account the risk-taking incentives of financial market participants. And, here, the role of the federal financial safety net is important. Many financial transactions take place under some form of government protection. Some protections are explicit—such as the guarantee offered to bank depositors. Arguably, such protection has reduced depositors' incentive to scrutinize the riskiness of their banks' lending practices and may have contributed to the crisis experienced by thrifts in the 1980s. In addition, it seems likely that market participants view the safety net to include more than simply those explicit guarantees. That is to say, many market participants may believe that there are implicit guarantees, which also affect their risk-taking behavior.[6] For instance, there has long been a widely held notion that some financial institutions are simply "too big to fail." Such institutions are perceived to be essential to the functioning of domestic and often of international financial markets. As a result, these institutions and their creditors may assume that, should they encounter difficulties due to unwise lending practices, the public sector will respond to maintain their solvency.[7]

Such public-sector action might take several forms. It could involve direct lending to troubled firms by the Federal Reserve or the Treasury Department. Or it could take a less direct form, such as that which occurred in the case of Long-Term Capital Management (LTCM). The Federal Reserve helped to orchestrate a recapitalization of LTCM by its creditors. Had LTCM's creditors not taken action to keep the firm from bankruptcy, it is unclear how the Fed would have responded. But market participants might have reasonably assumed—given the Fed's interest in seeing LTCM survive—that explicit federal assistance would have been forthcoming. Further, the Fed's involvement signaled a concern about the possible systemic consequences of losses incurred by the large institutions that were exposed to LTCM.[8]

Given the presence of the federal financial safety net—both its explicit and implicit guarantees—what options do policymakers face?

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[6] Walter and Weinberg (2002).

[7] Such protection does not extend to the financial sector only. Other industries, such as the airline and automobile industries, have also received government assistance in the past decade.

[8] Haubrich (2007).

Some might argue that the moral hazard problems associated with a large federal financial safety net cannot be avoided, especially in rich, advanced countries. As a result, we must more stringently regulate those firms that may avail themselves to such protection to ensure that they are acting prudently and, hence, to protect the taxpayer. Indeed, one may be skeptical—or remain relatively agnostic—about the inevitability or desirability of the federal financial safety net, yet still argue that, given its presence, the current regulatory regime may need to remain intact or be strengthened.[9]

Such arguments are reasonable. However, additional regulation of financial markets would likely hamper innovation in that industry. An alternative approach is to seek to reduce the scope of explicit safety net protection—as well as creditors' expectations of implicit protection of firms deemed too big to fail.[10] The presence of the federal financial safety net was not the sole cause of questionable risk-taking by financial institutions.[11] But it likely altered those institutions' behavior and, hence, contributed to the current turmoil. Any future attempt to redesign financial regulation should be undertaken with an assessment of the safety net, including the desirability and feasibility of scaling back implicit protections. Attempting to restructure the regulatory landscape without taking into account the effects of the safety net is like "putting the cart before the horse."[12]

In summary, the boom and subsequent decline in the housing market had numerous causes. In hindsight, private lenders and borrowers may have made some imprudent decisions. But they were acting on what they believed to be sound information about the current state of the economy and the path of future growth.

Also, the Federal Reserve kept interest rates low for a long period, which may have encouraged additional lending that exacerbated the crisis. In addition, the government-sponsored enterprises greatly expanded their portfolios, boosting the market for loans that have proved difficult for many borrowers to repay. Finally, the presence of the federal financial safety net likely encouraged institutions to take risks that they otherwise would have forgone. The decline in the housing market has sent shocks throughout the banking industry and related financial

[9] Edward (1999).

[10] Stern and Feldman (2004) argue that too-big-to-fail protection imposes net costs on society and that the problem has grown in severity over time.

[11] For instance, Diamond and Rajan (2009) argue that, over short periods of time, even vigilant creditors may have difficulty monitoring whether financial managers are engaged in excessive risk-taking, especially in the case of new products.

[12] Kareken (1983) used this analogy in the slightly different context of banking deregulation in the 1980s.

institutions. Already, the Federal Reserve, the Treasury Department, and Congress have taken considerable actions to stem the financial crisis. Later, we will comment on those programs and consider how the Federal Reserve, in particular, should try to implement an "exit strategy" that will ultimately lead to the winding down of current lending facilities and to renewed focus on price stability.

3. RATIONALES FOR PUBLIC-SECTOR CREDIT IN FINANCIAL CRISES

Much of the public policy response to turmoil in financial markets over the last two years has taken the form of expanded lending by the Fed and central banks in other countries. The extension of credit to financial institutions has long been one of the tools available to a central bank for managing the supply of money—specifically, bank reserves—to the economy.

Indeed, discount window lending by the 12 Reserve Banks was the primary means for affecting the money supply at the time the Fed was created. Over time, open market operations, in which the Fed buys and sells securities in transactions with market participants, have become the main tool for managing the money supply. Lending became a relatively little-used tool, mainly accessed by banks with occasional unexpected flows into or out of their Fed reserve accounts late in the day. If such banks were to seek funding in the market, they would likely have to pay above-normal rates for a short-term (overnight) loan. In this way, the discount window became a tool for dampening day-to-day fluctuations in the federal funds rate. In 2006, average weekly lending by the Reserve Banks through the discount window was $59 million.

Since the outset of the widespread market disruptions in the summer of 2007, the Fed has changed the terms of its lending to banks and created new lending facilities. In the first three quarters of 2008, weekly Fed lending averaged $132.2 billion, and in the fourth quarter of the year, that figure rose to $847.8 billion.

In some cases, lending in response to a crisis can be seen as an extension of the use of central bank credit as a tool for managing the money supply. But for much of the current crisis, the Fed has not used its lending in this way.

Even though lending rose sharply, the Fed's overall balance sheet, and therefore its supply of money to the economy, remained roughly unchanged until September 2008. Until that time, the Fed was "sterilizing," or offsetting, its lending growth with open market operations. This suggests that, at least initially, the aim of expanded Fed credit was not growth in the overall supply of money or liquidity to

markets but rather the direction of money or liquidity to particular market segments deemed to be in the greatest need of support.

The use of sterilized lending in order to direct funding to institutions or markets is based on the belief that, at times, financial markets cannot properly function in directing funds to where they are needed the most.[13] Like any argument about the need for or consequences of public-sector intervention in markets, this is a statement of economic theory. In discussions of the Fed's actions in the last two years, two theoretical concepts have stood out as reasons why markets might fail to effectively allocate funds among market participants—coordination problems and "firesale" prices.

The classic example of a coordination problem in a financial market is a bank run. When depositors have the right to take their funds out of the bank on demand, and when the bank uses these highly liquid liabilities to fund longer-term, illiquid assets, then the bank is fragile in the sense that a sudden demand by many depositors for their money could force the bank to liquidate some of its longer-term assets inefficiently. This fragility makes the bank subject to a run in which depositors demand their funds because they think other depositors are doing the same. In such a case, all depositors might be better off if they could coordinate their decisions and leave their money in the bank, saving the bank from the costs of inefficient liquidations. The inability to coordinate means that bank runs could conceivably cause even a solvent bank to fail.[14]

The key characteristic that makes runs possible is the maturity mismatch on a bank's balance sheet—funding long-term assets with short-term liabilities. In recent years, this feature has not been limited to traditional, commercial banking. The securitization of mortgages and other assets has brought with it a number of other types of this maturity transformation—asset-backed commercial paper, auction-rate securities, and the funding of investment banks' holdings of securities through overnight repurchase agreements. Most of these nonbank arrangements have come under stress at some point during the ongoing market turbulence.

The fragility that makes runs possible, however, is itself the result of choices made by market participants. The willingness to create a fragile balance sheet structure should depend on market participants' beliefs about what would happen in the event of a run-like event. And part of these beliefs should involve people's expectations about

[13] Goodfriend and King (1988) argue that with well-functioning markets to redistribute funds, open market operations are sufficient to provide liquidity to markets.

[14] Diamond and Dybvig (1983).

public-sector actions in the event of a run. In particular, the likelihood of assistance in the form of government or central bank lending reduces the prospective private costs of a run and, on the margin, increases the incentive to engage in maturity transformation. This is an essential part of the moral hazard problem resulting from the federal financial safety net.[15]

Another important ingredient of the theory of runs is that the early liquidation of long-term assets is costly. If a bank is forced to sell an asset to meet its depositors' demands for funds, there must be a real loss compared to holding the asset to maturity. If all assets could be sold at a price equal to the expected, discounted present value of the ultimate returns, then depositors' demands could be met without loss, which in turn eliminates a depositor's incentive to run. In traditional banking, the possibility of a run comes from the notion that the bank would have to sell loans, for which the originating bank has an advantage in monitoring borrowers' performance and ensuring repayment. But in the recent episode, assets at the heart of maturity transformation increasingly have been asset-backed securities, for which there may be no particular advantage to the institution holding securities on its balance sheet. Indeed, such securities were envisioned as a way of making loans more "tradeable" by pooling together many loans into a security.

Through much of this episode of financial volatility, many commentators have argued that the prices observed on many types of assets, especially those related to housing, represent deviations from fundamental market value. The available prices are seen as firesale prices—lower than fundamental value because many institutions have been or may be forced to sell their assets in attempts to repair their balance sheets. For such low prices to persist, there must be no patient market participants with the financial resources and knowledge necessary to profit from buying assets at artificially low prices. This suggests that either the fundamental shocks affecting financial markets were so pervasive as to compromise essentially all participants' financial positions or there is some incompleteness or segmentation that prevents those with financial resources from taking advantage of arbitrage opportunities.[16]

Theories of market imperfections that give rise to financial market disruptions in which prices deviate persistently from fundamentals might imply that targeted public-sector credit can im-

[15] Lacker (2008). See also Ennis and Keister (2007).

[16] Allen and Gale (1998) describe the phenomenon of "cash in the market pricing" in a financial crisis.

prove the functioning of the market. But matching conditions observed in actual markets to conditions in these theories is a difficult judgment.

Much of what we have observed is also consistent with a market in which significant fundamental shocks have greatly increased the uncertainty facing market participants. If policymakers have no better information than market participants about fundamental values as compared to market prices, then the ability of targeted public-sector intervention to improve market conditions is limited.

4. PAST, CURRENT, AND FUTURE PUBLIC POLICY RESPONSES

It is understandable that the Federal Reserve, the Treasury Department, and Congress were eager to act as the financial system began to face what many feared to be systemic risks. However, problems in the financial system have persisted in spite of these efforts and some of those resulting policies could create challenges of their own over time.

The most fundamental issue, of course, is moral hazard. How will current federal intervention affect the behavior of banks and investors in the future? That is, will the support that has been provided encourage financial institutions to engage in behavior that they otherwise would have eschewed? Basic economic theory suggests so: The more something is subsidized, the more that is likely to be provided. In this case, the "something" is leveraged risk-taking, leading to potentially imprudent lending. How large this effect will be is ultimately an empirical question. But it is important to note that even if all of the new lending facilities were eliminated as the economy and financial system recover, moral hazard will still be a problem. Market participants know that federal support was readily forthcoming during the current turmoil—and most now would reasonably expect that such support will be there when the next turmoil occurs. Changing these expectations will be a long and hard process. In short, the Fed will need to regain credibility for not bailing out insolvent institutions—and as we know from our experience with monetary policy in the 1970s, such efforts to gain credibility can be long and difficult.[17]

The current situation, with a vastly expanded financial safety net, presents long-term challenges with respect to private-sector risk-taking and risk-management incentives. Even in the near term, the task of scaling back the safety net toward its pre-crisis status raises many

[17] Goodfriend and Lacker (1999) discuss how central banks could build a reputation for limiting their lending commitments, just as central banks acquired credibility for maintaining price stability.

difficult questions. For instance, the extent to which the new lending facilities should be either eliminated or moved to the Treasury Department is a matter of debate. But, as a matter of governance and central bank independence, there is a strong argument that those facilities which target specific industries or credit markets should be handled first. The provision of subsidized credit—especially on a sustained basis—is a fiscal policy action. Depending on one's perspective, this may or may not be a desirable policy goal, but it is arguably not one that should be pursued by the central bank. Placing the administration and funding of such programs under the direction of the Treasury Department puts those programs more directly under congressional authority.

The conflation of the roles of the Federal Reserve and the Treasury Department during the current crisis could threaten the Fed's independence. The Federal Reserve's principal policy goal is to conduct monetary policy in pursuit of price stability and sustainable macroeconomic growth. That goal is much harder to pursue in a world where the Fed is also operating a number of lending facilities. In the near term, inflation does not appear to be a problem, certainly not relative to continued weakness in the real economy. But when the economy recovers, the Fed must have the flexibility to restrain monetary growth and prevent rising inflation. And the Fed's ability to exercise this vigilance will be enhanced if it can separate its credit policy activities from its management of the money supply. Expansion of Fed credit expands the monetary base by adding to reserves held by the banking system with the Fed. Indeed, from the beginning of September of 2008 through the end of the year, total reserves held at the Fed grew from close to $10 billion to about $785 billion. Other things equal, an expansion of the monetary base is stimulative. Such stimulus is generally warranted in a period of economic contraction. But when the economy recovers, the Fed will need to have the flexibility to remove the monetary stimulus brought about by an expanded base.

Fundamentally, the Fed must determine how it wishes to act as a lender of last resort. The Fed could benefit from heeding the advice of two classical economists, Henry Thornton and Walter Bagehot, who considered how the Bank of England could act effectively as the lender of last resort. The Thornton-Bagehot framework stressed six key points:

- Protecting the aggregate money stock, not individual institutions
- Letting insolvent institutions fail
- Accommodating only sound institutions

- Charging penalty rates
- Requiring good collateral
- Preannouncing these conditions well in advance of any crisis so that the market would know what to expect.[18]

Current Federal Reserve credit policy has deviated from most if not all of these principles. Before the crisis, the Fed's lender of last resort activity functioned as a standing facility with fixed terms. Through the crisis, the Fed's approach has evolved and changed in numerous directions, including the direction of credit to particular market segments and institutions. Beyond winding down its many new lending vehicles, the Fed will need to make it clear to all market participants which principles it will follow during future crises. Reductions in the Fed's credit activities—even in the near term —do not need to result in monetary contraction, as those programs can be replaced by asset purchases.

This last point also applies to actions taken beyond those of the Federal Reserve. Public policies by all agencies must be well articulated and time consistent so that market actors can make rational plans regarding their financial and other business affairs. Arguably, such policy uncertainty did much to prolong the Great Depression in the United States.[19] In addition, policymakers should be wary about the potential productivity-dampening effects of ill-considered fiscal and regulatory policies. There is some evidence that such policies slowed productivity in the United States during the 1930s[20] and in Japan during the 1990s.[21] While, as noted earlier, the Federal Reserve should not be directly involved in appropriating funds, it is not beyond its bounds to offer thoughts on the relative efficiency of such programs pursued by the legislative and executive bodies.

5. CONCLUSION

The United States—and, indeed, the whole world—has experienced a significant financial and economic crisis since late 2007, and especially since September of 2008. The causes of that crisis are multifaceted and will require much future research. However, policymakers must act in real time on the best information available. It is not surprising that

[18] Humphrey (1989).
[19] Higgs (1997).
[20] Cole and Ohanian (2004).
[21] Hayashi and Prescott (2002) and Hoshi and Kashyap (2004).

policymakers have taken a very active approach to the current crisis; after all, the costs of inaction were perceived to be quite large. The effects of those actions, just like the causes of the crisis, will no doubt continue to be the subject of much study and commentary for some time.

This episode has brought a number of particular questions to the forefront, questions that will be at the center of ongoing efforts to strengthen our financial system. Among those are questions regarding the possible sources of incentives for financial market participants to take excessive risks. One candidate discussed earlier involves the incentive effects of the federal financial safety net. The significance of this potential contributor to risk-taking lies in its implications for how we think about the role of Fed credit in ensuring financial stability. While the liberal provision of credit can cushion the effects of a crisis, expectation of such credit availability can dampen incentives to take actions that may limit the likelihood of a crisis. This tradeoff lies at the heart of any effort to design a set of policies that achieves a balance between the roles of government and market forces in disciplining the incentives of participants in our financial system.

APPENDIX

This timeline appeared in the original publication as a sidebar.

Summer 2007: Markets first respond on a large scale to concerns that mortgage-backed securities might significantly underperform expectations

August 10, 2007: Federal Reserve announces that it "will provide reserves as necessary" amidst strains in money and credit markets

September 18, 2007: FOMC lowers target federal funds rate 50 basis points to 4.75 percent, the first of a series of rate cuts

December 12, 2007: Fed announces creation of the Term Auction Facility (TAF), the first of several new tools designed to provide liquidity to markets

March 11, 2008: Fed creates Term Securities Lending Facility (TSLF), which trades banks' illiquid assets, including mortgage-backed securities, for liquid Treasury securities

March 16, 2008: Fed creates Primary Dealer Credit Facility (PDCF), allowing it to lend to primary dealers for the first time

March 14–24, 2008: Fed announces it will provide term financing for JPMorgan Chase to purchase Bear Stearns by taking risky securities off Bear's balance sheet via the PDCF

September 7, 2008: Federal Housing Finance Agency (FHFA) places Fannie Mae and Freddie Mac in government conservatorship following increasing scrutiny over their soundness

September 15, 2008: Lehman Brothers files for Chapter 11 bankruptcy protection

October 3, 2008: President Bush signs into law the Emergency Economic Stabilization Act of 2008, establishing the $700 billion Troubled Asset Relief Program (TARP)

November 25, 2008: Fed announces creation of the Term Asset-Backed Securities Loan Facility (TALF), supporting the issuance of asset-backed securities. Becomes operational in March 2009

November 25, 2008: Fed announces program to purchase direct obligations of Fannie Mae and Freddie Mac, and mortgage-backed securities backed by them. Purchases begin January 5, 2009

December 11, 2008: The Business Cycle Dating Committee of the National Bureau of Economic Research announces that the recession began in December 2007

December 16, 2008: FOMC votes to establish a range for the fed funds rate of 0 to 0.25 percent

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Systemic Risk and the Pursuit of Efficiency

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What is systemic risk? When might it arise? How should it influence policymakers? In this essay we identify systemic risk with the presence of linkages between market participants whereby problems for one directly create problems for others. We argue that such situations can arise from the use of contractual arrangements, especially debt that requires frequent refinancing and liquidation in the event of an inability to repay. The presence of spillover effects can, in turn, lead to outcomes in the wake of shocks that can be unambiguously improved via policy intervention. Nonetheless, we caution against taking this as a license to intervene after the fact, and instead suggest that observed contracting arrangements may be important in promoting efficient trade between parties from a "before the shock" perspective. We argue that helping to ensure efficiency as seen prior to a shock is the right goal for policymakers. Lastly, we note that the pursuit of such an objective may require credible commitments to tolerating inefficiency after a shock.

In the past two years, U.S. financial markets have undergone dramatic changes, with storied firms vanishing from existence and others surviving only as a direct result of public sector intervention. A handful of these events stand out as emblematic. These are, respectively, the bailouts of Bear Stearns, AIG, and the housing government-sponsored enterprises; the institution of large credit programs such as the Term Asset-Backed Securities Loan Facility (TALF) and the Troubled Asset Relief Program (TARP); and the striking nonbailout of Lehman Broth-

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ers. A common thread in the interventions that took place, and the criticism of the one that did not, was the appeal to the idea that the failure of one financial institution would threaten the health of others and, as a result, hurt the ability of the financial system as a whole to channel resources to productive investment projects. In a 2008 assessment of the TARP program, for instance, then-Treasury Secretary Henry Paulson argued:[1]

"The crisis in our financial system had already spilled over into our economy and hurt it. It will take a while to get lending going and repair our financial system, which is essential to an economic recovery. This won't happen as fast as any of us would like, but it will happen much, much faster than it would have had we not used the TARP to stabilize our system. Put differently, if Congress had not given us the authority for TARP and the Capital Purchase Program and our financial system had continued to shut down, our economic situation would be far worse today."

Similarly, the rescue of Bear Stearns was justified by the then-president of the New York Fed, Timothy Geithner, as follows:

"We judged that a sudden, disorderly failure of Bear would have brought with it unpredictable but severe consequences for the functioning of the broader financial system and the broader economy."[2]

1. DEFINING SYSTEMIC RISK

Aside from policymakers, economists have tried to understand the potential for spillovers both within the financial sector, as well as those that might flow from the financial sector to the nonfinancial (or "real") sector of the economy. Research in this area captures the idea of destructive spillovers with the term "systemic risk." A consensus view of systemic risk comes from Acharya et al.[3] who define it as "...the risk of a crisis in the financial sector and its spillover to the economy at large." De Bandt and Hartmann[4] use the related term "systemic crisis" to capture "...a systemic event that affects a considerable number of financial institutions or markets in a strong sense, thereby severely impairing the general well-functioning (of an important part) of the financial system. The well-functioning of the financial system relates to the effectiveness and efficiency with which savings are channeled into

[1] Prepared remarks by Paulson before the House Financial Services Committee, November 18, 2008.

[2] *New York Times*, April 8, 2008.

[3] Acharyaet al. (2009).

[4] de Bandt and Hartmann (2000).

the real investments promising the highest returns. For example, a systemic financial crisis can lead to extreme credit rationing of the real sector ('credit crunch')."

In what follows, we will discuss the notion of systemic risk, describe recent economic theory related to the idea, and suggest some implications that these ideas have for policymakers. In terms of emphasis, we make no attempt to be exhaustive and will focus primarily on conceptual issues surrounding systemic risk and policymakers' role in not only its mitigation, but also its very presence.[5]

Economists have categorized two broad sources of systemic risk: externalities and implicit guarantees. Externalities, loosely speaking, are effects that occur when one party's actions affect another's either by markedly affecting prices or by directly limiting the options available to another in any other way. Such direct effects should be contrasted with the indirect effects that occur in settings where individual participants face prices that they regard as too small to influence.

As for implicit guarantees as a source of systemic risk, the idea is this: Any belief among financial market participants, *especially creditors*, that they will be made whole by the public in the event of the failure of the assets they finance (i.e., that they will be "bailed out") will lead them, all else equal, to (i) take greater risks, even if that means becoming ever more opaque or interconnected, and (ii) grow too large. Externalities and implicit guarantees are related. The existence of the latter allows market participants to structure operations in ways that create externalities (for example, by growing very large via leverage), thereby virtually guaranteeing themselves a bailout from a benevolent government intent on avoiding the collateral damage created by these externalities.

The discussion of systemic risk thus far suggests that it describes situations in which markets are unable to appropriately allocate resources *after* the occurrence of a surprise event or "shock." So we might begin by asking: What is meant by "appropriate"? One attribute economists often look for in outcomes is Pareto efficiency. A Pareto-efficient outcome is a feasible outcome such that no one can be made better off without hurting someone else. Outcomes that are not Pareto efficient are therefore clearly wasteful. We define systemic risk as the risk that trading arrangements will not yield Pareto-efficient outcomes, particularly in the wake of a shock to the system.

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[5] For those interested in more detailed surveys of systemic risk, de Bandt and Hartmann is useful, and for autopsies of the recent crisis, the received literature now provides many options, but two especially useful treatments are the symposium issue (Winter 2009) of the *Journal of Economic Perspectives* and the book-length treatment of Acharya and Richardson (2009).

The preceding implies that in settings where shocks, such as the sudden revaluation of real estate, can occur, one can differentiate between the Pareto efficiency of a trading arrangement after, and before, the realization of the shock. If the expected welfare of participants prior to the realization of shocks cannot be improved, the outcome is said to be ex-ante Pareto efficient. And if no Pareto improvements can be made after the shock, we have an ex-post Pareto-efficient outcome. A fact for the reader to keep in mind is this: There are outcomes that are ex-post Pareto efficient that are *not* ex-ante efficient. In particular, a commitment by policymakers to ensure ex-post efficiency can actually prevent a society from attaining the ex-ante efficient deployment of its resources. In this essay, we will argue that the goal of policy should be to approximate ex-ante efficiency.

The main sphere of policymaking we address is that of regulating financial markets. Financial markets facilitate the transfer of funds between parties at various times and under various contingencies. A question to address, then, is how effective are these markets at achieving efficient outcomes?

Assessing the extent to which a financial system is allowing society to attain an ex-ante Pareto-efficient allocation is not an easy task, but there are guidelines. Households use financial instruments to hedge risks, prepare for retirement, and buy homes, among other things. Financial markets therefore mainly assist households in maintaining a stable lifestyle. Perhaps naturally, then, an observable hallmark of a well-functioning financial system for households is one where expenditures usually do not move suddenly unless there has been an unexpected event suffered simultaneously by a significant group of households, such as occurs in a recession. By this measure, a consensus view of research on this topic is that U.S. households are able to fairly effectively, but not perfectly, "smooth" their consumption against all but those shocks that simultaneously affect significant proportions of households, or those that are extremely long-lasting, such as disability or displacement. In particular, household consumption is shielded well from temporary shocks,[6] most households arrive well-prepared for retirement,[7] and consumption inequality among those with similar expected lifetime earnings does not grow substantially with age.[8]

Firms are, of course, the other major user of financial instruments, borrowing directly from households via capital markets, borrowing from banks, arranging trade credit with one another, and hedging risks

[6] Blundell, Pistaferri, and Preston (2008).

[7] Aguiar and Hurst (2005) and Scholz, Seshadri, and Khitratakun (2006).

[8] Heathcote, Storesletten, and Violante (2005).

through options, swaps, and other types of instruments. Unfortunately, unlike the case of households, detecting how effective financial markets are at efficiently allocating funds across producers is not straightforward. Theoretical work does not give definitive tests of financial market inefficiency.[9] As a result, policymakers have been forced to rely largely on more heuristic methods to assess strain or illiquidity in financial markets. Specifically, the sharp changes in observed interest rate spreads and credit volumes in many short-term debt markets starting in mid-2007 led to the conclusion among many policymakers that such data reflected inefficiency. The data on interbank lending spreads[10] were seen as deviations from fundamentals suggestive of severe impediments to trade arising from counterparty risk and asymmetric information. As a result, policymakers, especially those within the Federal Reserve, focused most of their efforts on ensuring that a wide spectrum of firms was able to access short-term finance.

2. WHAT DOES ECONOMICS TELL US ABOUT SYSTEMIC RISK?

Of specific concern to us here is the systemic risk that propagates difficulties in one financial sector firm to other financial sector firms, and then, possibly, to the nonfinancial sector as well. The importance of the spread of spillovers between firms suggests that systemic risk is, at its heart, a product of the *linkages* that exist both between firms and between households and firms. In what follows, we detail some of the central lessons of economic theory and explain how they help us think about these linkages and view policies aimed at improving outcomes.

Lesson 1: Mere Linkages between Economic Participants Do Not Imply Inefficiency

Economics is interesting because of linkages. Put another way, resource allocation is relevant only because most goods and services we value have the property that what one party consumes precludes the use of these resources at a later date or by others. When a firm places an order for more plastic to make children's toys, for example, it necessarily becomes unavailable for making life-saving syringes for medical use. Does this mean that "too many" toys will be produced relative to syringes? The answer is: It depends on the cost perceived by users of both items. The most important achievement of 20th century eco-

[9] See, e.g., deBandt and Hartmann (2000).
[10] See, e.g., Cecchetti (2009).

nomics was to show that, in general, there is a system of prices for all goods and services such that if self-interested traders cannot manipulate them, then (i) these prices will allow all participants in the economy to feasibly buy and sell what is best for them, and (ii) that the single-minded pursuit of self-interest subject only to the constraints imposed by these prices actually leads to a Pareto-efficient outcome.[11] This result is the so-called "Invisible Hand" theorem and was famously first conjectured by Adam Smith. Therefore, in the context of our example, the answer depends on whether markets exist for both items and, if so, whether all participants take the prices in these markets as given (i.e., not up for haggling). Otherwise, there is no guarantee of efficiency. The Invisible Hand theorem is very general and fully applies to settings involving trade in financial instruments.

The Invisible Hand result teaches us that inefficiency stems fundamentally from the ways in which the competing interests of trading partners are adjudicated.[12] In markets for goods and services, this is generally done by allowing competitive processes to work in the hope that they will generate prices that all participants take as given.[13] However, as we will argue, in financial markets, especially banking, trading arrangements that allow parties to attain ex-ante efficiency can sometimes create the possibility of instability. As a result, financial contracting arrangements can in some instances create situations where productive interventions by policymakers exist. For example, the extreme flexibility of "demandable deposit" contracts offered by banks allows households to invest efficiently in productive long-term projects while simultaneously insuring themselves against the risk of sudden liquidity needs. Nonetheless, as we will discuss below, such contracts can also allow for self-fulfilling and destructive runs on banks. In turn, the institution of deposit insurance can help rule out such events, and thereby push outcomes toward ex-ante Pareto efficiency.

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[11] See, e.g., Debreu (1959).

[12] To repeat, in any setting with limited resources, what one party does *must* affect all others. The only question then is how these effects manifest themselves. The Invisible Hand result tells us that when there are markets for all relevant goods and services, the interaction of parties in settings where they cannot affect prices through their individual actions leads to Pareto-efficient outcomes.

[13] Think of the auctions for commodities that occur routinely: Millions of small buyers and sellers individually can do essentially nothing but accept the price coming from the auction house, but together their actions certainly affect the price that is set.

Lesson 2: Spillovers Cause Inefficient Responses to Shocks

When linkages are not mediated through prices that are taken as given, the failure of a specific financial intermediary may impose costs on unrelated third parties and may use up scarce resources. It is clear that if a heavily interconnected firm is not allowed to operate after it becomes delinquent on its liabilities, severe disruptions may occur elsewhere. This is simply because it may take time and resources for the physical, organizational, and human capital at that entity to be redeployed. Thus, failure itself can lead to costs and ex-post inefficiency that, given a choice, policymakers will opt to avoid, all else equal. Consider next the costs of forcing a failed entity into bankruptcy. Taken in isolation, note first that the liquidation of a firm via formal bankruptcy will typically be beneficial relative to the status quo. Bankruptcy courts, after all, exist primarily to ensure efficient liquidation, i.e., to decide how best to reorganize an entity that is unable to meet commitments to creditors, dissolving it (ideally) in only those instances when its "going concern" value is low and, in these instances, trying precisely to prevent inefficient liquidation processes. As a result, such procedures help society channel resources to their most productive users.

However, the specter of spillovers grows with the size and, in some cases, the number of distressed institutions. In practice, such a view was expressed to justify the extremely large bailout of AIG, for example. The fear was that the shuttering of such a large or "interconnected" firm would then sow the seeds of further distress.[14] In other recent cases, the specific fears have been that the liquidation of a firm's assets, especially when large, would lower asset prices overall and cause further problems. Specifically, a fall in asset prices was seen to have the potential to lead to a further round of tightening in credit availability for unrelated firms by lowering their ability to post collateral.[15] Thus, bankruptcy courts, though set up to aid efficiency, may take actions that create externalities.

[14] "The U.S. Department of the Treasury (Treasury), the Federal Reserve Board, and the Federal Reserve Bank of New York agreed that the collapse of AIG could cause large and unpredictable global losses with systemic consequences." Prepared testimony of Timothy Geithner, March 24, 2009.

[15] Criticisms of the nonbailout of Lehman Brothers usually have taken this view.

Lesson 3: The Sources of Spillovers Vary Substantially

Presently, there are several types of linkages that researchers have identified that can forcefully transmit ex-post inefficient outcomes in financial markets into production and the "real" side of the economy.

First, given the centrality of banks and bank-like institutions in the recent crisis, it is useful to review briefly the most influential model of banks available: that of Diamond and Dybvig.[16] In their account of banks, the authors envision a scenario in which a very large number of households have funds and would like to save for the future, but are faced with random shocks to their spending needs. The shocks represent any event that forces the household to withdraw its deposit. For example, a household may need to make an emergency repair to its home or car or face a large out-of-pocket medical or legal expense. Given this uncertainty, households will value a savings instrument that can be easily liquidated if need be.

Diamond and Dybvig's scenario is one in which households' shocks are independent of each other, in the sense that one person's receipt of a shock doesn't imply that others have received one as well. As a result, the fact that there are a large number of households guarantees that the proportion of those that will realize the shock is known with certainty.[17]

Consider now a situation where the investment projects available in the economy all have a lengthy gestation period—if liquidated early, they generate low returns. Think of office buildings, or airplanes, or homes: Each takes time and each, if half-completed, is still nearly worthless. This creates a problem: While it would be nice to be able to take advantage of these projects, few individuals would risk having their funds tied up without recourse. So is there a way for society to fund these projects while protecting investors/depositors?

Since the shocks to households imagined by Diamond and Dybvig are independent, a financial intermediary that can collect funds from *many* households will be able to (i) hold funds in reserve for only the proportion it knows will need to withdraw funds due to a shock and (ii) use the remaining funds to make productive long-term investments. This is precisely what Diamond and Dybvig call a bank. The lesson, at this point, is that the ubiquitous institution of a bank allows for

[16] Diamond and Dybvig (1983).

[17] Think, for example, of a large number of individuals, where each person holds an unbiased coin. If they all flip their coins, we cannot know the outcome for any one individual with certainty beforehand, but we do know that the fraction of people who flip "heads" (or "tails") will nearly always be very close to one-half.

productive investments, but does so in large part by forfeiting all flexibility in its obligations to depositors.

Unfortunately, the absence of flexibility noted above can create a new problem. And this is the other remarkable feature of Diamond and Dybvig's analysis: It captures bank runs, a central feature of banking prior to deposit insurance. In particular, there is nothing in the account of Diamond and Dybvig to rule out individuals believing that a bank lacks sufficient funds to meet all withdrawal needs. If investors believe this, and the bank redeems deposits on a first-come, first-served basis, households may choose to run the bank. Given the fact that the bank held only a fraction of all deposited funds in reserve and invested the rest, a run will necessarily force the bank to liquidate at least some of its long-term investments to meet redemption requests, and society will lose as a result.

The introduction of deposit insurance can rule out such self-fulfilling "crises of confidence." But, once again, this insurance is not without other, less desirable, side effects. In particular, deposit insurance changes both the incentives and ability of bank management and ownership to take risks. First, when publicly provided, deposit insurance removes incentives for the bank's creditors (insured depositors) to ask what the bank is doing with their money. Second, even when deposit insurance is privately run, the incentives of equity holders to take risks grow as bank capital deteriorates: Big gambles can have large payoffs for both owners and a management that has little left to lose. Notice that in this instance, corporate governance is *not* the issue; the firm is being operated in the best interests of shareholders. It is just that their interests no longer necessarily coincide with societally desirable goals. In such situations, the shareholders themselves may urge the manager of the firm to take risks, including those that generate interconnections and thereby foster spillovers.

As a result of the lack of equity holders' incentives to limit risk-taking in bad times and insured depositors' perpetual indifference to bank asset quality, providers of insurance, and regulators in the case of FDIC-insured banks, are left with the task of monitoring bank activities. They must ensure that huge investments in generally unproductive projects are not pursued simply because they might pay off in an unlikely event. In the absence of such oversight, bank investments would almost certainly be allocated inefficiently from the ex-ante perspective and virtually ensure deadweight costs if liquidated.

The incentives to take large gambles create yet another problem. Deadweight costs of the sort we mentioned earlier will likely be most important in cases where the institution being liquidated is large. As a result, if policymakers are very concerned with limiting ex-post

deadweight losses, they will feel pressure not to allow such liquidation and instead may transfer public resources to the failing institution. The crucial problem with this, as alluded to at the outset, is that such pressure will be anticipated by banks themselves and lead them, all else equal, to grow too big. This is the classic "too big to fail" (TBTF) problem.[18]

Another potential source of spillovers arises from the absence in some markets of trading institutions capable of tracking net claims rather than gross claims. The main idea is this: Consider a setting with three firms, A, B, and C. Firm A owes Firm B $100, while Firm B owes Firm C $100. Clearly, if netting was possible, only one transaction needs to occur: Firm A pays Firm C. But in a setting in which gross claims must be settled, more transactions must occur. In addition, if either Firm A or B must make an asset sale in order to raise the $100 it owes, problems may occur. In the midst of widespread suspicion on asset quality, it may be unable to get a price reflective of the true underlying quality of the assets being sold; and if the sale is made anyway, the net worth of *both* institutions can decline. This idea has received formal attention from economists. The classic contribution that highlights the potential for wasteful liquidation and allocation is that of Kiyotaki and Moore,[19] in which chains of inefficient liquidation can occur due to a failure of either centralized netting of contracts or the availability of a single "deep-pocketed" creditor. In such an environment, a single default can lead to a "spiral" of liquidation that significantly amplifies an initial shock. Such risk is likely to be most relevant when many investors face risk arising from default by their counterparties, and in so-called over-the-counter (OTC) markets there was very little information that was centralized and thereby known to a party that could monitor the ability of obligors to make good on promises. By contrast, a centralized exchange may have been able to keep much better track of net obligations, and thereby avoid default. Shleifer and Vishny[20] focus on the issue that there may be only a limited number of parties with the expertise to value and manage certain kinds of assets.

The absence of netting is likely to be most problematic when the seller of assets is a bank or other relatively opaque institution. In

[18] See, e.g., Stern and Feldman (2004). At banks with access to insured deposits, the competitive pressure to continue acquiring exposure to high-risk mortgages was likely to have been substantial. Chuck Prince, CEO of Citigroup, famously stated that "...as long as the music is playing, you've got to get up and dance. We're still dancing." *Financial Times*, July 10, 2007.

[19] Kiyotaki and Moore (1997).

[20] Shleifer and Vishny (1992).

particular, a traditional view of banks is that they are entities that specialize in "information intensive" lending. As a result, banks typically fund precisely those investment projects that are not sufficiently transparent or standardized to permit the use of capital markets. As a result, few are in a position to value such assets when they are sold, and this possibility in turn may generate what economists call a "Lemons problem." That is, if the quality of an asset is known to sellers but not to buyers, and if sellers anticipate a low price, then the quality of the assets placed for sale will be disproportionately low (i.e., "Lemons"). In the absence of a credible mechanism to discern quality, asset prices may be inefficiently low in the sense that there may be buyers willing to pay high prices for high-quality assets but find them unavailable. Therefore, while a large liquidation may be sufficient to induce inefficiency, it is not necessary.

At a general level, Lemons problems seem likely to have played an important role in explaining why the initial wave of mortgage defaults led to greater than 10 percent unemployment rates. A very rough summary of recent events might be the following: Mortgages defaulted and securitization led the exposure to these defaults to be very widespread and difficult to assess. Many who invested in these assets did so by borrowing short-term. When the performance of mortgages eroded, these investors were asked by their creditors to lower their leverage to increase the likelihood of repayment. This often necessitated the sale of assets. To the extent that sellers were seen to know more than buyers about what they were selling, the price commanded by these assets was low—reflecting the possibility that the seller was intent on unloading his worst assets on unwitting buyers. As some sold at these low prices, others were directly affected in their ability to sell assets. In the interim, some investors, e.g., so-called structured investment vehicles (SIVs) and conduits, had arranged for backup lines of credit from banks. As banks made good on these commitments, their health and corresponding ability to fund projects, including those completely unrelated to mortgage lending, were undercut. As a result, what started as a crisis on "Wall Street" became a larger crisis on "Main Street."

The preceding description of a "death spiral" has been formalized to account for some additional specifics of the current crisis. Most recently, Brunnermeier[21] emphasizes two spirals related to forces identified in Kiyotaki and Moore: (i) a "loss" spiral and (ii) a "margin" spiral. In the former case, a reduction in asset prices (possibly for entirely fundamental reasons) lowers the ability of participants to borrow,

[21] Brunnermeier (2009).

especially leveraged ones. This is because the fall in asset prices lowers the net worth of the leveraged entity by much more than the gross worth, and it is net worth that matters for being able to post collateral and, in turn, borrow. Subsequently, the loss in net worth may necessitate the sale of more assets, as lenders will not want exposure to such a leveraged borrower to persist. Such pressure will lead the borrower to sell some of his assets to restore the original leverage ratio, which further lowers the net worth of other agents, and soon. A margin spiral is one where the loss spiral is made worse because lenders may no longer be content with allowing the same leverage ratio and, by demanding lower leverage, force greater asset sales by each constrained institution, further pressuring asset prices downward.

The prevalence of OTC transactions for many derivatives, especially credit-default swaps, later proved to be a source of significant counterparty risk. In turn, the failure of an insurer to deliver as promised may itself threaten the health of those who purchased the insurance and may force them to liquidate positions to meet obligations. Such liquidations can, as before, lead to downward spirals. The case of AIG illustrates this clearly. Many holders of mortgage-backed securities purchased insurance against a loss in their value. AIG collected premiums in return for promising to buy back these securities at face value in the event of default. However, it later turned out that the firm would be incapable of making the promised payments, and its unanticipated failure could reasonably be associated with some of the inefficiency-inducing spirals discussed above.

An issue related to margin spirals and asset sales is that of the valuation of a firm's balance sheet. The practice of generating a real-time valuation of the balance sheet goes by the terms "fair value accounting" (FVA) and "mark-to-market" accounting. After the savings and loan (S&L) crisis of the 1980s, regulators and policymakers came to realize that when an insured depository institution is aware that its balance sheet has deteriorated, but regulators aren't, very bad things can happen. In particular, poorly performing insured depository institutions can raise funds by offering high interest rates on deposits and other short-term funding and use the proceeds to invest in projects that pay off handsomely in rare cases, but most often do not. Commercial real estate, in particular, was a favorite for speculative investments by S&Ls.

As a result, many financial institutions now are asked to routinely present valuations of the objects on their balance sheets (the assets, in particular). These valuations are really a thought experiment in which the firm assesses the value of assets were they to be sold immediately. In settings in which trading arrangements (i.e., markets) allow for the

easy sale of assets without suspicion of them being Lemons, FVA *will* keep insolvent institutions from raising funds to invest in bad projects. However, in cases where asset markets are afflicted by serious Lemons problems, an institution may be inaccurately portrayed as undercapitalized, in which case it must either sell assets to repay creditors (in other words, shrink its balance sheet) or issue new equity. Both of these options may cause further problems, the former for reasons we have already discussed and the latter because the very issuance of new equity might be perceived as a signal that an entity is undercapitalized. Thus, it is possible that some of the spillovers that occurred came from measures designed to prevent them from occurring in the first place. institutions can decline. This idea has received formal attention from economists. The classic contribution that highlights the potential for wasteful liquidation and allocation is that of Kiyotaki and Moore, in which chains of inefficient liquidation can occur due to a failure of either centralized netting of contracts or the availability of a single "deep-pocketed" creditor. In such an environment, a single default can lead to a "spiral" of liquidation that significantly amplifies an initial shock. Such risk is likely to be most relevant when many investors face risk arising from default by their counterparties, and in so-called over-the-counter (OTC) markets there was very little information that was centralized and thereby known to a party that could monitor the ability of obligors to make good on promises. By contrast, a centralized exchange may have been able to keep much better track of net obligations, and thereby avoid default. Shleifer and Vishny focus on the issue that there may be only a limited number of parties with the expertise to value and manage certain kinds of assets.

We have argued that spillovers leading to ex-post inefficiency can come from many places, of which we named a few: (i) demand-deposit-style contracts, (ii) distorted incentives created by deposit insurance and financial institution size, (iii) the absence of centralized netting of contracts, especially in derivatives, and (iv) regulatory practices. It should be clear, therefore, that there are widely varying, and individually coherent, arguments as to why systemic risk may be present. There will, in turn, usually be interventions that can genuinely improve outcomes, though typically from the ex-post perspective. This is an important point to keep in mind, and one that is not always appreciated by those advocating pure "laissez faire" approaches to crisis management. However, it is perhaps equally crucial to recognize that the promise of help from policymakers to avoid inefficiency ex post can (i) disrupt ex-ante efficient contracting arrangements and (ii) increase the odds of ending up in a situation where such intervention takes place. Therefore, it is important to understand first why certain risks may be

an unavoidable side effect of contractual arrangements constructed to ensure ex-ante efficiency. In general, such an evaluation is best done on a case-by-case basis.

Lesson 4: Many of the Linkages Leading to Fragility and Ex-Post Inefficiency Stem from Purposeful Choices

The preceding section showed that trading arrangements in financial markets often leave intact features that can lead to inefficient responses to shocks, but that tolerating ex-post inefficiency may be essential to allowing for beneficial outcomes from an ex-ante perspective. The inflexibility of short-term debt in banking arrangements, for example, was shown to place burdens on the depository institutions, predisposing them to being run and to becoming a source of spillovers. Nonetheless, such arrangements are precisely what might allow society to invest in productive ventures.

A ubiquitous feature of the current crisis, and one that arguably sets it apart from previous periods of rapid asset-price appreciation, is the pervasive use of debt finance. Therefore, given its inflexibility—and demands for the liquidation of assets in the event of poor outcomes—why is debt such a pervasive contractual form? An answer is suggested in a classic work of Townsend.[22] In this paper, the author studies a setting in which a lender can generate a return on an investment only by hiring a worker, and where there turn on the investment can be observed only by paying a cost. The author then shows how a simple debt contract achieves ex-ante Pareto efficiency. That is, the optimal contract is one where borrowers make a constant repayment to lenders except in bankruptcy when they report an inability to pay as promised. In this case, the borrowers' output is verified and assets are seized and liquidated. No further opportunities to improve the well-being of both borrower and lender remain.

An important aspect of Townsend's analysis is that, in the cases where a borrower reports an inability to make the specified repayment, it doesn't help either party to use up resources that could instead be divided between them. Thus, a costly liquidation process may well be worse, ex post, than, say, partially forgiving the debt. But without this commitment to force the borrower into liquidation whenever he claimed that project returns were poor, the manager of the project would be able to report that the project always generated poor returns, repay

[22] Townsend (1979).

very little, and retain the rest. Knowing this, the lender might never lend in the first place, putting a stop to a socially useful investment.

As discussed at the outset, recent calls for intervention by policymakers have uniformly appealed to the idea that inefficient outcomes would otherwise result. However, a lesson of the preceding discussion is that one can accept the idea that such inefficiency may result without intervention, while keeping in mind that the anticipation of such after-the-fact interventions can damage the ability of market participants to effectively structure contracts.

3. IMPLICATIONS FOR POLICYMAKERS

Policymakers seem now to have recognized that the forces created by implicit guarantees and an unwillingness to tolerate ex-post inefficiency may be important and have reacted by proposing legislation. Most recently, legislation under consideration in the Senate seeks to substantially overhaul the regulation of financial institutions, largely with a view toward containing actions that will lead to systemic risk, through the creation of a systemic risk authority.[23]

The recent crisis, while beginning with household-level decisions to default on mortgages, has largely been a crisis of short-term funding for banks and nonfinancial firms. Given that neither financial intermediaries nor firms are people, the importance of protecting the incomes of such entities from sharp falls is not by itself a compelling rationale for policy intervention. The goal of policymakers in these instances, if anything, might be to ensure that the entities best equipped to channel funds to productive projects remain able to do so. Nonetheless, the discussion thus far has alluded to the idea that what market participants expect financial market policymakers and regulators to do ex post will matter for their decisions ex ante. Given this, there are some general implications for policymakers.

Be Aware of Time Inconsistency

Perhaps the single most important idea that economics has to offer the practice of policymaking is that of "time inconsistency." A policy is a rule that spells out what a policymaker will do under various contingencies now and in the future. A policy is said to be time inconsistent if a policymaker would opt in the future to *not* carry out the prescription of a previously announced policy wherever it was not optimal to do so

[23] See the U.S. Senate Committee on Banking, Housing, and Urban Affairs hearing titled "Establishing a Framework for Systemic Risk Regulation" held July 23, 2009.

from that time forward. Instead, such a policymaker will choose new policies in the future by repeatedly reoptimizing. The downside to this is that he will not be able to credibly promise or threaten certain future actions, even when such a promise would allow for actions that would be clearly beneficial from the viewpoint of the present. Knowing this, individuals (i) will ignore the possibility that the strategy announced in the present will actually be implemented in certain eventualities, and, more detrimentally, (ii) can force the hand of the policymaker in the future by taking actions in the present.

The preceding is a bit abstract, so consider the classic example of time inconsistency from the seminal article of Kydland and Prescott,[24] in which the idea was first formalized. Imagine a society where some of the land may flood frequently enough to make home construction a bad idea from the ex-ante perspective. Ideally, the right policy for the government in this instance would be to announce that it would not help those whose homes have flooded. If credible, this would prevent building on the floodplain and, in turn, void the need to bail out anyone after the flood. But, if a benevolent government lacks the commitment to refrain from helping to reconstruct the homes after a flood, private citizens will rationally expect that any homes that are built are indeed insured. As a result, homes will be built on floodplains and, since floods will occur, the government, if it is benevolent, will find itself helping homeowners after the fact. If the expected costs to society from not building there in the first place are smaller, society as a whole loses.

There are at least two lessons here. First, for policymakers, "tough talk," such as announcing that there will be no future bailouts, will, if not accompanied by something that makes the policy intentions credible, be disregarded at best. Second, there is a lesson for the broader public. In order to expect policymaking to meaningfully alter decisions, one must ask whether a policymaker has the willingness to stick to an announced policy, especially when the optimal choice in the future might be to let bygones be bygones.

Pursue Ex-Ante, not Ex-Post, Pareto Efficiency

Given the ability, and willingness, of policymakers to intervene to ensure efficiency in the wake of a shock, why is the pursuit, if not attainment, of ex-ante Pareto efficiency a useful standard for the regulators of financial institutions? In the context of financial markets, there are at

[24] Kydland and Prescott (1977).

least three reasons. First, in markets where there is no informational advantage held by one party relative to another, and all parties can be forced to honor their promises, policies aimed at the achievement of ex-ante efficiency ensure ex-post efficiency; one needn't target the latter explicitly. Second, in the presence of informational advantages held by one party over another, or when parties cannot be presumed to do as promised, ex-post interventions, even when they ameliorate ex-post inefficiency, can undermine private contracts engineered to reflect a variety of considerations necessitated by the informational frictions present. For example, debt contracts were seen to be useful in helping parties attain financing even when one party faced the prospect of being cheated by the other. In turn, even well-meaning policies that hinder the seizure and liquidation of assets as per the contract could inhibit the financing of many worthy projects. Third, in a world of smart, forward-looking private sector decisionmakers, the willingness to pursue ex-post efficiency (or the inability to stop from pursuing it) can lead society to wasteful allocations of resources through misdirected investments, tax distortions, and deliberate exploitation of the taxpayer through excessive risk-taking. This is the lesson of the time inconsistency problem.

Recalling the case of AIG, we can see that once its inability to meet the claims of its creditors became clear, policymakers intervened, perhaps justifiably under an ex-post Pareto efficiency criterion. But, as with deposit insurance, the fly in this ointment is that situations rife with inefficiency may be inherited by a policymaker precisely because of his inability to commit to allowing inefficiency after the fact. AIG, for its part, may have anticipated (correctly) that the circumstances in which the credits they insured would fail would likely also be ones in which aggregate economic activity was already significantly affected. In turn, in these situations, the firm may have expected assistance from a policymaker—especially one concerned with ex-post efficiency. As a result, such views may have been important in allowing AIG and others perceived to be TBTF to grow and create systemic risk.

It is also important to recognize that the ex-ante standard is not an automatic call for pure laissez faire. For example, the institution of deposit insurance for banking can be provided by the public and, in turn, can help ensure that the banking system is productive from the ex-ante viewpoint. Similarly, in the context of the example describing the time-inconsistency problem, an ex-ante standard would differentiate sharply between the two following scenarios. First, in the example given, the risks of building on the floodplain were high enough to make investment there a poor choice. Moreover, no houses had yet been built. Therefore, in this instance, the inability of a policymaker to commit to

avoiding a bailout led directly to wasteful investments that necessitated bailouts. Consider now a modification of this scenario where the land floods infrequently enough to attract private investors even in the absence of any possible bailout. However, assume that insurance markets for some reason don't function well. In this case, would-be homeowners face risks, but because they cannot insure against them, may fail to build even though it is productive to do so from an ex-ante standpoint. Now, imagine that the government offers insurance to those building there and charges actuarially fair premiums. This will improve ex-ante efficiency, as citizens will now be able to pool their risks with others. And in the rare event that a flood does occur, the policymaker will make payments to help people rebuild. This example suggests that a crucial litmus test for useful ex-post interventions is whether or not they can reasonably be interpreted as proxying for a missing market.

A more general danger (i.e., one that is not restricted to financial market policy) in abandoning the ex-ante efficiency standard for policymaking is that it opens the door, in principle, to the implementation of policies that merely redistribute. However, redistributionary policies are not appropriately conducted by the regulators of financial institutions who can act fairly unilaterally. Rather, such actions are more appropriately conducted through the consensus building inherent in the legislative system. Politically appointed decisionmakers, especially those whose choices are not immediately subject to open debate or transparent appropriations processes, may find themselves under intense pressure to pursue such policies. Moreover, given the speed with which interventions in financial institutions have taken place, there will be incentives for the owners, creditors, and employees of a handful of financial firms to invoke the specter of systemic risk to request interventions that are primarily transfers.

The preceding arguments suggest that ex-post interventions carried out in the name of mitigating systemic risk may themselves pose a risk to the welfare of the citizenry. To avoid this, the public must ask regulatory authorities to consistently articulate the pure *ex-ante* efficiency rationale for their proposed actions. Moreover, such a defense of intervention must spell out precisely why private contracting, even when it raises the possibility of ex-post inefficiency, may not simply reflect the best that society can achieve ex ante to deal with various informational- and commitment-related impediments. Federal Reserve Bank of Richmond President Jeffrey Lacker has expressed this view fairly strongly.[25] As mentioned at the outset, economic theory does

[25] Lacker (1998).

offer guidance here. The presence of widespread market power arising from barriers to entry and the inability to trade certain contracts due to various spatial or informational frictions are two of the most obvious impediments to achieving ex-ante efficiency. And in the context of financial intermediation, theoretical work on the effects of various impediments to trading arrangements such as collateral scarcity, maturity mismatch, and centralized netting are all ongoing. We have also briefly alluded to the inability of the government to commit against bailout as an influence on ex-ante financial contracting, and thereby fragility and real outcomes.[26]

One explanation that has been widely circulated to account for the severity of the crisis, and especially its transmission to the real economy, is that there was a dramatic expansion of the set of financial institutions with balance sheets that featured a large maturity mismatch. That is, in the recent crisis there was an expansion[27] in the set of financial actors that used short-term debt to invest in long-term assets such as real estate or collateralized debt obligations with underlying value dependent on long-maturity loans such as mortgages. The expansion of such entities in the run-up to the collapse of real estate prices has been called the rise of a "shadow" banking system. The Diamond and Dybvig account of banking suggests that if such an expansion is not met with (i) a concomitant expansion of something analogous to deposit insurance and (ii) publicly imposed limits on risk-taking via capital requirements or portfolio restrictions, fragility and misallocation are likely to ensue.

By all accounts, strict leverage limits and capital requirements were not measures imposed on hedge funds, investment banks, and money market mutual funds, which all constructed balance sheets that predisposed them to the sort of instability discussed above. Therefore, one implication may be to work to recognize, in real time, those financial institutions that have balance sheets with bank-like characteristics but that are not being treated accordingly.

Before becoming overly optimistic about being just one more regulation away from containing systemic risk, however, it is useful to ask why such maturity transformation took place outside of insured and regulated depository institutions. There is good reason to think that it was precisely to escape the regulation facing the latter. Therefore, unless we are confident that we can detect maturity transformation in all its forms, our best bet may be to allow creditors of unregulated institutions to bear risk, especially of the macroeconomic kind. This

[26] See Chari and Kehoe (2010) for a formal analysis of this idea.
[27] See, e.g., Acharya et al. (2009) for details.

may only be possible via credible promises to allow such entities to fail. In other words, the additional costs of monitoring and regulating may well outweigh any additional benefits of creating yet more actors in the officially insured maturity transformation business.

The Variety of Linkages and Reasons for Spillovers Will Make Regulating Hard

We argued above that not only are there many ways for financial sector entities to be linked and create inefficiency in the wake of shocks, but also that many contractual choices that create ex-post inefficiency were deliberately aimed at allowing for gains from trade between two parties. Recalling the example of mortgage lenders committed to foreclosing on late payers, we saw that even though debt forgiveness would be ideal after the fact, such a policy would be ruinous for lenders, and thus ultimately choke off credit to borrowers.

From a policy perspective, this suggests that it may be beneficial to tie the hands of policymakers in the wake of crisis: It is perhaps the only way to give participants, especially nonbanks, the incentives to avoid becoming overly linked with each other and choosing balance sheets that make them fragile. But here again, a policy of never intervening may not always be desirable either. As Diamond and Dybvig's analysis shows, the presence of fragility sometimes comes from the achievement of other, more desirable objectives as well, and in these cases programs like deposit insurance can indeed help achieve ex-ante efficiency.

Another problem facing would-be systemic risk regulators is that asset price collapses often seem to precede financial crises. In the recent crisis, the collapse in housing prices has been widely seen as a crucial starting point for events. In particular, many of the mortgage contracts that required little or nothing from the borrower for more than a year, only to ask for far more in subsequent periods, were predicated on increases in house prices that were ultimately not realized. Any regulator charged with mitigating systemic risk would have had to take a position on the likely path of house prices. Such forecasts are not easy to make. In fact, from a theoretical perspective, forecasting the path of the price of any asset, especially when markets are functioning well, is inherently difficult. Moreover, in addition to forecasting house prices, assessing the implications of changes in these prices for various market participants would have required detailed knowledge of not only mortgage contracts, but also the health of all those who acquired exposure to them.

Lastly, it should be kept in mind that in some cases, the very regulations intended to protect the public from excessive risk-taking may

have unintended consequences. As discussed earlier, FVA may have played a decisive role in exacerbating the initial effects of the financial crisis, even though it was instituted to prevent the public from being exploited by financial intermediaries with access to backstop public funding and insurance. As a result, it is difficult to know what a policymaker intent on limiting systemic risk might have done differently. The preceding ideas lead to the question of how much discretion policymakers (ought to) have. We will argue that the answer may be: not much.

Broader Powers Are not Necessarily Better

The perception that disastrous outcomes would have occurred in the absence of timely intervention by policymakers has now led to calls to endow regulatory bodies, including the Federal Reserve System, with wider powers. Such efforts may have benefits, but they also carry risks. The benefits of having such a regulator, especially when it is the Fed, are listed frequently,[28] so we will focus on some of the risks.[29] First, recall that the time inconsistency problem arises not in spite of, but rather because a policymaker is benevolent, seeking at each moment only to do what is best for the public. And yet, it is this inability to stick to a rule that created the very conditions that led such a policymaker to have to act: One need not have a jaundiced view of policymakers to worry about giving them discretion.

With respect to the discretion possessed by policymakers, a central question that at present does not have a clear answer is whether policymakers can ever have commitment to not revisit their policy announcements. One view is that the answer is no; policymakers will always reoptimize and refuse to allow very bad things to occur. The dramatic policy responses by the Fed and the executive branch of government suggest that they indeed reoptimized, seeking to improve outcomes from the present moment forward. However, what is less clear is the extent to which the preconditions for a crisis would have occurred in a world where policymakers were determined to always let the chips fall where they may. If one's view is that policymakers do not have commitment to avoiding bailouts, then it follows that they must limit behavior that would force their hand in the wake of any shock, especially a large one. This is the essence of the argument for

[28] See, e.g., Labonte (2009).

[29] To be clear, what is being emphasized is that there are some risks that would face any systemic risk regulator. The question of who that regulator should be (e.g., the Fed, the Office of Thrift Supervision, etc.) is a separate issue—one that we do not address here.

preventing firms from growing TBTF, especially when they do so by issuing debt.

If one's view is that policymakers are unable to tolerate ex-post inefficiency, then the source of this inability matters. In particular, if policymakers pursue bailouts because they fear a public unwilling to brook such outcomes, it becomes crucial that the public understands the extent to which a given after-the-fact intervention sows the seeds for behavior that will create the next crisis. And here, the received science is not definitive. Large banks and other financial institutions *do* provide potential efficiency gains through scale and network effects. Nonetheless, if TBTF is known to influence some banks' and financial intermediaries' decisions, economic theory tells us that they will certainly choose too much risk if left to their own devices. As a result, allowing for very large, complex, and interconnected institutions means vigilance by policymakers and regulators. It is not obvious, though, that very pervasive regulation can be successful, especially since it creates the distinct possibility of regulatory capture whereby policymakers subtly become beholden to the entity they are charged with regulating. Future work must help delineate clearly the gains the public gets from allowing financial intermediation to grow extremely concentrated and the gains from allowing nonbanks to hold bank-like balance sheets with heavy short-term leverage and long-term assets.

How relevant was TBTF in recent events? An emerging view is that the risk and size assumed by banks was quite deliberate and quantitatively large enough to severely constrain subsequent lending by banks in the wake of losses due to mortgage default. As Richardson and Acharya, Schnabl, and Suarez document,[30] banks were "playing the leverage game" and thereby creating a serious TBTF problem. The reason that even securitized loans sold into conduits threatened bank balance sheets is that banks were obligated to provide credit support in the event that the assets performed poorly.[31] As a quantitative matter, the reductions in value of the securities held by conduits were enough to wipe out the capital of many institutions that had issued support agreements. As a result, the securitization, which would have worked well if the assets had been sold, did not ultimately transfer risk away from banks and toward investors. Similarly, the credit support that many of the issuers of real-estate- backed commercial paper (e.g., SIVs and conduits) had from banks ensured that their creditors would not see losses. Nonetheless, the willingness of banks to issue such commitments may well have been affected by the view that they were TBTF.

[30] Richardson (2009) and Acharya, Schnabl, and Suarez (2010).

[31] See, e.g., Acharya and Schnabl (2009).

As a result, such commitments may have served as a way to transfer risk originating in a SIV to the taxpayer by way of the banking system. In this view, the fundamental problem is not the credit lines but the inability of the policymaker to credibly commit to allowing an overextended institution to simply fail.

4. CONCLUDING REMARKS

We have identified systemic risk with linkages between market participants that lead to outcomes that can be unambiguously improved after a shock. As to the sources of such outcomes within financial markets, certain contractual arrangements featuring inflexibility, or requiring collateral infusions or liquidations in the event of a negative shock, appear important. However, we have also argued that in many cases, the trading arrangements that display such features may themselves have been constructed precisely to deal efficiently with problems of asymmetric information and limited commitment between trading partners. Moreover, in some instances, contractual arrangements may have been constructed with a view to exploit the unwillingness of benevolent policymakers to allow certain financial market entities to be liquidated. As a result, we have argued that the right goal for policymakers is to do as much as possible to ensure that the institutional arrangements for trade can attain efficiency as viewed before the arrival of shocks. The successful pursuit of this objective may then require credible commitments to withhold assistance in the wake of a shock. Understanding the channels by which after-the-fact interventions alter, and perhaps destroy, the ability of society to allocate resources productively is of critical importance. It is particularly crucial for measuring the long-run costs of the discretionary policymaking that is currently taking place. In the context of fiscal and monetary policy, there is now something of a consensus among economists that discretion is harmful. The consequences of discretion in financial markets are now getting more attention as well. In the interim, the broader public should remain realistic about the benefits of codifying and dealing with systemic risk. In addition, society must remain vigilant to ensure that systemic risk is not invoked to further ends unrelated to the long-run realization of gains from trade.

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Should the Fed Have a Financial Stability Mandate? Lessons from the Fed's first 100 Years

Renee Haltom and Jeffrey M. Lacker

The year 2013 marked the 100th anniversary of the Federal Reserve Act that created the Fed. The Act was passed to address recurrent financial crises, so it is ironic that the Fed's centennial nearly coincided with the global financial crisis of 2007–08, the worst financial crisis in generations.

Federal Reserve lending programs were prominent during the crisis, and the Fed supervised important parts of the financial sector prior to the crisis. Understandably, many policymakers and academics have been asking whether changes to the Fed's responsibilities and authorities are needed to create a more stable financial system.

But what should the Fed's role in financial stability be?

The broad context for this question is the movement in the global central banking community toward more formal financial stability mandates.[1] These efforts have tended to focus on prevention, namely looking for signs of excessive risk-taking in an array of financial markets. In the United States, the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act enhanced the Fed's surveillance powers and imposed new constraints on risk-taking in the financial sector, all aimed at reducing the probability of the type of financial market turmoil

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[1] For a summary, see Bank for International Settlements (2011).

experienced during the recent crisis.[2] One implication of heightened responsibility for financial stability is that a central bank should use all the tools at its disposal to mitigate identified problems, for example, by curtailing risk through targeted regulatory interventions, or even using monetary policy tools to prevent the negative effects that financial distress could have on central banks' objectives for growth and inflation.

Many of the Fed's past actions in the name of financial stability, however, have come in the form of credit extension once crises are underway, as in the case of the Fed's extraordinary lending to firms and markets in 2007 and 2008. A financial stability mandate would seem to imply a central bank obligation to intervene to alleviate potential damage in cases of financial distress.

Is crisis lending necessary for a stable financial system? Some observers have addressed this question by looking to the history of the Federal Reserve. The 1913 legislation creating the Fed grew out of the reaction to the Panic of 1907, an economic contraction in which many banks experienced runs and suspended depositor withdrawals. One central purpose of the Fed was to respond to such panics, which has been said to justify the broad range of Fed responses to modern financial crises.

Another common rationale for the Fed's emergency lending is the doctrine that a central bank should act as a "lender of last resort," an idea associated with the writings of Walter Bagehot, the 19th century British economist. Episodes in which the Fed failed to act aggressively as lender of last resort—most notably during the wave of bank failures at the outset of the Great Depression, which the Fed did little to prevent—are often described as demonstrating the necessity of crisis lending by the central bank.

This essay argues that these justifications for Fed crisis lending are based on erroneous readings of history. The Fed was originally designed and built to solve a monetary problem, not a lending problem. That monetary problem resulted from legislative restrictions that hindered the banking system's ability to issue currency and redistribute it as needed. Bagehot's 19th century work, too, was intended to encourage the Bank of England to provide liquidity to illiquid but otherwise

[2] There is clear support for a formal financial stability mandate in the United States. A near-final version of the 2010 Dodd-Frank Act almost took this step, stating that, "The Board of Governors shall identify, measure, monitor, and mitigate risks to the financial stability of the United States." For unexplained reasons, the phrase was dropped in conference. Some parties have even argued that a financial stability mandate already exists by virtue of the Fed's other mandates. For example, see Bank for International Settlements (2011), Dudley (2013b), Baxter (2013), and Tarullo (2012).

solvent firms during panics. While this may sound similar to the Fed's actions in 2007 and 2008, Bagehot's prescriptions had more to do with providing monetary stability to the financial system as a whole in the face of panics than allocating credit to targeted sectors or firms as the Fed did during the recent crisis. The Great Depression can be misread as well. The Fed's central failing was that it allowed the money supply to fall precipitously, not that it didn't prevent bank failures.

By contrast, when the Fed has used its lending tools to promote financial stability by limiting creditor losses, the results have been less than salutary. In a series of incidents beginning in the 1970s, the Fed, in cooperation with the Federal Deposit Insurance Corporation, intervened to limit bank failures' effect on creditors. Early interventions were relatively small, but they established precedents that led potential creditors to expect to be rescued in future instances of financial distress, weakening their incentives to limit borrower risk-taking and vulnerability.

Government-lending programs often appeared to stabilize markets because they confirmed hopes of intervention, and so have been hailed as successes.[3] But this has come at the cost of moral hazard, greater risk-taking, and greater instability down the road.

Tougher regulations may seem like a way to overcome the moral hazard that results from the government's safety net, but that strategy has fallen short in the past. Regulations can be helpful in containing risk, but they are fallible and boost the incentive to move risk-taking outside of regulated sectors. Moreover, a mandate for the central bank to prevent excessive risk-taking is likely to give rise to expectations that it will respond if it fails in that objective by ameliorating the effects with crisis lending. The implied government safety net then encourages riskier behavior. When the government steps in to protect creditors with emergency lending, it continues the self-perpetuating cycle of crisis, intervention, regulation, and regulatory bypass.

The result has been an ever-expanding government safety net and an ever-expanding interpretation of the Fed's role in financial stability.

Recent regulatory reforms continue our journey down this path. While the Dodd-Frank Act tried to improve the handling of large failing financial institutions, the capacity to use government resources to protect creditors remains. Instances of financial distress are inevitable, but the anticipation of support is likely to turn them into crises, eliciting ever-more rescues and preventative regulation. A broad and ill-defined financial stability mandate for the Fed would contribute to the cycle of

[3] For a review of literature on the effectiveness of crisis lending programs, see Fleming (2012).

crisis and intervention by fostering the expectation that the Fed will respond to financial instability with all the tools at its disposal, including lending to protect the creditors of large financial institutions.

There is a way to correct this course, however, and it requires clarifying the Fed's role in financial stability. We need to break the cycle by which expectations of intervention beget excessive risk-taking, which begets distress and further interventions. The real lesson of the

Fed's first 100 years is that the best contribution the Fed can make to financial stability is to pursue its monetary stability mandate faithfully and abstain from credit-market interventions that promote moral hazard. A careful look at the Fed's first 100 years sheds light on reforms that would truly help ensure financial stability.

1. WHAT PROBLEM WERE THE FED'S FOUNDERS TRYING TO SOLVE?

Today, the Fed's primary goals are to achieve low, stable inflation and healthy employment. But neither of these goals is why the Fed was created. The Fed's purpose in 1913 was to help the monetary and banking system overcome legislative flaws.

At times, the public would want to convert a substantial amount of its bank deposits into currency. The fundamental problem was that it was costly and cumbersome to increase the supply of currency for banks to meet the demands of depositors. The architects of the Federal

Reserve Act often stated that the source of the problem was twofold.[4] First, currency was issued by banks, not the government, but all currency was required by the National Banking Acts of 1863 and 1864 to be backed by U.S. government bonds. To issue new currency, banks would have to acquire new bonds and wait for new notes to be printed and shipped by the Bureau of Engraving and Printing, the agency that still prints currency today. This cumbersome process meant the supply of currency could not expand quickly.[5]

Second, the banking system was fragmented. Most U.S. states prohibited banks from establishing branches. When the Fed was founded, there were more than 27,000 banks; virtually every town had its own. Other countries, such as Canada, had no branching restrictions, and this allowed banks to diversify their portfolios. In the United States, the health of many banks hinged on the local economy—often on the season's production of a single crop. Country banks kept deposits in

[4] For a review of literature on the effectiveness of crisis lending programs, see Fleming (2012).

[5] Cagan (1963)

city "correspondent" banks, which in turn kept deposits in the major money center banks and clearinghouses that were mainly in New York.[6] When currency demand surged, country banks would ask their correspondent banks for shipments of banknotes, to be paid for from their reserve accounts. But sometimes the demands on the money center institutions were too great, and they refused withdrawal requests to preserve cash for themselves. This resulted in suspensions of payments to depositors, who rushed to be first in line when suspension or failure was feared, resulting in "bank runs." A run on one institution sometimes led to runs on others, resulting in what were known as broader "financial panics."

These two problems had serious consequences. The pressure on the currency supply during the autumn harvest season meant interest rates were significantly higher in the fall than the rest of the year, the equivalent today of the Fed significantly tightening monetary policy every Thanksgiving.[7] Bank panics could be devastating to economic activity because they disrupted the ability to make payments conveniently. Carter Glass, the senator from Lynchburg, Va., who helped design the Federal Reserve, said that panics, "affected not alone the financial institutions immediately involved, but the merchants whose credits were suspended; the industries whose shops were closed; the railroads whose cars were made idle; the farmers whose crops rotted in the fields; the laborer who was deprived of his wage. No business enterprise, if any individual, ever entirely escaped."[8] Prior to the Fed's founding, major panics occurred in 1873, 1884, 1890, 1893, and 1907, with many smaller panics and bank failures in between. It was that last particularly disastrous panic in 1907 that finally galvanized the political will—after more than three-quarters of a century without a central bank—to create the Fed.

Congressmen, bankers, and economists all participated in the debate over how to reform the banking system. Discussions centered on laws pertaining to currency. Who should issue it? What would back it? How would oversupply be prevented to preserve its value? Some factions wanted banks to issue currency against their own general assets, sidestepping frictions in the U.S. bond-backed system, but there was little agreement on how to prevent over-issue. Others wanted to broaden membership in the system of private clearinghouses that had averted

[6] Keeping deposits in other banks also facilitated check clearing in the days when physical checks traveled by horse and carriage. Reserves allowed "correspondent" banks to immediately cash each other's checks by drawing down the correspondent's reserve balance (Lacker, Walker, and Weinberg 1999).

[7] Miron (1986)

[8] Glass (1922, 5–7)

panics in the late 1800s by pooling the reserves of members and issuing emergency credit. However, many vehemently opposed the accompanying centralization of institutional power. Dismantling restrictions on bank branching and consolidation was viewed as clearly desirable but politically infeasible since farmers and small bankers opposed it, and thus it received little attention.[9] After considerable debate over the balance between centralized and regional powers, a federated system of regional Reserve Banks was adopted. The Federal Reserve Act was passed in 1913, and the Fed opened its doors in November 1914.

2. WAS THE FED CREATED FOR FINANCIAL STABILITY?

The preamble to the Act stated that the Fed was created to "furnish an elastic currency." This was to take place primarily through loans from the Fed to commercial banks. Banks facing a heightened short-term need for currency could obtain it from their regional Reserve Bank. In exchange, the banks would assign the Reserve Bank some of their own assets at a discount that reflected an implied interest rate—hence, the process was called "rediscounting" the bank's initial loan, and the Fed's lending was called the "discount window."[10]

A crucial feature was that only a very specific, limited set of assets were eligible for rediscounting. The Federal Reserve Act reflected elements of "real bills," a doctrine dating to the early 18th century that held that banknotes should be backed exclusively by loans that funded legitimate commercial activity, as opposed to speculative investments.[11] Currency issued via such lending would be retired naturally when the economy no longer needed it since the underlying loans would be repaid with the sale of goods and services. In the context of the original Federal Reserve Act, only short-term paper arising from

[9] Sprague (1910, 249–251); Glass (1922, 5); Calomiris (1990); Wicker (2005, 2–3). Alternatives to currency reform and the Fed were discussed but did not gain traction. In addition to bank branching, deposit insurance was considered, but large banks objected under the argument that it would force them to subsidize the risk-taking of small banks (Flood 1992). For more discussion on how the reform debate evolved prior to the Federal Reserve Act, see Wicker (2005), Warburg (1930, Chapter 1), and Willis (1923).

[10] To make the loan, the lending Reserve Bank would credit the borrowing bank's reserve account. The bank could then withdraw the reserves in the form of currency (Federal Reserve notes) if so desired.

[11] To be precise, the real bills doctrine said that if banks lent against only sound, short-term paper, the money supply would automatically match the needs of commerce. The doctrine has since been discredited for ignoring the fact that inflation would itself create a greater demand for currency to fund trade. See Humphrey (1982) for more discussion.

commercial transactions or international trade was eligible for rediscounting.[12]

The Fed also was given authority to buy certain securities—assets eligible for rediscounting plus government debt—through open market operations. The intent of open market operations was to strengthen the Fed's ability to control gold flows, but it also provided another tool for expanding the supply of bank reserves and circulating notes, and it would become more important later in the Fed's history.[13] Open market purchases were made by crediting banks' reserve accounts and had the same effect on the supply of monetary assets—Federal Reserve notes, reserve balances with Federal Reserve Banks, and gold coins and bullion—as discount window loans.

We would argue that the primary goal of the Fed's founders was to achieve monetary stability. "Furnishing an elastic currency" meant that the supply of monetary assets would vary with fluctuations in demand. Instead of interest rate spikes and withdrawal suspensions, swings in the need for currency could be accommodated smoothly and interest rate movements would be dampened. In recent decades, the Fed generally has managed the money supply through open market operations. Purchases and sales are designed to keep a short-term interest rate—the federal funds rate—at a target value set by the Federal Open Market Committee.[14] Open market operations have been the main tool of monetary policy and have been used to manage the money supply to keep inflation low and stable.

In 1914, monetary policy was conducted through direct lending to banks. As a result, the distinction between monetary policy and credit allocation—when policymakers choose certain firms or markets to receive credit over others—was blurred in the language the founders often used. A careful reading of the debates over the Federal Reserve Act makes clear, however, that the only intended type of credit allocation was the one embodied in the real bills doctrine. Federal Reserve lending was to channel credit away from uses that would lead to

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[12] The Federal Reserve Act itself did not indicate that only "self-liquidating" loans were eligible, a defining component of real bills (Humphrey 1982). However, maturity limits were imposed, and the same month the Fed opened, the Board clarified in its accompanying regulations that notes funding permanent or fixed investments, like land and capital, were ineligible for rediscounting. That exclusion was lifted in 1973, though maturity limits remained (Hackley 1973, 35–37).

[13] If the Fed created an artificial shortage of reserves through asset sales, banks would be forced to borrow from the Fed at the discount rate, which would ensure its influence over other market rates, and therefore gold flows. Policymakers at the Fed disagreed over whether open market operations were contradictory to real bills (Meltzer 2003, 263–264).

[14] Hetzel (2004)

"speculative excesses," such as call loans in the stock market, and toward more productive uses, such as the "needs of commerce."

The Fed has since abandoned the real bills doctrine, but the central bank has engaged in a different type of credit allocation: preventing losses for the creditors of specific distressed financial institutions or asset markets. This type of credit allocation is often conflated with the lending envisioned at the Fed's founding because the tools are the same. The original Federal Reserve Act was not wellsuited to this contemporary form of credit allocation, however. The Act significantly limited the Fed's ability to support many types of financial entities because only member banks had access to the Fed's discount window. Nonmember banks were excluded, as were many other types of financial institutions, including the trusts that were at the center of the Panic of 1907. Moreover, it would be surprising if the founders had included such provisions; they generally opposed guarantee schemes for fear they would encourage banks to take greater risks.[15]

Before the Fed's creation, panics were simply an acute manifestation of the broader monetary instability problem. With the latter perceived as solved by the Federal Reserve Act, the Fed's founders largely ignored the question of whether the new system would adequately prevent narrower instances of financial distress at individual banks. The hearings over the Glass-Owen bill that became the Federal Reserve Act featured almost no discussion of whether the legislation sufficiently prevented panics, the role of open market operations in providing backstop liquidity, and whether the legislation's restricted discount window access would impair the Fed's ability to avert crises.[16] Moreover, the Act included no provision for relaxing lending standards to resolve panics. If firms couldn't obtain credit under the Fed's strict collateralization rules—in a panic or otherwise—then they were considered to be simply unworthy of credit.

All this indicates that the stabilizing role envisioned by the founders was to provide for the general circulation of currency, not to channel funds to targeted institutions or markets in crises. In other words, it is more accurate to say that the Fed was originally created and designed to ensure monetary stability, not financial stability as the latter term is now understood.

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[15] Carter Glass, who coauthored the Glass-Owen bill that became the Federal Reserve Act, was a well-known opponent of deposit insurance. Federal deposit insurance was nonetheless incorporated into the Glass-Steagall Act of 1933 as an 11th-hour addition in exchange for the support of Alabama Rep. Henry Steagall for the bill's many other provisions that Glass advocated. Steagall represented many small banks that would be kept viable by deposit insurance in the face of increasing bank branching and consolidation (Flood 1992; Economides, Hubbard, and Palia 1996).

[16] Wicker (2005, 78)

3. WHAT ABOUT BAGEHOT AND THE CENTRAL BANK AS THE LENDER OF LAST RESORT?

If that's the case, then where did the notion of "lender of last resort" come from? The phrase is associated with Bagehot, the classical economist, who in 1873 refined the earlier work of Henry Thornton on the central bank of England.[17] Bagehot's famous dictum on central bank lending in a crisis is often paraphrased as, "lend freely on good collateral at penalty interest rates." Many people have argued that this is what the Fed did during the recent financial crisis.[18]

Bagehot is often misinterpreted, though, because our current financial system is very different from the one he confronted. In those days, the central bank's loan to a bank necessarily increased the money supply; once again, direct lending and monetary policy were intertwined. Today, by contrast, direct lending and monetary policy are separate processes with separate objectives. Direct lending is conducted so as not to have any effect on the overall money supply.[19] In Bagehot's time, central bank lending was simply the primary way the money stock was managed. What's more, the Bank of England's discount lending was intermediated through "discount houses," which effectively prevented the Bank from knowing the identities of the borrowing institutions, much less allocating credit based on case-by-case analysis of their financial conditions and interconnections within the financial system.[20] Thus, when Bagehot advocated central bank lending in a crisis, he was advocating that the central bank expand the money supply to meet the increase in demand.[21]

Moreover, Bagehot advocated crisis lending only under a specific set of rules—only against good collateral and at above-market interest rates to dissuade firms from relying on central bank credit as a substitute for risk management. Bagehot further advised the central bank to allow insolvent firms to fail if they could not meet those terms, even if their failures might shake market confidence, because the expectation of bailouts would only encourage risk-taking and "rashness." If failures threaten to hurt other firms or the economy at large, Bagehot said

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[17] Thornton and Bagehot never actually used the phrase "lender of last resort." The first popular English usage was in 1932 in *Art of Central Banking* by R.G. Hawtrey, although Sir Francis Baring in 1797 did refer to the Bank of England as "the dernier resort," a source of liquidity for banks in a crisis (Humphrey 1989).

[18] For example, see Madigan (2009) and Wolf (2014).

[19] Discount window loans increase the supply of bank reserves, and in normal times are offset to prevent downward pressures on the federal funds rate, the FOMC's targeted interest rate.

[20] Capie (2002, 311)

[21] Goodfriend and King (1988)

the central bank should continue to protect the money stock through liberal lending without relaxing its criteria. And importantly, he said, the central bank should make these policies clear ahead of time to reassure the public that currency will be available and to prevent firms from expecting a central bank safety net to protect them from bad investments.[22]

The context in which Bagehot wrote is often omitted from modern invocations. Bagehot began work on his famous book *Lombard Street* in the autumn of 1870, during the Franco-Prussian War. The French central bank already had suspended payments, a move that threatened to heighten gold demands on the Bank of England. Bagehot felt the Bank of England needed to maintain a large stock of gold to reassure markets that the currency supply would be protected. In fact, much of *Lombard Street* was about that need, not panics.[23] However, he wrote, if the large gold stock wasn't enough to allay panic, the Bank of England should follow the "brave plan" and lend liberally. Such lending would be "brave" because the Bank of England was set up to be accountable to stockholders, so the profit motive made it naturally reluctant to lend in riskier times. Bagehot's dictum to "lend freely at a penalty rate" was intended to encourage a risk-averse Bank of England to lend.

The Fed faces the opposite dilemma because it lends taxpayer dollars. The Fed receives no appropriations from Congress, but it remits all profits in excess of operational costs to the U.S. Treasury, so taxpayers bear both profit and losses from the Fed's investments. The challenge for the Fed is how to resist the temptation—and perhaps political pressure—to over-lend.[24] Singling out Bagehot's dictum about crises glosses over his emphasis on protecting the overall money stock in both normal and crisis times and his vigilance regarding moral hazard.

The Fed's lending during the 2007–08 financial crisis bore little resemblance to what Bagehot had in mind. First, it was not monetary in nature. For most of the crisis, the Fed ensured that its unusual lending had no monetary impact by sterilizing the effects on the money supply (that is, simultaneously selling an equivalent amount in Treasury securities). In fact, until interest rates were effectively reduced to zero in late 2008, the Fed's interest rate targeting procedures made the supply of monetary assets vary automatically with movements in demand, without the need for special lending. When the Fed's balance sheet did grow in late 2008, it was primarily a byproduct of its targeted lending

[22] Goodfriend and King (1988)

[23] Rockoff (1986)

[24] This point is argued by Goodfriend (2012).

to support the flow of credit to particular markets, notably mortgage markets; it did not emerge primarily from a desire to ease monetary conditions.[25] Much of the Fed's crisis response was openly about allocating credit to specific sectors and institutions perceived as being in trouble, not about managing the money supply.

The Fed's crisis response departed from Bagehot's recommendations in other ways as well. The Fed provided financing in connection with two arguably failing institutions, Bear Stearns and American International Group. The Fed protected countless other creditors through emergency lending to support asset prices. No pre-announced policy governing intervention was articulated or followed. The Fed failed to charge penalty interest rates in some cases and took on credit risk by accepting troubled and difficult-to-value securities as collateral.[26]

Bagehot and the traditional conception of a lender of last resort thus provide scant support for the interventions that the Fed undertook in the name of financial stability during the recent crisis.

4. WOULD FAILURE TO LEND HAVE CAUSED ANOTHER GREAT DEPRESSION?

Advocates of strong central bank actions to promote financial stability often cite the Great Depression, when the Fed reacted passively, allowing a third of the nation's banks to fail between 1930 and the banking holiday of 1933. The Fed's policy failure at the outset of the Depression was a principal finding of Milton Friedman and Anna Schwartz in their famous 1963 book, *A Monetary History of the United States*. It prompted Ben Bernanke, himself a scholar of the Depression, to tell Friedman and Schwartz in 2002, "You're right, we did it. We're very sorry. But thanks to you, we won't do it again." The Fed has never repeated the mistake.

In the 1930s, the Fed could have lent to prevent bank failures but did not. In part, this reluctance reflected the real bills doctrine, which, under the circumstances, encouraged Reserve Banks to be overly conservative.[27]

Reserve Banks also resisted conducting open market purchases because that would drive down interest rates and lead to gold outflows,

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[25] In an October 2009 speech, then-Chairman Ben Bernanke said, "Although the Federal Reserve's approach ... entails substantial increases in bank liquidity, it is motivated less by the desire to increase the liabilities of the Federal Reserve than by the need to address dysfunction in specific credit markets. ... For lack of a better term, I have called this approach 'credit easing.'"

[26] Madigan (2009); GAO (2013b); Goodfriend (2012).

[27] Richardson and Troost (2009)

jeopardizing their ability to defend the gold standard.[28] The money supply contracted by a third from 1929 to 1933, with a commensurate fall in the overall price level. Friedman and Schwartz emphasized the devastating impact of this dramatic and unanticipated deflation. Loan defaults rose as borrowers struggled to acquire the dollars they needed to repay debts.

Bank failures were less important than the collapse of the money supply. For example, Canada had zero bank runs or failures during the same time period, but it also had a severe depression after its money supply declined by 13 percent.[29] To be sure, bank failures hastened withdrawals and reduced deposits, worsening the money supply decline. But the Fed could have offset that by increasing bank reserves through open market operations. Indeed, the contraction slowed when open market operations were conducted in the spring of 1932, and the contraction resumed when the Fed reversed course later that year.[30] Friedman and Schwartz concluded that, "If [failures] had occurred to precisely the same extent without producing a drastic decline in the stock of money, they would have been notable but not crucial. If they had not occurred, but a correspondingly sharp decline had been produced in the stock of money by some other means, the contraction would have been at least equally severe and probably even more so."[31]

The lesson, then, is that central banks should prevent deflation, not necessarily bank failures. The Great Depression was a failure of monetary stability, not financial stability.

5. WHY IS TOO MUCH LENDING RISKY?

After 1951, the Fed shifted the purpose of the discount window from being a tool for monetary policy to primarily one for allocating credit to specific firms.[32] A 1968 Fed report noted that borrowing averaged less than 2 percent of total Fed credit extended from the 1930s to the mid-1960s.[33] The report explicitly adopted, seemingly for the first time, the role of lender of last resort "when liquidity pressures threaten to engulf whole classes of financial institutions." Though the report emphasized that the Fed's function is not to provide a "bail-out operation," it

[28] Eichengreen (1992)
[29] Friedman and Schwartz (1963, 352)
[30] See essays about the Great Depression era on federalreservehistory.org.
[31] Friedman and Schwartz (1963, 352)
[32] Hackley (1973, 185–188)
[33] Board of Governors (1968)

provided great detail on how existing laws might enable the Fed to extend credit to nonmembers and nonbanks in emergencies.

The report was prescient because the Fed was called to perform this function within two short years. In a series of incidents, the Fed and other regulators began intervening in ways that rescued the creditors of large, distressed financial firms. After the Penn Central railroad defaulted on $82 million in paper obligations in 1970, the Fed indirectly supported securities markets by encouraging banks to borrow from the Fed to purchase commercial paper. In 1972, the FDIC gave the $1.2 billion Bank of the Commonwealth a $60 million line of credit that prevented its failure after rising interest rates produced significant losses on municipal debt. After escalating losses in 1974, the Fed lent $1.7 billion to Franklin National Bank, accepted deposits from its foreign branch as collateral, and assumed $725 million of its foreign exchange book. When the $40 billion bank Continental Illinois was pulled under by bad loans in 1984, it was able to borrow from the discount window even as it was receiving a capital injection from the FDIC. The FDIC committed to guaranteeing deposits even above the statutory limit of $100,000, and it gave the bank and its parent company a permanent capital infusion.[34]

These were among the largest examples of government rescues, but there were many others. From 1985 through 1991, 530 discount window borrowers failed within three years of borrowing from the Fed; 437 of them had the lowest possible examiner rating, and 60 percent of them had outstanding discount window loans when they failed.[35]

The Fed and the FDIC operated in concert. Fed lending bought time for the FDIC to arrange for the institutions to be sold or kept afloat with FDIC funds. Fed lending also provided time for uninsured creditors—that is, those who had not been explicitly promised support before the trouble began—to exit without losses, increasing the cost of the failure to the FDIC. Between 1986 and 1991, the average size of troubled banks that the FDIC liquidated without protection of uninsured creditors was $65 million, while the average size of banks whose uninsured creditors were protected was $200 million.[36]

In the most well-known cases, the government's stated concern was not the welfare of a single institution's creditors, but the possibility that, if the institution failed, funding costs would rise for other market

[34] For more on these episodes, see Sprague (1986) and Carlson and Wheelock (2013).

[35] Schwartz (1992). The appendix in Sprague (1986) lists the 100 largest banks that received FDIC assistance from the Depression through 1985. Continental Illinois and Franklin National were ranked first and fourth, respectively.

[36] FDIC (1997)

participants.[37] In each case, the government intervened rather than test the market's ability to weather spillovers, and these actions successfully quelled the immediate volatility. Note that government intervention was unlikely to prevent knowledge from spreading about a given firm's trouble. The primary spillover that was affected was the inference investors drew about the government's willingness to intervene to support other market participants.

A strong case can be made that these interventions caused greater instability down the road. When the government defines in advance institutions that have access to its liquidity, it can tax and regulate those firms accordingly, offsetting moral hazard and constraining risk-taking. By contrast, when the government suddenly expands its safety net in the face of threats to firms and markets that have not been taxed and regulated, or when it prolongs the life of insolvent firms, it conveys that market participants can take excessive risks without bearing the full costs. On the margin, funding flows to markets that seem most likely to receive government support. The expectation of that support reduces the monitoring efforts of creditors, so those borrowers can take greater risks. When firms fail, government support is invoked again.

As this narrative suggests, failures and the safety net have grown successively larger. Richmond Fed researchers calculate that, by 1999, approximately 45 percent of the financial sector was either explicitly protected by the government, or investors could reasonably expect protection because of past statements and actions. The protected portion rose to as much as 57 percent after the government's activities during the financial crisis.[38] The size of the safety net suggests that moral hazard is a significant presence in our financial system.

6. IS EMERGENCY LENDING NECESSARY?

Our current financial system has changed dramatically over the past century. Banks and trusts dominated the landscape in 1913. The system now includes an interconnected web of banks and investment companies, including mutual funds, private equity pools, hedge funds, and others. These institutions operate with opaque interconnections and on a global scale, and they ultimately fund the bulk of economic activity.[39]

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[37] Sprague (1986) provides detailed insight on the internal discussions that took place among regulators in these instances. The Fed was, more often than not, in complete support. Sprague notes, "What were the real reasons for doing the [bailouts]? Simply put, we were afraid not to."

[38] Marshall, Pellerin, and Walter (2013)

[39] Pozsar, Adrian, Ashcraft, and Boesky (2010)

They use an array of complex financial instruments, and some perform bank-like functions in the sense that they accept very short-term instruments that function much like "deposits," and use them to fund longer-term investments.

A common argument given for preserving the Fed's emergency lending powers, despite the risks described above, is that the government must retain some way to provide backstop financial assistance to treat the fragilities inherent in banking.[40] The essence of the financial crisis, in this view, was that many investors declined to roll over short-term, deposit-like investments in a process resembling a bank run. As the shadow banking system emerged over the past century, no official institution emerged to create an "elastic currency" for it—that is, a reliable supply of short-term credit instruments to fund the shadow banking system.[41] In this narrative, the Fed's special lending programs during the financial crisis of 2007–08 simply provided an elastic currency to protect the needs of commerce. Many observers have described the crisis as a classic banking panic.[42]

If the fragility we recently observed were due mostly to inherent fragilities in banking, we should expect to see similar financial crises with some consistency across countries over time. Yet history shows that the occurrence of financial crises is very unevenly distributed. They were particularly prevalent during some periods but noticeably less frequent in others. The 1920s and 1930s, for example, and the period since 1973 have seen significantly more frequent crises than the classical gold standard period or the Bretton Woods era.[43] And many countries have experienced far fewer crises than the United States, a fact documented in studies by Michael Bordo and Barry Eichengreen, Carmen Reinhart and Kenneth Rogoff, and Charles Calomiris and Stephen Haber.

Canada provides a particularly compelling example of a country that is quite similar to the United States but has avoided systemic banking panics altogether since 1839, despite the lack of a central bank until the mid-1930s. In the late 19th century, Canada allowed bank branching and less-restrictive issuing of banknotes, which made their banking system better able to respond to regional economic shocks. These features afforded Canadian banks an "elastic currency" with no central bank. If needed, Canadian banks could shift reserves between

[40] Dudley (2013a)

[41] Gorton (2010); Gorton and Metrick (2013)

[42] See Bernanke (2013b), Gorton (2010), and the Federal Open Market Committee meeting transcripts from 2008, among others.

[43] Bordo, Eichengreen, Klingebiel, and Martinez-Peria (2001)

them, and the confidence that this would take place seemed sufficient to ward off runs. The system was concentrated enough that banks could monitor each other's operations to offset the moral hazard that might otherwise arise from this private backstop.[44]

One reason we may not see crises consistently is that financial institutions face a different set of incentives across countries and time periods to fund themselves with short-term debt. There are alternative funding methods that aren't as vulnerable to sudden demands for withdrawals. If financial institutions choose to fund themselves with short-term, demandable debt, they can include provisions that make them more resilient, therefore reducing the incentive for runs.[45] Many of these safeguards already exist: contracts often include limits on risk-taking, requirements for borrowers to maintain a degree of liquidity, overcollateralization, and other mechanisms.[46] Moreover, contractual provisions can explicitly limit investors' ability to flee suddenly, for example, by requiring advance notice of withdrawals or allowing borrowers to restrict investor liquidations. Indeed, many financial entities outside the banking sector, such as hedge funds, avoided financial stress by adopting such measures prior to the crisis.[47]

Yet, leading up to the crisis, many financial institutions chose funding structures that left them vulnerable to sudden mass withdrawals. Why? Precedents established over the previous four decades arguably convinced market participants of an implicit government commitment to provide liquidity in the event of significant financial distress. Larger bank holding companies relied to a greater extent on the short-term credit markets that ended up receiving government support during the crisis.[48] As the crisis unfolded, beginning in the summer of 2007, the Federal Reserve took actions that are likely to have further influenced expectations regarding support. In August 2007, the Fed lowered the discount rate and urged banks not to think of borrowing as a sign of weakness. In December 2007, the Fed implemented the Term Auction Facility in order to make credit available on more favorable terms.

The effect of these policy decisions is often underappreciated. They likely dampened the willingness of troubled institutions, such as Bear Stearns and Lehman Brothers, to undertake costly actions to shore up their positions, whether by raising capital, selling assets, or reducing their reliance on short-term funding. These incentives were further

[44] Bordo, Redish, and Rockoff (1996); Williamson (1989)
[45] Wallace (1988); Green and Lin (2003); Ennis and Keister (2010)
[46] Bernanke (2012)
[47] Aragon (2007); Zuckerman (2008)
[48] GAO (2013b)

entrenched when the New York Fed funded JPMorgan's purchase of Bear Stearns in March 2008; for example, credit rating agencies considered the government's support of Bear Stearns in their decisions to leave Lehman Brothers with high ratings just before its collapse.[49] When Lehman Brothers was allowed to fail in September 2008, despite being a much larger institution than Bear Stearns, these expectations were reevaluated suddenly, spurring the most volatile days of the financial crisis. Allowing Lehman to fail could have been the start of a new, more credible precedent against bailouts; but that same week, American International Group received assistance from the New York Fed, further confusing already volatile markets.

After decades of expanding the financial safety net, the precedents set during the crisis may have been the most consequential of all.

7. IS THERE A BETTER PATH TO FINANCIAL STABILITY?

The moral hazard that results from government support is not a new revelation. Dating back to the 1930s, policymakers have acknowledged it with virtually every step that expanded or reinterpreted the government's reach.[50] From the Depression to the bank failures of the 1970s and 1980s, major crises have prompted sweeping reforms to constrain risk-taking and prevent future financial distress. Yet, at each turn, policymakers have been unwilling to relinquish the ability to funnel credit to particular markets and firms in perceived emergencies.[51] One can understand why, because such lending, by confirming hopes for intervention, appears to stabilize markets, as it did in 2007 and 2008. The approach instead has been to retain that power and attempt to counter moral hazard with enhanced supervision.

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[49] In a September 2009 House subcommittee hearing, Moody's chairman and CEO Raymond McDaniel said, "An important part of our analysis was based on a review of governmental support that had been applied to Bear Stearns earlier in the year. Frankly, an important part of our analysis was that a line had been drawn under the number five firm in the market, and number four would likely be supported as well."

[50] Moral hazard was acknowledged during the debates surrounding deposit insurance (Flood 1992), the Board's apparent adoption of the lender of last resort role (Board 1968), the first time the Fed purchased mortgage-related securities in 1971 (Haltom and Sharp 2014), the bailouts of the 1970s and 1980s (Sprague 1986), and the actions during the financial crisis that motivated the Dodd-Frank Act—among other instances.

[51] A notable example was 1991's Federal Deposit Insurance Corporation Improvement Act. FDICIA limited the FDIC's ability to rescue firms and limited the Fed's ability to lend to insolvent ones. However, FDICIA loosened collateral requirements for the Fed's 13(3) emergency lending facility, granting what former Fed Chairman Alan Greenspan in 2010 called "virtually unlimited authority to the Board to lend in 'unusual and exigent circumstances."'

The most recent crisis was no exception. The 2010 Dodd-Frank Act tightened limits on risk-taking and increased supervision, especially for "systemically important" financial firms. Title I of the Act allows regulators to constrain the activities of firms if their managements are unable to create a credible plan for their orderly wind-down in bankruptcy. Title II gives the FDIC authority to facilitate a firm's resolution if unassisted failure would threaten financial stability. Dodd-Frank prohibits the Fed from extending loans to specific firms under section 13(3) of the Federal Reserve Act, requiring instead that all 13(3) loans have "broadbased eligibility" and advance Treasury approval. The preamble to the Dodd-Frank Act states that one of its objectives is to end "too big to fail," the term often used to describe the government's historical tendency for bailouts of large, interconnected firms.[52]

Regulation, however, is far from foolproof as a way to counter moral hazard. To be sure, safety and soundness regulation is critically important given the size of the financial safety net. But regulations tend to take the current world as static, when in fact the world changes quickly, especially in response to new regulations. The emergence of the shadow banking system, for example, was a response to risk-taking limits imposed on traditional banks. Surveillance helps but may not keep up with innovation. In each past reform episode, policymakers have hoped they had their arms around risk-taking, and in the next episode, risk showed up in new places.

Thus, the real work of ensuring financial stability must start with addressing the incentives that encourage excessive risk-taking. Dodd-Frank does not accomplish this; like past reforms, policymakers retained broad discretion to conduct bailouts.[53] An important difference between resolution authority under Dodd-Frank's Title II and the normal bankruptcy code is that the former gives the FDIC the ability to borrow from the Treasury to pay creditors of a failed firm, and it gives the FDIC broad discretion to determine which creditors to pay.[54] Thus, creditors still can reasonably expect government support based on the government's past actions, with the attendant deleterious effects on their incentives to monitor a firm's activities. Moreover, Dodd-Frank's restrictions on 13(3) lending do not prevent bailouts. When large firms

[52] The phrase "too big to fail" was made popular after the failure of Continental Illinois, when Comptroller of the Currency C.T. Conover explicitly stated that regulators were unlikely to allow the nation's 11 largest multinational banks to fail. Congressman Stewart McKinney responded, "let us not bandy words. We have [created] a new kind of bank. It is called too big to fail. TBTF, and it is a wonderful bank."

[53] Of too big to fail, Bernanke stated in a March 2013 press conference, "I never meant to imply that the problem was solved and gone. It is not solved and gone; it's still here ..."

[54] Pellerin and Walter (2012)

are in trouble, it can be hard to distinguish between market distress and firm distress, and a broad-based lending program could be particularly attractive for a distressed firm.

At the same time, Dodd-Frank provides one of the most promising avenues for scaling back the perceived government backstop. Title I requires large firms to create "living wills," detailed plans for how each firms' operations could be rapidly wound down in an orderly manner under the U.S. bankruptcy code without government assistance. The Fed and the FDIC can jointly determine that a firm's proposed plan is not credible. In that case, if the firm does not revise the plan to regulators' satisfaction, they can impose changes to the firm's structure and operations that would make the firm resolvable without government assistance. Establishing credible living wills will be hard work.[55] However, they currently provide the best hope for ending bailouts of "too big to fail" firms because they prompt regulators to create conditions under which they consistently prefer unassisted bankruptcy to bailouts. With a credible alternative to bailouts available, investors would have reason to expect that unassisted bankruptcy would be the norm, and firms would have a strong incentive to implement their own safeguards against runs.

In addition, certain reforms of the bankruptcy code could improve prospects for credible resolution plans. Currently, if a borrower files for bankruptcy, a provision of the code known as the "automatic stay" prevents creditors from seizing collateral or taking certain other actions against the borrower. The borrower's assets are essentially frozen until bankruptcy courts can oversee the development and adoption of a plan for the distribution of assets to creditors. Certain financial contracts, such as repurchase agreements and some derivatives, are exempt from this provision, and counterparties in such contracts are entitled to immediately liquidate their positions and seize collateral. Exemptions to the automatic stay were added to the bankruptcy code and enhanced in 2005 because it was felt that allowing derivatives counterparties to liquidate their positions immediately would reduce the incentive for lenders to run before bankruptcy is declared. The exemption creates instability in other ways, however. It reduces creditors' risk, and so distorts incentives toward greater use of exempted contracts, and diminishes the lender's incentive to monitor the firm. It presents the possibility of additional market volatility after a failure as lenders are liquidating their positions, and it can diminish the value of the failed firm, both of which make it more tempting for the government to rescue

[55] Lacker (2013b)

large firms.[56] Reforming the bankruptcy code to limit these exemptions would enhance stability.[57]

If expectations of government intervention were to persist, even with credible living wills and a better bankruptcy code, market participants would face dampened incentive to avoid fragile arrangements. Those expectations are likely to persist as long as there is the legislative authority to provide that support, such as the power to use the Orderly Liquidation Fund to protect creditors in a Title II FDIC resolution. This power will be unnecessary and obsolete once credible living wills are in place. At that point, repeal of Title II would enhance financial stability. The Fed still possesses expansive authority to conduct bailouts, however, since it can lend to various parties in the broader financial system without special congressional approval. Rescinding section 13(3) entirely would be a useful step toward establishing a credible commitment to resolve failing financial institutions without rescuing creditors. The same reasoning suggests imposing clearly articulated restrictions on discount window lending, strictly limiting it to good collateral at penalty interest rates, as Bagehot suggested.[58]

The steps outlined above won't eliminate instances of financial distress. But optimal financial stability does not mean the absence of financial firm failures and creditor losses. Indeed, a well-functioning financial system must allow firms to fail, even if they are large and interconnected. Financial stability is to be found in the financial system's resilience to potential triggering events—without government assistance. The steps described above may be our best chance at achieving true financial stability.

The Fed's emergency lending authority is anachronistic and unnecessary for the Fed's core mission of providing monetary stability. In a panic, open market operations are capable of flooding the market with liquid assets. For this reason, some economists have argued that the discount window is obsolete.[59] Removing discretionary lending

[56] The Government Accountability Office notes that approximately 80 percent of Lehman's derivative counterparties terminated their contracts after the firm filed for bankruptcy, exacerbating Lehman's losses and leading to run-like behavior in money market mutual funds and other markets (GAO 2013a, 45–46).

[57] Roe (2011); Duffie and Skeel (2012)

[58] One example of an attempt to prevent government lending to insolvent firms is the "Prompt Corrective Action" provision of the Federal Deposit Insurance Act. PCA imposes increasingly aggressive restrictions on banks as their capital levels fall, although capital levels may not be sufficient as a measure of solvency because lags in the recognition of losses mean that the book value of capital is a backward-looking measure that can overstate the net worth of a bank. PCA has failed to limit the cost to the FDIC of failed banks, and regulators are considering changes (GAO 2011).

[59] See Goodfriend and King (1988); Schwartz (1992).

authority would prevent future policymakers from feeling trapped into lending by the effects of expectations of support.

A critical lesson from the Fed's first 100 years is that an overly broad interpretation of the Fed's role in financial stability in fact undermines financial stability, contributing to a cycle of moral hazard, financial failures, and rescues. The Fed already has the tools and mandate it requires to provide monetary stability, which is its best contribution to financial stability.

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Living Wills: A Tool for Curbing Too Big to Fail

Arantxa Jarque and David A. Price

Although the financial crisis of 2007–08 is gradually receding into history, policymakers and the public are still concerned about avoiding a repetition of the crisis. At issue is not only the economic dislocation that arose from the crisis, but also the public bailouts of major financial institutions such as Bear Stearns and AIG that became financially distressed and were then considered "too big to fail."

These rescues—seen by many as a distasteful brew of private risk-taking and socialized losses—seem to have been in part the outcome of an expectation that policymakers brought about with a series of rescue operations and other interventions going back to the 1970s. Two examples of these are the Fed's support for Continental Illinois National Bank and Trust Co. in 1984 and the Fed's use of its "good offices" to save the hedge fund Long-Term Capital Management in 1998. Such actions are likely to have created a belief in the markets that some institutions are, in fact, too big to fail. Hence, despite an intention to stabilize the financial system, the implied promise of rescue may have actually induced fragility in financial markets through a circle of rescue and failure:

- Policymakers, concerned that the failure of certain institutions would have costly effects on society, intervened to rescue them,
- leading creditors to expect future interventions in support of such institutions in the event of trouble,

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- reducing the incentives of creditors to monitor the risk-taking of those institutions and appropriately price for risk,
- leading to excessive risk-taking that caused the failure of several of those institutions in the 2007–08 crisis,
- spurring another round of rescue interventions.

In short, the expectation of a bailout changed risk-taking behavior, a phenomenon known as "moral hazard." What this cycle means is that policymakers who want to avoid bailouts similar to those of the financial crisis should try to commit in advance not to rescue financial firms. This is hard to do because the costs to the economy of letting a major institution fail are uncertain. As part of the effort to make such a commitment credible, regulators need a strengthened understanding of, and control over, the characteristics of those institutions that may make them difficult to resolve in bankruptcy if they fail.

When Congress passed the Dodd-Frank Wall Street Reform and Consumer Protection Act in 2010, the elimination of bailouts was among its goals. One of the many measures in the Act was the creation of a new tool—known as resolution plans, or "living wills"—aimed at helping policymakers work toward the objective of making the largest and most complex financial institutions resolvable without public assistance if they become financially distressed. These institutions, known as systemically important financial institutions, or SIFIs, are the ones that the policymaking community perceives as posing a risk to the rest of the system if they fail. (They include both bank holding companies, such as Bank of America, and nonbank institutions, such as the insurer AIG.) The provisions of Dodd-Frank on living wills give financial regulators the authority to require these firms to submit a resolution plan to be followed in the event of severe financial distress. On an annual basis, all SIFIs must submit detailed plans to the Fed and the Federal Deposit Insurance Corporation (FDIC).

But living wills don't stop with planning and disclosure. If the Fed and the FDIC find that a plan does not set out a credible path to resolving the firm without public support, they can, if need be, require the firm to increase its capital or liquidity, limit its growth, activities, or operations, and even divest assets to make such resolution a credible option in the future.

Thus, with living wills, Congress has put a tool in regulators' hands that may be critical to curbing rescue pressures. In this essay, we will argue that while the Dodd-Frank Act's limitations on bailouts and its enhanced regulation of safety and soundness are significant steps toward limiting rescues, they leave further work to be done, and living wills can help us do this work. We will look at why living wills, properly

implemented, make unassisted bankruptcy a more attractive option for policymakers—and why there are good reasons for bankruptcy to be the preferred route for resolving large distressed institutions. Finally, we will discuss several important obstacles that remain in the project of establishing a credible commitment not to rescue the largest and most complex firms, along with some promising approaches to overcoming them.

1. COMMITTING NOT TO RESCUE

What makes living wills an especially powerful tool is that they can assist policymakers in establishing credibility—in particular, a credible commitment not to rescue.

The word "credibility" here refers to a concept that economists call dynamic consistency or time consistency. It sounds technical, but in its simplest form, it isn't. Roughly speaking, time consistency problems arise when your present self wants to bind your future self to do something that may turn out to be contrary to the wishes of your future self. Our present self sets an alarm clock; our future self doesn't want to get up in the morning. Many of us learned Homer's story of Odysseus and the Sirens, who used music to lure sailors into wrecking their ships. Odysseus, who wanted to hear the Sirens' music, solved his time consistency problem by ordering his sailors to plug their ears with wax, to tie him to the mast, and to keep him tied no matter how much he asked to be let go.

What does this have to do with "too big to fail"? The answer is that policymakers can sometimes best serve financial stability by tying themselves to the mast—committing themselves not to take certain actions—and ensuring that everyone knows. Here, as noted above, to align the incentives of market participants and bring about market discipline, policymakers must make clear that they will not rescue failing institutions during a crisis no matter how tempting bailouts might appear to be once a crisis occurs.[1] By requiring firms to create living wills, regulators aim to improve the outcomes for the financial system and the economy when they resolve a firm without assistance—so the temptation of a bailout won't be there to start with.

In monetary policy, the importance of time consistency problems has been understood for a long time. In the 1970s, Americans

[1] Federal Reserve Bank of Richmond research has explored the role of credibility and market expectations in curbing public rescues of financial institutions. See, for example, Goodfriend and Lacker (1999); Athreya (2009); Grochulski (2011); Haltom and Lacker (2013); and Lacker (2014).

experienced not only high inflation, but unemployment and inflation rising together. After years of failed approaches such as wage and price policies and stop-and-go monetary policy, Fed Chair Paul Volcker brought, and kept, inflation down with a Fed policy based on a credible commitment to act against inflation. He responded first with a sustained tightening of monetary policy, despite the serious recession that predictably resulted, and then with a determination to act if inflation appeared to rise again, notwithstanding the costs of such action. The Fed has continued to show determination to act against inflation, a policy that has led markets to expect inflation to remain low.[2]

The credibility that the Fed earned during the Volcker era—and that it has maintained since—has been crucial to the price stability that the nation has enjoyed for more than 30 years. To bring about greater stability in financial institutions, policymakers must now establish credibility with respect to rescues of financial institutions.

2. DODD-FRANK TRIED TO FIX THE RESCUE PROBLEM, BUT DIDN'T

The Dodd-Frank reform law was a significant effort to bring about this credibility and thereby put an end to bailouts. One of its sponsors, former Rep. Barney Frank (D-Mass.), remarked at a conference last year, "We did, I believe, the maximum that you could do legally to make clear that if a large financial institution incurs debts it cannot pay, it is out of business and no taxpayer money can be used."

As Frank noted, the law does not allow the direct use of tax funds for rescues.[3] Then why isn't that the end of the issue?

The reason is that Congress stopped short of the larger goal of taking away the possibility of ad hoc support. Such support can still come from another source. Although the Dodd-Frank Act presents unassisted bankruptcy as the preferred option, the Act gives regulators the power to resolve large financial firms in distress through an administrative process known as orderly liquidation if they conclude that unassisted failure would threaten financial stability. The power to do so, known as Orderly Liquidation Authority (OLA), provides a side door through which regulators can provide funds to the distressed firm.

That door is the Orderly Liquidation Fund, a mechanism giving the FDIC the ability to borrow from the Treasury to pay creditors of a firm being resolved under OLA. Subject to various restrictions,

[2] See Goodfriend (1996). Regarding some earlier such episodes, see Sargent (1982).
[3] Dodd-Frank Act § 214, 12 U.S.C. § 5394

Dodd-Frank allows the FDIC to borrow so it can make loans to or guarantee obligations of a covered financial company or a bridge financial company during the orderly liquidation process, including obligations to unsecured general creditors. If the FDIC cannot later recover all the money from the distressed institution, it can levy an assessment on large financial firms to ensure that the borrowings are repaid. Thus, although the process does not draw money from general treasury funds, it is a source of money for rescues.[4]

What the existence of this mechanism means is that, in the absence of a contrary signal from regulators, markets are likely to expect that at least some creditors of SIFIs will be protected from loss. The possibility of an assessment following a major failure could stimulate industry-sponsored arrangements of self-regulation, arrangements that have sometimes arisen in U.S. banking.[5] But the net effect of the Orderly Liquidation Fund is likely to be that the moral hazard problem prevails.

In addition to the Orderly Liquidation Fund, other public financing mechanisms still exist. Among these are the Fed's power to lend to private entities in "unusual and exigent circumstances." The Dodd-Frank Act did narrow the latter power, known as "section 13(3) lending," by requiring that it take place only as part of a program with broad-based eligibility, but this does not eliminate the problem of moral hazard with respect to such lending. Moreover, even without lending powers or other rescue powers already established by law, regulators could—in the absence of a commitment not to bail out distressed firms—go to Congress in the midst of a crisis to seek such authority, much as they did in connection with the Troubled Asset Relief Program, or TARP, created by emergency legislation in 2008.

But do financial markets really pay attention to such possibilities? The answer appears to be yes; early evidence suggests that moral hazard in financial markets remained with us following enactment of the Dodd-Frank law. One way of considering this is to look at how much the largest financial institutions pay to borrow money compared with other institutions; if the largest institutions are paying less on a risk-adjusted basis, the difference reflects investors' expectations of a rescue in the event of distress. In a 2013 paper, Viral Acharya of New York University, Deniz Anginer of Virginia Tech, and Joseph Warburton of Syracuse University analyzed bond credit spreads of 567 financial institutions and found that the passage of the Act does not appear

[4] Price (2011)
[5] Calomiris (1990)

to have reduced expectations of public support for the largest institutions.[6]

Another way of considering the question is to look at the risk-taking behavior of the institutions themselves. This is, in general, a difficult task, and little systematic evidence has been gathered on the effect of Dodd-Frank in this area. One recent attempt is a 2014 article in the *Journal of Financial Stability*. Two researchers, Magdalena Ignatowski and Josef Korte of Goethe University Frankfurt, studied the risk-taking of U.S. banks and bank holding companies using their regulatory filings and other financial reports, as well as mortgage loan information from Home Mortgage Disclosure Act filings. They concluded that the institutions did reduce their risk-taking in response to Dodd-Frank—except for the largest, most systemically important ones, whose risk-taking does not seem to have changed. Although this study necessarily relies on approximate measures of risk-taking that may have been affected by other policies and by the state of the economy following the financial crisis, it suggests that the too-big-to-fail expectation may still be guiding some decisions of the largest financial institutions.[7]

In short, while the Dodd-Frank Act's barrier against bailouts from the general treasury was a good start, more must be done to establish a credible commitment not to rescue. One way we can do so is with the tool that Dodd-Frank itself gave us—living wills.

3. WHAT WE WANT TO SEE IN LIVING WILLS

The value—and costliness—of living wills is easier to understand if you know what goes into them. They are required to include, among other things, information on all of the firm's business units and subsidiaries and their dependencies on each other, its material off-balance-sheet obligations, its key internal reports, and its management information systems and the operations and business lines that they support. Beyond these inventory-like information requirements, of which there are scores, the living wills also must include the firm's detailed strategic plan for rapid and orderly resolution in the event of distress. What will be the firm's capital needs and how will it meet them? How does the firm determine the market values of its business lines and asset holdings? How long will the steps of the plan take to carry out?[8] This information would be helpful to a bankruptcy trustee and to potential lenders or acquirers.

[6] Acharya, Anginer, and Warburton (2013)
[7] Acharya, Anginer, and Warburton (2013)
[8] 12 C.F.R. § 243.4

The Fed and the FDIC are engaged in a back-and-forth process with SIFIs to push the firms to produce living wills that accurately reflect the firms' current state of resolvability as well as highlighting where further progress is needed. This iterative process is necessary because living wills are a new concept. The first wave of living wills came from 11 large banking organizations, which were required to file their first annual plans in mid-2012 and to file revised plans the following year. The agencies have publicly noted some common shortcomings of the plans. Among these were unrealistic or inadequately supported assumptions about the likely behavior of customers, counterparties, and investors when the institution is in distress and the failure to identify the kinds of changes in the firms' structures and practices needed.[9]

At the same time that the agencies are giving guidance to the SIFIs, they are also trying to understand better what a firm needs to look like—in terms of liquidity, complexity, and other factors—to be resolvable without public assistance in a realistic economic scenario.

It's new and difficult terrain for both institutions and regulators. (We'll come back to the challenges later.) But the benefits of achieving greater market discipline seem likely to justify these costs.

4. VIRTUES OF BANKRUPTCY

The existence of a living will that sets out a credible path to resolving the firm without public support makes it more plausible that regulators would actually opt for bankruptcy rather than feeling forced to mount a rescue.

Even though the word "bankruptcy" does not bring warm feelings to most of us, unassisted bankruptcy has benefits over an administrative procedure such as OLA. Bankruptcy differs from OLA in a number of ways that are helpful to the task of establishing market discipline. One difference is in the way that the two are triggered. Bankruptcy protection is sought by the institution itself based on its inability to raise money to operate (or, in some cases, by unpaid creditors), while OLA is triggered by regulators whose motivations in a particular case may be uncertain and may be distinct from the financial issues at stake. For example, regulators with political accountability may have an incentive to forbear from instituting proceedings until after an election; alternatively, if financial institutions have political power, they

[9] Board of Governors of the Federal Reserve System and the Federal Deposit Insurance Corporation (2014); Hoenig (2014)

may be able to prevail upon regulators to use the discretion afforded by OLA in a manner favorable to them.[10]

Additionally, creditors in bankruptcy have more certainty about their priority; they generally get the priority that they contracted for when they granted credit to the institution. In OLA, on the other hand, the agency carrying out the resolution process—the FDIC—has the discretion to pay a creditor more than bankruptcy priority rules would dictate if it believes doing so is "necessary or appropriate to minimize losses."[11]

Finally, and most importantly, a bankruptcy court does not have access to a pre-existing pool of money to pay out to creditors—unlike the OLA process with its Orderly Liquidation Fund. Even though the Orderly Liquidation Fund does not come from taxpayers, its existence makes a rescue, and therefore moral hazard, more probable.

While the bankruptcy process, like any resolution process, is imperfect, the experience with the 2008 bankruptcy of Lehman Brothers has been a source of insight into what may be the main difficulties of bankruptcy in the case of a distressed SIFI and the mistakes to avoid. As of March 2014, Lehman's unsecured creditors had recovered an average of 28 percent of the value of their allowed claims—lower than historical norms but higher than initially expected. This figure was likely boosted by the Fed's provision of short-term lending to Lehman's broker-dealer subsidiary for less than a week and by other support to financial markets by the Fed and the Treasury Department. At the same time, it is reasonable to assume that the recovery was depressed by Lehman's lack of resolution planning.[12]

Given the magnitude of these losses, a natural question is why creditors of firms such as Lehman were not already demanding resolution plans before and during the crisis. We consider this question in the next section.

5. WHY DIDN'T MARKETS ALREADY DEMAND LIVING WILLS?

In theory, a good living will should benefit the firm by lowering its cost of funding. Because a living will sets out information that creditors would value, such as its complementarities and interconnections and its financing needs, creditors should be willing to lend money more cheaply

[10] Imai (2009); Brown and Dinç (2005); Kane (1990)
[11] Pellerin and Walter (2012)
[12] Fleming and Sarkar (2014)

to firms that have one in place. So why was action by regulators needed to bring them about?

Certainly, living wills are costly. The creation and revising of living wills requires the time of firms' employees, as well as legal and consulting fees. The Fed and the FDIC have estimated that the process of initially creating the living will, together with the process of obtaining approval, will require 5,500 to 10,200 hours of staff time per institution.[13] (The lower figure is for institutions that are predominantly banking companies, from whom less detail is required.) Beyond the cost of producing the living wills, the changes needed to make a firm resolvable—that is, easy to liquidate in an efficient manner—may be highly costly. These changes may include, as we will see, major revisions in debt structure and organization.

Given these costs, shareholders considering the creation of living wills would need to evaluate the savings in financing costs that a good living will was likely to bring about. In a world with public guarantees through either implied expectations or explicit deposit insurance or both, lenders will not demand a premium for complexity that makes firms more difficult to resolve—and hence creating living wills would entail significant costs and no benefits. Moreover, even without government support, if the failure of a SIFI is believed to hurt the stability of financial markets through fire sales of assets or payment disruptions, then private lenders would be less concerned about failure than society as a whole—since the institution and its creditors do not bear the full damage that the failure would induce in the rest of the economy. For both of these reasons, we would expect financial markets not to demand living wills, or not ones of sufficient quality.

6. LIVING WILLS IN ORDERLY LIQUIDATION

At least in the short run, policymakers may continue to be drawn to administrative resolution and ad hoc support despite the benefits of bankruptcy. This could happen if policymakers are fearful about the possible systemic effects of letting a SIFI be resolved through unassisted bankruptcy. To the extent that policymakers want to retain OLA in their toolkit during a transitional period, living wills can still have significant value.

Living wills give regulators the authority to shape firms in ways that will make them less likely to need assistance during any resolution process, whether the process takes place within bankruptcy or OLA.

[13] Federal Reserve System and FDIC. November 1, 2011. "Resolution Plans Required." Federal Register 76 (211): 67323-67340.

Additionally, as an article published in 2011 by the FDIC has noted, if a SIFI became financially distressed and policymakers opted to use OLA, the living will would likely prove useful to the FDIC during the resolution process.[14]

The level of complexity revealed by living wills can also be used by regulators as a tool in itself. For example, a group of a dozen highly accomplished financial economists, known as the Squam Lake Group for the location of its first meeting in New Hampshire in 2008, has suggested that capital requirements and limits on short-term debt could be set on the basis of the level of complexity indicated by the living wills. Such uses of the complexity information are another potential benefit of living wills that would apply regardless of resolution regime.[15]

7. CHALLENGES AHEAD

The cycle of moral hazard, crisis, and intervention tells us that to avoid future bailouts and to improve stability, the better form of resolution is unassisted bankruptcy. For regulators who must oversee the transition of firms to resolvability, whether through unassisted bankruptcy or OLA, there are significant challenges to be dealt with. We consider some of the most prominent ones below.

Challenge 1: Short-Term Financing

One of the challenges facing policymakers is that SIFIs in their present form have large liquidity needs. By definition, SIFIs tend to be very large firms, and there is limited experience with resolving financial firms of such a scale. The largest bank resolution by regulators so far, that of Washington Mutual in September 2008, involved assets of $302 billion; the bankruptcy of Lehman Brothers, the largest bankruptcy in history, involved assets of $639 billion. In contrast, the distress of one of the largest SIFIs would involve assets of more than $1 trillion. Also, financial firms in general tend to have high short-term liquidity needs to the extent that their business models are based on maturity mismatch (for example, accepting deposits that can be withdrawn on demand and using them to fund long-term loans). Both the size and the typical financial structure of SIFIs, then, pose an obstacle to their unassisted resolution.

When firms other than SIFIs are in bankruptcy, they meet their short-term financing needs through "debtor-in-possession," or DIP,

[14] FDIC (2011), pp. 10-11, 12

[15] Squam Lake Working Group on Financial Regulation (2009)

financing. This type of financing, which must be approved by the bankruptcy court, is generally senior to the firm's already-existing debt. The firm's creditors nonetheless are often willing to approve DIP financing because it keeps the firm in operation. The question is, would a failing SIFI be able to obtain sufficient DIP financing to see it through the bankruptcy process?

By virtue of its size, a SIFI relying heavily on maturity mismatch could have DIP financing needs without precedent—needs that lenders might not be willing or able to meet, especially if the distress occurs during a time of market crisis. Given this challenge, even strong proponents of bankruptcy as a means of resolving SIFIs, such as the Resolution Project at Stanford University's Hoover Institution, hold that while a reformed bankruptcy procedure may improve the unassisted resolution of SIFIs, it should not rule out the possibility of government-provided DIP financing in some instances.[16]

How, then, can living wills help policymakers maintain a credible commitment not to provide financing—that is, not to rescue the firm?

The answer lies in the fact that the approval process for living wills does not require regulators to take the existing operations of a firm as given. The combination of a very large institutional size and heavy reliance on maturity mismatch is not essential to financial markets. When reviewing living wills, regulators may determine that if a SIFI wishes to retain its large scale, it will need to reduce its reliance on short-term liabilities. Alternatively, if the firm believes that the costs of reducing its maturity transformation would be unacceptable, it could instead make itself smaller by shutting down certain business lines or, more likely, spinning them off. Ease of resolution should play, together with safety and soundness considerations, a critical role in determining what constitutes acceptable practice in financial intermediation.

Other regulatory initiatives may also move large institutions toward less use of short-term funding; these include efforts dealing with capital and liquidity requirements. The focus in the living wills process is somewhat different, however: While safety and soundness regulations may limit short-term financing with the objective of preventing the failure of a financial institution, the living wills process addresses the expected need for DIP financing once the failure has happened.

Once policymakers have established a commitment not to rescue firms in distress, and that commitment is widely perceived as credible, that commitment in itself will reduce the need for DIP financing. The lack of a safety net would cause the price of debt to become more

[16] Jackson (2014), p. 17

sensitive to the amount of maturity transformation, leading SIFIs to restrain their reliance on short-term funding.

Challenge 2: Organizational Complexity

Another potential obstacle to making institutions resolvable is that they may have highly complex structures. One simple measure of this complexity is the sheer number of entities within today's institutions: In 2012, six U.S. bank holding companies had more than 1,000 subsidiaries, up from only one such firm in 1991. Four of them had more than 2,000 subsidiaries.[17]

The rise in complexity has come from a number of sources that have contributed to growth in firm size and diversification. Among these have been cost advantages to large financial firms from technological scale economies, the pursuit of regulatory arbitrage (for example, moving activities into the nonbanking sector), the pursuit of favorable tax treatment, the rise of asset securitization, and significant industry consolidation.[18] Moreover, both globalization and the elimination of legal restrictions within the United States on expansion across state lines has helped banking institutions grow to a point where it is profitable for them to expand into nonbank financial services.[19] Finally, the industry consolidated during the financial crisis as regulators arranged for distressed institutions to be acquired.

Why might complexity matter? One reason that complexity may be a hurdle to unassisted resolution is that regulators might want to separate the parts of the institution that are most important to the stability of the overall financial system and arrange for those to be taken over by another institution. Regulators refer to the functions of a firm that they believe to be highly important to the operation of markets as "critical functions." Such functions might include clearing and settlement services, for example. The larger the number of subsidiaries, the more challenging it may be to untangle their relationships and to single out which ones perform critical functions. In addition, when bankruptcy courts resolve a large, complex institution, their options may be constrained to some degree by the existence of critical shared services—for example, information systems that are run by one entity but relied on by other entities within the firm.

As with the challenge of short-term funding, to the extent that regulators believe complexity may stand in the way of unassisted

[17] Avraham, Selvaggi, and Vickery (2012)
[18] Avraham, Selvaggi, and Vickery (2012)
[19] Cetorelli, McAndrews, and Traina (2014)

resolution, the Dodd-Frank Act gives them the power to take action: They can require SIFIs to reduce their complexity. They might, for example, direct the firm to spin off lines of business, consolidate subsidiaries, or duplicate certain functions to make some entities more self-sufficient. In doing so, regulators should seek to strike the right balance, as changes of this nature will involve adjustment costs and perhaps forgoing economies of scope and scale. (A different case would be one where complexity has been driven by the pursuit of tax advantages; in this case, the increased taxes that may result from undoing that complexity should not be a concern to financial regulators.)

Market forces should also prove helpful. Like the amount of maturity mismatch, the degree of complexity may itself be partly a result of the expectation of support. Once regulators have established the credibility of their commitment not to rescue, debtholders will have an incentive to monitor institutions for excessive complexity that might reduce their ability to recover their money in a bankruptcy proceeding.

Challenge 3: Cross-Border Issues

One aspect of the complexity of systemically important institutions is that they often operate across numerous national boundaries. For example, at the time Lehman Brothers failed in 2008, it had activities in 40 or more countries, leading to insolvency proceedings around the world.[20]

In a sense, the existence of cross-border difficulties is nothing new to financial regulators. All large international institutions are already subject to supervision by regulators in multiple countries. What is different here is that while supervision of these institutions is an everyday event, resolution of them is a rarity, leaving room for uncertainty about what a cross-border resolution would look like.

The possibility of multiple proceedings may be a problem when different entities within an institution, under the jurisdiction of different countries, are interdependent. Authorities in country A may have control over significant financial or operational assets of a subsidiary in country A needed by another subsidiary in country B. Although the optimal approach from a collective point of view is for authorities in all countries to cooperate to maximize the value of the institution as a whole, the incentives facing authorities are likely different than this. Regulators in a country where the firm's assets are located may have an incentive to exercise control of those assets to pay for losses occurring

[20] Carmassi and Herring (2013)

within its borders. (But regulators will not necessarily act in such a manner; for example, the Fed's rescue of AIG in 2008 partly benefitted foreign parties, while U.S. taxpayers bore all the risk.)

Beyond the possible differences in incentives, multiple insolvency proceedings may give rise to difficult practical issues. The proceedings may be subject to inconsistent legal regimes in different countries.

Regulators in one country may have difficulty learning about an institution's foreign-based operations. When resolution takes place within bankruptcy proceedings, cross-border coordination could be still more challenging because courts may be less apt than administrative agencies to coordinate internationally; cross-border cooperation among courts, when it occurs, typically occurs on a case-by-case basis, while financial regulators have had experience cooperating broadly on issues, including resolution policy.

Part of the answer to these concerns about multiple proceedings may be found in the notion of country-level separability—that is, making sure the local operations of an institution are resolvable independently of its foreign-based entities. The more self-contained and self-supporting an institution's operations within a country can become, the less cross-border issues will arise in the resolution process, and the more credibly regulators can commit to a no-bailout policy. As with the issue of short-term funding, regulators are already working on separability outside the context of living wills; for example, a rule issued by the Fed in February 2014 requires large foreign banking organizations operating in the United States to establish an intermediate holding company over their U.S. subsidiaries.[21]

To be sure, separability comes at a cost, limiting the adaptability of the institution in how it uses its resources and where it positions them. Nonetheless, such costs will probably be necessary to some degree to keep cross-border issues in resolution reasonably manageable.

Challenge 4: Transparency

Even if SIFIs achieve a financing structure and an organizational structure that make them resolvable, this outcome will not lead to market discipline if market participants do not believe that it has happened. If markets do not believe that institutions will be resolvable in the event of distress, then the credibility of policymakers' commitment not to rescue will be reduced. Another challenge for regulators, then, is deciding

[21] Board of Governors of the Federal Reserve System. February 18, 2014. "Enhanced Prudential Standards for Bank Holding Companies and Foreign Banking Organizations." Federal Register 79 (59): 17239–17338.

whether markets will accept the agencies' own determinations about resolvability—or whether markets will need to see some of the underlying facts for themselves. In other words, regulators need to decide how much transparency in living wills is desirable.

When an institution submits a proposed living will to the Fed and the FDIC, the institution itself designates the material that will be included in the publicly released section of the document, subject to the requirements and approval of the agencies. In the view of some, the outcome of this process has generally been a minimal level of public disclosure. Indeed, a study of the living wills submitted in 2012 found that most institutions "took full advantage of their discretion to maintain confidentiality of information that is crucial to understanding how easily they could be resolved."[22] This is consistent with financial firms wishing to disclose publicly as little as possible about their strategies and operations.

The right level of public transparency for living wills is an open question. The treatment of public disclosure by regulators so far has been influenced by the longtime concern for maintaining the confidentiality of proprietary information in the supervision process. At the same time, as we noted earlier, the concern for maintaining confidentiality of proprietary information must be weighed against the need for a meaningful level of disclosure about the firm's ability to be resolved without assistance. Moreover, in a democracy, voters arguably have a legitimate interest in transparency so they can assess the progress made in stabilizing the financial system.

Changes may be in store. The Fed and the FDIC stated in August 2014 that they are jointly "committed to finding an appropriate balance between transparency and confidentiality of proprietary and supervisory information in the resolution plans" and that they will be working with SIFIs "to explore ways to enhance public transparency of future plan submissions."[23]

8. CONCLUSION

Living wills promise to be highly useful complements to safety and soundness regulation. While there is significant work to be done and there are challenges to overcome, the reward, if we do our jobs well, will be a more stable economic environment for businesses and individuals.

[22] Carmassi and Herring (2013)
[23] Board of Governors of the Federal Reserve System and FDIC (2014)

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