

Chapter 1

Introduction

The financial system promotes our economic welfare by helping borrowers obtain funding from savers and by transferring risks. During the World Financial Crisis, which started in 2007 and seems to have ebbed as we write in 2010, the financial system struggled to perform these critical tasks. The resulting turmoil contributed to a sharp decline in economic output and employment around the globe.

The extraordinary policy interventions during the Crisis helped stabilize the financial system so that banks and other financial institutions could again support economic growth. Though the Crisis led to a severe downturn, a repeat of the Great Depression has so far been averted. The interventions by governments around the world have left us, however, with enormous sovereign debts that threaten decades of slow growth, higher taxes, and the dangers of sovereign default or inflation.

How do we prevent a replay of the World Financial Crisis? This is one of the most important policy questions confronting the world today, and it remains unanswered. In this book, we offer recommendations to strengthen the financial system and thereby reduce the likelihood of such

damaging episodes. Though informed by the lessons of the Crisis, our proposals are guided by long-standing economic principles.

When developing our recommendations, we think carefully about the incentives of those who will be affected and about unintended consequences. We try to identify the specific problem to be solved and the divergence between private and social benefits behind that problem; we carefully examine the possible unintended effects of our proposed solution; and we consider ways in which individuals or institutions can circumvent the regulation or capture the regulators.

Two central principles support our recommendations. First, policymakers must consider how regulations will affect not only individual financial firms but also the financial system as a whole. When setting capital requirements, for example, regulators should consider not only the risk of individual banks, but also the risk of the whole financial system. Second, regulations should force firms to bear the costs of failure they have been imposing on society. Reducing the conflict between financial firms and society will cause the firms to act more prudently.

In the remainder of this book we present a series of policy proposals, each of which can be read on its own or in combination with the others. The conclusion summarizes these proposals and shows how they might have helped during the World Financial Crisis.

WHAT HAPPENED IN THE WORLD FINANCIAL CRISIS?

The Prelude

The first symptoms of the World Financial Crisis appeared in the summer of 2007, as a result of losses on mortgage backed securities. For example, in August, BNP Paribas suspended the redemption of shares in three funds that had invested in these securities, and American Home Mortgage Investment Corp. declared bankruptcy. Mortgage related losses continued throughout the fall, and indicators of stress in the financial system, including the interest rates that banks charge each other, were unusually high. Despite huge injections of liquidity by the U.S. Federal Reserve and the European Central Bank, financial institutions began to hoard cash, and interbank lending declined. Northern Rock was unable to refinance its maturing debt and the firm collapsed in September 2007, becoming the first bank failure in the United Kingdom in over 100 years.

The next big problem was in the market for auction rate securities. Although auction rate securities are long-term bonds, short-term investors found them attractive before the Crisis because sponsoring banks held auctions at regular intervals—typically every 7, 28, or 35 days—to allow the security holders to sell their bonds. Thousands of the auctions failed in February 2008 when the number of owners who wanted to sell their bonds exceeded the number of bidders who wanted to buy them at the maximum rate allowed by the bond and, unlike in previous auctions, the sponsoring banks did not absorb the surplus. After much

litigation, the major sponsoring banks agreed to pay many of their clients' losses. The market for auction rate securities has not revived.

Bear Stearns' failure in March 2008 proved, in retrospect, a critical turning point. The firm had funded much of its operations with overnight debt, and when it lost a lot of money on mortgage backed securities, its lenders refused to renew that debt. At the same time, customers ran from its prime brokerage business, a process we describe in detail below. Over the weekend of March 15, the U.S. government brokered a rescue by J.P. Morgan that included a generous commitment by the Federal Reserve. Many observers and officials thought that the Crisis was contained at this point and that markets would police credit risks aggressively. That hope proved unfounded.

The Remarkable Month of September 2008

The World Financial Crisis moved into an acute phase in September 2008.¹ Fannie Mae and Freddie Mac, large government-sponsored enterprises that create, sell, and speculate on mortgage backed securities, failed during the first week of September and were placed under the conservatorship of the Federal Housing Finance Agency.

The peak of the Crisis started on Monday, September 15, 2008. Lehman Brothers, a brokerage and investment bank headquartered in New York, failed with a run by its short-term creditors and prime brokerage customers that was similar to the run experienced by Bear Stearns. Lehman's bankruptcy was a surprise, since the government had

stepped in to prevent the bankruptcy of Bear Stearns only months before.

Within days, the U.S. government rescued American International Group. AIG had written hundreds of billions of dollars of credit default swaps, which are essentially insurance contracts that pay off when a specific borrower, such as a corporation, or a specific security, such as a bond, defaults. As economic conditions worsened and it became increasingly likely that AIG would have to pay off on at least some of its commitments, the swap contracts required the firm to post collateral with its counterparties. AIG was unable to make the required payments. Goldman Sachs was AIG's most prominent counterparty, and Goldman's demands for collateral were an important part of AIG's demise. The cost to taxpayers of government assistance for Fannie Mae, Freddie Mac, and AIG is now projected at hundreds of billions of dollars.

That same week, Treasury Secretary Hank Paulson announced the first Troubled Asset Relief Program (TARP), asking Congress for \$700 billion to buy mortgage backed securities. Federal Reserve Chairman Ben Bernanke and President George W. Bush also gave important speeches warning of grave danger to the financial system. The Securities and Exchange Commission banned the short-selling of several hundred financial stocks, causing pandemonium in the options market, which relies on short-selling to hedge positions, and among hedge funds that employed long-short strategies.²

The turmoil of the week did not stop there. Interbank lending declined sharply, the commercial paper market

slowed to a crawl, and there was a run on the Reserve Primary Fund, a money market mutual fund. Unlike other mutual funds, money market funds maintain a constant share price, typically \$1, by using profits in the fund to pay interest rather than to increase share values. Because the share price is fixed at \$1, losses that push a fund's net asset value below \$1 per share can trigger a run, as investors rush to claim their full dollar payments and force the losses onto other investors. The Reserve Primary Fund, which had more than 1 percent of its assets in commercial paper issued by Lehman, suffered just such a run on September 16, 2008. After Lehman declared bankruptcy, the fund's net asset value dropped to \$0.97 per share and investors withdrew more than two-thirds of the Reserve Fund's \$64 billion in assets before the fund suspended redemptions on September 17. Concern spread to investors in other money market funds, and they withdrew almost 10 percent of the \$3.5 trillion invested in U.S. money market funds over the next ten days. To stabilize the market, the government took the unprecedented step of offering a guarantee to every U.S. money market fund.

In normal times, any one of these events would have been the financial story of the year, yet they all happened in the same week in September 2008. Although much commentary and popular press coverage blames the World Financial Crisis entirely on the government's decision to let Lehman fail, such an analysis ignores the evident contributions of the many other momentous events that occurred during that week.

October 2008: The Bank Bailout and Credit Crunch

By early October 2008, the U.S. government realized that the TARP plan to buy mortgage backed securities on the open market was not feasible. Instead, the Treasury Department used the appropriated money to purchase preferred stock in large banks, and to provide credit guarantees and other support. Though now remembered as the “bank bailout,” the TARP purchases were not simply a transfer to failing institutions. Healthy banks were also forced to accept capital in an attempt to mask the government’s opinions about which banks were in more trouble than others. Many policymakers seemed to think that banks were not lending because they had lost too much capital and were not able or willing to raise more. Thus, the goal seemed to be not to save the banks but to recapitalize them so they would lend again. In the end, the former result was achieved—none of the large banks that received TARP funds failed—but the latter, arguably, was not. We analyze these issues in detail below, and recommend some alternative structures and policies that we believe would have worked better.

During much of the World Financial Crisis, the Federal Reserve experimented with a wide range of new facilities beyond its traditional tools of interest rate policy and open market operations. The Fed lent broadly to commercial banks, investment banks, and broker-dealers, and ended up buying commercial paper, mortgages, asset backed securities, and long-term government debt in an effort to lower interest rates in these markets. By December 2008, excess

reserves in the banking system had grown from \$6 billion before the Crisis to over \$800 billion. These actions are not a focus of our analysis, but they surely helped prevent the Crisis from turning into another Great Depression. At a minimum, they eliminated most banks' concerns about sources of cash.

Bank failures in Europe in the fall of 2008 led to more direct bailouts. The Netherlands, Belgium, and Luxembourg spent \$16 billion to prop up Fortis, a major European bank with about \$1 trillion in assets. The Netherlands spent \$13 billion to bail out ING, a banking and insurance giant. Germany provided a \$50 billion rescue package for Hypo Real Estate Holdings. Switzerland rescued UBS, one of the ten largest banks in the world, with a \$65 billion package. Iceland took over its three largest banks, and its subsequent difficulties highlight what happens when the cost of bailing out a country's banks exceeds the government's resources.

Throughout the fall of 2008, there was a "flight to quality" in markets around the world. When investors are worried about default, they demand higher interest rates. Yields on securities with any hint of default risk rose sharply, especially in the financial sector.

The flight to quality is apparent in the interest rates on commercial paper, in Figure 1. Commercial paper is short-term unsecured debt issued by banks and other large corporations and is an important part of their financing. The commercial paper rates for financial institutions and lower-credit quality borrowers jumped in September and October, but after a small increase, the rate for large creditwor-

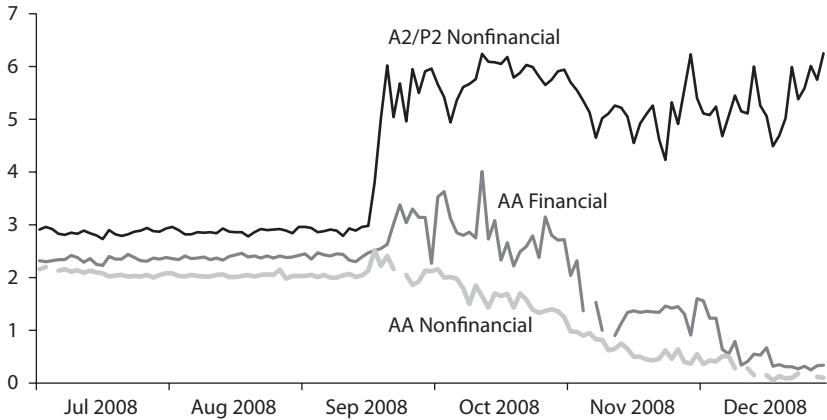


Figure 1: Annualized Percent Yields on 30-Day High-Quality (AA) Financial and Nonfinancial Commercial Paper and Medium-Quality (A2/P2) Nonfinancial Commercial Paper, in Percent, August to December 2008. Source: Federal Reserve

thy nonfinancial companies actually declined. The rate on U.S. Treasury bills, which are viewed as the most secure investment, also fell; the three-month Treasury bill rate actually dropped to zero for brief periods in November and December 2008.

THE RUN ON THE SHADOW BANKING SYSTEM

The panic that struck financial markets in the fall of 2008 has been characterized as a run on the shadow banking system, and with good reason. Before the Crisis, many bonds, mortgage backed securities, and other credit instruments

were held by leveraged non-bank intermediaries, including hedge funds, investment banks, brokerage firms, and special-purpose vehicles. Many of these intermediaries were forced to “delever” during October and November, selling assets to repay their creditors.

Hedge funds and other leveraged intermediaries use the securities in their portfolios as collateral when they borrow money. During the World Financial Crisis, many wary lenders decided the collateral borrowers had posted before the Crisis was no longer sufficient to guarantee repayment. When the lenders demanded either more or better collateral, many borrowers were forced to sell their levered positions and repay their loans. The result was a reduction in the quantity of assets they held and in their leverage. In addition, hedge funds and other intermediaries suffered large withdrawals by panicky customers, again forcing them to sell securities on the market. The assets being sold were generally acquired by individual investors, the federal government, or commercial banks, which as a group financed most of their purchases by borrowing from the government.³

The financing difficulties faced by arbitrageurs and liquidity providers are apparent in a series of fascinating market pathologies. In financial markets, there are often many different ways to obtain the same outcome. An investor can use many different combinations of securities, for example, to risklessly convert dollars today into dollars in six months. The actions of arbitrageurs usually keep the costs of the different approaches closely aligned. During the fall of 2008, the costs often diverged, with the approach that required more capital typically costing less.⁴

The principle of covered interest parity, for example, says that after eliminating exchange rate risk, risk-free investing should have the same return in every currency. An investor who wants to invest dollars today and receive dollars in the future usually buys a U.S. bond. He could accomplish the same thing by converting his dollars into euros, investing in a riskless euro bond, and locking in the conversion of the euro payoff back into dollars with a forward contract. Since both strategies convert dollars today into dollars in the future, they should have the same return.⁵ Suppose instead the return on the U.S. bond is lower. Then an arbitrageur could borrow money in the United States at the lower rate, invest it in the euro transaction at the higher rate, and make a profit.

During the Crisis, covered interest parity violations as large as 20 basis points (0.20 percent) emerged.⁶ This may seem trivial, but in normal times these violations rarely exceed 2 basis points. Moreover, traders can usually “lever up” transactions like this and make a large profit. But that’s the catch—hedge funds, brokerages, and investment banks were being forced to delever during the Crisis, and 20 basis points is not enough to entice many long-only investors to replace the U.S. bond they are currently holding with a foreign bond and some seemingly complicated currency transactions.

Other recent research finds similar disruptions of the normal pricing relations linking (1) Treasury bonds, corporate bonds, and credit-default swaps (a Treasury bond should be the same as a corporate bond plus a credit default swap—except for liquidity, financing, and CDS counterparty

risk); (2) fixed and floating rate investments (a sequence of short-term investments plus a contract swapping a floating interest rate for a fixed interest rate should have the same payoff as a fixed rate investment); (3) convertible bonds, debt, and equity; (4) newly issued “on-the-run” and recently issued “off-the-run” Treasury bonds, which have essentially the same payoff but differ in liquidity; and (5) stock and option prices, which are linked by what financial economists call the put-call parity relation.⁷

The breakdown of these normal pricing relations does little direct harm to the rest of the economy. A 20-basis-point violation of covered interest parity has little effect on a U.S. exporter using currency contracts to lock in the rate at which it can convert future Japanese revenue back into dollars. These violations show, however, that markets were not functioning normally. In particular, they suggest there was not much capital available to provide liquidity to buyers and sellers. Anyone needing to sell securities quickly in such a market—such as a financial institution trying to reduce its risk—was not likely to get a good price.

LENDING, BANKING, AND THE RECESSION

During the fall of 2008, output and financing activity contracted sharply. Commercial paper, corporate bond, and equity issuance all fell dramatically, as did mortgage originations.

Originations of most types of asset backed securities also slowed to a trickle. Many banks in the United States

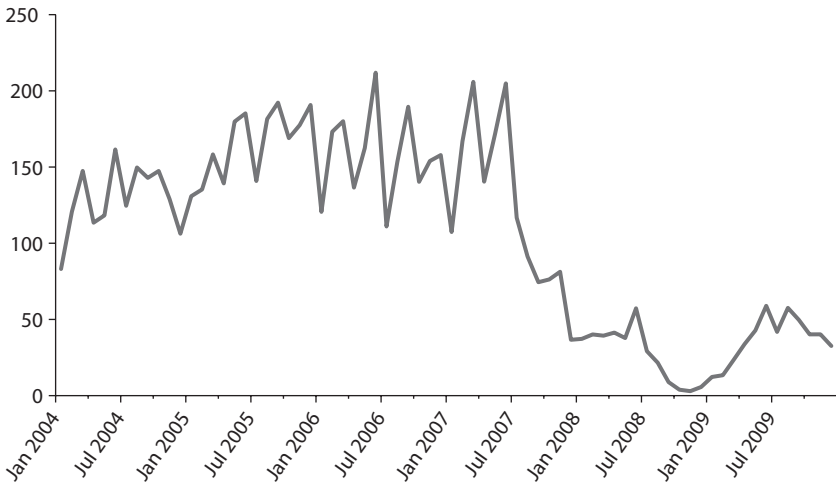


Figure 2: Asset Backed Securities Issued in the United States, January 2004 to December 2009, Billions of Dollars per Month. Source: Federal Reserve

and other countries no longer hold much of the credit they issue. They have moved instead to an “originate and sell” model in which they bundle together similar loans, such as jumbo mortgages, commercial loans, student loans, or credit card debt, and sell them to investors as asset backed securities. New issues of these securities essentially stopped in October and November 2008. Figure 2 shows that the amount of asset backed securities issued in the United States rose from \$28.8 billion in January 2000 to \$385.3 billion in June 2007, and then plunged to \$102.6 billion in September 2007. Issuance in the United States continued to decline over the next year, eventually falling to only \$8.7 billion in October 2008 and \$6.6 billion in

November—just 2 percent of the volume 18 months earlier. Only mortgages pooled by Fannie Mae and Freddie Mac, with an explicit government guarantee and subject to huge Federal Reserve purchases, continued to flow to the market.

There is plenty of anecdotal and survey evidence that bank lending also dried up during the Crisis. For example, loan officers surveyed by the Federal Reserve reported that credit conditions progressively tightened during 2008. In a survey about their perceptions of credit conditions and corporate decisions as of late November 2008, more than half of the chief financial officers of large American firms who responded said that their firms were either “somewhat or very affected by the cost or availability of credit.”⁸

There is a lively and fundamentally important debate about why the quantity of lending fell. Some financial economists argue that banks wanted to lend more but were unable to do so because they faced binding capital constraints. In this view, information costs and other frictions in the loan origination process kept customers from moving to less constrained banks.

Others argue that the primary reason banks were unwilling to lend is that their customers had become less credit-worthy. These economists point out that the high level of uncertainty about future economic conditions during the Crisis ratcheted up the default risk of even the most reliable clients. This interpretation of the decline in bank lending implies that no amount of capital would have induced banks as a group to lend more because all the good loans were being made.

Figure 3 shows data on the quantity of bank lending

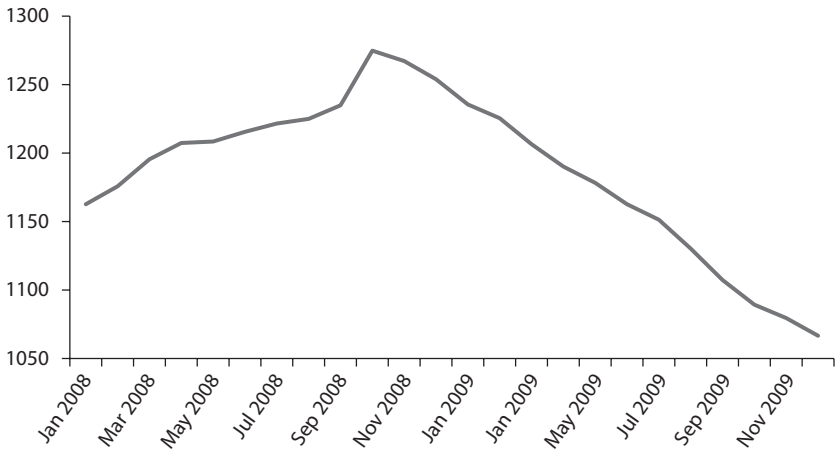


Figure 3: Commercial and Industrial Loans by U.S. Commercial Banks, 2008–9, in Billions of Dollars. Source: Federal Reserve

in the United States in 2008 and 2009. Starting in October 2008 there was a spike in lending, followed by a protracted decline. V. V. Chari, Lawrence Christiano, and Patrick Kehoe take the spike at face value: in aggregate, banks lent more. At a minimum, the banking system as a whole—as opposed to individual banks—was not deleveraging to overcome loss of capital.⁹ Victoria Ivashina and David Scharfstein note that much of the increase in bank lending was involuntary on the part of the banks, the result of drawdowns by borrowers on existing lines of credit.¹⁰ They also show that banks that were more vulnerable to drawdowns because they were in more syndicates with Lehman reduced subsequent lending more, and conclude that there was indeed a genuine contraction in the effective supply of bank credit.

Economists will argue about the events of the World Financial Crisis for years to come. In fact, we still argue about the Great Depression. None of the analysis behind our recommendations, however, depends on how these debates are settled. For example, no matter how capital-constrained the banking system really was in the fall of 2008, our proposals for changes that make such constraints less binding and give policymakers better tools when they fear capital constraints remain valid.

WHAT WAS WRONG WITH THE FINANCIAL SYSTEM DURING THE CRISIS?

The Crisis revealed a number of serious problems with our financial system. Some had been in the background all along, others did not appear until the Crisis. In this book we emphasize four categories of problems: conflicts of interest, known to economists as agency problems; the difficulty of applying standard bankruptcy procedures to financial institutions; the emergence of a modern form of bank runs; and the inadequacy of the regulatory structure, which had not kept up with recent financial innovation. (In fact, much innovation served to escape regulations.)

Conflicts of Interest: Agency Problems

Conflicts of interest that cannot be resolved easily by contracts or markets occur throughout the economy, but they

can be particularly harmful in the financial system. There are several reasons. First, many financial transactions and contracts involve a principal, such as an investor or shareholder, asking a trader, manager, or other agent to act on his or her behalf. Second, most financial transactions involve highly uncertain future payoffs, and in many transactions one party is better informed about the payoffs than the other. Third, the high volatility of the future payoffs often makes it hard to assess whether the outcome of a financial transaction is due to the agent's efforts or luck. And fourth, the sums involved can be huge.

Some proprietary traders, for example, earn a lot when their trades do well, but their personal losses are limited when their trades do poorly. Because of the asymmetric nature of their compensation, these traders can increase their expected income by taking riskier positions. This problem is dramatically illustrated by periodic cases in which “rogue traders” incur losses that are big enough to damage or even destroy large financial institutions. In 1995 Nick Leeson brought down Barings Bank with a \$1.3 billion loss, and in 2008 it was revealed that Jérôme Kerviel had severely damaged Société Générale with a loss of over \$7 billion.

Conflicts of interest, or “agency problems,” also exist at many other levels within the financial system. Shareholders of financial institutions have a conflict of interest with the bank's senior executives, especially when those executives are rewarded for good performance but do not have a large fraction of their wealth tied up in the shares of the bank.

Many financial institutions have large quantities of debt,

which creates a conflict of interest between the bank's creditors and its shareholders. Shareholders have an incentive to authorize excessively risky investments, for example, especially after a bank has incurred losses that erode the value of the shareholders' claim. The gains on these risky investments will accrue largely to shareholders, while the losses will mostly be borne by creditors. The conflict with creditors also reduces the incentives for the shareholders of troubled institutions to raise new capital because that would strengthen the position of creditors while diluting the shareholders' position. This "debt overhang" problem was widely cited during the World Financial Crisis, when many banks that were insolvent, or close to insolvency, seemed reluctant either to raise new capital or to reduce their risks by selling distressed securities.¹¹

At the highest level, there is a conflict of interest between society as a whole and the private owners of financial institutions. Because robust financial institutions promote economic growth and employment, during financial crises governments often rescue troubled firms they perceive to be systemically important. The result is privatized gains and socialized losses. If things go well, the firms' owners and managers claim the profits, but if things go poorly, society subsidizes the losses.

The candidates for government bailouts are popularly described as "too big to fail." More precisely, the argument for government support—which many economists challenge—is about firms that are too systemically important to fail. In its 2004 Annual Report, the European Central Bank described systemic risk as "The risk that the inability of one

institution to meet its obligations when due will cause other institutions to be unable to meet their obligations when due. Such a failure may cause significant liquidity or credit problems and, as a result, could threaten the stability of or confidence in markets.” Systemically important firms are those whose failure could pose a large threat to the stability of or confidence in markets. These firms are likely to be large, but they also tend to have complex interconnections with other financial institutions.

Too-big-to-fail policies offer systemically important firms the explicit or implicit promise of a bailout when things go wrong. These policies are destructive, for several reasons. First, because the possibility of a bailout means a firm’s stakeholders claim all the profits but only some of the losses, financial firms that might receive government support have an incentive to take extra risk. The firm’s shareholders, creditors, employees, and management all share the temptation. The result is an increase in the risks borne by society as a whole.

Second, these policies encourage smaller financial institutions to expand or to become more closely interconnected with other firms, so they move under the too-big-to-fail umbrella. Firms have an incentive to do whatever it takes to make policymakers fear their failure, creating the very fragility the government wishes to avoid. Belief that a government rescue will protect a financial institution’s creditors in a crisis also gives a firm a competitive advantage, lowering its cost of financing and allowing it to offer better prices to its customers than its fundamental productivity warrants.

Third, inefficient firms that cannot compete on their own should fail. Otherwise, firms have less incentive to become and stay efficient. A government policy that props up inefficient firms is wasteful and destructive. Allowing these firms to fail frees up resources and provides opportunities for more efficient and innovative competitors to flourish.

Fourth, and most generally, capitalism is undermined by policies that privatize gains but socialize losses. Government guaranteed institutions can become government run institutions, allocating credit, for example, to maximize political gain rather than economic welfare.

The conflict between society and the owners of financial firms becomes more serious during severe crises, when many financial institutions are close to insolvent. It is the prime motivation for our regulatory proposals, but several of the lower-level conflicts we have described are relevant because they magnify the risk borne by society as a whole.

The self-serving behavior that many of our recommendations target—whether by traders, senior management, or the firm's owners—need not be strategic, intentionally malicious, or even conscious. Consider a trader who inadvertently develops an investment strategy with highly probable gains and improbable but large losses. Like a firm that has sold earthquake insurance, the strategy may produce a long string of impressive returns before one year of losses wipes out many years of profits.¹² If so, during the good years the trader will be celebrated for his or her brilliance, rewarded with large bonuses, and given more resources to manage. Many sophisticated traders and hedge funds

were not aware of the “earthquake risks” inherent in many of their strategies. Similarly, when firms take actions that increase the likelihood of a government bailout in the next financial crisis, the market rewards them with a lower cost of capital. As firms become too big to fail, for example, the implicit government guarantee reduces the riskiness of their debt and lowers the interest rate demanded by their creditors. A CEO working to maximize firm value may not even realize the importance of the government guarantee, but a Darwinian process will encourage behavior that exploits it.

Bankruptcy and Resolution Procedures

It is impossible to write a financial contract that specifies every possible contingency. Instead, contracts rely on bankruptcy to determine outcomes in certain bad and unlikely states of the world. In bankruptcy, control of a firm is transferred from the shareholders, who no longer have a stake in losses because their shares are worth little, to the debt-holders. It is in society’s interest to develop bankruptcy procedures that maximize the post-bankruptcy value of a firm’s assets. In particular, society should avoid the destruction of value that occurs with disorderly liquidation.

Disorderly liquidation of financial institutions is particularly costly. First, valuable knowledge that the institution has accumulated about its counterparties—borrowers, trading partners, and so on—can disappear as the institution loses employees and ceases to operate normally. Financial

economists have found that the collapse of a bank has a material adverse impact on many of its borrowers.¹³ Second, the prospect of a disorderly liquidation makes it more likely that a troubled financial institution will suffer a run by creditors who conclude they are better off claiming what money they can today, rather than waiting through protracted liquidation proceedings. Third, “fire sales” of specialized assets in a disorderly liquidation can depress prices and thereby spread problems to other holders of the asset class. Fourth, disorderly liquidation increases the uncertainty about the impact of a financial institution’s failure on its counterparties and other claimholders. Because financial firms are tightly interconnected, this uncertainty can precipitate or intensify a financial crisis.¹⁴

In the United States, the standard bankruptcy code allows both for liquidation of a firm and the sale of its assets (Chapter 7), and for continued operation of a firm under the supervision of a bankruptcy judge who protects the firm from creditors’ claims while a reorganization plan is approved (Chapter 11). These procedures appear to work well for nonfinancial corporations but not so well for financial organizations. The Chapter 11 approach of separating a firm’s financial affairs from its nonfinancial business activities is infeasible when the business of the firm is financial transactions. Furthermore, many financial institutions rely heavily on short-term debt, possibly as a valuable discipline on bank executives who can rapidly change the risks their firms take. This makes financial firms vulnerable to a rapid withdrawal of short-term credit that is likely to occur before any event that would trigger bankruptcy.

We argue below that there is a need for a special resolution procedure that can be applied to large insolvent financial institutions. We also advocate regulatory changes that would push financial firms toward more resilient capital structures.

Bank Runs

Classic bank runs, in which depositors race to withdraw their funds before a bank fails, were one of the central contributors to the Great Depression. Deposit insurance, which was introduced after the Depression to counter this destructive process, made demand deposits one of the most stable forms of bank financing during the World Financial Crisis. Many financial institutions, however, suffered a modern version of bank runs.

Banks, especially those with investment banking activities, typically finance a significant fraction of their business with overnight commercial paper, repos, and other short-term instruments. In normal times, banks roll over this debt as it matures, taking new loans to pay off the old. In a crisis, however, uncertainty about whether a troubled institution would be able to pay off its creditors tomorrow causes lenders to stop extending credit today. Thus, short-term financing can lead to a run that is similar to a classic run on deposits.

Even some secured creditors participated in runs during the World Financial Crisis. Banks often use repurchase agreements to borrow money, securing the loan by giving the lender a financial asset, such as a Treasury bond,

as collateral. Because they are over-collateralized, with assets worth perhaps \$105 guaranteeing every \$100 in loans, lenders view “repos” as a safe way to extend credit. When credit markets froze during the Crisis, however, lenders worried that retrieving collateral and selling it would be difficult, and not worth the small interest on an overnight loan. As a result, at various times during the Crisis many investment banks had difficulty rolling over even their secured loans. Even relatively healthy financial institutions were hampered by the trouble in the repo market after August 2007. As the market became more and more uncertain about the prices securities would fetch in a forced sale, these institutions found they could borrow less and less with the same collateral.¹⁵

Prime brokerage accounts also saw a run-like withdrawal by customers. Many large banks have prime brokerage groups that assist hedge funds and other institutional investors by providing financing, securities lending, clearing, custodial services, and operational support. In exchange, the funds pay fees and, critically, post collateral to secure their loans. With some restrictions that we explain in Chapter 10, the prime broker can then use the collateral in its own business, in some cases commingling it with the firm’s own assets. During the Crisis, hedge funds monitored the financial well-being of their prime brokers and, like depositors in the Depression, fled with their collateral at the first sign of trouble. Bear Stearns, for example, had a large prime brokerage business. According to press accounts, one of the largest hedge funds that used Bear Stearns as a

prime broker, Renaissance Technologies, withdrew \$5 billion of cash in the week the firm failed. With such outflows, it is not surprising that Bear Stearns ran out of money even though it had more than \$18 billion in cash a week earlier.

Like classic bank runs, modern bank runs are both destructive and self-fulfilling. Concern that a bank might be in trouble spurs its creditors and counterparties to withdraw or withhold their capital. As a result, even rumors of a problem may be enough to destroy a viable institution. The importance of modern bank runs during the World Financial Crisis is a recurring theme throughout the book, and we make several proposals that are intended to reduce the frequency of such events.

The Inadequacy of the Regulatory Structure

The World Financial Crisis made it clear that financial innovation had overwhelmed existing financial regulations. Notable examples include AIG's decision to sell an extremely large amount of credit default swaps on subprime debt to banks in the United States and abroad; the holding of Lehman paper by money market funds, particularly the Reserve Primary Fund; the complexity of the derivative books at Lehman and other investment banks; and the difficulty of simultaneously applying several countries' bankruptcy codes to the subsidiaries of multinational financial institutions.¹⁶

There is a trade-off between financial innovation and stability. Innovation can improve the financial system's ability

to allocate resources to their highest valued use, but it can also reduce the stability of the system. The challenge is to develop regulations that improve stability without stifling innovation. In addition, regulation often leads to innovations designed to evade the regulations, which makes the financial system more fragile. For example, many of the special-purpose vehicles that imploded in the Crisis were created to get around capital requirements.

In many countries, the response of regulators to the World Financial Crisis was hampered by the fragmented nature of their regulatory systems. Financial regulations are typically designed to ensure the health of individual institutions rather than the financial system as a whole. In this book we argue that systemic regulation is an important function that requires a special mandate, and that the central bank is particularly well equipped to fulfill this function.

Finally, effective financial regulation requires that politicians, and ultimately the public, have an adequate understanding of the financial system. The political turmoil surrounding the Crisis suggests the importance of disseminating expert knowledge about finance to a broader audience. This is one of our motivations for writing this book.

WHAT WERE THE ORIGINS OF THE WORLD FINANCIAL CRISIS?

Like the origins of the First World War, the causes of the Crisis will be debated by scholars for many years.

Most observers agree that the strong run-up and subsequent sharp decline in the prices of stocks, houses, and other financial assets in developed countries was an important catalyst for the Crisis. There is disagreement, however, about whether this pattern in prices is the result of rational investor behavior or “irrational bubbles.”

Some argue that the run-up before the Crisis was driven by investors who knowingly accepted unusually low expected returns, and they offer several possible reasons why. First, there was a surge of savings in emerging countries, driven by a combination of rapid economic growth and demographics. Perhaps because of a desire to accumulate foreign reserves in the aftermath of the Asia crisis of 1997–98, much of this wealth was invested in developed markets. Second, financial markets were unusually tranquil during 2003 to 2006. With low volatility, investors may have settled for a low risk premium. Third, influenced by fears of a Japanese-style deflation resulting from the market downturn of 2000–2001 and by a belief that they should not try to use monetary policy to counteract rising asset prices, central bankers in the United States maintained a loose monetary policy throughout the period.¹⁷ And from this rational view of investors, the plunge in asset prices that accompanied the Crisis was caused by bad news about future cash flows, unexpected increases in the returns required by investors, or both.

Others suggest a more direct explanation. The high prices before the Crisis were driven by an irrational belief that prices would continue to rise, and the collapse of asset prices was the inevitable result of this mistake. Whatever

the explanation, the sharp drop in asset prices both contributed to and was a symptom of the Crisis.

Other commentators argue that the financial system became vulnerable because many market participants assessed risks inaccurately during the period leading up to the World Financial Crisis. Consumers, banks, and investors in general underestimated the risk of house price declines, increasing the prices they were willing to pay for real estate, the credit they were willing to extend, and the valuations of banks that extended such credit. Banks put much weight on the recent past when they estimated value at risk, which led them to conclude that the level of risk was low and that there was little downside to having high leverage. Other market participants did not fully appreciate that high liquidity was suppressing volatility and that the process might reverse, with liquidity decreasing and volatility increasing.

More generally, the high level of financial innovation, driven in part by the declining cost of information technology, made it hard for risk assessment to keep pace with the evolving financial system.¹⁸ The benign environment of the credit boom exacerbated this problem by tempting financial institutions to underinvest in risk management.

U.S. policymakers also contributed to the severity of the Crisis by pushing Fannie Mae and Freddie Mac to increase the availability of mortgage funding to borrowers with questionable ability to repay their mortgages. As a result of this pressure, both agencies relaxed their standards for the mortgages they purchased and guaranteed. The demand

for homes by borrowers who qualified for mortgages because of these lower standards pushed up prices, and the default by many of them during the recession contributed to the drop in home prices.

The panic and run in the fall of 2008 remain the central distinguishing features of the World Financial Crisis. Asset prices have risen and fallen before, and the world economy has borne large financial losses many times without such a severe economic outcome. Conversely, losses from completely different underlying sources—commercial real estate or perhaps sovereign defaults—could cause a similar catastrophe if they again provoke too-big-to-fail chaos or runs.

This book does not seek to provide a complete diagnosis of the World Financial Crisis, nor does it take a stand on the relative importance of the contributing factors listed above. Rather, we believe our recommendations will help prevent or mitigate future crises even though we do not fully understand all the causes of the last one.

Carmen Reinhart and Kenneth Rogoff, among others, have pointed out that financial crises have occurred throughout the history of capitalism, and that these crises share many common patterns.¹⁹ The lesson we draw from this is that no acceptable set of regulations can prevent market participants from making mistakes that create economic instability. Our purpose in this book is instead to suggest regulatory reforms that will make the system more stable despite the mistakes that are sure to come.