CHAPTER 6

STRENGTHENING THE FINANCIAL SYSTEM

Introduction

The financial system plays an important role in any modern economy, providing key services that not only match savers with borrowers but also provide services that facilitate such economic activity as safekeeping of financial assets and payment processing. While the markets for financial services generally succeed in providing these services, there are situations in which financial markets do not function well; referred to as market failures. Due to the existence of market failures, regulation plays an important role in helping to ensure that financial service providers continue to effectively provide necessary services to the economy.

The 2008-09 financial crisis highlighted several such market failures. Responding quickly, the President, Congress, and regulators addressed these failures by adopting necessary reforms to the financial system. These measures were designed to address three areas of concern: (1) increasing the safety and soundness of individual financial institutions; (2) identifying and mitigating sources of systemic risk – the risk that a threat to one firm or small number of firms could incite widespread panic in financial markets and threaten the entire financial system; and (3) improving transparency, accountability, and protections for consumers and investors.

During the Obama Administration, the passage and implementation of financial reform has worked to address these issues with measurable impact on the safety and soundness of financial markets. Although there is still work to be done, considerable progress is evident. The financial system in 2016 is more durable and able to perform its necessary and important functions without undue risk.

The reforms involved a substantial reshaping of the financial regulatory landscape in the United States. Rules were changed to make banks

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hold more capital and have better access to liquidity. The ability of banks to engage in risky trading was reduced. Over-the-counter (OTC) derivatives trading is now better regulated and more transparent. The rules governing credit ratings agencies that many investors rely on were substantially reformed. Importantly, two new institutional structures were created: the Financial Stability Oversight Council (FSOC) that brings together different regulators to consider and respond to systemic risks and the Consumer Financial Protection Bureau aimed at making sure financial institutions interact in a fair manner with their clients.

This chapter focuses on the steps taken during the Obama Administration to reform the financial system, starting with a discussion of the economic rationale for regulation, particularly as it applies to financial market failures. The state of financial markets just prior to, and during, the financial crisis is detailed, followed by an outline of specific financial reforms undertaken in response to the crisis and the measurable impact of those reforms. A final section provides a snapshot of the state of financial markets in the fall of 2016 after the implementation of most of the financial reforms discussed below.

Economic Rationale for Regulating Financial Markets

The financial system —commercial banks, along with insurance companies, investment banks, mutual funds, and all the other institutions where individuals and firms put their savings or borrow funds—plays an integral role in any modern economy. Providers of financial services stand between savers who seek a return on their savings and borrowers who are willing to pay to use those savings to start a company or buy their first home. The U.S. financial system, among other things, provides financial intermediation between savers and borrowers; yet the infrastructure to perform that function is necessarily complex and costly. While the markets for financial services generally succeed in facilitating the matching of those wishing to lend or invest their savings with those wishing to borrow or invest those savings, there are situations in which financial markets do not function well — often referred to as market failures — or may not achieve the desired outcome from society's point of view. Due to the existence of market failures, regulation plays an important role in helping to ensure that financial service providers continue to effectively intermediate between savers and borrowers.

Without a financial system, the modern economy could not function. In the short run, people could keep their savings in their homes, and the only apparent losses would be the forgone interest and dividends. But

with no easy way to get the funds from savers into productive investment, the economy would face bigger problems very quickly. Entrepreneurs with ideas would find it difficult to get capital, large companies in need of money to restructure their operations would have no way to borrow against their future earnings. Young families would have no way to buy a house until they had personally saved enough to afford the whole thing. Workers saving for retirement, and firms and individuals attempting to insure against risk, would find it hard to do so.

As part of collecting savings and making them available to borrowers, financial firms perform several important functions. The first is to evaluate the potential borrower and the reasons they wish to borrow, and to make reasonably sure that the loan will be repaid and that the investment will perform as promised. This includes the continued monitoring of the borrower to ensure the money is being used as promised. When the system works well, the financial service provider acts on behalf of the saver – and in the process helps ensure that capital is allocated more efficiently in the economy. Savers or investors may lack information about the quality of a firm looking to borrow money. Figuring out the creditworthiness of potential borrowers and supervising the borrower after a loan is made is costly. By specializing in making loans or providing funds, the financial service provider typically has better information than savers about potential and actual borrowers as well as the likelihood that loans will be repaid and investments will perform as expected. Problems may develop, however, if or when the financial service provider puts its interests ahead of the saver. Economists refer to this as an example of the principal-agent problem.

Another important function of financial service providers is to supply liquidity and maturity transformation. Borrowers often wish to borrow for a long period of time to invest in a home or a new business. However, savers may wish to have the ability to cash out of their investment should they desire to use their funds for other purposes. An example of maturity transformation is when a credit union that aggregates the savings deposits of many customers to make a mortgage loan that will be repaid over 30 years.

Financial service providers also facilitate diversification. Savers who invest through an intermediary typically have a small investment in many large projects rather than having "all their eggs in one basket." The financial system allows investors not only to have ready access to their funds if needed, but also to spread a relatively small amount of money across a wide range of investments.

Finally, the financial system plays a key role in the way payments are made in our economy. While people can always use cash for their purchases, it is not always the most convenient method. Checks, transfers, credit cards,

and other non-cash payment methods offer effective alternatives. People depend on the financial system to make these alternatives possible.

"Financial institution" often means a commercial bank, but there are many other types of financial institution. Investment banks help firms sell stakes in the company directly to investors as well as borrow money directly from investors. Rather than taking a loan from a bank, a firm could issue stock to build a new factory. Brokers allow investors to access equity and bond markets to make it possible to buy and sell stocks and bonds. Rather than rely on a bank, investors can access liquidity through secondary markets. Over time, financial firms have learned to pool various types of individual loans or debt obligations and combine them into different securities that they can sell, a process known as securitization, allowing further diversification. Derivative contracts allow hedging, or other types of investing behavior. Various insurance products on real life or financial events can also play an important role by allowing for hedging of many different types of risk.

Financial institutions effectively provide services to their customers much of the time; however, fragility, instability, or disruption in financial markets can cause those institutions to fail. Individuals or firms, acting independently, may not be able to effectively address these market failures because there is often a conflict between the individual's or firm's best interest and the aggregate best interest of all market participants. Economists refer to this as a collective action problem. In such cases, it may be efficient for government to step in to regulate, including the monitoring and supervision of financial firms.

An example of fragility in the financial system that can lead to a market failure involves liquidity and maturity transformation. A financial service provider that offers liquidity and maturity transformation may have illiquid long-term assets and liquid short-term liabilities. If creditors all call these liabilities at the same time, the financial service provider may find itself unable to raise the cash to meet those calls. The classic example is a bank run, where depositors all "run" at the same time to withdraw their funds, leaving banks unable to sell the illiquid business loans and mortgages quickly enough to meet those demands. So-called "run-risk" can occur in a wide variety of nonbank institutions as well.

Runs can occur when all individuals are acting in their own best interests. The fact that they lack full information about a financial institution's investments means that if they believe the institution may be in trouble, the rational response may be to withdraw their funds. Once the run starts, it makes even more sense for others to try to withdraw their funds before the institution runs out of liquidity (Diamond and Dybvig 1983). Because the

public has limited information, runs on an individual institution may spread to other institutions. People could worry that whatever problem afflicts the first institution may also affect others, or they could worry that the failure of the first institution may cause problems in others with which it does business. These other institutions, even though solvent, may not have sufficient liquid assets on-hand to meet the demands of depositors. In the absence of a mechanism that either stops the initial run or the contagion effects, a run on a single institution can become a run on the broader financial system.

One lesson driven home by the financial crisis is that actions taken by a single systemically important financial institution can negatively impact the stability of the entire system, particularly if the financial system is already threatened. Threats to the systemic stability can pose costs on society, and such societal costs are typically not considered in the decision-making of the firm. Thus, regulations that seek to limit the risk that the failure of a single institution can pose to the financial system are warranted when the social costs of the failure of a financial institution exceeds the private costs.

Systemic risk issues have traditionally been central to the regulation of banks due in part to the danger banks face from runs. A bank run has the potential to cause significant harm to the economy because of the pivotal position of banks in the financial system, including in clearing and payment systems, and because a run on one bank has the potential to impact the health of other banks. The dangers resulting from bank runs and issues of adverse selection and moral hazard associated with safety-net arrangements designed to lower the risk of a run, such as deposit insurance and access to the central banks as a lender-of-last resort, are common justifications for bank regulation.[1] However, run-risk can occur in financial institutions other than banks if there is a liquidity and maturity mismatch between assets and liabilities.

Run risk may be mitigated through government insurance schemes, regulations that limit the ability of financial institutions to engage in liquidity and maturity transformation, regulations that limit the ability of financial institutions to take risks, or by requiring financial institutions to keep enough loss-absorbing capital to lower the chance of a run. The government or central bank could also act as a lender of last resort — providing loans to financial firms that have good, but illiquid assets during a crisis. Each of

[1] Adverse selection occurs when one party to a transaction has better information than the other and will participate in trades which benefit it the most, typically at the expense of the other party. A bank that takes advantage of a lender-of-last-resort arrangement may be a much less creditworthy borrower than a typical bank.
Moral hazard occurs when the one party is more likely to take risks when another party bears part or all of the cost of a bad outcome. For example, a bank may be more likely to make loans to risky borrowers at high interest rates if deposits are insured.

Box 6-1: Financialization of the U.S. Economy

Since the late 1970s, financial deregulation, innovation, and advances in information technology have fueled an expansion of the financial services industry. The growth of the financial services industry relative to the economy, referred to as "financialization," accelerated since the 1980s, peaking before the global financial crisis that began in 2007. Most industrial countries have experienced financialization, joined more recently by emerging market economies as they liberalize their domestic capital markets.

Expanded financial markets bring many potential benefits. For example, households today have more access to financial services which, in turn, gives them greater ability to finance the purchase of homes and automobiles, and to save at low cost in diversified portfolios. Increased trading activities can enhance market liquidity and aid in price discovery. These gains may be magnified when financial activity occurs across larger and more inclusive markets.

However, there are a number of reasons to be concerned that, past a certain point, a larger financial sector could be economically costly. First, a larger financial sector may threaten the overall economy if its size is coupled with fragility as, the larger the sector, the more problematic the spillovers may be to the broader economy if a crisis does hit. Second, financial services may have expanded beyond their social value, effectively capitalizing on information asymmetries to oversell unneeded services to an unwitting population. Finally, if the financial sector is earning excess profits and some of that is used to raise the pay of those who work in the sector, the higher pay could draw talent away from alternative activities that would provide social value.

Size of the Financial Sector

A common measure of financial-sector size is the share of GDP contributed by financial services – consisting of (1) insurance, (2) securities trading, and (3) credit intermediation.[1] This measure does not capture asset *stocks*, such as outstanding mortgage credit; rather, it gives the flow of value added (the flow of compensation, depreciation, profits, rent, and other income streams) from the financial service activities. Financial services comprised 4.5 percent of GDP in 1977, crested above 7.5 percent in the mid 2000's, before crashing in the financial crisis. The

[1] In what follows, "Insurance" is defined as the NAICS code 524, which includes insurance carriers, agencies, brokerages, and related activities; "Securities Trading" as NAICS codes 523 and 525, which include securities and commodity contracts intermediation and brokerage, as well as funds, trusts, and other financial vehicles; "Credit Intermediation" as NAICS code 521 which includes monetary authorities, depository credit intermediation, non-depository credit intermediation, and related activities.

value added of the sector has gradually climbed since then to approximately 7 percent in 2015 (Figure 6-i).

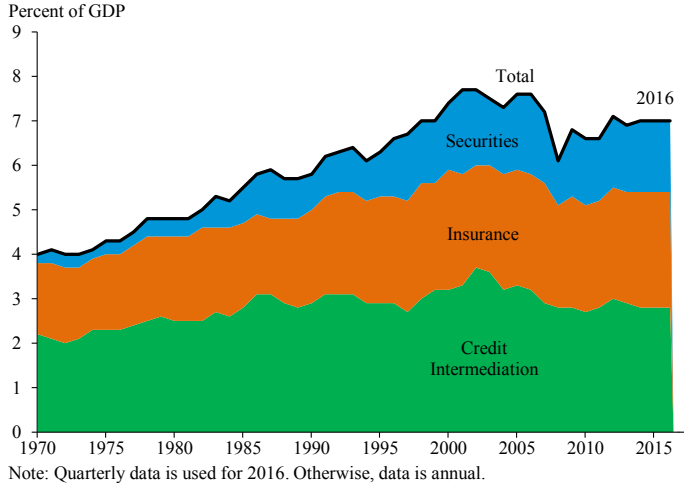
Note that this measure may inflate financial sector growth. For example, the shift from defined benefit pension funds, often managed by the pension sponsor, to defined contribution pension plans, typically managed by a financial services firm, could result in activity shifting from the sector of the sponsor to financial services.

As the financial sector grows, any associated risks may generate larger risks to society as a whole. This is not purely a function of size, but a question of size combined with fragility. In some countries where financialization has far outpaced that of the United States, the burden of a failing financial system has been quite large. In Ireland, for example, cleaning up the financial sector following the global financial crisis required a sizable government intervention, contributing to fiscal deficits as high as 30 percent of GDP in 2010. The U.S. financial sector, though smaller relative to GDP, was still able to generate large economic costs, helping propel the economy into a protracted recession. When well-regulated and smoothly functioning, the raw size may be unimportant, but when problems strike, the size can matter.

The Value of Financial Services

Almost half of the growth in financial services as a share of GDP from 1980 to its peak in 2006 has been in the securities trading category. The asset management subcomponent of the securities trading category

Figure 6-i
Financial Insurance and Services: Value Added, 1970–2016



Note: Quarterly data is used for 2016. Otherwise, data is annual.
Source: Bureau of Economic Analysis, National Income and Product Accounts.

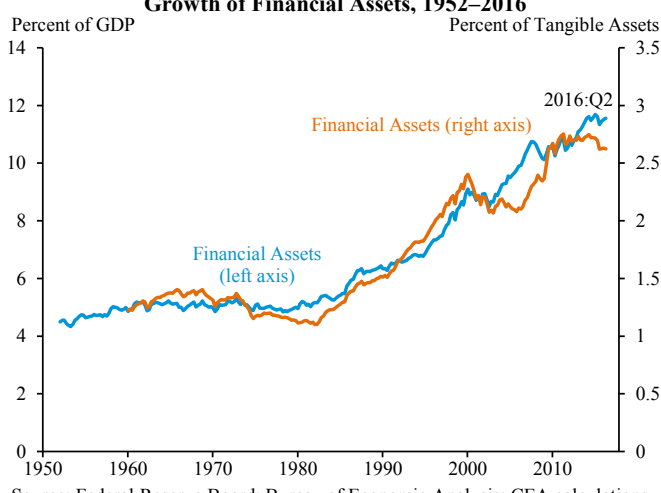
accounted for half of the industry's gross output by 2007. The Credit Intermediation subcomponent that includes many traditional banking services has grown as well but more slowly. Transactional services, particularly fees related to consumer and mortgage credit, account for nearly all the growth in Credit Intermediation, approximately a quarter of the financial industry's growth. Thus, in many ways, the question of the value of this growth rests on the value of the asset management services and the expansion of credit to households.

Professional Asset-Management

Management fees account for most of the growth in professional asset management. Greenwood and Scharfstein (2013) estimate these fees to be relatively flat as a percent of assets under management, fluctuating between 1.1 and 1.6 percent. The growth in the total dollar amount of these fees is due to the growth in both the value of assets and the share of these assets that are professionally managed. Figure 6-ii below illustrates the growth in the value of total U.S. financial assets, relative to both GDP and U.S. nonfinancial (tangible) assets.

Greenwood and Scharfstein find the growth in the share of assets under professional management puzzling because there is considerable evidence that active managers tend to underperform when compared with passively managed funds, after controlling for risk. For example, Fama and French (2010) find little evidence of skill in fund management, particularly when examining returns net of fees charged by fund

Figure 6-ii
Growth of Financial Assets, 1952–2016



Source: Federal Reserve Board; Bureau of Economic Analysis; CEA calculations.

managers. Thus, after fees, savers on average earn less when they invest in actively managed funds vs. passively managed funds. Households often misunderstand the pricing of the financial products they purchase, which could mean individuals do not recognize the overpricing of active management. Index funds, automated investment advice, and substantially less trading and lower fees might leave people better off.

Cochrane (2013) notes that financially sophisticated managers of endowments typically invest in actively managed funds. He argues that basing an explanation of the growth of active management on investor naïveté ignores the behavior of such sophisticated investors, though it is also possible that sophisticated institutional investors simply have access to better fund managers than regular investors. Further, he points to academic literature (see, for instance, Berk and Green 2004) that proposes explanations for both rational investors pursuing an active investing strategy and the observed absence of evidence in support of superior performance of active managers highlighted by Greenwood and Scharfstein.

The growth of professional asset management may also provide benefits to ordinary Americans as mutual funds or employer-sponsored retirement plans have made it easier for households to participate in securities markets and diversify their wealth. The share of households between the 20th and 80th income percentiles owning stock (including through retirement accounts) rose from 29 percent in 1989 to 49 percent in 2013, having peaked at 55 percent in 2001 (Figure 6-iii).

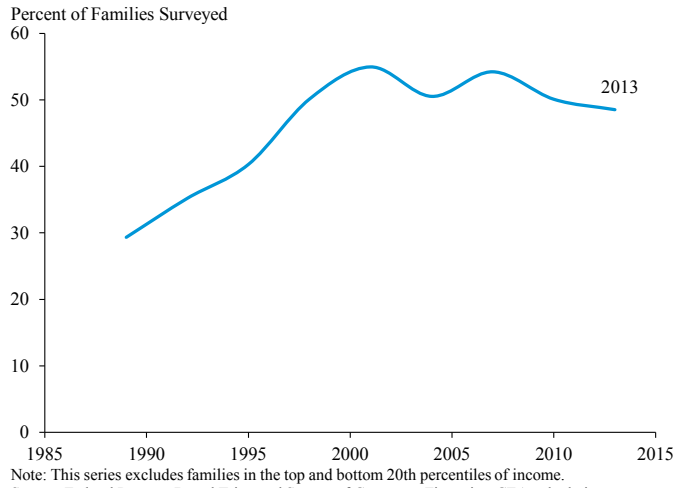
Credit Intermediation

Fees associated with consumer and mortgage credit largely have driven the growth in credit intermediation. Jorda, Schularick and Taylor (2016) point out this is a trend across 17 advanced economies where the bulk of credit growth over the second half of the 20th century came in the form of bank financed mortgages, not business investment.

Household credit, mainly in the form of mortgage debt, grew dramatically from 48 percent of GDP in 1980 to 99 percent in 2007. Meanwhile, household debt held by banks as a share of GDP was stable at 40 percent, meaning the broader financial market, not just banks, held the assets that were generated by this expansion of mortgage debt. Household credit that was not held by traditional banks was packaged into asset-backed securities. The expansion of the securitization market, and the plentiful assets associated with it, helped increase the supply of credit available in the housing market. However, this form of credit expansion also increased the vulnerability of the financial system to the housing collapse by creating highly-rated securities backed by portfolios of mortgages supposedly protected by equity tranches that would absorb losses in the event some mortgages in the portfolio defaulted. This loss

Figure 6-iii

Families with Direct or Indirect Holdings of Stock, 1989–2013



Note: This series excludes families in the top and bottom 20th percentiles of income.
Source: Federal Reserve Board Triannual Survey of Consumer Financies; CEA calculations.

absorbing layer proved inadequate when it became clear the mortgages in the portfolio were of questionable quality.

Greenwood and Scharfstein provide evidence that mortgage securitization extended the number of intermediaries between initial borrowers and investors who ultimately assumed the risk of the mortgage defaults. The increase in credit intermediaries resulted in information asymmetries, where intermediate investors knew less about the original borrowers than the initial lender who created the loans. In this market, there was an incentive for original lender to grant loans to sub-optimal borrowers, knowing intermediaries would purchase the loan. When individuals began defaulting on loans, intermediaries were unable to distinguish between low-risk loans and loans at risk of default. Several studies note that this mechanism is at the core of what made the financial sector fragile.

As Cochrane points out, the problem was not strictly with the size of this market as a function of GDP but with its fragility. He also points out that this financial innovation has potentially large social benefits. Securitization of mortgage debt allows loan originators to create portfolios of loans and sell them to investors with greater ability and willingness to bear the associated risk. Securitization thus could increase risk in the market by making the credit chain longer and more opaque, but may also spread that risk in possibly efficient ways and make funds available for lending to homeowners, possibly at a lower price.

Too Many Resources in Finance?

Beyond the question of the size of the financial sector or the value it creates is the question of whether the United States dedicates too many resources—such as talent and capital—to reallocating funds from savers to borrowers. On the income side, there is concern that financialization is driving up financial sector wages relative to other industries. Philippon and Reshef (2012) find that between 1950 and 1980 wage profiles of finance and other sectors were similar. However, in 2006, the average finance worker earned 50 percent more than the average private-sector worker, adjusted for education. In high management, executives in finance earned 250 percent more than other private-sector executives in 2005. According to Benaubou and Tirole (2016), high wages in financial services may be luring talent (highly-educated individuals) away from more productive industries, which can be costly in terms of economic growth. However, Philippon and Reshef finds evidence that the high-skill high-compensation nature of our current financial system is not inherent to finance. They suggest instead that financial deregulation "may increase the scope for skilled workers to operate freely and to use their creativity to produce new complex products." Philippon and Reshef find that periods of financial deregulation in the United States see talent inflows to the financial sector, while periods of regulation see talent outflows.

The financial sector attracts not only talent, but huge, arguably excessive, amounts of capital in activities whose social benefits are unclear. For example, companies have spent billions of dollars creating slightly faster trading platforms to beat competing trades to the market by milliseconds. The returns of imperceptibly faster trading to the fastest trader may be immense, but the social value is difficult to discern. As some traders become faster, the cost of adverse selection increases for all traders, increasing incentives for investing in faster technology. Ultimately, trading becomes more expensive for all traders, with little evidence of substantially increasing benefits to society (Biais, Foucault, and Moinas 2015). Liquidity provision, price discovery, and opportunities for diversification have benefits; however, the important questions for policymakers are whether financialization implies too much talent is being drawn into the creation and sale of these new products and whether these products generate benefits broadly or just allow the accumulation of excess profits for the most successful financial firms.

While the financial sector has indeed grown and the global financial crisis exposed distortions in financial markets, not all financial market distortions are associated with financialization. As the country has seen, distortions caused by the growth of securitization of mortgages

are due in part to information asymmetries, which are not necessarily characteristics of a large financial sector. Distortions stemming from inefficient consumer behavior may be due to a lack of information or insufficient consumer protection. Thus, carefully considered regulation that focuses on eliminating distortions will improve the overall system. The goals of such reforms should not necessarily focus on the size of the financial system or individual institutions *per se*. Reforms should instead focus on the reduction of market distortions so that resources find their most productive use, which may or may not impact the size of the financial sector.

these methods has benefits and drawbacks and may be used in combination to lower the systemic risk posed by run risk.

One notable risk of insurance schemes, lenders-of-last-resort, or the widespread belief that the government will not allow a particular financial firm to fail is the moral hazard it introduces into the behavior of both consumers and firms. Consumers may be less careful in the selection of financial institutions or even seek high-risk firms that offer higher returns because, if the firm fails they will be compensated by a government-backed insurance scheme. The firm is incentivized to take more risk because resulting profits may be retained while losses are born by the insurance provider. The incentive to engage in such behavior becomes stronger the closer the firm comes to failing. This is similar to what occurred during the savings and loan (S&L) crisis of the 1980s and 1990s that resulted in the failure of almost one-in-three S&L institutions. Depositors were unconcerned about risky loans and investments made by S&Ls because the Federal Savings and Loan Insurance Corporation insured their deposits. Such insurance schemes protect against bank runs and may also reduce the problem of a single firm's failure posing significant risk to the larger financial system; however, deposit insurance also requires rules to reduce incentives to take on too much risk and continual monitoring for compliance.

Financial regulation can also be necessary to correct for specific market imperfections or failures that reduce consumer welfare. These include consumers having inadequate information available to make well-informed decisions, agency costs, and the difficulties consumers face in assessing the safety and soundness of financial institutions. Many of these problems arise because of the information advantage held by financial institutions and because financial contracts are long-term in nature. This results in the inability of the consumer to ascertain the quality of a contract at the time of purchase, potential moral hazard that may emerge in that the behavior

of the firm after the purchase affects the value of the contract, and the firm may have incentives to behave opportunistically. The purpose of required information disclosures is to reduce the information advantage of financial institutions, to make consumers more confident that they possess the information necessary to make well-informed decisions, and to reduce costs of making poor decisions.

Information asymmetries may reduce demand for financial services. If consumers know there are good and bad firms and products but are unable to distinguish between them, a cautious consumer may simply not purchase such products. This means families may make poor investment choices leaving them with less wealth for retirement or may not purchase products such as life insurance that may protect the family's future should tragedy strike. Similarly, firms may not take advantage of opportunities to hedge business risks or reduce financing costs, putting their financial health, and therefore the jobs of their employees, at risk.

The financial system plays a key role in the economy, but because of these various market failures, it cannot be relied upon to do so safely without regulation. The next section summarizes the state of U.S. financial markets leading up to the crisis.

U.S. Financial Markets in 2007-08

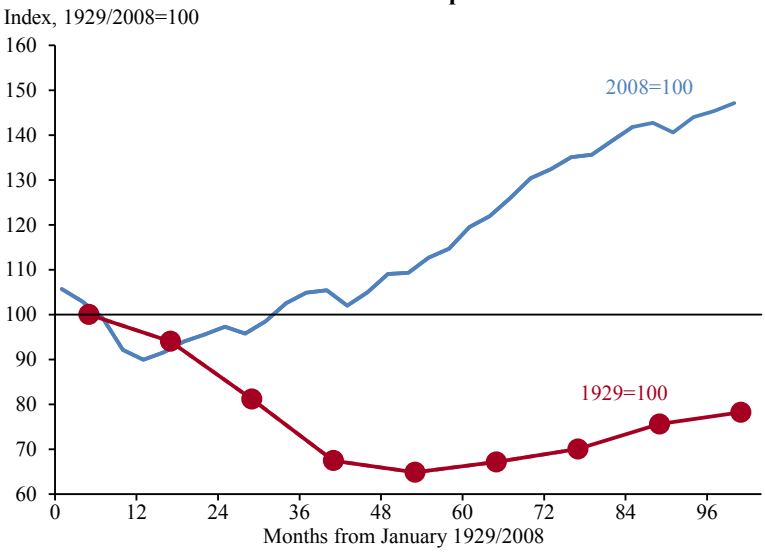
Financial crises result from the collapse or serious disruption of financial intermediation. In a crisis, the ability of the financial system to move savings into investment is severely impaired with far reaching repercussions for the economy. The 2007-08 crisis and the recession that followed resulted in millions of lost jobs, trillions in lost output, and hardship for many who lost homes, savings, or financial security. As a result of declining asset prices, U.S. households lost a total of $13 trillion in wealth, 19 percent of total U.S. household wealth from its peak in 2007 to its trough in 2009. The decline in wealth was far more than the reduction in wealth experienced at the onset of the Great Depression (Figure 6-1).

While the vulnerabilities that created the potential for crisis were years in the making, the collapse of housing prices ignited a string of events that led to a full-blown crisis in the fall of 2008.[2] Banks took advantage of securitization opportunities to institute relaxed lending standards that drove a boom in mortgage lending. In particular, as seen in Figure 6-2, there was significant growth in mortgage loan types — Alt-A and subprime — that were typically made to riskier borrowers during the pre-crisis period.

[2] See FCIC (2011) for more complete discussion of the causes of the financial crisis.

Figure 6-1

Household Net Worth in the Great Depression and Great Recession

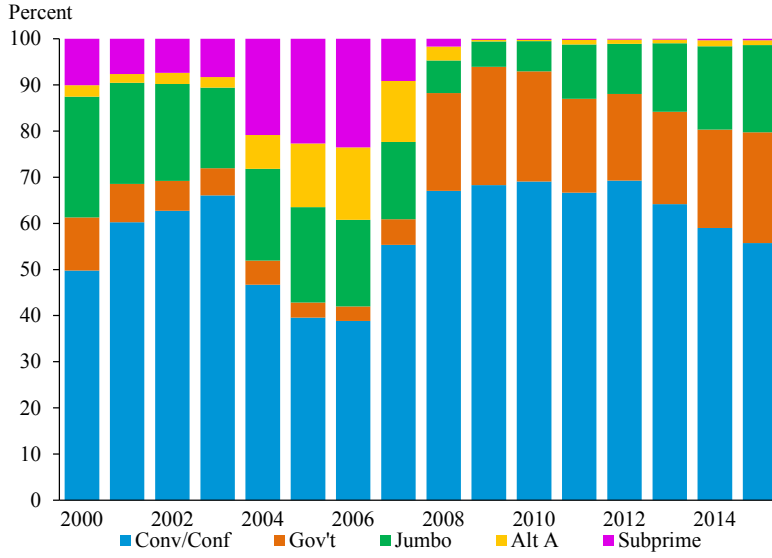


Note: Red markers represent annual averages.
Source: Federal Reserve Board of Governors; Mishkin (1978).

This expansion of lending, and the financial system behavior that encouraged it, both fueled an unsustainable rise in housing prices and filled the financial system with risky assets that left financial firms over-leveraged and vulnerable. Publicly traded government-sponsored enterprises (GSEs) including Fannie Mae and Freddie Mac used leverage as high as 75-to-1 to build a $5 trillion mortgage exposure. This included the purchase of a growing fraction non-GSE subprime mortgage-backed securities, rising from 10.5 percent in 2001 to 40 percent in 2004. Trillions of dollars in mortgages were held directly and indirectly by many different types of market participants as mortgage-related securities were packaged, repackaged, and sold to investors around the world. When housing prices collapsed, hundreds of billions of dollars in losses in mortgages and mortgage-related securities caused problems for financial institutions that had significant exposures to those mortgages and had borrowed heavily against them. What had been excessively loose lending quickly became tight, and impacts started spilling into other sectors of the economy.

Uncertainty about exposure to losses from mortgage-related securities as well as derivatives based on those securities led to uncertainty about the creditworthiness of major financial institutions. Short-term wholesale funding became more challenging. The crisis intensified in September 2008 with

Figure 6-2
Mortgage Originations by Product Type, 2000–2015



Source: Inside Mortgage Finance.

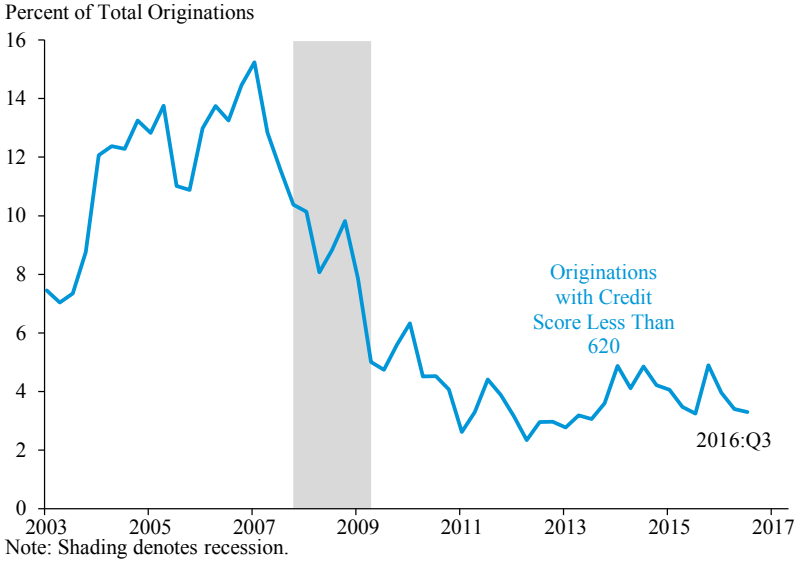
the failure of Lehman Brothers and the near collapse of the insurance giant American International Group (AIG) shortly thereafter.

A particularly noteworthy event occurred in money markets during the crisis. The net asset value of the Reserve Primary Fund, a money market mutual fund with significant holdings of commercial paper issued by Lehman Brothers, declined below $1, the usual share price of this type of fund. In industry jargon, the fund "broke the buck." Investors in money market funds often thought of them as safe and risk-free as a bank account and, while they did in fact provide investors with immediate access to their funds, they were not in fact regulated banks with insured deposits. When a major money market fund returned less than what investors had deposited, it stood as a stark reminder that such seemingly low-risk investments could decline in value and this caused investors effectively to stage a run on this portion of the financial system. This further drove down the prices of assets as funds sold their holdings to meet investor redemption requests. These events highlighted the risks of non-banks conducting the traditional banking functions of credit, maturity, and liquidity transformation without the safety-net of the banking sector.

Additional uncertainty about the exposures of surviving financial institutions to those that had either already failed or were thought to be close to failure, and the lack of transparency of the balance sheets of those

Figure 6-3

Subprime Mortgage Originations, 2003–2016



Note: Shading denotes recession.
Source: FRBNY Consumer Credit Panel; Equifax.

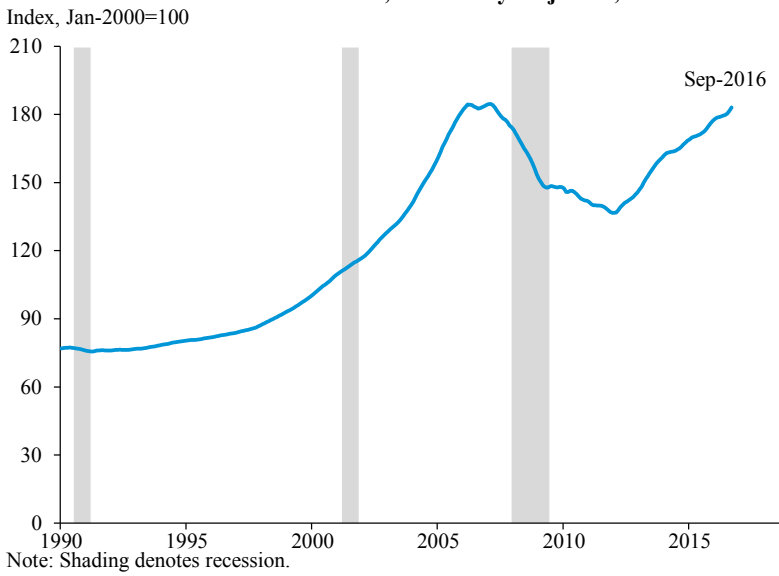
financial institutions coupled with a tangle of interconnections among financial institutions caused credit markets to seize up. Trading in many securities ground to a halt, the S&P 500 stock market index lost more than half its value between early December 2007 and March 2009, and as the financial collapse disrupted the functioning of the real economy, the nation plunged into a deep recession.

There were many signs of potential instability in financial markets in the years leading up to the crisis. As shown in Figure 6-3, the fraction of mortgages that were subprime rose rapidly in the years directly preceding the financial crisis. This was accompanied by widespread reports of egregious and predatory lending practices. Easy access to credit contributed to a near doubling of housing prices in the eight years ending in February 2007 (see Figure 6-4). The rise in housing finance activity resulted in a dramatic increase in household mortgage debt as a percentage of disposable personal income, as shown in Figure 6-5.

There were also warning signs within the financial services sector. The relatively less regulated shadow banking sector was growing considerably faster than the traditional banking sector. Shadow banks are financial intermediaries that conduct maturity, credit, and liquidity transformation without explicit access to central bank liquidity or public sector credit guarantees. Examples of shadow banks include finance companies, asset-backed commercial paper (ABCP) conduits, structured investment vehicles

Figure 6-4

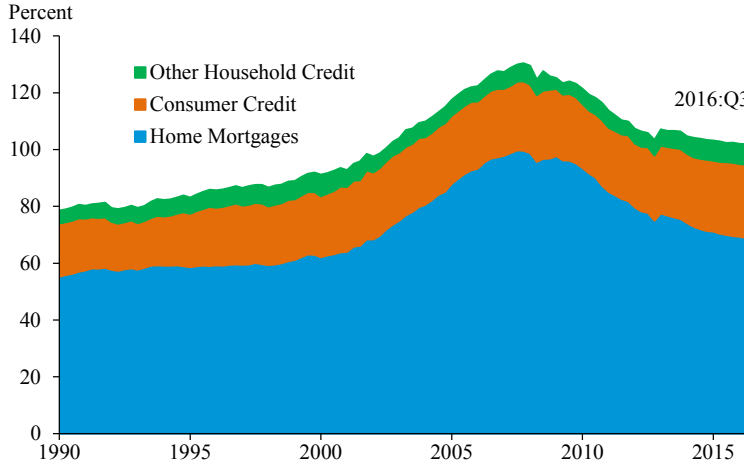
Case-Shiller Home Price Index, Seasonally Adjusted, 1990–2016



Note: Shading denotes recession.
Source: Standard & Poors.

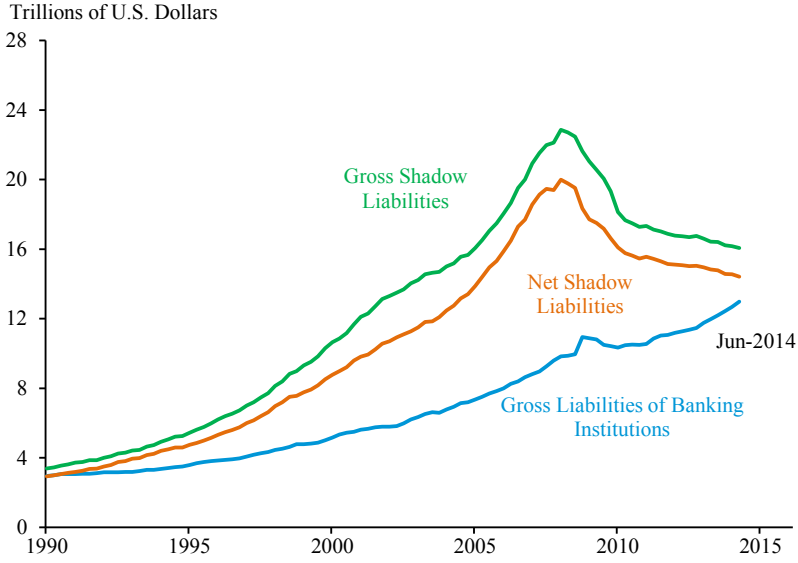
Figure 6-5

Household Credit as a Percent of Disposable Personal Income, 1990–2016



Note: Other household credit includes loans to both households and nonprofit organizations.
Source: Federal Reserve; Bureau of Economic Analysis.

Figure 6-6
Growth of Shadow Banking, 1990–2014



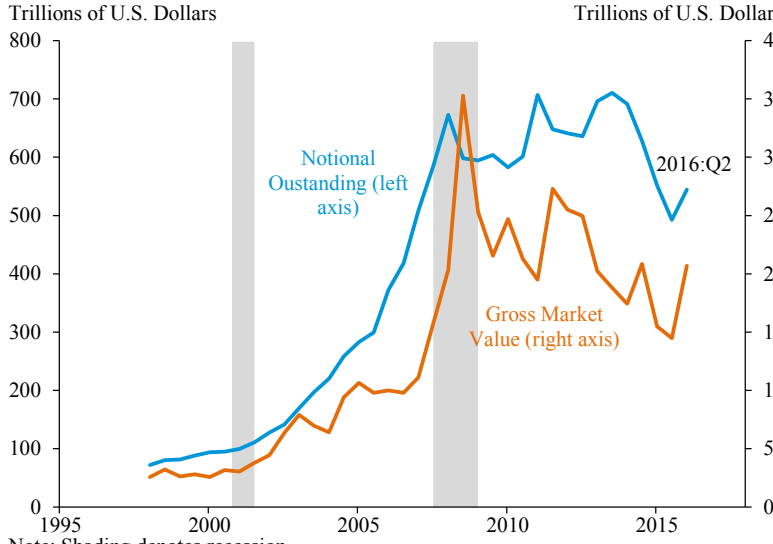
Source: Federal Reserve Board; Haver Analytics.

(SIVs), credit hedge funds, money market mutual funds, securities lenders, limited-purpose finance companies (LPFCs), and government-sponsored enterprises (GSEs). Pozsar et al. (2012) estimate the size of the shadow-banking sector over time using flow-of-funds data.[3] Figure 6-6 uses the same methodology and shows that net liabilities of the shadow-banking sector grew at almost 1.5 times the growth rate of traditional banking sector liabilities in the decade preceding the financial crisis. By 2007, the net liabilities of the shadow-banking sector were substantially larger than the gross liabilities of banking institutions.

As shown in Figure 6-7, there was rapid growth in financial firms' trading in unregulated over-the-counter (OTC) derivatives. Many institutions took on too much risk with, as it is now known, with too little capital and with too much dependence on short-term financing. Although the rise in trading volume in these markets may have been a rational response to financial and technological innovations, the financial crisis made clear that there was a lack of transparency and market oversight that required carefully considered regulatory solutions.

[3] The gross measure sums all liabilities recorded in the flow of funds that relate to securitization activity (MBS, ABS, and other GSE liabilities), as well as all short term money market transactions that are not backstopped by deposit insurance (repos, commercial paper, and other money market mutual fund liabilities). The net measure attempts to remove double counting.

Figure 6-7
Global OTC Derivative Market, 1998–2016



Note: Shading denotes recession.
Source: Bank for International Settlements (BIS).

Impact of Reforms to Establish a More Sustainable Financial System

The new Administration's highest priorities were (1) to cushion the blow to the economy, (2) stabilize the financial system, and (3) get the economy growing again. The American Recovery and Reinvestment Act of 2009 provided substantial fiscal stimulus in the form of tax cuts, direct aid to states or affected individuals, along with important investments in transportation, clean energy, and other long-term priorities.[4] (For a more detailed discussion of the Administration's response to the crisis, including the Recovery Act, see Chapter 1.) At the same time, the Federal Reserve used its authority to provide monetary accommodation to support the broad economy and to provide liquidity in particular financial markets where private markets were frozen.

Congress had passed the Emergency Economic Stabilization Act of 2008, creating the Troubled Asset Relief Program (TARP), and the Bush and Obama Administrations used the authorities in TARP to provide capital injections to banks, aid to homeowners, as well as support for the automobile industry. The financial rescue was followed by stress tests of the largest banks that revealed information to the markets about the health of

[4] See 2014 *Economic Report of the President*, Chapter 3 "The Economic Impact of the American Recovery and Reinvestment Act Five Years Later."

these financial institutions and the magnitude of their capital needs. Banks with shortfalls under the stress tests were able to subsequently raise private capital. Many smaller banks that were unable to raise private capital, as well as many large banks, were recapitalized through TARP funds. These actions aimed to stabilize the economy and the financial system, but were not solutions to the underlying problems in the regulatory framework that the crisis revealed.

At the same time, President Obama did not wait to push for longer-run changes to address the risk of future financial crises; in July 2010, he signed into law the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) whose stated purpose was "to promote the financial stability of the United States by improving accountability and transparency in the financial system, to end 'too big to fail,' to protect the American taxpayer by ending bailouts, to protect consumers from abusive financial services practices, and for other purposes."[5] There have been multiple other efforts to identify opportunities for regulatory solutions to improve the functioning of financial markets and promote financial stability. The Basel Committee on Banking Supervision, for example, recommended a set of international banking regulations, Basel III, to strengthen the regulation, supervision, and risk management of the banking sector.

In many ways these longer-run reforms have reshaped the financial regulatory system of the United States. Banks and other financial institutions now face different rules designed to make them safer and less of a threat to the overall system. With the creation of FSOC, regulators now have a way to pool knowledge and insights about risks to the financial system. With the creation of the Consumer Financial Protection Bureau (CFPB), consumers now have a regulator whose sole job is to look out for the interests of consumers in the financial system.

The many individual components of financial reform over the past eight years can be classified into three broad overlapping categories. The first includes measures aimed to improve the safety and soundness of individual financial institutions by not only increasing their capital and liquidity but also decreasing risky behavior. These reforms should increase the banking sector's ability to absorb shocks arising from financial and economic stress. The second category of reforms includes measures aimed at reducing systemic risk in the financial system by bringing more of the financial system under a regulatory umbrella, improving financial regulatory coordination, and ensuring that individual financial institutions can fail without derailing the system. The third includes measures designed to increase transparency and accountability in financial markets as well as provide additional

[5] Dodd-Frank Act preamble

consumer and investor protections. These include reforms designed to improve risk management, governance and transparency of the financial system by strengthening banks' transparency and disclosures, improving consumer protections, and better regulating credit rating agencies. These three categories of longer-run reforms are the focus of this section.

Increasing the Safety and Soundness of Individual Financial Institutions

The crisis revealed clear fault lines in the financial system. Many financial firms lacked the ability to absorb losses because they had inadequate levels of capital or lacked the ability to survive runs because they lacked sufficient liquid assets. In fact, these two issues are related because fears about solvency or insufficient liquidity can lead to runs. Moreover, many firms engaged in excessively risky trading and lending activity while at the same time enjoying the benefits of federally insured deposits and access to borrowing at the Federal Reserve. Financial reform has helped make the financial system more secure by requiring financial firms to have less unstable funding, more liquid assets, higher capital levels, and reduced risk-taking.

Capital Levels

An important step toward increasing the safety and soundness of individual financial institutions was the publishing of the Basel III recommended reforms in December 2010. These reforms recommended both higher minimum capital ratios and capital buffers for banks and a stronger definition of what counts as regulatory capital. In July 2013, the Federal Reserve implemented important parts of the Basel III recommendations by finalizing rules that strengthened the definition of regulatory capital, mandated that common equity tier 1 capital must be 4.5 percent of risk-weighted assets, and introduced a capital conservation buffer of 2.5 percent of risk-weighted assets.[6] The Federal Reserve's final rules implementing Basel III also usefully constrained the role of bank internal models in the bank regulatory capital framework.

Dodd-Frank-required stress testing is a means for regulators to assess whether the largest bank holding companies (BHCs) have enough capital to weather another financial crisis. The Federal Reserve uses the results of the

[6] Tier 1 capital consists primarily of common stock and retained earnings, but may also include certain types of preferred stock. Risk-weighted assets are the bank's assets or off-balance-sheet exposures weighted according to risk. For example, a corporate bond would typically have a higher risk weight than a government bond reflecting the higher risk of default. A capital conservation buffer is extra capital built up when business conditions are good so that minimum capital levels are less likely to be breached when business conditions are bad.

Box 6-2: A Cross-Country Comparison of Bank Size

The financial crisis refocused attention on the challenges posed by large financial institutions that could threaten the financial system should they become insolvent, otherwise known as "too-big-to-fail" (TBTF), (see Box 6-4). Because increases in size may bring additional risk and managerial challenges, some argue that certain U.S. banks are so large that, in the event of another financial crisis, there is still a significant risk that investor uncertainty may force governments to intervene to prevent another financial crisis.

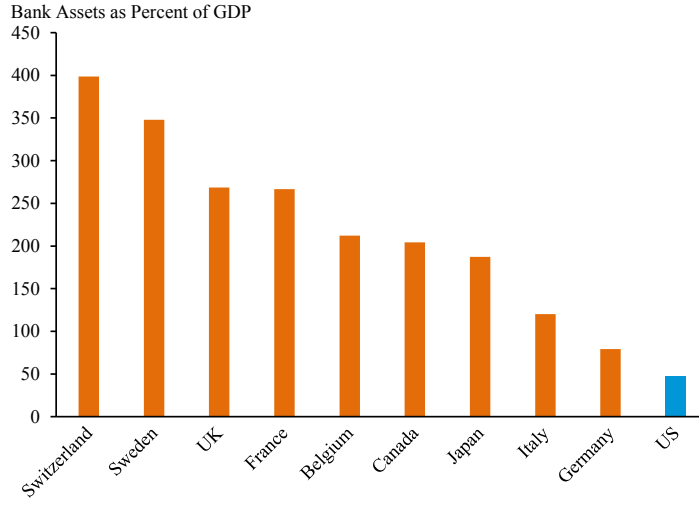
There may be certain advantages associated with bank size that help balance the potential risks. For example, large banks enjoy economies of scale in both operations and in the management of credit and liquidity risks by holding diversified portfolios of these risks (Hughes and Mester 2013). Beck, Demirguc-Kunt, and Levine (2006) also provide evidence suggesting that concentrated banking systems tend to be more stable and better able to withstand a financial crisis because banks in concentrated banking systems are more diversified and easier to monitor. However, healthy large banks may threaten competition and, when near failure, may threaten the stability of the financial system. One approach to evaluating whether large U.S. banks are "too large" and subsequently "too risky" is to compare them with the size, concentration, and systemic risk of banks of other advanced economies.

How Big is "Big?"

The five largest U.S. banks account for a large share of the U.S. banking sector's total assets, market capitalization, and revenue. In a Bloomberg ranking of the largest banks by total assets as of December 2015, four of the top 20 are based in the United States, with the largest U.S. bank ranked sixth in the world. However, these U.S. banks do not appear as large when scaled by measures of the size of the economy. For example, in Switzerland, Sweden, France, the United Kingdom, and Belgium, total assets of the top five banks were about two to four times as large as their home country's GDP, while in the United States, they were about half the size of GDP in 2015 (Figure 6-iv). Even if scaled to the aggregated Eurozone GDP (though this is not the approach used in Figure 6-iv because the repercussions of these banks' failure likely would predominantly fall on the individual country), the top five Eurozone banks still make up a greater share of their economy than do the top five U.S. banks (nearly 80 percent of GDP for the former and about 50 percent for the latter).

Beyond the traditional measures of total assets, a number of other benchmarks may be used to assess the size of banks. Across these mea-

Figure 6-iv
Top 5 Banks as Share of GDP in 2015



Source: Bloomberg; International Monetary Fund (IMF); CEA Calculations.

sures, U.S. banks also do not appear to be particularly large compared with those of other advanced economies.

When is "Big" Bad?

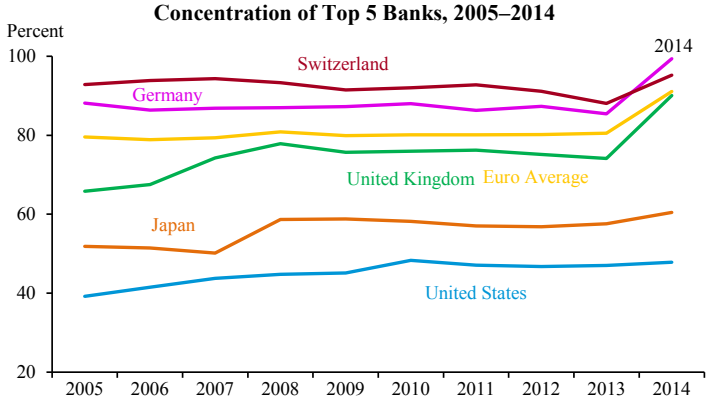
Large banks pose several potential risks to the economy. First, large banks have the potential to engage in monopolistic and rent-seeking behavior, crowding out smaller institutions. Economists often measure the potential for such behavior by the concentration of large firms within a sector. Several studies show that in the run-up and immediate aftermath of the financial crisis, large banks increasingly dominated the global financial sector. For example, International Financial Services London Research found that the share of assets of the 10 largest global banks compared with the largest 1000 rose from 14 percent in 1999 to 26 percent in 2009 (Goldstein and Veron 2011). However, there is some evidence that this trend may have changed in recent years in the United States. World Bank data shows that bank concentration (assets of the five largest banks as a share of total banking assets) in the United States rose until 2010 before stabilizing at about 47 percent. In the United Kingdom, Eurozone, and Switzerland, bank concentration has been considerably higher than in the United States and increased sharply between 2013 and 2014 (Figure 6-v).

Second, the failure of a large financial institution could cause the failure of other financial institutions with which it has business relationships. Economists refer to the risk that the failure of one bank may pose

to the larger financial system as systemic risk. For example, though Lehman Brothers was only the fourth largest investment bank in 2008 and only about a third the size of the largest, its failure created repercussions throughout the financial sector and the larger economy (Wiggins, Piontek, and Metrick 2014). Recognizing that large or highly interconnected financial institutions may pose systemic risk, the Financial Stability Board designates firms that meet certain criteria as "systemically important financial institutions."

Figure 6-v

Concentration of Top 5 Banks, 2005–2014



Note: Assets of five largest banks as a share of total commercial banking assets shown. Euro Area includes Austria, Finland, France, Germany, Italy, Latvia, Lithuania, and Spain where data is available from 2005 to 2014. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax, discontinued operations, and other assets.
Source: World Bank Global Financial Development Database.

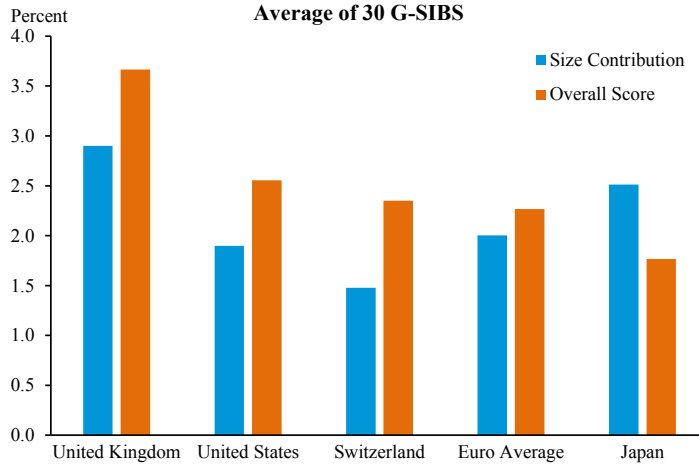
Glasserman and Loudis (2015) evaluate the risk of large banks using the five factors employed by the Basel Committee on Banking Supervision for designating global systemically important banks (G-SIBs): size, cross-jurisdictional activity, interconnectedness, substitutability, and complexity.[1] The methodology assumes that the distress or failure of banks that are larger, operate in more countries, do more business with other financial institutions, provide services that are diffi-

[1] G-SIBs are designated based on a cut-off score determined based on the scores of a sample of banks. Banks in the sample include: the 75 largest global banks based on financial year-end Basel III leverage ratio exposure, banks designated as G-SIBs in the year before, and banks added by national supervisors using "supervisory judgement." The cutoff score is then used to allocate banks to four buckets with different level of loss absorbency requirements, determined on an annual basis. There were about 90 banks in the sample in the end of 2014 exercise. See: http://www.bis.org/bcbs/gsib/gsibs_dislosures_end2014.htm.

cult to replace with services from other providers (for example, payment processing), and have more complex operations, pose greater risk to the global economy (Basel Committee on Banking Supervision 2013).[2] Figure 6-vi shows that when this overall score is decomposed into its five components, U.S. banks stand below those of several other countries in size and cross-jurisdictional activity and above those in many other countries in substitutability and complexity (particularly in the operation of payment systems), suggesting that size is not the decisive factor contributing to the systemic risk of the largest U.S. banks. This does not mean the largest U.S. banks pose no risks, but it suggests their size may not be the main issue.

Figure 6-vi

Systemic Importance Score 2013
Average of 30 G-SIBS



Source: Glasserman and Loudis (2015).

New York University's Volatility Laboratory offers an alternative measure of the systemic risk of individual financial institutions

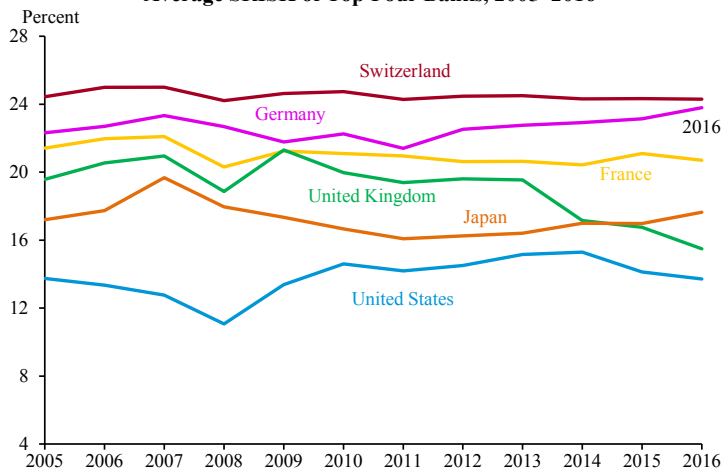
[2] Glasserman and Loudis' (2015) G-SIB score show the mean score for the top thirty banks on the G-SIB ranking scale, grouped by country. The score is calculated as the average of (1) Cross-jurisdictional activity: foreign claims, cross-jurisdictional liabilities; (2) Size: Total exposure, a more comprehensive indicator than total assets because it maintains a consistent measure across jurisdictions while assets are specific to national accounting standards; (3) Interconnectedness: intra-financial system assets, intra-financial system liabilities, total securities outstanding; (4) Substitutability: assets under custody, payments activity, underwriting activity; (5) Complexity: over-the-counter derivatives, level 3 assets, trading and available for sale value.

by scoring banks based on their percent contribution to the aggregate capital shortfall in the event of a financial crisis (SRISK%) (Engle 2012, Glasserman and Loudis 2015).[3] Firms with a high SRISK% in a crisis are not only the biggest losers in a crisis but also are the firms that create or extend the crisis. The measure, plotted in Figure 6-vii, shows that the top four U.S. financial institutions with the highest SRISK% average less than 16 percent contribution consistently from 2005 to 2016, which is well below the average percent contribution of the top four banks of France, Germany, and Switzerland over this same time period (Acharya, Engle, and Richardson 2012; Acharya et al. 2016).

The Dodd-Frank Act takes many steps to try to limit the risks posed by the largest financial institutions in the United States as well as

Figure 6-vii

Average SRISK of Top Four Banks, 2005–2016



Note: Data gathered for October of each year (2005-2016).
Source: NYU Volatility Lab; CEA Calculations.

limiting the ability of very large financial institutions to grow through acquisition. In addition, the President has proposed a financial fee on the liabilities of the largest financial institutions, which would reduce the incentive for such institutions to leverage, reducing the cost of externalities arising from financial firm default as a result of high leverage (Department of Treasury 2016).

[3] The Volatility lab samples 1,200 global financial firms. https://www.unige.ch/gsem/iee/files/7613/9574/8572/Solari_2012_slides.pdf.

Are U.S. Banks Too Big?

The question of whether individual banks are too big is separate from the question of whether the financial system as a whole is too large relative to the economy that could come about, for example, with many smaller firms. This issue is discussed in Box 6-1. Viewed individually, large U.S. banks do not appear disproportionate to the scale of the economy when compared with those in other advanced economies. However, their interconnection highlights the importance of global cooperation in regulating these large institutions, ensuring that the comparative benefits of large banks outweigh their risks, and enhancing the resiliency of the financial sector in the face of an economic downturn. Moreover, it is important that the size of banks reflects the underlying economics, including any external risks posed by size, and that there not exist any implicit subsidies related to size.

stress tests as a complement to its annual Comprehensive Capital Analysis and Review, a thorough qualitative and quantitative assessment of each BHC's capital plan. Within the quantitative assessment, the Federal Reserve examines the effects of various simulated financial stress scenarios on a BHC's capital ratios. The Federal Reserve also examines qualitatively the BHC's internal controls, contingency planning, governance, and the overall robustness of its capital planning process. Those banks that do not pass the annual review may not make any capital distributions such as dividend payments and common stock repurchases unless expressly permitted by the Federal Reserve.

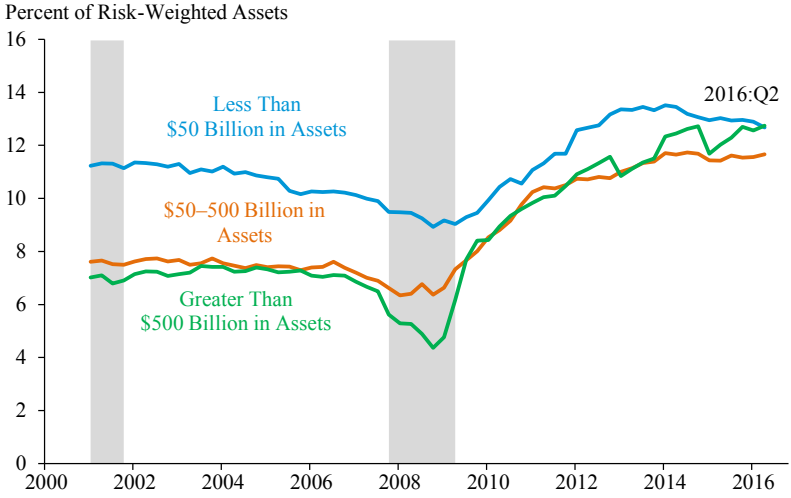
The overall quantity and quality of capital has increased at BHCs since the crisis. As seen in Figure 6-8, from March 2009 to June 2016, aggregate tier 1 common equity capital for the largest banks and the BHCs increased from 4.8 percent to 12.7 percent of risk-weighted assets, well above the minimum required total capital ratio of 8 percent that the Federal Reserve adopted in 2013. In the most recent annual review, completed in June 2016, 30 of the 33 BHCs passed the Federal Reserve's test. The Federal Reserve objected to the capital plans of two banks, and did not object to the plan of a third, but required it to resubmit its plan with revisions by the end of 2016.

Liquidity

Federal banking regulatory agencies have also instituted reforms that help banks survive periods of financial stress by improving their ability to withstand acute short-term liquidity stress and improve their long-term funding positions. To better manage short-term liquidity stress, regulators have raised the quality and stability of the assets that banks hold to ensure

Figure 6-8

Tier 1 Common Equity Ratios for U.S. Banks by Bank Size, 2001–2016



Note: Shading denotes recession. Includes data for U.S. bank holding companies (BHCs) and "stand-alone" banks not controlled by a BHC, but not savings bank holding companies, branches and agencies of foreign banks, or nonbanks that are not held by a U.S. BHC.
Source: Federal Reserve Bank of New York; Haver Analytics.

that they will not run out of cash, or liquidity, during times of financial stress. In September 2014, the Office of the Comptroller of the Currency (OCC), the Federal Reserve, and the Federal Deposit Insurance Corporation (FDIC) finalized a rule that mandates minimum Liquidity Coverage Ratios (LCR) to be consistent with Basel III for large banks and BHCs. LCR is the ratio of a bank's high-quality liquid assets to its projected cash outflows during a 30-day stress period. The Federal Reserve defines high quality liquid assets as assets that a bank can easily convert into cash within 30 days such as central bank reserves and government or corporate debt. Mandating a higher LCR will reduce the likelihood that banks face a short-term liquidity crisis.

To improve the longer-term funding resilience of banks, the three regulatory agencies proposed a rule in May 2016 to require large banks and BHCs to have a Net Stable Funding Ratio of at least 1. This ratio is calculated by assigning scores to each type of funding based on the price "stability" of the funding source. Equity capital and long-term deposits earn higher scores, while very short-term funding (such a repurchase agreements) earn the lowest score. They then calculate the bank's required amount of stable funding based on the quality and stability of its assets. Banks must maintain the ratio of their available stable funding to required level of stable funding at a specified level, thus lowering their liquidity risk profiles.

The three federal banking agencies have tailored both the LCR and the Net Stable Funding Ratio rules to a bank's riskiness and complexity. The full requirements of each rule would apply to BHCs with $250 billion or more in total assets while less stringent versions of these rules would apply to BHCs with more than $50 billion but less than $250 billion in assets. These rules do not apply to community banking institutions.[7] The LCR rule became effective on January 1, 2015, starting with an LCR of 80 percent and increasing to 100 percent by January 1, 2017. The Net Stable Funding Ratio requirement will not become effective until January 1, 2018. Despite criticism of the expected negative impact of Net Stable Funding Ratio requirements, the Federal Reserve Board found that, as of the end of 2015, nearly all covered companies were already in compliance with the standard. The Federal Reserve Board also found that because the aggregated stable funding shortfall amount would be small relative to the size of these companies, the costs connected to making changes to funding structures to comply with the NSFR requirement would not be significant.

The result of the new bank liquidity requirements has been a general improvement in the liquidity positions of U.S. banks. The liquidity ratio reported in Figure 6-9 is similar to LCR but calculated using only publicly available data.[8] Figure 6.9 shows the average liquidity ratio of the largest one percent of U.S. BHCs has risen from its trough at the beginning of the financial crisis to well above levels observed before the crisis. Further, Figure 6-10 shows that BHCs reporting LCR using either the standard or modified methods of calculating the LCR show marked improvement in the liquidity available to them.

Thus, banks appear to be in a better position to weather a crisis or liquidity event than they were on the eve of Lehman's collapse. They have more stable funding and more liquid assets than before, and hence the risks that runs could cause an institution to seize up have been moderated.

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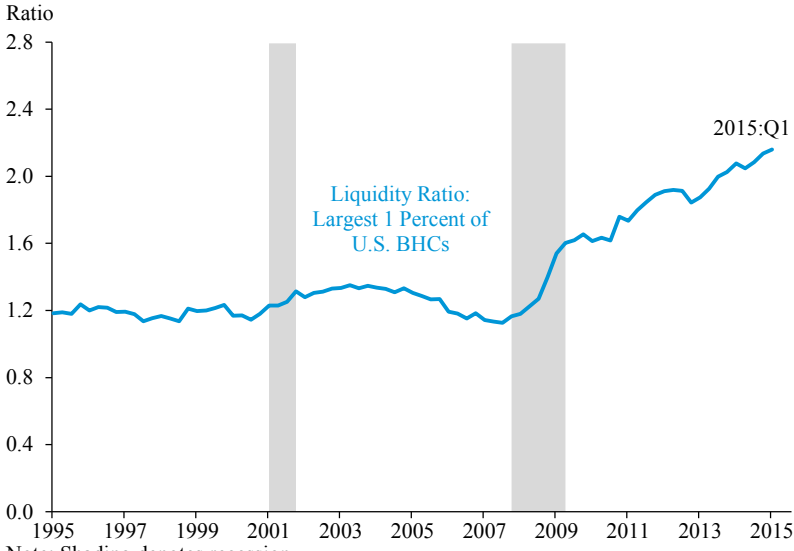
[7] The LCR rules apply to all banking organizations with $250 billion or more in total consolidated assets or $10 billion or more in on-balance sheet foreign exposure and to these banking organizations' subsidiary depository institutions that have assets of $10 billion or more. The rule also will apply a less stringent, modified LCR to bank holding companies and savings and loan holding companies that do not meet these thresholds, but have $50 billion or more in total assets.

[8] This figure is reproduced from Choi and Choi (2016) with permission. The liquidity ratio is similar to LCR, which is the ratio of the stock of high quality liquid assets (HQLA) to potential net cash outflow over a 30 calendar day liquidity stress scenario. However, there are differences in the liquidity adjustments for certain assets and liability classes from those used in the LCR because the liquidity ratio uses only publicly-available data. Derivative exposures are ignored due to data limitations.

Figure 6-9

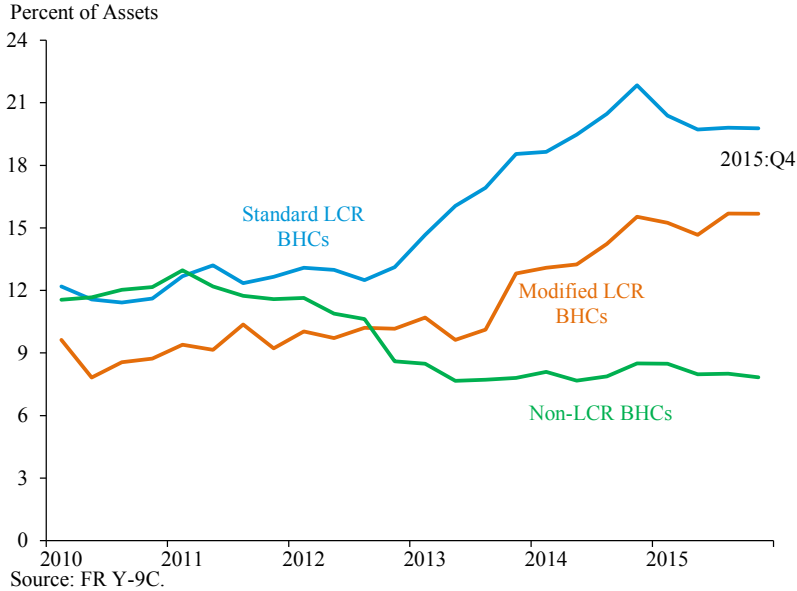
Liquidity Ratio for Largest U.S. Bank Holding Companies, 1995–2015



Note: Shading denotes recession.
Source: Choi and Choi (2016).

Figure 6-10

Selected High-Quality Liquid Assets at BHCs, 2010–2015



Source: FR Y-9C.

Risk Taking

The Dodd-Frank Act took a number of steps to limit risky behavior by financial firms. One component dubbed "the Volcker Rule" is named for Former Federal Reserve Chair Paul Volcker. As required by Dodd-Frank, the SEC, CFTC and banking regulators finalized the Volcker Rule in 2013 to restrict federally insured banking entities from engaging in proprietary trading or investing in or sponsoring private equity or hedge funds. As seen in Figure 6-11, activities related to trading and securities contributed to significant losses during the crisis. The Volcker Rule is meant to mitigate the moral hazard inherent in access to federally insured deposits by limiting high-risk-taking activities. Banks have until July 2017 to conform investments in, and relationships with, covered funds. In the meantime, banks are recording and reporting certain quantitative measurements to regulators, and divesting their proprietary positions, including those in hedge funds.

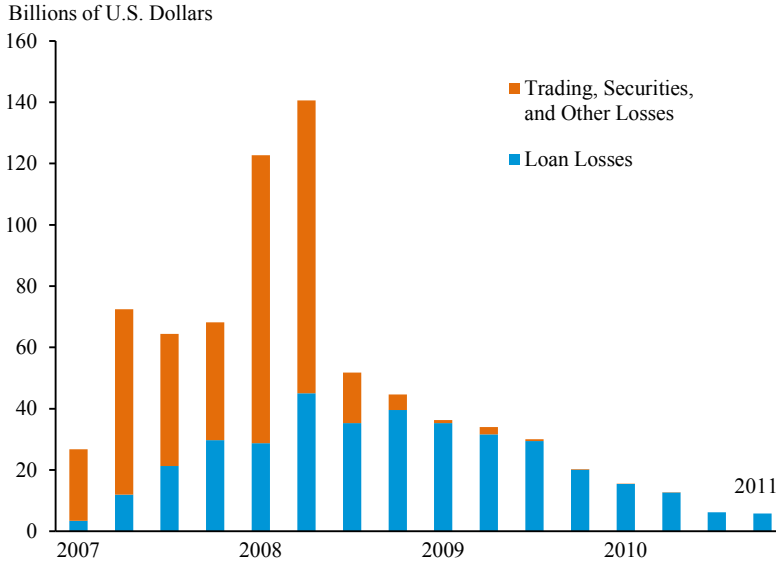
Banking regulations typically require firms to meet a minimum ratio of capital to risk-weighted assets. A risk-weighting system assigns a weight to each asset or category of assets that reflects its relative risk. Figure 6-12 shows a general decline in risk-weighted assets as a fraction of total assets, reflecting declining relative risk of bank assets over time. Both Basel 2.5, effective in January 2013, and Basel III, effective in January 2016, revised the risk-weighting methodology and are reflected in the Figure as discrete increases on these dates.

The Dodd-Frank Act included several reforms of the Federal Deposit Insurance Corporation (FDIC) to better protect depositors and stabilize the financial system. First, it permanently raised the level of deposits insured for each depositor from $100,000 to $250,000 for each insured bank. Second, it altered the operation of deposit insurance. Since its founding in 1934, the FDIC has maintained a Deposit Insurance Fund, a pool of assets meant to prevent bank runs by insuring the deposits of member banks and finance the resolution of failed banks. The FDIC maintains funds in the Deposit Insurance Fund by charging insurance premiums, or assessments, to banks whose depositors it insures. Specifically, Dodd-Frank required two changes in the methodology for calculating these premiums that provided direct relief to small banks with more traditional business models by making large banks bear more of the costs of deposit insurance.

The first change required by the Dodd-Frank Act expanded the deposit insurance assessment base. When this change took effect in spring 2011, total assessments for small banks with less than $10 billion in assets fell by a third — an annualized decrease of almost $1.4 billion. The second change required by Dodd-Frank raised the minimum Designated Reserve Ratio—the Deposit Insurance Fund balance over total estimated insured

Figure 6-11

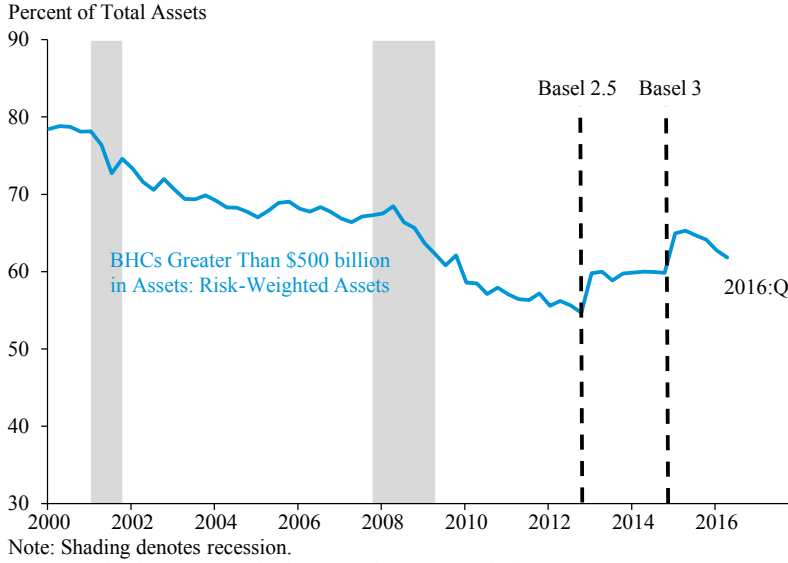
Losses for Large U.S. Banks, 2007–2011



Source: Bloomberg; Treasury Department calculations.

Figure 6-12

Average Risk-Weighted Assets, Largest U.S. BHCs, 2000–2016



Note: Shading denotes recession.
Source: Federal Reserve Bank of New York; Haver Analytics.

Box 6-3: The Performance of Community Banks[1]

Community banks, defined generally here as banks with less than $10 billion in assets, are an important part of the U.S. banking landscape, providing access to banking services for millions of Americans and serving as the only local source of brick-and-mortar traditional banking services for many counties, as well as key sources of credit for rural communities and small business loans.[2] The number of community bank institutions has declined steadily over the last two decades, yet the passage of Dodd-Frank in 2010 does not appear to have affected this long-term trend. Community banks face a challenging competitive and macroeconomic environment, but since Dodd-Frank was passed, the growth rate of lending has rebounded, market share has stabilized for some important types of community bank lending, profitability (measured by return on assets) has returned to pre-crisis levels for the smallest community banks, geographic coverage across counties has remained stable, and the largest community banks have been expanding their geographic reach.

The Dodd-Frank Act is designed to prevent excessive risk-taking and protect consumers from exploitative bank lending practices. It also distinguishes between banks on the basis of size—many rules include exemptions and tailoring for financial institutions with less than $10 billion in assets—to help keep it from being an undue burden on small banks.

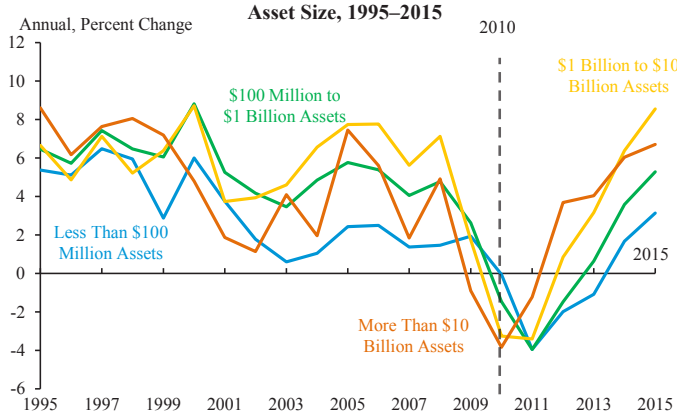
Economic evidence shows that community banks remain healthy and have recovered together with big banks since 2008. The annual growth rates of lending by community banks in each asset range have returned to levels seen prior to the crisis and are well above the negative rates seen following the crisis (see Figure 6-viii). Since 2008, community banks' market share of total loans has held steady at around 20 percent.

Access to community banks has remained steady since 1994 at the county level. About 99 percent of counties have a community bank office (either a main office or a brick-and-mortar branch office), something that has not materially changed since 2010. About 1 in 4 counties rely exclusively on community banks for brick-and-mortar services within county lines. The steady decline in the number of community bank institutions over the past two decades has largely been offset by an increase in the number of brick-and-mortar branch offices per main office. The

[1] For more information on Box 6-3, as well as other statistics on the health of community banks over the last two decades, please see CEA's (2016) issue brief "The Performance of Community Banks over Time."

[2] Asset size is computed in constant 2009 dollars.

Figure 6-viii
Average Loan Growth of Banking Institutions, by Asset Size, 1995–2015



Notes: Banks assets ($2009) are for the institution. Total loans ($2009) are total loans and lease financing receivables, net of unearned income. Due to merger and acqusition activity, we exclude loan growth rates greater than 25 percent and less than -25 percent.
Source: FDIC (June, Qtr 2) Call Report Data. CEA Calculations

number of brick-and-mortar branch offices per main office has also increased slightly since 2010.

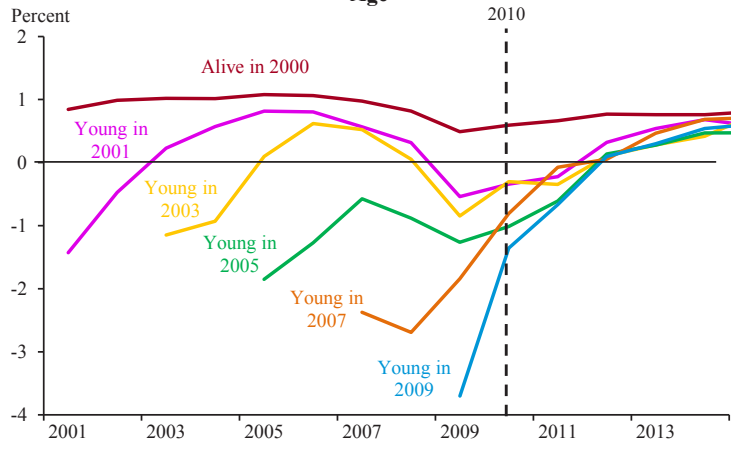
The decline in the number of community bank institutions in recent years reflects decreased entry rather than increased exit. The number of exits each year has been roughly steady since 2004. In most years, mergers with other community banks are the most common reason for exit. These merged banks are living on as community banks, but as part of a larger parent group. Entry began falling in 2006 and has been nearly zero since 2010.

Recent research suggests that macroeconomic conditions likely explain much of the drop in bank entry in recent years (Adams and Gramlich 2016). All new bank entry (both *de novo* and branch expansion by incumbent banks) has fallen considerably since 2006. The profitability of new entrants is typically lower on average than an established bank of comparable size. For younger banks, a larger proportion of their loans were originated in the current macroeconomic environment, which includes low equilibrium interest rates.[3] This depresses profit margins on traditional lending activity. The profitability of the youngest community banks fell precipitously relative to incumbent banks between 2001 and 2009, but by 2015 all cohorts have achieved a level of profitability roughly equal to or exceeding what they earned prior to the financial crisis (see Figure 6-ix). Although not shown here, the same holds true for community banks with assets between $100 million and $1 billion.

[3] See CEA (2015b) report "Long-Term Interest Rates: A Survey" for a discussion of factors contributing to the decline of the equilibrium interest rate.

Figure 6-ix

Return on Assets of Banking Institutions with Less than $100M Assets, by Age



Notes: A bank is "Young in 2001" if it received a charter in 2000 or 2001. A bank is alive in 2000 if it had a charter in 2000. Top 1%, bottom 1% ROA for all banks excluded from average.
Source: FDIC (June, Qtr 2) Call Reports; CEA Calculations.

The Dodd-Frank Act has helped to remove some cost disadvantages for community banks. Dodd-Frank has forced large and complex banks and BHCs to better internalize the costs that their failure may have upon the broader financial system, and therefore has helped to reduce any funding cost advantages that such banks may have held in the past. Moreover, banking agencies continue to take steps to lessen and simplify the regulatory burden on community banks, while directing the burden on those banks whose riskiness Dodd-Frank has sought to reduce.

In implementing the provisions of Dodd-Frank, the Administration has taken important steps to ensure that regulatory requirements are implemented in an efficient manner. The banking agencies have begun and are continuing to tailor regulatory requirements to reflect the different level of financial risk that community banks pose. Some steps include allowing for longer exam cycles for smaller banks that are well capitalized, streamlining the regulatory reports that community banks must file, and continuing to develop a simpler and shorter regulatory reporting procedure for community banks. Furthermore, the banking agencies continue to consider the written and oral comments made by community banks in the banking agencies' nationwide meetings, working to reduce unnecessary regulatory burden under the Economic Growth and Regulatory Paperwork Reduction Act. The Administration strongly supports these ongoing efforts by the banking agencies to fairly tailor the regulatory requirements for community banks and avoid any unnecessary and inefficient burdens.

deposits—from 1.15 percent to 1.35 percent. The FDIC issued a final rule increasing the reserve ratio in March 2016 and paid for the increase by levying a surcharge on top of regular assessment fees for banks with more than $10 billion in assets, effectively requiring large banks to bear the full cost.

Have Big Banks Become Safer?

Recent research by Sarin and Summers (2016) documents that most regulatory measures of major banks such as capital levels or liquidity suggest banks are safer; however, market-based risk measures that reflect bank equity volatility and default probability seem to suggest that, though risk has decreased since its crisis peak, it is not in fact lower than the period prior to the crisis. This is consistent with evidence from sources like the NYU Volatility Lab, discussed below, that use market measures of risk and finds that, while risk in the financial system is down considerably from the crisis, based on market measures, it is not lower than prior to the crisis.

It may be the case that either risk was mispriced or markets lacked the information necessary to price the risk of individual banks before the crisis. If either is the case, better information concerning the risks the banks face could make them appear riskier today relative to the pre-crisis period, when we had a poorer understanding of banks' risk. Another explanation for this finding is that banks may simply be worth less because of the present macroeconomic environment, regulations that limit banks' ability to take risky positions, and loss of the implicit TBTF guarantee.

A central argument of the Sarin and Summers paper, and work like it, is that the franchise value of banks has fallen. Markets value bank assets and their business models as being worth less over the past few years than they were before the crisis. Consequently, one would expect the bank to appear riskier based on market metrics. Hence, a comparison of market-based measures pre- and post-crisis reflects the impact of financial reform on bank safety and soundness and the impact on banks' profitability. The rules that made banks better capitalized almost certainly made banks safer and better able to withstand future crises; however, constant vigilance is necessary to make sure that, in a changing environment, risks are adequately managed.

Systemic Risk and Identifying Sources of Risk in the System

The crisis revealed the impact that the failure, or threatened failure, of even a single financial institution can pose to the larger financial system. Financial reform has helped make the financial system more secure by identifying firms that pose such a risk and subjecting them to additional regulatory oversight and other mitigation strategies. In part, it has accomplished this by improving the coordination of regulatory oversight such that

regulators can take a more holistic view of the financial system and properly identify and act on sources of risk to the system.

Individual bank failures can have negative impacts on their customers and the communities that they serve. Deposit insurance is meant to protect depositors and mitigate run-risk while FDIC resolution is meant to mitigate the impact of a bank failure on customers and communities. Regulation also seeks to minimize the impact of a bank failure on the financial system more broadly.

Promoting financial stability requires identifying potential sources of risk to the financial system. One issue the crisis revealed was the patchwork nature of U.S. financial supervision. While regulators may have been able to consider the safety of a particular institution, they often lacked the perspective to consider systemic issues.[9] The Dodd-Frank Act established a new body to fill this regulatory gap, the Financial Stability Oversight Council (FSOC). The FSOC has a clear mandate that creates for the first time collective accountability for identifying risks and responding to emerging threats to financial stability. It is a collaborative body chaired by the Secretary of the Treasury that brings together the expertise of the Federal financial regulators, an independent insurance expert appointed by the President, and state regulators. Dodd-Frank also established the Office of Financial Research (OFR) to support the FSOC by looking across the financial system to measure and analyze risk, perform essential research, and collect and standardize financial data.

Shadow Banking and Regulatory Gaps

Since its establishment by the Dodd-Frank Act, the FSOC has worked to identify non-bank financial institutions that are systemically risky to

[9] The U.S. financial regulatory apparatus consists of numerous agencies, each of which has a distinct, though quite closely related, jurisdiction. A useful way to organize these agencies is to categorize them into prudential bank regulators and market regulators. Prudential bank regulators focus on specific financial institutions and ensure compliance with applicable risk management and prudential rules. Within this category, the Federal Reserve Board regulates all banks that are part of the Federal Reserve System and regulated BHCs. It also sets reserve requirements, serves as the lender of last resort to banks, and assesses the overall soundness of bank and BHC balance sheets, often in concert with other regulators. The Federal Deposit Insurance Corporation (FDIC) provides deposit insurance for depositors and regulates state banks that are not Federal Reserve System members. The Office of the Comptroller of the Currency (part of the Treasury Department) regulates national banking institutions and seeks to foster both safety and competition within the national banking system. The main market regulators are the Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC). The SEC regulates securities exchanges, brokers, dealers, mutual funds and investment advisers among other market participants. It enforces securities laws and regulates the buying and selling of securities and securities-based derivatives. The CFTC specifically regulates futures, commodity, options, and swap markets, including the exchanges, dealers, and other intermediaries that constitute these markets.

U.S. financial stability, subjecting each designated company to enhanced prudential standards and supervision by the Federal Reserve. While any financial institution that performs maturity transformation faces run-risk, in traditional banking the risk is mitigated through the use of deposit insurance and the Federal Reserve's availability as a lender of last resort. On the other hand, many non-bank financial institutions engage in financial intermediation and therefore maturity and liquidity transformation, without explicit public-sector guarantees, access to liquidity from the Federal Reserve, or regulatory oversight.

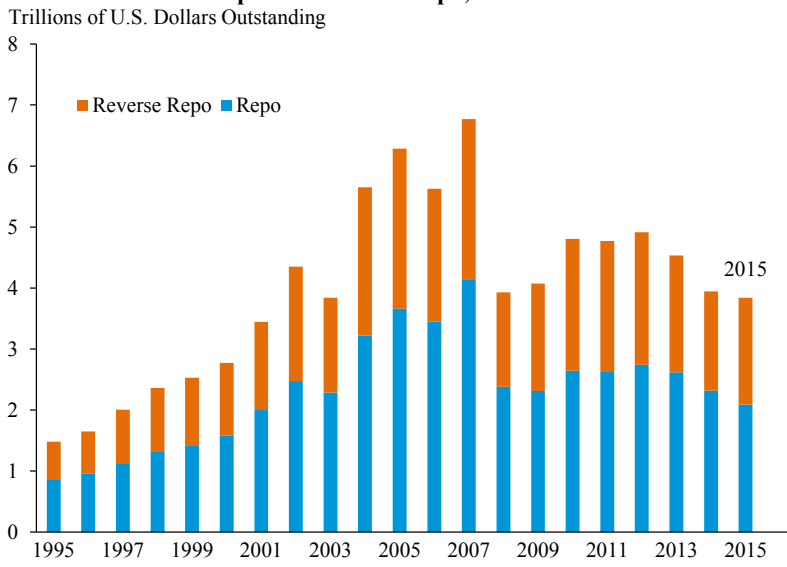
Such non-bank financial institutions gather funds from those wishing to invest, typically by issuing commercial paper, engaging in repurchase agreements (repo), or issuing debt instruments.[10] Money market mutual funds (MMFs) or other types of investment funds, often purchase these debt instruments on behalf of investors. Institutions engaged in such activities include large securities dealers, finance companies, and asset managers who use such funds to invest in other assets that have longer maturity, less liquidity, or both.

As discussed above, the size of the shadow-banking sector grew much faster than the traditional banking sector in the decade leading up to the financial crisis. Following the crisis, the sector shrank to the level seen earlier in the 2000s and continued to decrease in the following years. Two other important components of the shadow-banking sector, repo and commercial paper, grew rapidly in the years prior to the crisis before falling in the years following the crisis and ensuing recession. Figure 6-13 shows the repo market is well below its size in the years immediately preceding the crisis. As Figure 6-14 shows, the commercial paper market has stabilized at a level well below its peak in recent years. By adding additional oversight of the sector, Dodd-Frank has reduced the likelihood of shadow-banking entities being the source of financial instability.

As part of its mandate to identify risks to financial stability, in July 2013 the FSOC designated four non-bank firms as Non-Bank Systemically Important Financial Institutions. These firms became subject to heightened prudential requirements and supervision by the Federal Reserve Board. This additional regulatory scrutiny, along with pressure from investors and analysts, has led some firms to consider actions that will reduce their

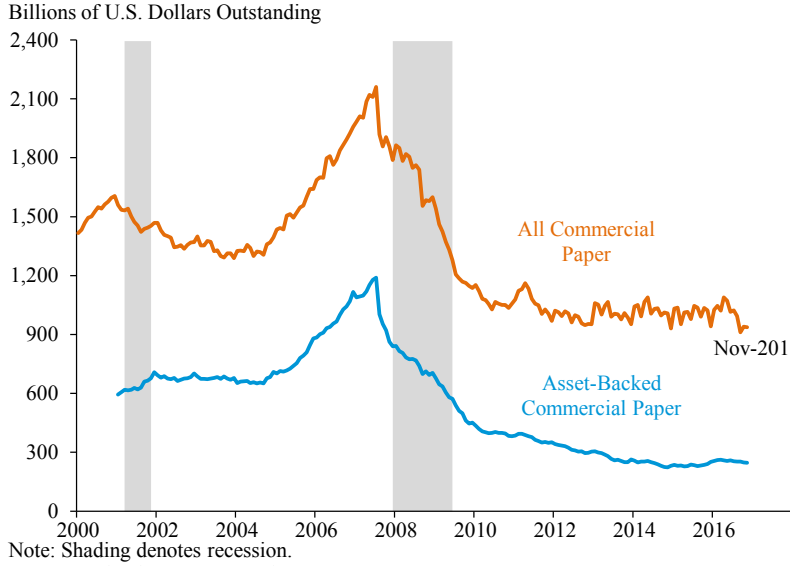
[10] A repurchase agreement, or repo, is a type of short-term loan where the "borrower" sells securities to the "lender" with an agreement to buy them back at a future date at a slightly higher price. This is similar to a collateralized loan except ownership of the collateral passes between the borrower and lender. The difference in the selling price and the buyback price represents the interest on the loan and is referred to as the 'repo rate'.

Figure 6-13
Repo and Reverse Repo, 1995–2015



Source: Federal Reserve Bank of New York.

Figure 6-14
Commercial Paper, 2000–2016



Note: Shading denotes recession.
Source: Federal Reserve Board.

systemic footprint. In April 2015, one of these firms, General Electric Capital Corporation (GE Capital), announced that it would be selling off most of its financing arm to "create a simpler, more valuable company," and committed to working with the FSOC and the Federal Reserve to "take the actions necessary to de-designate GE Capital as a Systemically Important Financial Institution" (General Electric 2015). These actions resulted in the FSOC rescinding the "systemically important financial institution" designation for GE Capital on June 28, 2016.

Private funds can contribute to systemic risk in similar ways to other large financial institutions.[11] Losses at a large private fund may result in default to creditors and the financial institutions with which the fund does business. In addition, private funds often employ high levels of leverage. Although leverage is not a perfect proxy for risk, there is ample evidence that the use of leverage, in combination with other factors, can contribute to risks to financial stability. These risks are likely to be greater if an elevated level of leverage is employed; borrowing counterparties are large, highly interconnected financial institutions; counterparty margining requirements are limited or lax and positions are infrequently marked to market; the underlying assets are less liquid and price discovery is poor; or other financial institutions with large positions are involved in similar trading strategies.[12]

In 2011, the Securities and Exchange Commission (SEC) and the Commodities Futures Trading Commission (CFTC) adopted new Form PF, required by the Dodd-Frank Act to help the SEC, CFTC, and the FSOC monitor hedge funds and other private funds, and identify potential systemic risks associated with their activities. The SEC makes available a summary report each quarter of the information reported on Form PF. As seen in Figure 6-15, the number of private funds reported on Form PF has risen from just over 20,000 to more than 26,000 including almost 9,000 hedge fund filings. In addition to using these reports to identify systemic risks within the United States, the SEC has provided certain aggregated, non-proprietary Form PF data to the International Organization of Securities Commissions (IOSCO) on large hedge funds to provide it with a more complete overview of the global hedge fund market.

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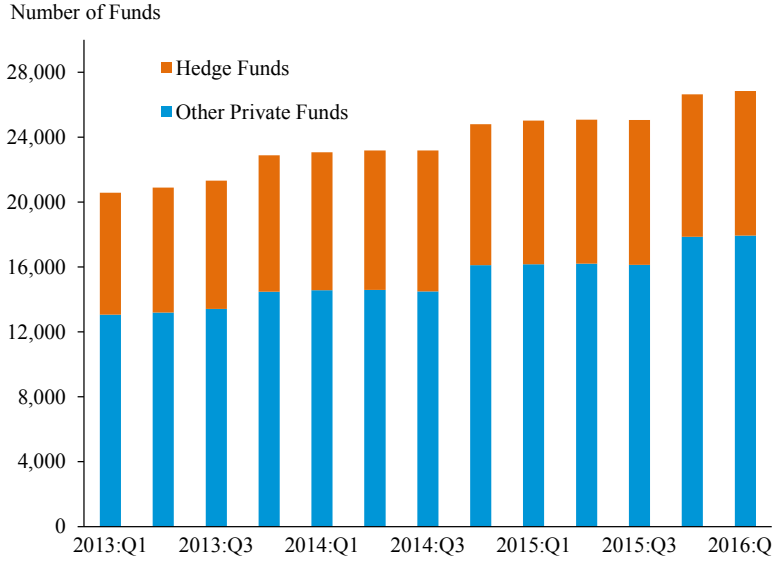
[11] Private Funds are excluded from the definition of an investment company and are, therefore, not registered under the Investment Company Act of 1940. Private funds may be excluded from the definition of an investment company by having fewer than 100 shareholders or only being open to "qualified purchasers" (such as institutional investors or high-net worth individuals) as defined by the SEC. Examples of private funds include hedge funds and private equity funds.

[12] See Financial Stability Oversight Council Update On Review of Asset Management Products and Activities at (https://www.treasury.gov/initiatives/fsoc/news/Documents/FSOC%20Update%20on%20Review%20of%20Asset%20Management%20Products%20and%20Activities.pdf)

Figure 6-15
Private Funds Reporting to Form PF, 2013–2016



Source: Securities and Exchange Commission (SEC).

Money market mutual funds (MMFs) are a particular type of mutual fund that invests in debt securities with short maturities and very low credit risk. These funds typically maintain a net asset value (NAV) of $1 even when the actual value is slightly above or slightly below that value. As MMF shares may be redeemed at $1 each on demand, the funds are still engaged in maturity transformation. The funds face run-risk if the value of the fund portfolio is thought to be less than $1, particularly because there is an advantage to being the first to redeem. In 2010, the SEC adopted rules that make structural and operational reforms to address risks of investor runs in money market funds, while preserving the benefits of the funds. The purpose of these rules was to reduce the interest rate, credit and liquidity risks of money market fund portfolios.

In 2012, as part of its efforts to identify and address systemic risks to financial stability, the FSOC issued proposed recommendations for how the SEC might address the risks to financial stability that money market mutual funds (MMFs) continue to present. In 2014, the SEC finalized MMF reforms that required structural and operational changes that address risks of investor runs in MMFs during times of financial stress but preserved the benefits of such funds for investors and companies. Changes included requiring a floating NAV for institutional prime money market funds, which allows the daily share prices of these funds to fluctuate along with changes in the market-based value of fund assets and provides non-government money

market fund boards new tools – liquidity fees and redemption gates – to address run-risk.[13] Figure 6-16 shows the weighted-average maturity of MMFs have declined by roughly ten days since the new regulations became effective, increasing liquidity and reducing the sensitivity of net asset value to changes in interest rates.[14]

Measures of Systemic Risk

The FSOC's mandate includes identifying risks and responding to emerging threats to financial stability, often referred to as systemic risk. Scholars have proposed several different measures of systemic risk, each of which measures an aspect of the tendency for the performance of financial institutions to move together when the market is under stress. ΔCoVaR measures the difference between the value at risk (VaR) for the financial system when an institution is in distress and the VaR of the financial system when the firm is in its median or typical state (Adrian and Brunnermeier 2014).[15] The higher the ΔCoVaR, the more systemic risk is endemic within the financial system. The distress insurance premium (DIP) is calculated as the insurance premium that protects against the expected losses of a hypothetical portfolio of the liabilities of all large banks (Huang, Zhou, and Zhu 2011). Additionally, the Systemic Expected Shortfall (SES) estimates how likely a certain institution is to be undercapitalized when the financial system as a whole is undercapitalized (Acharya et al., 2016). Figure 6-17 shows the measures have receded since the financial crisis but remain above levels prior to the crisis.

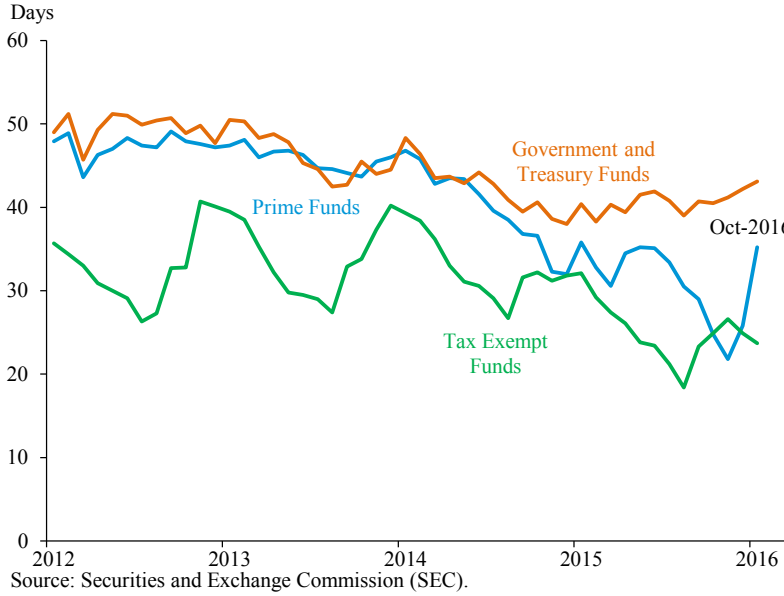
SRISK, measured by the New York University Volatility Laboratory, translates systemic expected shortfall for the banking system into a dollar figure in a simulated period of financial stress. This shortfall may be interpreted as the amount of capital required to absorb a large negative shock. As shown below, the level of SRISK has come down since the financial crisis and is approaching pre-crisis levels. Similar to the systemic risk measures above,

[13] "Fees and redemption gates" refer to the fund board's ability to impose liquidity fees or to suspend redemptions temporarily, also known as "gate," if a fund's level of weekly liquid assets falls below a certain threshold. This provides the ability to stop temporarily a run on the mutual fund.

[14] Many institutions withdrew funds from prime MMFs as the effective date for new SEC rules that mandated a floating share price for institutional MMFs approached in October 2016. In anticipation of additional withdrawals from these prime MMFs, managers kept an unusually high portion of the portfolio in cash, reducing the weighted-average maturity. This is evident in the rapid decrease in average maturity of these funds toward the end of the period in the figure.

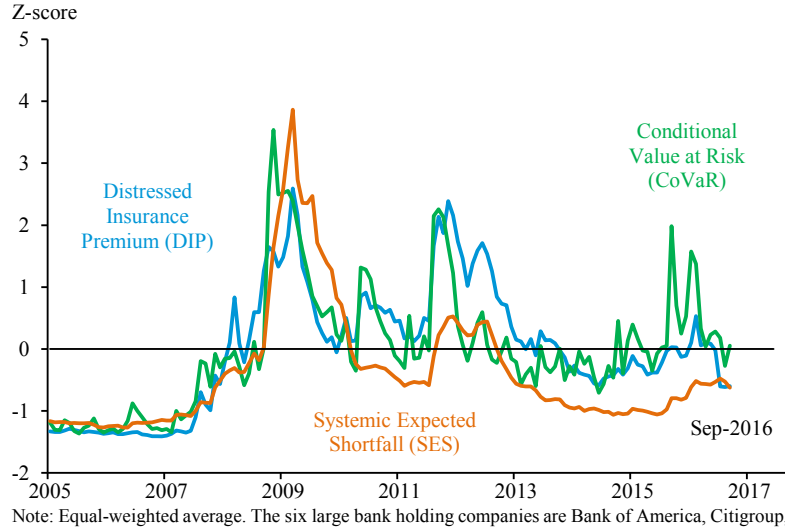
[15] VaR is a measure of the likelihood of a big loss. If the 1 month 1% VaR is $10 million, then there is only a 1 percent chance that there will be a loss greater than or equal to $10 million over the month.

Figure 6-16
Weighted-Average Maturity of MMFs, 2012–2016



Source: Securities and Exchange Commission (SEC).

Figure 6-17
Measures of Joint Distress of Largest U.S. BHCs, 2005–2016



Note: Equal-weighted average. The six large bank holding companies are Bank of America, Citigroup, Goldman Sachs, JPMorgan Chase, Morgan Stanley, and Wells Fargo. Z-score represents the distance from the average, expressed in standard deviations.
Source: U.S. Department of the Treasury, Office of Financial Research.

Figure 6-18 shows that the SRISK measure has receded since the financial crisis but remains just above the level prior to the financial crisis.

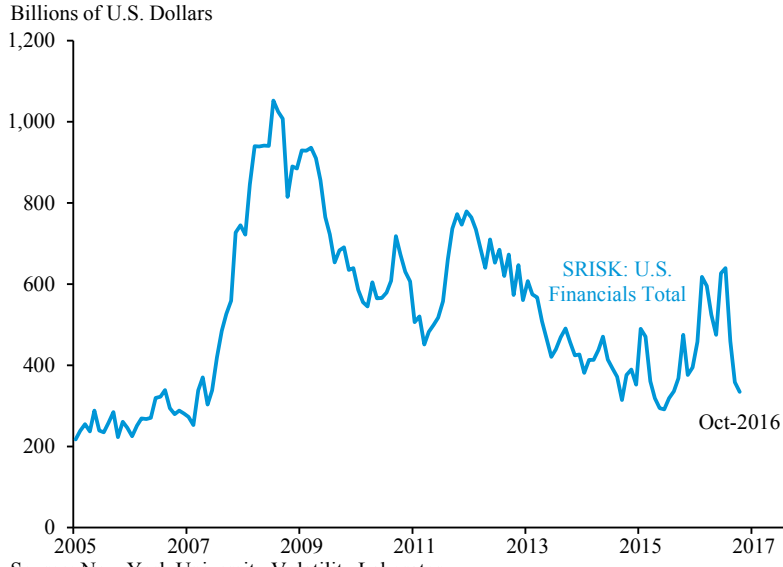
Resolving Failure

Under the Dodd-Frank Act, bankruptcy is the first, and preferred, option to resolve a failing financial institution and protect the financial stability of the United States. To that end, the Act requires systemically important financial institutions to periodically submit living wills to the Federal Reserve and the FDIC that detail a process for their orderly resolution under the bankruptcy code in the event of material financial distress or failure. If the banks' plans are determined not to be credible and the banks do not remedy those shortcomings in the allotted period of time, the regulators may require the banks to take certain actions to simplify their structures, including divestment of certain assets or operations. As a result, banks have increased their focus on their resolvability.

The Federal Reserve and FDIC finalized rules relating to living wills in October 2011. The latest round of evaluations by the agencies, completed in April 2016, examined each living will of the eight systemically important domestic banks. The agencies jointly determined that five of the eight institutions' living wills were "not credible or would not facilitate an orderly resolution under the U.S. Bankruptcy Code," and issued split determinations on two institutions' living wills (FRB 2016). Only one bank, Citigroup, did not fail both the Fed and FDIC's evaluations. Those banks receiving joint negative determinations were given until October 2016 to address the specified deficiencies. If these firms do not mitigate the deficiencies by the October deadline, the agencies may jointly impose stricter prudential requirements, which may include measures to restrain the growth of these firms. The two banks that received split determinations must address their plans' shortcomings by the next filing deadline of July 1, 2017. While the 2016 determinations revealed that much work remains, it was also a step forward from the previous round of feedback given in August 2014 that had identified broad shortcomings across 11 banking institutions evaluated.

The Dodd-Frank Act also created a new resolution mechanism, the Orderly Liquidation Authority (OLA), that could be used to resolve a failing firm while limiting systemic risk and imposing all losses on the firm's creditors. Together with financial reforms that are intended to increase the safety and soundness of individual financial firms, these reforms are intended to lower the risk to the broader financial system should a particular firm fail, thus lowering the necessity of a bail-out. The DFA also restricts the Federal Reserve's emergency lending powers, making it harder for the Fed to lend to a particular insolvent firm or remove toxic assets during a financial crisis.

Figure 6-18
Systemic Risk (SRISK), 2005–2016



Source: New York University Volatility Laboratory.

Ending the Problem of Too-Big-To-Fail

Another component of systemic risk has been the view that some firms may be too large to fail without threatening the whole financial system. If these firms are indeed "too big to fail" (TBTF) it gives them a substantial advantage as their counterparties in transactions will know they are less likely to fail than similar firms without an implicit government guarantee. (See Box 6-4 on the TBTF premium.) The implicit guarantee may also make these firms more willing to take large risks as both the owners and managers of these firms do not truly face the risk of downside scenarios as they may feel they can count on the government to bail them out. The existence of TBTF firms can also be a source of risk because their counterparties may be wrong about which firms are TBTF. For example, some assumed the government would never allow a firm like Lehman Brothers to fail and were left exposed when Lehman declared bankruptcy.

The reforms of the last six years that the implementation of Basel III and Dodd-Frank Act put in place included a number of measures to address the risks posed by TBTF. First and foremost, these reforms have subjected the largest and most complex financial institutions to enhanced supervision designed to require these firms' equity and debt holders to bear the costs of the firms' failures. These enhanced supervisions increase in stringency based upon size and other risk factors. The most stringent rules apply

Box 6-4: Have We Ended "Too-Big-To-Fail"?

A financial institution that is "too-big-to-fail" (TBTF) is so large and interconnected with the financial system that market participants believe the government will intervene to prevent its failure. One of the goals of recent financial reform is to eliminate TBTF by making systemically risky banks less likely to fail, reducing the government's ability to aid insolvent firms, and reducing the damage a failure would cause so that such firms could be allowed to fail. Major credit rating agencies have cited financial reform and the reduced likelihood of a government bailout when downgrading the credit ratings of major U.S. banks. For example, in November 2013, Moody's lowered the so-called government support component of its credit ratings for global systemically important banks. In December 2015, the credit rating agency Standard & Poor's downgraded eight of the largest U.S. banks by a notch, saying it believes the banks are less likely to receive a government bailout if they find themselves in financial trouble. While ratings are not necessarily reflective of general market expectations, these actions suggest that financial reform has been successful in reducing TBTF.

A widely studied measure of TBTF is whether certain institutions are able to borrow more cheaply because of the perception that they will ultimately be bailed out if they fail. It was clear that many large financial firms were able to borrow more cheaply both shortly before and during the Financial Crisis because market participants did not believe that such institutions would be allowed to fail. Several more recent estimates of this funding advantage find it to be much reduced or eliminated. Although financial reforms have likely had an impact on TBTF, the improved macroeconomic atmosphere may make any existing funding advantage very difficult to detect, so a definitive measure of whether the TBTF advantage still exists may not be apparent until another crisis appears.

The costs of TBTF go beyond the direct costs of bail-outs. TBTF creates incentives that many consider socially harmful. Investors are willing to provide their funds to a TBTF bank without evaluating the safety and soundness of their investment because they believe that the government will bail them out should the bank get into trouble. This allows managers to engage in risky investment behavior, with the bank keeping the gains should those investments pay off but with taxpayers bearing the loss in the event of a near failure. These institutions also enjoy a TBTF discount on their funding costs, allowing them to borrow at lower interest rates than similar institutions that are not considered by investors to be TBTF. This discount is anticompetitive as it gives large or more systemically connected firms an advantage over smaller or new institutions.

In the absence of another financial crisis, it is difficult to definitively prove that financial reform has reduced or eliminated TBTF. Much has changed from the pre-crisis to the post-crisis period. First, today's macroeconomic environment is more benign than during the crisis, suggesting that the difference in the probability of default with and without an expected bail-out is small. This may make it more difficult to find evidence of changes in TBTF. Second, Sarin and Summers (2016) provide evidence that market-based measures of risk are not lower during the post-crisis period, perhaps because financial reform has lowered the franchise value of banks. This may impact funding costs in the post-crisis period making it difficult to detect a reduction in TBTF. Finally, financial reform has mandated increases in capital and liquidity that may impact funding costs. Nevertheless, one approach to evaluating the effectiveness of the reforms on reducing or eliminating TBTF is to analyze the borrowing costs of large banks. A firm's borrowing cost should reflect the firm's credit risk. A financial institution that the market views as TBTF should enjoy a lower cost of borrowing than an otherwise identical institution.

It is important to distinguish between TBTF and a bank's size. A bank that is TBTF will likely be big, but not every large bank will be TBTF. There is evidence that larger banks benefit from economies of scale (Hughes and Mester 2013, Wheelock and Wilson 2016). Large banks have global reach and more diversified services, and can provide financial products and services that small banks cannot offer (Bernanke 2016). The tradable debt of larger financial institutions tends to be more liquid. Each of these factors would likely reduce the borrowing cost of a large bank for reasons other than TBTF.

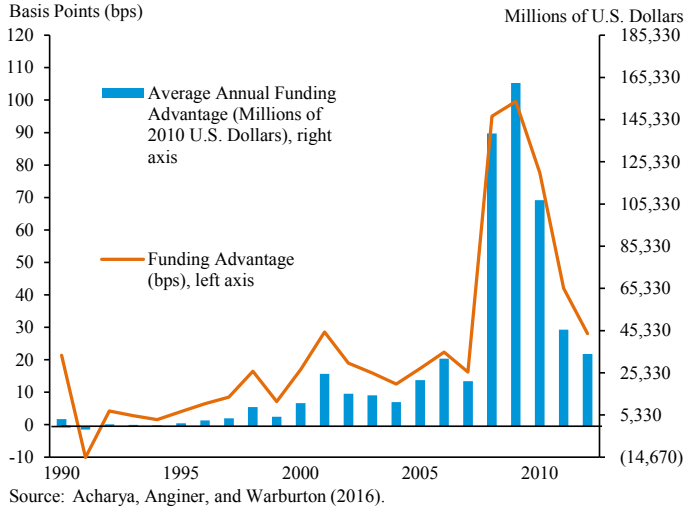
Scholars have taken several approaches to measure the TBTF premium. One approach uses a statistical technique to see if a bank's cost of borrowing varies with its size or designation of being "systemically important" after controlling for other variables related to credit risk. Examples include GAO (2014); Acharya, Anginer and Warburton (2016); and Balasubramnian and Cyree (2014). A second approach compares the market price of a contract that protects a bond holder from losses should the bond issuer default, known as a credit default swap (CDS), with the theoretical fair value of such a contract. An example of a study that uses such an approach is IMF (2014). A third approach compares the credit rating of a firm as a stand-alone enterprise with one that includes the possibility of government support. The difference between these two ratings may be interpreted as an indication of the size of the TBTF premium. Examples of studies using such an approach include IMF (2014) and Ueda and Weder di Mauro (2013).

Scholars using each of these methodologies have generally shown that the TBTF premium was positive but low in the 20 years before the crisis, illustrated by Figure 6-x (Acharya, Anginer, and Warburton 2016). During the financial crisis the TBTF subsidy spiked to approximately 100 basis points (bps). By 2012, the estimated subsidy had declined to roughly 25 bps. This illustrates an important point: the TBTF premium varies with time as market expectations change, especially regarding the likelihood of a government bailout. During a financial crisis, the probability of a financial firm's failure increases as does the probability that the government will rescue a TBTF firm, increasing the difference between the borrowing costs of a TBTF and a comparable non-TBTF financial firm.

While Acharya, Anginer, and Warburton (2016) are skeptical about the effects of post-crisis regulation on TBTF, several studies find that since the crisis, the TBTF premium either has effectively disappeared or has decreased to levels comparable with those pre-crisis. Balasubramnian and Cyree (2014) found the funding cost advantage of banks subject to the Federal Reserve's Comprehensive Capital Analysis and Review declined from 244 bps in the six-month period preceding passage of the Dodd-Frank Act to a statistically insignificant 6 bps in the six-month period following the law's passage. GAO (2014) uses 42 different econometric models to estimate the TBTF premium each year from 2006 to 2013. They find that while systemically important banks enjoyed

Figure 6-x

TBTF Premium, United States, 1990–2012



Source: Acharya, Anginer, and Warburton (2016).

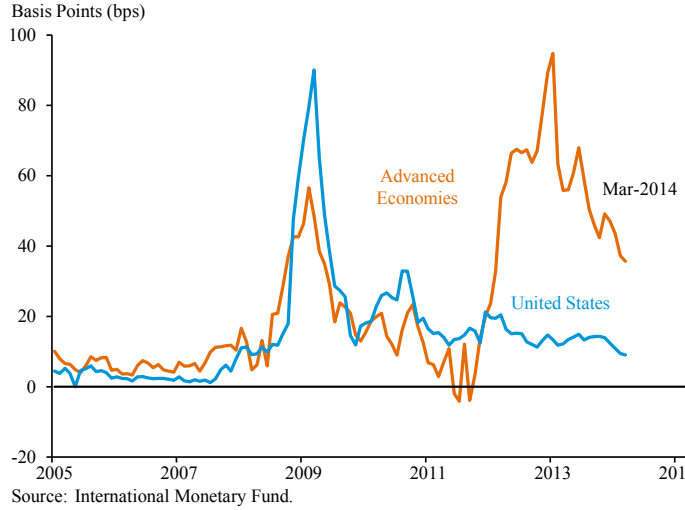
lower funding costs in 2007-09, "such funding cost differences may have declined or reversed in recent years."

Using the CDS approach, IMF (2014) finds that the TBTF premium rose from near zero bps in 2005 to over 50 bps during the crisis. As of 2013, the premium had declined to around 15 bps, an improvement since 2009 but not yet as low as levels in 2005 through 2007 and still indicative of a funding advantage. The United States appears to have been more successful than other advanced economies in narrowing the TBTF premium, though; the advanced economy average as measured by CDS spreads is approximately 40 bps as of the start of 2014, well above the level in the U.S. (as shown in Figure 6-xi).

The credit ratings-based approach also shows that the TBTF premium for systemically important institutions fell from a high of 30 bps to 15 bps, close to but still about 9 bps above the level in 2005. The ratings approach can also decompose the TBTF premium into effects from the probability that a firm becomes distressed and the expectation of bail-out when that firm is in distress. Using ratings for systemically important firms that are sub-investment grade, IMF (2014) finds that, despite a marked decline from crisis levels, the TBTF premium in 2013 was more than 10 bps above its level in 2005. Ratings, however, are slow to adjust to market conditions and suffer from conflicting views among different credit rating agencies.

Figure 6-xi

TBTF Premium for GSIBs, CDS Estimation, 2005–2014



Source: International Monetary Fund.

Overall, the funding advantage of global systemically important banks has declined since the crisis. While measures of the TBTF premium still vary across the academic literature, several studies have found that the premium as of 2013 was either statistically insignificant or significantly narrower than the levels during, and in, the three years after the financial crisis. Further, while the benign financial and macroeconomic conditions of the post-crisis period could be partially driving this decrease in the TBTF premium, studies such as IMF (2014) and Balasubramnian and Cyree (2014) that examine changes in borrowing costs around announcements of policy reforms find that they have driven up borrowing costs for systemically important institutions, suggesting that policy changes have had at least some effect in narrowing the TBTF premium.

to systematically important financial institutions and global systemically important banks (G-SIBs), which have become designated under recent reforms. Such a designation in no way guarantees a bailout or codifies a firm as TBTF, but rather adds rules to minimize the risk that the institution will fail and adds additional responsibilities so that it is possible for the institution to fail without endangering the broader system.

These enhanced rules include significantly higher standards for capital, stress-testing, liquidity, loss-absorbing capability, and resolution. In particular, the establishment of the OLA is meant to allow such firms to be resolved without taxpayer support and without endangering the rest of the financial system.

Transparency, Accountability, and Protecting Consumers and Investors

Beyond the broad measures needed to make financial institutions safer and to limit systemic risk, the crisis highlighted a number of issues of transparency and fairness within the financial system. As noted previously, information asymmetries may mean that financial professionals and firms likely have substantial information advantages relative to their customers or investors. This may require regulation that can improve the transparency of the actions of those financial firms, and the accountability of those firms to their investors, or simply to protect consumers from bad behavior.

Protecting consumers is warranted both to preserve their confidence in the financial system and because consumers ill-informed concerning financial products may be more likely to take on inappropriate loans and increase risk in the system more broadly. The Administration took numerous steps

through the Dodd-Frank Act and other measures to improve the information available in the financial system through reforms to derivatives markets, credit rating agencies, investor accountability, and through the creation of a new Consumer Financial Protection Bureau.

Improving Transparency and Oversight of Derivatives

Increased transparency in the financial system promotes investor protection and better enables market participants to price assets, risk, and other relevant inputs to financial decisions. Part of the cause of the financial crisis was a lack of critical information about counterparties. As the crisis unfolded, the potential exposures of large financial institutions to other financial institutions that were either known or suspected to be near bankruptcy led to a general unwillingness to enter into any additional transactions. This contributed to the seizing up of credit markets.

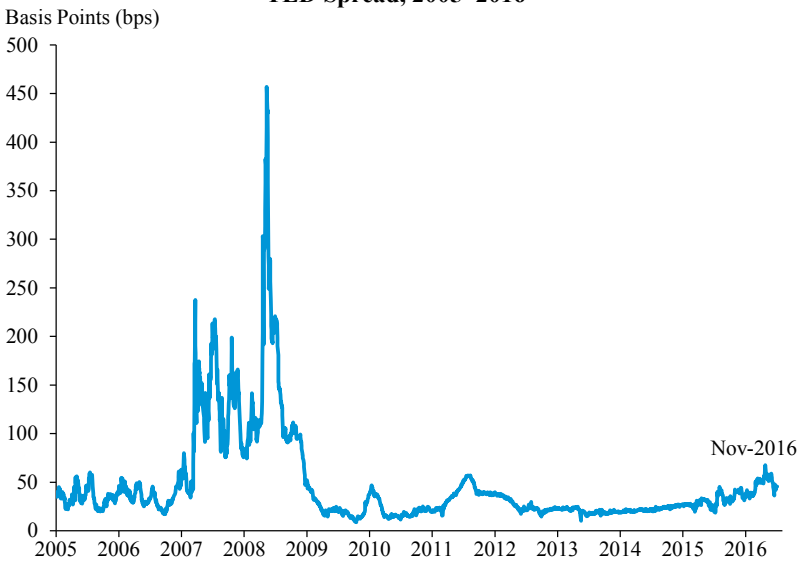
A number of measures showed how acute the problem was in late 2008. When there is fear of counter-party risk, banks will charge one another more than the safe interest rate to lend in overnight markets. One such measure of perceived credit risk in the interbank market is the TED spread, which is the difference between the three-month London Interbank Offered Rate (LIBOR)[16] and the three-month yield on U.S. Treasury bills. Figure 6-19 shows the TED spread for the years 2007 through October 2016. The TED spread jumped in the summer of 2007 when stress in the markets began to show and then again after Lehman Brothers' collapse in September 2008. An important part of making the system more stable was improving transparency among firms so that they could lend to one another more freely.[17]

One important way in which financial institutions had financial exposure to each other was through over-the-counter (OTC) derivative contracts. Just ahead of Lehman's collapse, the Federal Reserve Bank of New York was collecting information on the exposures created by Lehman's more than 900,000 derivative contracts. The volume of outstanding contracts and the

[16] LIBOR is an average of the rates at which large banks in London are willing to lend to each other in dollars. Collected by survey, LIBOR has been the focus of investigations of manipulation by individuals within the participating banks who were responsible for responding to the survey in cooperation with traders.

[17] The LIBOR increase in 2016 is likely due to money market reform rather than increased credit risk of large banks. New SEC rules for money market mutual funds that as of Oct. 14, 2016 mandated a floating share price for institutional MMFs that invest in commercial paper and bank CDs had driven the increase. As that date approached, many institutions withdrew from those funds in favor of those funds that only invest in government securities and whose NAV will not float. The effect was a reduction in funds that provide a source of short-term funding for banks, pushing up rates such as LIBOR.

Figure 6-19
TED Spread, 2005–2016



Source: Federal Reserve Board.

difficulty in creating a complete picture of such exposures highlighted the need for better data.

Derivatives are financial instruments whose values are determined by reference to other "underlying assets," and include forwards, futures, options, and swaps. These instruments are useful to investors and businesses seeking to hedge risks. For example, an airline may need to hedge its exposure to oil price fluctuations or a pension fund may need to hedge its exposure to interest rate changes. Derivatives often create leverage because changes in the value of the underlying asset can be magnified many times in the value of the derivative contract. Thus, while they can be used to hedge against risks, derivatives can also be used to increase exposure to risky assets and can concentrate risk rather than dispersing risk among many market participants. Many derivatives have standardized terms, are traded on exchanges, and are cleared through central counterparties (CCPs). Exchange trading and central clearing create a record of prices and transactions that can be used by the public in the price discovery process and by regulators to measure the exposures of market participants. Central clearing also helps mitigate counter-party credit risk.

Prior to the financial crisis, one category of derivatives, swaps, was not standardized and was traded over-the-counter.[18] The trading volume and outstanding notional value of these swaps, particularly the type known as a credit default swap, grew rapidly prior to the financial crisis and formed a complex network of exposures among large financial institutions.[19,20] Only the two parties to the transaction were typically aware that the transaction had occurred, resulting in an opaque market in which there was little transparency around either prices or exposures. The lack of transparency in exposures could result in a concentration of risk in particular financial institutions as occurred with AIG just prior to the financial crisis. As Figure 6-20 shows the rapid growth in several types of OTC derivatives in the years leading up to the financial crisis.[21]

The Dodd-Frank Act took a number of steps to reform the OTC market in derivatives, including the reporting of all swap trades to a trade repository, the public reporting of certain trade information, the posting of margin against possible losses resulting from counterparty default, the mandatory clearing of standardized swap contracts through registered central counterparties, trading on exchange-like trading facilities, and registration and regulation of swap dealers and certain large market participants. These steps were intended, among other purposes, to reduce the opaque nature of the derivatives market, to improve price transparency and to reduce systemic risk.

Under Dodd-Frank, swap and security-based swap dealers and major swap and security-based swap participants are required to register with and be subject to supervision by the CFTC and SEC. As of November 2016, more than 100 swap dealers were provisionally registered with the CFTC. The SEC estimates that as many as 50 security-based swap dealers, many of

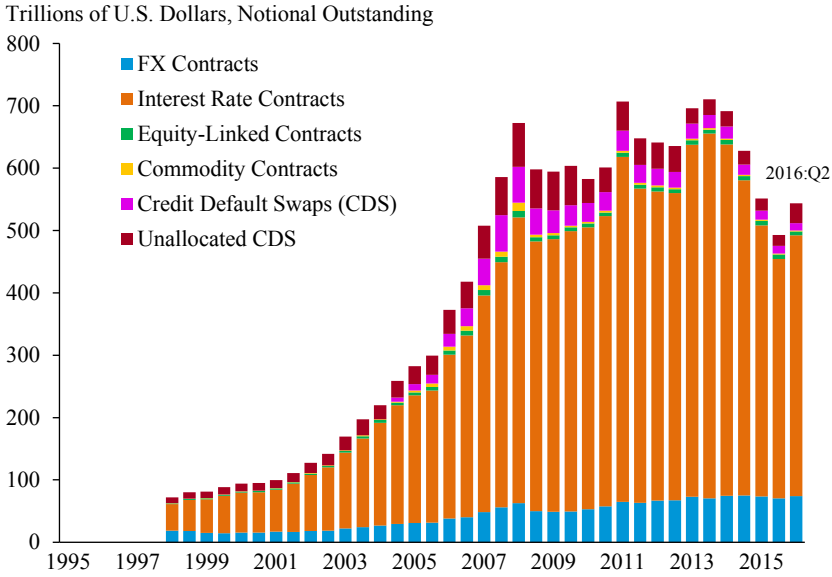
[18] A swap is an agreement between two parties to exchange sequences of cash flows for a set period of time. Types of swaps include interest rate, foreign exchange, and credit default. For example, in an interest rate swap one party pays a fixed amount and the counterparty pays an amount determined by a variable interest rate such as LIBOR.

[19] A credit default swap (CDS) is a particular type of swap designed to transfer the credit exposure of a fixed income security from the buyer to the seller. The CDS buyer makes periodic payments to the seller, who, in the event of default, pays the buyer the difference between the face value and the defaulted value of the security. CDS are often used by buyers to hedge the credit risk of bond positions and by sellers to create positions that are similar to holding the underlying bond. Dodd-Frank reforms have ensured that most such transactions are required to have collateral posted to insure performance of the contract.

[20] The notional value of a swap contract is the nominal or face value and is used to calculate payments made on the instrument. With respect to CDS, the notional value represents the face value of the debt security whose credit risk is transferred from buyer to seller of the CDS.

[21] It is important to look at global trading activity for several reasons. These include the fact that a sizeable fraction of these transactions are between parties in different jurisdictions and many participants in these transactions, particularly dealers, have a global presence and the jurisdiction in which they book the transaction is often a matter of choice.

Figure 6-20
Global OTC Derivatives Market, 1998–2016



Note: BIS data for CDS are not available until 2004.
Source: Bank of International Settlements (BIS).

which are already registered with the CFTC as swap dealers, and five major security-based swap participants will be required to register when the SEC's Registration Rules for Security-Based Swap Dealers and Major Security-Based Swap Participants go into effect.

Clearing through CFTC-registered derivatives clearing organizations is now required for most interest rate and index credit default swaps.[22,23] Mandatory clearing of single-name CDS and other security-based swaps through SEC-registered clearing agencies in not yet in effect, though many single-name CDS are accepted for clearing through CCPs on a voluntary

[22] After a trade is executed between a buyer and a seller, the CCP steps between the two counterparties and becomes the buyer to the seller and the seller to the buyer. Thus the CCP assumes the credit risk that used to be borne by the original counterparties. This can reduce risk in a number of ways including standardizing collateral requirements for all participants, allowing for the regulation of risk management practices, and promoting trade compression which reduces the total amount of trades outstanding. For example, if firm A buys a certain CDS (buys protection) from firm B on Monday and then firm A sells the same contract (sells protection) to firm C on Tuesday, because both trades have the CCP as the counterparty, they would "compress" resulting in no position for firm A.

[23] Participants in an interest rate swap exchange fixed interest rate payments for a floating rate interest payment. An index CDS is a portfolio of CDS on individual entities that comprise the index.

basis.[24] One of the advantages of central clearing is the increased ability of market participants to reduce their total exposure through trade compression – the canceling of equal and offsetting positions – that reduces the total amount of derivative positions outstanding. Figure 6-21 shows the rapid increase in trade compression in interest rate swaps as rules requiring their mandatory clearing came into effect.

Twenty-three swap execution facilities are now registered with the CFTC and the application of one additional swap execution facility is pending. The SEC estimates that as many as 20 security-based swap execution facilities will register with the SEC when its applicable rules become effective, many of which will also be registered with the CFTC. According to information compiled by the International Swaps and Derivatives Association (ISDA), in the first 10 months of 2016, 55 percent of total interest rate derivative notional value and 76 percent of total CDS notional value takes place on swap execution facilities, the exchange-like electronic trading platforms required by Dodd-Frank.

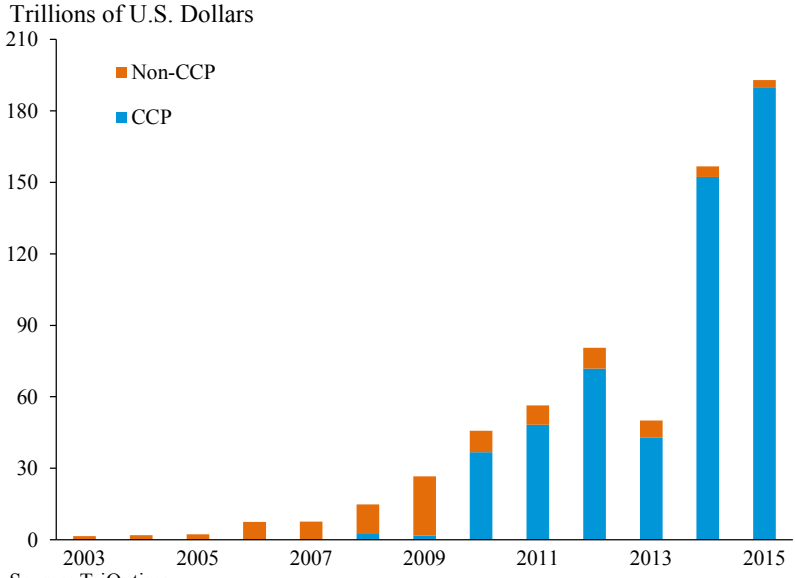
The Dodd-Frank Act improved the ability of regulators to oversee this market by requiring that all swap transactions be reported to registered swap data repositories (SDRs) and that summary information be periodically reported to the public. As of the fall of 2016, there are four SDRs provisionally registered with the CFTC and the SEC estimates that two SDRS will be registered with it when its rules become effective. In addition, there are many more trade repositories registered and operating overseas, including six registered with the European Securities and Market Authority, making a previously opaque market significantly more transparent.

Credit Rating Agencies

Credit rating agencies play an important role in the financial system. When a bank makes a loan, the bank is responsible for assessing the credit quality of the borrower and monitoring the performance of the loan. In a capital market, borrowers seek to raise funds by issuing bonds or other debt obligations to numerous investors. In this case, investors must either make their own determinations as to the borrower's creditworthiness, which is made more difficult given the information asymmetries between the borrower and the investors, or rely on third parties to perform this function. This is the role of credit rating agencies: they rate the creditworthiness of borrowers and the probability of default of bonds and other debt instruments, and provide surveillance on borrower's performance.

[24] A single-name CDS is a contract that pays the difference between the face value of a particular bond and the market value of that bond when the issuer defaults.

Figure 6-21
Interest Rate Derivative Compression Volume, 2003–2015



Source: TriOptima.

Over time, the credit rating agencies became essential parts of the financial systems. Many regulations referred to specific credit ratings, many investment funds limited themselves to holding only assets with a certain minimum rating, and ratings were a crucial part in determining what collateral was permissible in a number of transaction types, including repo transactions. In exchange for adhering to various reporting requirements, the SEC provides interested and eligible credit rating agencies with a Nationally Recognized Statistical Rating Organization (NRSRO) designation. The designation is particularly important because a variety of State and Federal laws and regulations reference NRSRO ratings.

One concern that emerged from the crisis was the problems with the incentives of the ratings agencies themselves. Although investors are the primary users of ratings, issuers hire and pay most rating agencies. The so-called issuer-pay compensation model raises conflicts of interest issues and can lead to "rating shopping." If an issuer believes a credit rating agency is likely to rate its debt lower than other agencies, the issuer would be less likely to hire that rating agency. This structure provided incentives for credit rating agencies to inflate ratings, and is compounded by the highly concentrated nature of the industry.

The Dodd-Frank Act created the Office of Credit Ratings within the SEC to oversee and conduct annual examinations of each NRSRO. The

findings from the NRSRO examinations are described in annual public reports published by the SEC. The examinations have shown a number of improvements, but have also identified continuing concerns, including those about the management of conflicts of interest, internal supervisory controls, and post-employment activities of former staff of NRSROs.

To improve transparency over the ratings process, the Dodd-Frank Act required enhanced public disclosure of NRSROs' credit rating procedures and methodologies, certain business practices, and credit ratings performance. According to the SEC, in 2014, "there [was] a trend of NRSROs issuing unsolicited commentaries on solicited ratings issued by other NRSROs, which has increased the level of transparency within the credit ratings industry" (SEC 2014). The SEC reported that this trend continued in 2015. In addition, some NRSROs have issued unsolicited commentaries on an asset class, rather than a specific transaction.

The Dodd-Frank Act eliminated references to credit ratings in certain Federal laws and required all Federal agencies to remove references to credit ratings from their regulations. To that end, the financial regulators adopted rule changes that removed references and, where appropriate, substituted alternative standards of creditworthiness.

Improved Accountability to Shareholders

The financial crisis led to policy concerns about a possible link between excessive financial firm risk taking and executive compensation practices. For example, a financial executive considering a very risky investment might weigh the potential personal benefit if the investment pays off against the personal loss if the investment fails. If the benefit, say a very large bonus, is more valuable to the executive than the potential loss, perhaps the risk of getting fired, then the executive has an incentive to make the risky investment. The best interest of the shareholders or the risks to either the firm or the financial system might only be of secondary importance to the executive.

Policymakers were concerned about what economists call "misaligned incentives" in 2008, one of the motivations for the Troubled Asset Relief Program subjecting recipients to various executive pay restrictions and corporate governance requirements. Soon after, the Federal Reserve issued guidelines for reviewing banks' pay structures to identify any compensation arrangements that provide incentives to take excessive risk.

In accordance with requirements in the Dodd-Frank Act, the SEC adopted rules in 2011 that require public companies subject to the Federal proxy rules to provide shareholder advisory 'say-on-pay,' 'say-on-frequency,' and 'golden parachute' votes on executive compensation. Say-on-pay refers

to a shareholder advisory vote on executive compensation, say-on-frequency refers to the frequency of say-on-pay votes, and golden parachute to advisory votes on compensation arrangements and understandings in connection with merger transactions. In 2015, 2,157 Russell 3000 companies had a say-on-pay vote, providing shareholders with the information they need to monitor potential abuses and an opportunity for shareholders to voice their opinion concerning steep increases in executive compensation packages. Sixty-one Russell 3000 companies (2.8 percent) had shareholders reject their 2015 say-on-pay vote.

In accordance with requirements in the Dodd-Frank Act, the SEC adopted rules in 2012 directing the national securities exchanges and national securities associations to prohibit the listing of any equity security of an issuer that does not comply with new compensation committee and compensation adviser requirements. To conform their rules to the new requirements, national securities exchanges that have rules providing for the listing of equity securities filed proposed rule changes with the SEC. The Commission issued final orders approving the proposed rule changes in January 2013.

Sponsors of asset-backed securities are now required to provide consistent, asset-level information to investors, improving clarity regarding the risks associated with these securities. Sponsors are also now required to retain a portion of the credit risk associated with the assets collateralizing the securities, better aligning the behavior of originators, securitizers, and investors, and addressing many of the perverse incentives that contributed to the financial crisis.

Wall Street reform recognized that markets require transparency to work properly. By shining a light on hidden business structures and increasing information for all participants, Wall Street reform has helped to realign incentives so that markets work for everyone.

Protecting Consumers

Consumers often know less about the investment or financial service they are considering than the financial industry professional with which they are doing business. Protecting consumers from this problem of asymmetric information by providing consistent and rigorous consumer protections is important to preserve consumer confidence in the financial system. If the consumer believes he or she cannot get a fair deal then the consumer is less likely to take advantage of the many beneficial financial services that are available for financing major purchases as well as saving for college or retirement.

Prior to the crisis, enforcement of laws meant to protect consumers from predatory practices was divided among multiple agencies. The Dodd-Frank Act created the Consumer Financial Protection Bureau (CFPB) "to ensure that important fair lending, debt collection, consumer credit, and other borrower protections were updated in response to quickly changing markets and consistently enforced nationwide" (U.S. House of Representatives, 2015). The financial crisis revealed that laws meant to protect consumers from predatory practices are meaningless if they are not enforced, and that consumers needed a government agency focused on their needs and experiences.

As of November 2016, the CFPB has returned $11.7 billion to more than 27 million harmed consumers —including homeowners, students, seniors, and service members. As of July 2016, millions of consumers have also taken advantage of the Bureau's financial resources at consumerfinance.gov and 930,700 complaints have been submitted to a database for collecting consumer complaints against service providers that have proved otherwise unresponsive.

The CFPB has been establishing and enforcing clear rules of the road and consumer protections to prevent the kinds of predatory behavior that contributed to the financial crisis. The CFPB protects consumers of a wide range of financial products and services, including mortgage loans, credit cards, student loans, car loans, and deposit products. The CFPB is developing landmark consumer protections for products often targeted to the unbanked and underbanked, such as prepaid accounts, payday loans, and car title loans. The CFPB also protects consumers with respect to other industry activities, such as debt collection and credit reporting.

In the lead up to the financial crisis, abusive lending practices and poor underwriting standards resulted in risky mortgages that hurt borrowers across the country. Wall Street reform addresses abusive practices in mortgage markets, including by improving disclosure requirements, curbing unfair servicing practices, restricting compensation practices that created conflicts of interest, and establishing protections for high-cost mortgage loans. In addition, mortgage lenders are required to make reasonable, good faith determinations that a borrower is able to repay her mortgage loan. More than 16 million mortgages are covered by the CFPB's Ability-to-Repay rule's protections and that number grows every month. Reforms also protect service members from deceptive mortgage advertising practices, predatory lending schemes, and hidden fees for automatic bill pay services.

Additional Investor Protections

The SEC's Whistleblower Office, created by the Dodd-Frank Act, became fully operational in 2011. In fiscal year 2014, the SEC received over 3,600 tips, covering a variety of securities law violations including those relating to corporate disclosures, financial statements, security offering fraud, market manipulation, investment adviser fraud, and broker-dealer rule compliance. Whistleblowers that provide the SEC with original information that leads to a successful enforcement action with monetary sanctions exceeding $1 million are eligible to receive an award ranging from 10 to 30 percent of the amounts collected in the action. As of November 2016, 34 whistleblowers have received awards with the total exceeding $110 million, with the highest award being over $30 million.

The Dodd-Frank Act enhanced the CFTC's ability to prosecute manipulation by prohibiting, among other things, manipulative and deceptive devices that are intentionally or recklessly employed, regardless of whether the conduct in question was intended to create, or did create, an artificial price. This authority provides the CFTC with more flexibility to go after reckless manipulation and fraud. The first case brought by the CFTC using this authority was against Panther Energy Trading LLC in 2013 for engaging in the disruptive practice of "spoofing" by using a computer algorithm to illegally place and quickly cancel bids and offers in futures contracts without ever intending to buy or sell those contracts. The CFTC also used this authority to bring charges against Navinder Singh Sarao for his role in contributing to the May 6, 2010 Flash Crash and in 2013 against JPMorgan Chase Bank in connection with its "London Whale" swaps trades.

As required by the Dodd-Frank Act, the SEC established the Office of the Investor Advocate, charged with identifying investor protection concerns and proposing to the SEC and Congress any administrative or legislative changes necessary to mitigate those concerns. Similarly, the Dodd-Frank Act also established the Investor Advisory Committee (IAC) comprised of the Investor Advocate, a representative of state securities commissions, a representative of the interests of senior citizens, and no fewer than 10 and not more than 20 members appointed by the SEC to represent the interests of various types of individual and institutional investors. The IAC may submit findings and recommendations for review and consideration by the Commission, which must promptly issue a public statement assessing those findings or recommendations and disclosing the action, if any, the SEC intends to take. Since its inception, the IAC has issued 14 recommendations covering: shortening the trade settlement cycle in U.S. financial markets, the definition of an accredited investor, impartiality in the disclosure of preliminary voting results, crowdfunding, decimalization,

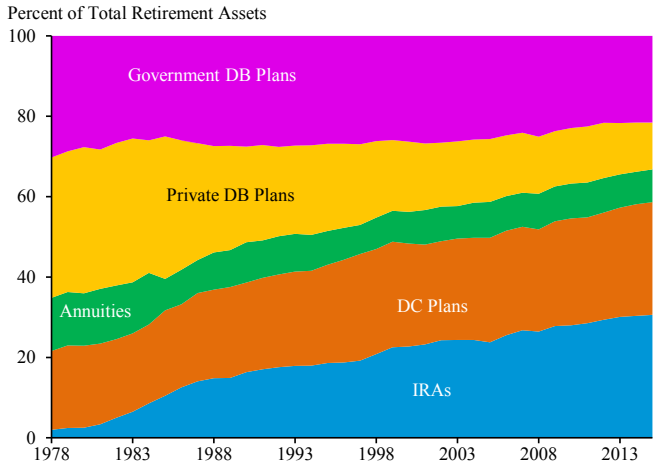
Box 6-5: Addressing the Problem of Conflicted Investment Advice for Retirement Savings

In April 2016, the Department of Labor (DOL) finalized a rule that substantially expanded the number of providers of financial advice required to adhere to a fiduciary standard, which requires them to put their clients' best interest before their own profits. The rule makes considerable progress in upholding consumer protections in the retirement savings marketplace.

Individuals saving for retirement usually make use of one or more of three major types of retirement plans. First, defined benefit (DB) plans provided by many public and private employers promise specified payments to the retiree that depend on characteristics of their work history, such as age, years of service and salary of the employee. The employer that sponsors the plan is typically responsible for making contributions to the plan adequate to finance the promised payments. If investment returns are less than expected, the plan sponsor is required to make up the difference. Another type of employer-sponsored plan is the defined contribution (DC) plan, such as a 401(k), which pays a retiree an amount based on how much the beneficiary and employers have contributed in his or her working years and the investment return earned on those contributions. The beneficiary typically has several investment options to choose from within the plan but bears the risk of lower retirement income if the investment returns are less than expected. Lastly, Individual Retirement Accounts (IRA) are savings accounts composed solely of an individual's contributions during his or her working years.

IRAs require individuals to make all investment decisions. In terms of investing retirement savings, employer-sponsored defined benefit (DB) plans generally delegate retirement savings of all participants to investment professionals who must serve the best interests of their clients. Employer-sponsored defined contribution (DC) plans typically give employees a list of investment options from which to choose. While IRAs offer individuals the most freedom to invest their retirement assets, it also means they must interact directly with those who provide investment products and investment advice. This has become more important as IRA assets have grown from 2 percent to 31 percent of all retirement assets from 1978 to 2015 (Figure 6-xii) During this period, the investment landscape has become much more complex and as a result, financial advice has become increasingly important to individual's investment strategies. One survey found that roughly half of households that own a traditional IRA have a retirement strategy created with the help of an investment adviser (Holden and Schrass 2015).

Figure 6-xii
U.S. Retirement Assets by Type, 1978–2015



Source: Investment Company Institute.

A growing body of academic and industry literature shows that such investment advice is not always in the best interest of clients. Table 6-i shows that savers may obtain advice from one of two main types of investment professionals: registered investment advisers (RIA), who have a fiduciary duty to clients; and broker-dealers, who are required to give only "suitable" investment advice. In addition, only registered investment advisers may give holistic advice on a client's investments, whereas broker-dealers primarily transact in financial markets and may provide only incidental advice to clients (SEC 2011).

Compensation structures for professionals who give financial advice often introduce conflicts of interest. Some investment advisers receive conflicted payments, which is compensation that depends directly on the actions taken by the advisee, such as trading shares of a company or selling shares of a fund. Certain types of mutual funds share a higher proportion of their revenues with advisers that sell them, or pay advisers relatively high fees per share that they sell to clients. These types of compensation structures incentivize advisers to steer investors into such products even if they are not optimal for a client's investment needs. Alternative compensation schemes such as an hourly rate or a yearly management fee charged as a percentage of assets provide payments that depend less on investment decisions and provide less opportunities for conflict of interest. Advisers not subject to a fiduciary standard may direct clients into funds that while meeting a "suitability" standard, are not in the best interests of the client.

Table 6-i
Sources of Investment Advice

Adviser	Description	Legal Standard
Registered Investment Advisers (RIAs)	Receives compensation in exchange for giving investment advice. May also manage a portfolio for clients.	Fiduciary duty to client, including a duty of loyalty and a duty of care. Must serve the best interest of the client.
Broker Dealers (brokers)	Makes trades for a fee or commission. A broker makes trades for a client's account, while a dealer makes trades for his or her own account.	Recommendations must be suitable for a client's investment profile taking into account factors such as age, income, net worth, and investment goals.
Other Potential Sources	Examples include friends, family, bankers, insurance agents, accountants, and lawyers.	Standards vary.

A substantial body of academic literature shows that conflicted advice leads to lower investment returns.[1] In previous work, CEA estimated that savers receiving conflicted advice earn returns roughly one percentage point lower than they would have otherwise and these losses amounted to $17 billion annually.[2]

The Employee Retirement Income Security Act (ERISA), enacted in 1974, regulates the provision of financial advice to retirement investors. Prior to the finalization of the new rule in 2016, the rules governing retirement advice had not changed meaningfully since 1975 despite the significant changes in the retirement savings marketplace. Starting in 2009, DOL started a reform effort to combat the problems stemming from conflicted investment advice. It proposed a new fiduciary rule in 2015, and after receiving stakeholder comment, adopted a revised rule in April 2016.

In its new rule, the DOL extends the fiduciary duty broadly to financial professionals giving investment advice for retirement plans subject to ERISA, including broker-dealers. The new rule requires that financial advisors who receive commissions and other transaction-based payments provide advice that is in the best interest of the client and commit to a set of policies and procedures that ensures that the advisor meets this standard. The intent of the rule is to protect retirement investors and ensure that the advice they receive is in their best interest. Though this

[1] See, among others, Bergstresser, Chalmers, and Tufano (2009), Del Guercio and Reuter (2014), and Christofferson, Evans, and Musto (2013).
[2] For more information on the costs of conflicted investment advice, see CEA's (2015a) report "The Effects of Conflicted Investment Advice on Retirement Savings."

rule does not ban such "conflicted payments," it does stipulate that those institutions still receiving such transaction-based compensation must have clients sign a best interest contract exemption, which pledges that the adviser will act in the client's best interest.

While the rule will only apply to transactions beginning in April 2017, the effects will become evident sooner as investment advisers adjust their business practices to comply with the new regulations. Analysts anticipate that the effects will be large. Morningstar estimates that the rule will require that accounts with more than $800 billion of defined contribution plan assets that are receiving some form of advice be checked for compliance. In addition, wealth management firms will need to justify that over $200 billion of IRA rollovers are in the clients' best interest. Commentators envision that the plan will place the highest costs on independent broker-dealers, formerly obliged only to offer suitable investment advice. Registered investment advisors (RIAs) will bear smaller costs given they are already under a fiduciary standard. The additional liability of a best interest contract exemption will likely incentivize broker-dealers to switch to fee-based compensation structures. Since fee-based compensation may make small accounts less profitable, advisers could decide either to drop small retirement accounts or shift them into automated advice accounts —so called "robo-advisors." While the results of these regulations will become more apparent in the coming year, the initial commitment of some firms toward lower fee, passive products, should then lower costs to consumers, consistent with the original intent of the DOL rule.

legislation to fund investment adviser examinations, broker-dealer fiduciary duty, data tagging, and target date mutual funds.

International Cooperation

The U.S. financial system does not exist in a vacuum. Massive volumes of capital flow between U.S. financial markets and those abroad. Over the course of a month, foreign residents buy and sell trillions of dollars' worth of U.S. assets to or from U.S. residents. European banks were major borrowers from U.S. money market funds and subsequently major investors in U.S. asset markets. Foreign domiciled financial institutions play sizable roles in many aspects of U.S. financial markets. In addition, U.S. financial firms compete for business in financial markets around the world with firms regulated by other countries' rules. Reforming the U.S. financial system and regulatory architecture alone would be insufficient to ensure the safety of the U.S. financial system if there were not important steps to ensure the global

financial system and the systems of those of our partners were also better regulated.

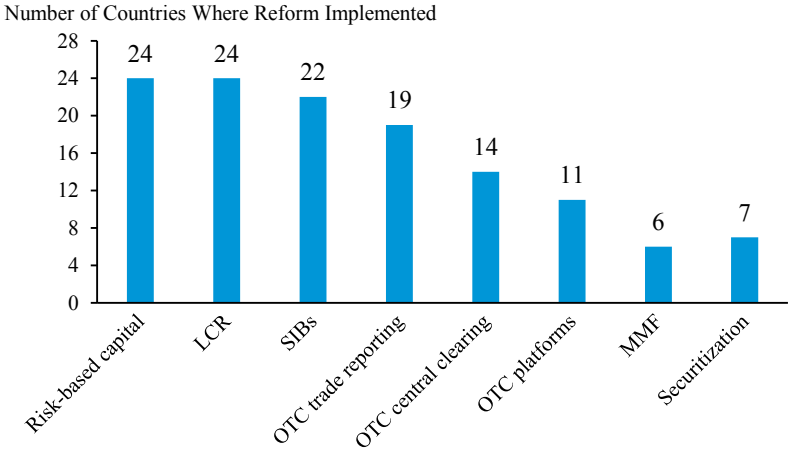
In September 2009, the G-20 met in Pittsburgh to discuss, among other things, the measures the member nations had taken to address the global crisis and the additional steps necessary to build a stronger international financial system. The international financial reform agenda that came from the Pittsburgh and subsequent G-20 meetings aimed to ensure a "race to the top" to raise the quality of regulation and thereby the safety of the international financial system as well as level the playing field across major and emerging financial centers. To this end, G-20 leaders called for the establishment of the Financial Stability Board (FSB) to serve a key role in promoting the reform of international financial regulation and to promote financial stability and endorsed its original charter at the Pittsburg meeting. The Dodd-Frank Act is fully consistent with — and in a number of areas surpasses —the G-20 recommendations. Initiatives proposed in Pittsburgh and subsequent G-20 meetings include: 1. Strengthening bank capital and liquidity; 2. Reducing the risk posed by large systemically important financial institutions; 3. Making derivatives markets safer and more transparent; 4. Establishing higher capital margins for non-centrally cleared derivatives; and 5. Identifying parties to financial transactions.

Consistency of regulatory approach across jurisdictions is important because so much financial activity occurs between financial institutions located in different jurisdictions. To the extent that financial market activity can move to the jurisdiction with the weakest regulation and with the interconnected nature of the world economy, a financial crisis that begins in one country can quickly spread to others. A consistent regulatory approach across countries makes the financial system in every country safer.

The FSB produces a semiannual report that tracks the progress of regulatory reform around the world.[25] As seen in Figure 6-22, within the 24 FSB member jurisdictions, progress in implementing banking regulation reform has been widespread with considerable progress having been made in the reform of OTC derivative markets. Other initiatives have not yet been implemented beyond a few jurisdictions though progress continues.

[25] The Financial Stability Board (FSB) is an international body that monitors and makes recommendations about the global financial system. It was established after the 2009 G-20 London summit in April 2009. The FSB includes representatives from 24 countries plus The World Bank, International Monetary Fund, Bank for International Settlements, Organization for Economic Cooperation and Development, European Central Bank, European Commission, Basel Committee on Banking Supervision, International Association of Insurance Supervisors, International Organization of Securities Commissions, International Accounting Standards Board, Committee on the Global Financial System, and Committee on Payments and Market Infrastructures.

Figure 6-22
International Financial Regulation: Implementation of G20 Financial Regulatory Reforms



Note: LCR stands for liquidity coverage ratio. SIBs refers to requirements made by each country on domestic systemically important banks. MMF refers to money market fund reforms. MMF and securitization reform both fall under reform to the shadow banking system.
Source: Financial Stability Board 2016.

The United States has made substantial progress in implementing the priority reforms identified by the FSB. The United States has fully implemented reforms in nearly all of the priority areas and is making progress in others. Many major advanced economies with large financial systems that are highly interconnected with the U.S. financial system —in particular the United Kingdom and the euro area —are also making substantial progress.

U.S. Financial Markets in 2016

Seven years after the end of the financial crisis, the purpose of financial reform remains the same: to reduce as much as possible the likelihood of another financial crisis and the incalculable costs that it would inflict on the economy, the financial markets, and society. The recovering economy and implementation of financial reform have been accompanied by strong performance of a wide variety of financial market indicators. Not only have financial markets recovered from the losses suffered during the crisis, but banks are healthier and stronger, regulators are on the lookout for systemic risk, once-opaque derivative markets are safer and more transparent, credit ratings agencies are subject to more effective oversight and increased transparency, and investor protections have been strengthened.

A variety of measures show the renewed health of the financial markets. Equity prices and housing prices have rebounded, rebuilding

Box 6-6: The JOBS Act

While it was an imperative to correct the market failures and excesses in the pre-2008 financial system, an important aspect of financial regulatory reform is ensuring funds can be channeled to entrepreneurs who have productive uses for capital. In April of 2012, the President signed into law the Jumpstart Our Business Startups (JOBS) Act, a bipartisan bill that enacts many of the President's proposals to encourage startups and support the nation's small businesses. The Act allows for "crowdfunding", expands "mini-public offerings," and creates an "IPO on-ramp", all of which allow for easier funding of small businesses while maintaining important investor protections.

As implemented by the Securities and Exchange Commission, "crowdfunding" allows startups and small businesses to raise up to $1 million annually from many small-dollar investors through web-based platforms, democratizing access to capital. Investor protections include a requirement that crowdfunding platforms must be registered with a self-regulatory organization and regulated by the SEC. In addition, investors' annual combined investments in crowdfunded securities are limited based on an income and net worth test. SEC rules implementing the crowdfunding portion of the JOBS Act became effective in May 2016 making it possible for entrepreneurs across the country to raise small-dollar investments from ordinary Americans.

Prior to the JOBS Act, the existing "Regulation A" exemption from certain SEC requirements for small businesses seeking to raise less than $5 million in a public offering was seldom used. The JOBS Act raises this threshold to $50 million, streamlining the process for smaller innovative companies to raise capital consistent with investor protections. The SEC rules implementing this portion of the Act became effective in the summer of 2015.

The JOBS Act makes it easier for young, high-growth firms to go public by providing an incubator period for a new class of "Emerging Growth Companies." During this period, qualifying companies will have time to reach compliance with certain public company disclosure and auditing requirements after their initial public offering (IPO). Any firm that goes public already has up to two years after its IPO to comply with certain Sarbanes-Oxley auditing requirements. The JOBS Act extended that period to a maximum of five years, or less if during the on-ramp period a company achieves $1 billion in gross revenue, $700 million in public float, or issues more than $1 billion in non-convertible debt in the previous three years.

Additionally, the JOBS Act changed some existing limitations on how companies can solicit private investments from "accredited inves-

tors," tasked the SEC with ensuring that companies take reasonable steps to verify that such investors are accredited, and gave companies more flexibility to plan their access to public markets and incentivize employees.

Taken together, the components of the JOBS Act has the potential to enable entrepreneurs and small businesses to raise capital not previously available to them, increasing overall levels of capital formation in the economy.

Americans' net wealth. Measures of volatility or financial market stress are all largely contained as well. Finally, there is evidence – from firm loans to home mortgages – that capital is being channeled towards productive uses. Implementation of the Jumpstart Our Business Startups (JOBS) Act (see Box 6-6) has made it easier for entrepreneurs and small businesses to raise capital and grow. Performance in financial markets is driven by economic fundamentals as well as factors related to the markets themselves. The fact that markets have been up does not mean that the Dodd-Frank Act has been a success any more than would declining markets represent a failure of financial reform. But the recovery of markets and their ability to serve the core roles they play in the economy is an indicator of the success of the financial rescue and reform efforts in this Administration.

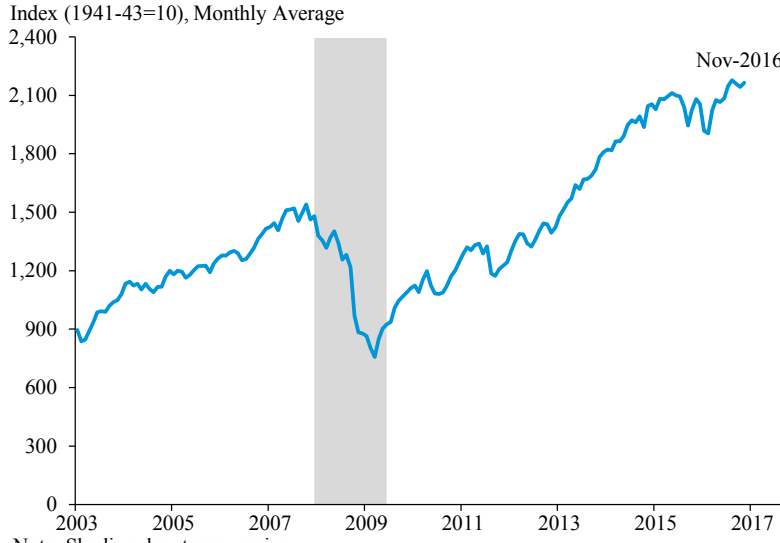
General Measures of Financial Sector Health

The stock market has more than recovered from the losses suffered during the financial crisis. One broad measure of U.S. stock market performance, the S&P 500 index, fell from a peak of over 1,500 in Fall 2007 to a trough below 700 in March 2009, a decline of more than 50 percent. Since then the market has recovered all of that loss and risen above 2,150 in Fall 2016 (Figure 6-23).

Forward-looking measures of equity market volatility are relatively low. Derived from options on the S&P 500 index, the VIX is a measure of expected volatility over the life of the option. The VIX, also referred to as the "fear index", is well below the crisis peak of over 60 percent (Figure 6-24). As of November 2016, the VIX was at 15.2 percent, which is below its 17-year pre-crisis average of almost 19 percent.

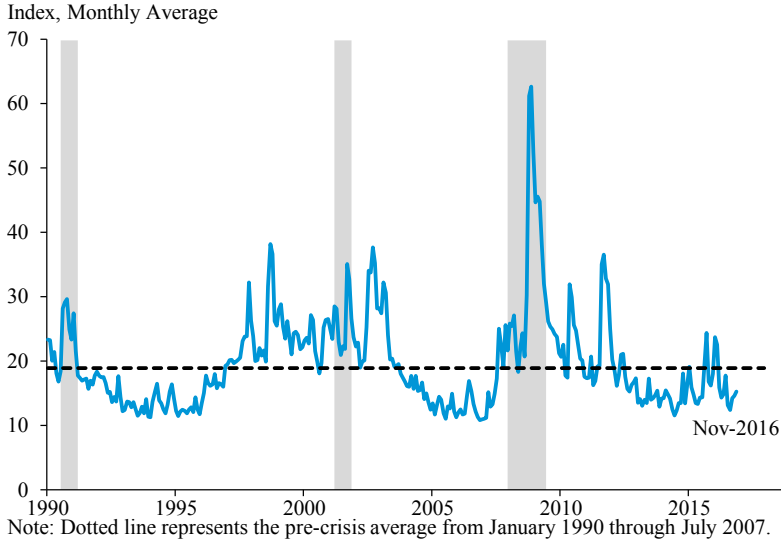
Measures of bond market health have also recovered from the financial crisis. The bond market analogue of the VIX, the Merrill Lynch Option Volatility Estimate (MOVE) Index, is a yield curve weighted index of the implied volatility on 1-month Treasury. The MOVE has fallen from its

Figure 6-23
S&P 500, 2003–2016



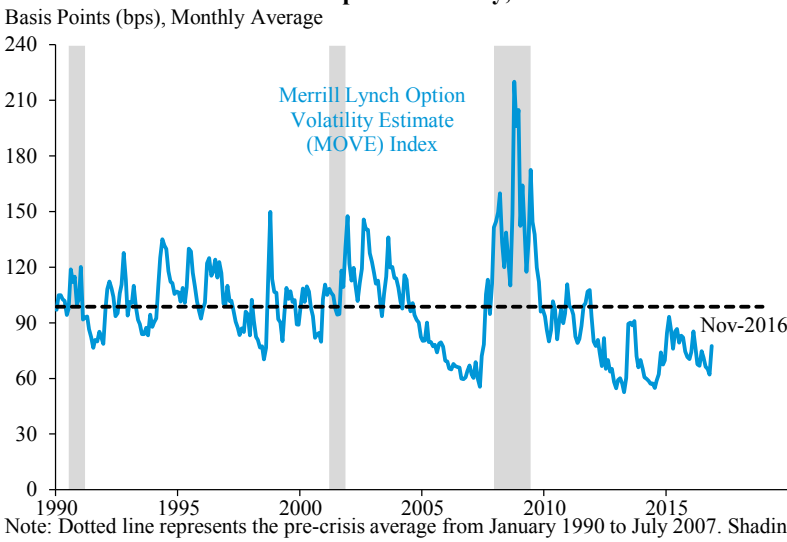
Note: Shading denotes recession.
Source: Standard & Poors.

Figure 6-24
VIX, 1990–2016



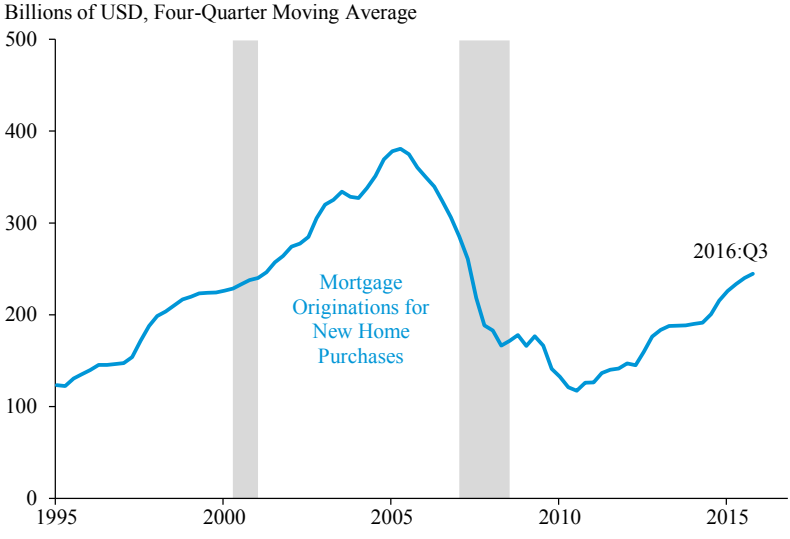
Note: Dotted line represents the pre-crisis average from January 1990 through July 2007.
Shading denotes recession.
Source: Wall Street Journal.

Figure 6-25
Fixed Income Implied Volatility, 1990–2016



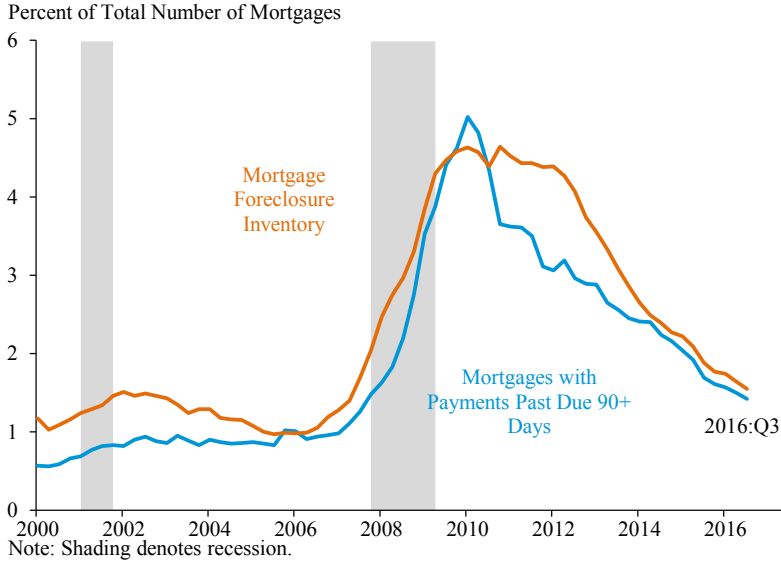
Note: Dotted line represents the pre-crisis average from January 1990 to July 2007. Shading denotes recession.
Source: Bank of America Merrill Lynch.

Figure 6-26
Mortgage Originations, 1995–2016



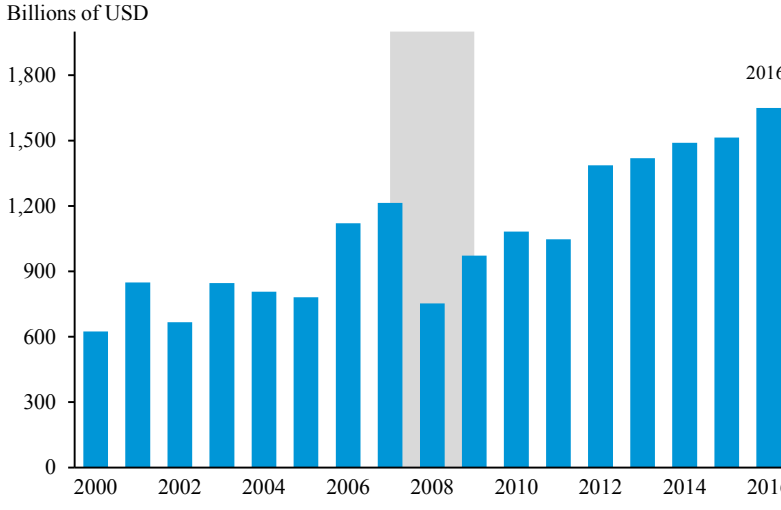
Note: Shading denotes recession.
Source: Mortgage Bankers Association.

Figure 6-27
Mortgage Delinquency and Foreclosure, 2000–2016



Note: Shading denotes recession.
Source: Mortgage Bankers Association.

Figure 6-28
U.S. Corporate Bond Issuance, 2000–2016



Note: Shading denotes recession. Figures include investment grade and high yield, convertible bonds, MTNs, and Yankee Bonds. Issuance number for 2016 is annualized based on issuance through September 2016.
Source: SIFMA.

peak above 200 in the fall of 2008 to below 80 in Fall 2016, a level below the 17-year pre-crisis average of approximately 100 (Figure 6-25).

Measures of housing-market health, the sector in which the financial crisis began, have also improved. The Case-Shiller national index of house prices has regained almost all of the ground it lost during the crisis (Figure 6-4).

Mortgage lending has stabilized. The four-quarter moving average of mortgage originations for new home purchases fell from a pre-crisis peak of $381 billion in 2006:Q1 to a trough of $117 billion in 2011:Q2 (Figure 6-26). Since then, mortgage originations have risen steadily to $245 billion in 2016:Q3.

For existing loans, the fraction of mortgages with payments more than 90 days past due or in foreclosure continues to fall from the peak during the crisis. Mortgage payments more than 90 days past due have fallen steadily from a peak of 5.0 percent in 2010:Q1 to 1.4 percent in 2016:Q3. The fraction of mortgages in foreclosure has also fallen steadily from a peak of 4.6 percent in 2010:Q4 to 1.6 percent in 2016:Q3 (Figure 6-27). Both measures of troubled mortgages, suggest substantial progress since the crisis.

One of the most important functions of capital markets is to facilitate the formation of capital for business. Businesses have raised record amounts in the capital markets as corporate bond issuance has risen above pre-crisis levels (Figure 6-28).

Conclusion

The financial crisis revealed a number of fault lines in the U.S. financial system. Banks were inadequately capitalized, did not have enough liquidity, and took too many risks. Non-bank financial firms faced many of the same risks as banks, but lacked the same regulatory supervision or protection against runs. In addition, gaps in the regulatory architecture meant that financial regulators lacked a holistic view of the risks in the system.

The Administration has taken numerous steps to make the financial system safer, most of all through the Dodd-Frank Act, which has helped correct a number of market failures that arose in financial markets during the crisis. It helps generate safety and soundness of financial markets by requiring that banks hold more capital, have adequate liquidity, and do not take excessive risk because they have access to government deposit insurance or access to emergency liquidity provision from the Federal Reserve. Dodd-Frank takes steps to limit systemic risk by bringing unregulated parts of the financial system that were effectively performing banking functions without the necessary backstops or regulation under a regulatory umbrella.

It created the FSOC to consider risks to the overall financial system and better coordinate regulatory action. And it took steps to limit the problem of financial institutions that are too-big-to-fail by imposing additional regulatory requirements on such institutions and creating an architecture that would allow these systemically significant institutions to be unwound if they were to fail. Finally, Dodd-Frank improved the transparency, accountability, and consumer protections in our financial system. These measures will help consumers and investors engage with the financial system in a way that is beneficial to them.

Although implementation of Basel III and Dodd-Frank go a long way toward reforming the financial system, there are important issues that remain unresolved. These include reform of government sponsored enterprises Fannie (Federal National Mortgage Association) and Freddie (Federal Home Loan Mortgage Corporation) in a manner that ensures they do not return to a status as private entities that operate for profit but with implicit public guarantees, and ensuring that a sufficient resolution framework exists for systemically important insurance companies and systemically important financial companies with worldwide operations. And as the financial system evolves over time, the regulatory architecture will need to evolve as well to ensure that a financial crisis like the one from 2007 to 2009 does not wreak havoc on the economy in the future.