2 Analyzing Threats to Financial Stability

Our approach to promoting financial stability focuses on analyzing disruptions to the basic services provided by the financial system. Given the dynamic nature of markets and the propensity for market participants to move risky activities out of the view of regulators, supervisors, and investors, our analysis must be dynamic and flexible. The first section of this chapter describes the OFR's approach to financial stability research and monitoring; the second section applies that approach to the financial system in the summer of 2012.

2.1 Research Agenda

Three broad themes drive the OFR's research agenda: (1) Understand how the financial system is evolving in its provision of basic financial services; (2) Assess emerging risks and vulnerabilities; and (3) Evaluate mitigants, such as risk management, disclosure, supervision, and macroprudential policy.

The financial crisis revealed significant gaps in the analytical and empirical understanding of the financial system, its interaction with the economy, and the role of the financial regulatory structure. Today, it is better understood that the financial system was evolving in ways that changed the behavior of institutions and markets. Financial activity had moved substantially outside the focus of supervisors with responsibilities over specific markets and institutions into the unregulated or lightly regulated shadow banking system—that is, credit intermediation by unregulated financial institutions in combination with the creation of money-like liabilities, involving leverage and maturity transformation, in opaque markets (Pozsar and others, 2012). Regulatory reporting systems had not kept up with the increased interconnections among financial institutions, the heightened reliance on leverage, and the dramatic increase in the variety, complexity, and volume of financial activity. Following the crisis, it is now much more clearly understood that the financial system is prone to instability and that weak links in the chain of intermediation must be strengthened.

Financial supervisors have begun to address these problems in important ways. There is a new consensus that policymakers need to have a comprehensive understanding of how the financial system is arranged and connected, how it performs its key functions, and how those functions are being transformed through the activities of market participants, including the development of new products and markets. Likewise, it is also more clearly understood that policymakers must adopt a *macroprudential* approach to their analysis and policy tools, one that looks across the entire financial system to assess and deal with threats to financial stability. Had the regulatory community known in 2005 what we now know, would the outcome have been different? We think the answer is yes, but humility is essential. Our knowledge today is far from complete, and the constant evolution

BOX A. KNOWNS AND UNKNOWNS IN 2005

What types of data or analysis might have helped policymakers identify the risks and vulnerabilities of the financial system as the seeds of the financial crisis were being sown?

Congress created the Office both to analyze the financial system and to conduct forensic analyses following financial disruptions. Based on those mandates, it is appropriate and essential for the OFR to ask what was known and not known before the crisis; what could have been done to develop a clearer picture of the potential for disaster; what information to look for during such a crisis; and how to learn from the crisis in the aftermath.

This analysis could focus on mid-2005, two years before the first liquidity phase of the financial crisis. At that time, some but not all of the key elements that made the financial crisis so devastating were already in place.

At that time, there was a broad public debate about whether the nation was in the midst of a housing bubble. Policymakers had expressed concerns about underwriting standards and about the potential for economic pain when growth in housing prices inevitably slowed. But the consensus was that this adjustment would be moderate, largely because securitization and other market innovations appeared to transfer credit risks and liquidity risks from the regulated and insured banks to other financial institutions that were presumably better able to bear them.

However, few had done the work to follow the risks to their ultimate bearers—and those risk-bearers were too removed from the information to determine the nature of their own risks. It was not well known that American International Group (AIG), the largest insurance company, had already taken significant exposures to the mortgage market, largely through derivatives and the securities lending market, and that several of the largest commercial banks and investment banks had begun to take similar positions. It was not known that the investors in short-term funding markets (asset-backed commercial paper or ABCP, repurchase agreements or repos, and securities lending), who had helped finance mortgage-backed securities (MBS) and other markets, might panic and pull their money. The nature of leverage in certain markets, particularly collateralized debt obligations (CDOs), derivatives, and repos, was not understood.

An appropriate role for an OFR in 2005 would have been to ask broad questions about how the financial system was conducting its basic tasks—credit allocation and leverage, maturity transformation, price discovery, risk transfer, liquidity provision, and facilitation of payments—and what the risks and vulnerabilities were. Although some data may have been available to explore these questions, an agency with a macroprudential perspective may have realized that more data were needed.

An OFR in 2005 might have focused on how new products and markets were affecting these basic financial tasks. How was credit risk being allocated—were concentrations developing, were new credit products distorting incentives, were risk takers sufficiently capitalized? How was maturity transformation being done—were there excessive maturity mismatches, what types of products or entities could be subject to run risk? These questions would have been as important in 2005 as they would have been in 1925, when the regulatory framework of

a different era similarly found itself unable to cope with imbalances across regulated and unregulated markets.

For 2005, these questions could have led, for example, to requests for more information about CDOs that were taking the riskiest parts of MBS—both by buying those securities and by selling protection on those securities through credit derivatives—and about who was buying the different types of CDOs. Large holdings of CDO securities contributed significantly to the losses for AIG, Citigroup, and other large financial institutions—and these holdings were highly leveraged, meaning the institutions had set little capital aside to back those investments. In an early 2005 report, international supervisors noted the possibility that CDOs and credit derivatives could concentrate credit risks in a small number of institutions but did not recognize the role these products were beginning to play in the mortgage market; they noted as reassurance that "such firms are subjected to regulatory, rating agency, and market scrutiny" (BCBS, 2005). The Financial Crisis Inquiry Commission later reported that CDOs and credit derivatives had stimulated demand for MBS and distorted incentives in the mortgage market, contributing both to the excesses of the boom and the severity of the bust (FCIC, 2011).

These questions could have also led to requests for more information about short-term funding markets that were providing funding for CDO and MBS securities, specifically the repo, securities lending, and ABCP markets. Each of these markets would suffer a crisis of confidence in 2007 and 2008 as investors became concerned about the ability of borrowers to make good on their mortgages. Again, AIG, Citigroup, and other financial institutions would suffer significant losses because of implicit or explicit support they had provided to ABCP programs. The nature, pricing, and risk of those commitments could have been better analyzed. In retrospect, it is better understood that these firms were taking "tail risk"—their losses in these markets, like their losses on CDOs, would only occur in a systemwide crisis. Macroprudential analysis requires a particular focus on the incentives to take this type of risk, particularly at the largest financial institutions.

Since the crisis, financial supervisors have begun to take a more comprehensive approach to monitoring and addressing threats to financial stability. That approach includes an emphasis on continually updating policymakers' understanding of activities outside or on the edge of the regulated periphery. As shown during the crisis, derivatives and short-term funding markets are of particular concern because of their ability to shift risk in unexpected ways and because they create leverage, counterparty risk, and other interconnections among market participants.

The new approach includes a renewed emphasis on large financial institutions whose failure could have systemic implications. It also emphasizes continual improvement in firms' own risk management practices and rigorous stress testing to better understand connections and exposures within the financial system and the potential for contagion in the event of a shock.

As described in this report, the OFR has begun to play an important role in implementing this approach, helping to make sure supervisors and market participants have the data they need to understand the financial system and its risk and vulnerabilities and contributing to the evolution of stress testing and risk management.

Chart 2.1.1 Goals of OFR Research

Understand the Financial System	Assess Risk and Vulnerabilities	Evaluate Mitigants
• Analyze the basic functions and services provided by the financial system • Analyze market developments, particularly in shadow banking and derivatives • Analyze new products and markets	• Assess gaps in analytics and data • Evaluate measures of threats to financial stability • Evaluate stress tests • Monitor financial stability	• Promote best practices in risk management • Promote data standards • Conduct forensic analysis of market disruptions • Analyze macroprudential policy

in financial markets will make it elusive *(Box A: Knowns and Unknowns in 2005)*.

That is why the OFR and other agencies charged with monitoring financial stability must always ask the same questions: How is the financial system changing? Where are risks accumulating? What are the forces driving risk-taking activities and what is the interplay among them? And, do policymakers have sufficient data and information to answer these questions? This report describes supervisors' efforts to address these questions and the roles the OFR has begun to play to support those efforts *(Chart 2.1.1)*.

Of course, we know more now than before the crisis. But there will always be a fundamental uncertainty about the sources and severity of threats to financial stability, so we must be modest about our ability to judge them. Financial innovation aimed at improving efficiency and promoting better risk-sharing potentially can morph into excessive risk-taking, and knowing when, why, and how healthy activity crosses the line to creating systemwide threats is difficult. But better data and analysis can help market participants identify and assess their own risks and make appropriate decisions about them.

Better data and analysis can also help policymakers evaluate and promote mitigants, that is, financial shock absorbers and guardrails, to reduce the risk of crises. Mitigants include indicators of threats to financial stability, risk management systems, and stress tests; macroprudential policy tools that seek to reduce both the structural vulnerabilities and cyclical excesses in the financial system; strong data standards to promote sound analysis; and crisis management and forensic analysis, to mitigate the effects of crises that occur and help draw lessons for the future.

2.1.1 Understand the Financial System

The OFR's financial stability monitoring efforts are driven by the principle that financial activities and risks are constantly shifting. In a short time, an entire market can develop out of a new way to perform an old financial function, as technologies and products evolve and companies experiment with new business models. Such innovation can make the financial system more effective and efficient and can promote economic growth; at the same time, it can create unexpected and hard-to-detect risks.

For that reason, financial stability analysts must always be asking how the financial system is conducting its basic tasks. While those basic tasks can be characterized in various ways, one framework would consist of the following six:

- **Credit allocation and leverage.** A dynamic economy needs a mechanism for making funds available to borrowers with projects or goods that need to be financed. Because of information asymmetries, the financial system provides a valuable service matching

lenders with borrowers. For investors, leverage magnifies financial returns.

- **Maturity transformation.** Many investors wish to commit themselves for only a short period of time, while many borrowers need to finance their investments over a longer period. Responding to those needs, banks and other financial institutions provide maturity transformation, for example, when they accept short-term deposits and invest in long-term loans. But that maturity transformation service is fundamentally unstable because short-term depositors may demand their money on short notice. Since the advent of the FDIC, insured deposits at banks are no longer susceptible to rapid outflows amidst a loss of confidence. However, other forms of market-based maturity transformation became prevalent in the past decade—money market funds, asset-backed commercial paper, repo markets—and also proved susceptible to a sudden loss in funding when investors lost confidence in their underlying assets or in the strength of the financial institutions that backed them.

- **Risk transfer.** Investors may wish to hold relatively safe claims while borrowers are often in the business of taking risks. Financial intermediaries assess borrowers' risks and provide their own capital cushions to transform risky individual loans into lower-risk, diversified portfolios that can offer reliable payoffs. Credit risk transfer became increasingly complex and opaque in the past decade with the advent of credit derivatives and complex structured credit products, and these innovations contributed importantly both to the mortgage market excesses of the 2000s and to the severity of the ensuing financial crisis.

- **Price discovery.** Through the interaction of buyers and sellers, markets perform a valuable social function by determining fair market prices for financial assets. This mechanism is essential for the efficient allocation of credit, maturity transformation, and risk transfer in the financial system.

- **Liquidity provision.** The willingness of investors, borrowers, and lenders to participate in the financial system depends on their ability to execute transactions in a timely fashion. Markets and financial institutions provide the liquidity necessary to fulfill many of the financial system's other roles.

- **Facilitation of payments.** All activities in the financial system depend on the smooth operation of a complex infrastructure for processing transactions and payments. That infrastructure enables market participants to clear and settle transactions and provides documentation for risk monitoring and risk management.

For consumers of financial services, institutions like banks or insurance companies offer the most tangible examples of the value of these financial services. A traditional bank offers low-risk deposits to savers and uses the funds to make riskier loans to borrowers. Risk transformation is accomplished through a combination of diversification and an equity cushion that shelters depositors from default risks. A bank provides maturity transformation and liquidity by allowing investors or depositors to withdraw their funds on short notice, even though the loans they fund are relatively illiquid and mature later. However, nonbanking markets also perform similar functions. For example, securitization has split up the traditional lending process into separate stages of loan origination, pooling, and market funding.

The execution of these six financial system functions is always evolving. Financial services swing between traditional banks and nonbanking markets in response to forces that drive market incentives and behaviors: financial innovations and other competitive forces, industry's perennial efforts to arbitrage official supervision and regulation, and other

policies, such as fiscal policy, monetary policy, and government guarantees such as deposit insurance. In recent decades, as noted above, government supervision focused on the primary providers of intermediation services, while many of the same services were provided through the shadow banking system ***(Box B: Shadow Banking—It's Not a New Story)***.

2.1.2 Assess Risks and Vulnerabilities

"Financial stability" simply means that the financial system is sufficiently functioning to provide those six basic tasks for the economy even under stress; in short, the system is resilient to the inevitable shocks and breakdowns in market confidence.[1] A breakdown in any one of these basic tasks can be very dangerous for the economy. Also, the provision of these tasks can be a double-edged sword. For example, although credit allocation and leverage, maturity transformation, and risk transfer are essential to the financial system and the economy, they can also pose risks to financial stability if taken to extreme.

Financial stability does not imply the absence of price volatility or failures of firms in the financial system; rather, it implies that markets continue to function despite such shocks. These shocks can take many forms, but in general can be transmitted through one of three channels: (1) A default by one or more major market participants; (2) A sudden loss of market confidence, which could be caused by new information about a particular type of asset and which could be expressed, for example, through freezing of liquidity or a sudden change in prices; or (3) A disruption in the market infrastructure—the so-called "plumbing" of the financial system, such as systems for payment, clearing, and settling of transactions.

Financial stability is essential for sustainable economic growth and efficient allocation of resources in the economy and the financial system. A stable financial system promotes economic growth and increasing wealth, while an unstable system can be both an independent source of shocks and a source of vulnerabilities to outside shocks.

Prior to the financial crisis, mainstream economic analysis did not routinely incorporate a framework explaining how risks could emerge from within the financial system. To be sure, some theorists had argued that relatively calm periods in financial markets could create an environment in which risk-taking and leverage would build, reinforcing the severity of business cycles and aggravating downturns (Minsky, 1992). But these were not mainstream views. Across the profession, there was a widespread belief in the self-correcting nature of markets and the inherent stability of financial activity. Under this view, risks flowed in one direction, from the economy to the financial system. It was widely believed that the so-called Great Moderation—a period of low inflation and remarkably steady economic growth—had engendered financial stability. If monetary policy could achieve price stability and steady economic growth, financial stability would naturally result. It remained possible that a severe recession would strain balance sheets and cause widespread defaults, but successful monetary policy made this seem unlikely. Moreover, private incentives for diversification would, it was believed, serve to limit the systemic effects of financial intermediaries' difficulties.

The recent crisis served as a painful reminder that the financial system is prone to internal instability resulting from a buildup of leverage, maturity mismatch, and mispriced credit and liquidity risks. The benign economic conditions seen in the Great Moderation created the illusion of financial stability as threats to financial stability proliferated in a climate of complacency and excessive risk-taking.

Traditionally, macroeconomists used analytical frameworks or models that precluded the analysis of such risk buildups, because of simplifying assumptions, for example, that all market participants were identical. Both traditional macroeconomic models and so-called Dynamic Stochastic General Equilibrium

models, which describe how forces of supply and demand can achieve balance in the economy, ignore financial complications such as the possibility of default. Assuming away default and the risks created by leverage is equivalent to assuming that the value of an individual firm is unrelated to the extent of debt or equity financing—that is, to its leverage (Modigliani and Miller, 1958).

But, from a financial stability perspective, debt and equity are not and should not be considered equivalent. Equity or capital provided by investors who are able to bear losses acts as a shock absorber that self-insures lenders against loss, helps contain leverage, and limits contagion in a crisis. In contrast, excessive credit or leverage promotes contagion; during a crisis, defaults tend to exceed the expectations of credit providers. The recent crisis is Exhibit A: It was fueled by badly managed credit and excessive leverage that led to the bankruptcy of individuals and the failure of firms, threatening financial stability as a whole. In the absence of significant capital buffers, the losses from defaults triggered deleveraging and balance sheet contraction.

Macroeconomists have been working to incorporate more robust assumptions about the financial system into their models to explain such internal buildups of risk.[2] Far from being a sterile intellectual exercise, adopting a more realistic analytical framework helps policymakers understand why the downside of credit cycles unfolds much faster than the upside. Equally, such tools help explain how tail risks in stress scenarios manifest themselves.

Taxonomies of Risks and Vulnerabilities

Risks to financial stability can be *internal* or *external* relative to the financial system. An example of an internal threat is the excessive risk-taking, fueled by relatively cheap credit and liquidity, which promoted the unsustainable housing price boom in the 2000s. Examples of external threats are a sovereign debt crisis overseas, a pandemic or other natural disaster, and an international political crisis. Financial stability analysis focuses on (1) the propensity of the financial system to generate risks—in particular, on *procyclicality*, which is the tendency of swings in financial activity, especially downswings, to magnify the business cycle and possibly trigger financial instability—and (2) the vulnerabilities or resilience of the financial system in the event of a shock.[3]

Vulnerabilities in the financial system have both *cyclical* and *structural* components. The buildup of leverage in a credit cycle is an example of how risks can accumulate both in a given financial institution and in the financial system as a whole. Alternatively, crowded trades in an interconnected system are an example of how the structure of the financial system itself exacerbates and transmits risks across investors within the system.

This taxonomy is similar to the approach in the FSOC Annual Report, which describes internal or external shocks interacting with structural vulnerabilities to disrupt financial stability (FSOC, 2012). In both taxonomies, a key point is that financial activity itself can generate threats to financial stability, as periods of calm lead to excess; not all potential threats are external to the financial system.

Cyclical Vulnerabilities. Leading up to the crisis, credit and leverage both grew significantly on the balance sheets of households and financial institutions and in financial markets. Some of the largest investment banks and commercial banks took increasing risks in their trading activities in pursuit of higher returns or incidentally in the course of providing services for their clients. Often those positions involved the use of leverage embedded in or created by financial innovations in derivatives, collateralized debt obligations (CDOs), and asset-backed commercial paper (ABCP) programs. In turn, that leverage amplified price bubbles, particularly in the housing market. In retrospect, it is clear that the management of these companies did not understand the risks they were taking and the dangers of the leverage they were using. Although recent

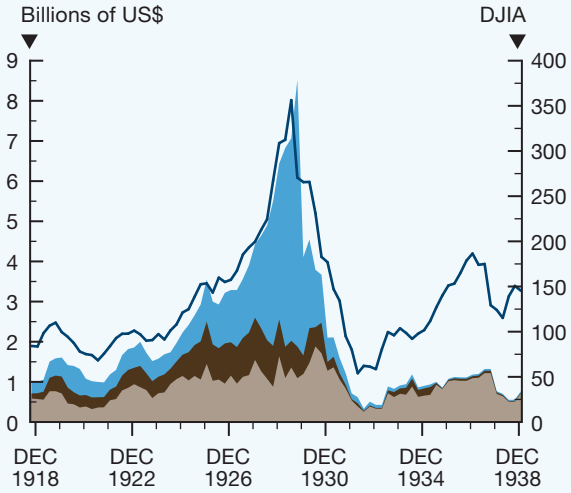
BOX B. SHADOW BANKING—IT'S NOT A NEW STORY

The term "shadow banking" has gained currency since the financial crisis to describe the provision of bank-like services—in particular, credit intermediation, maturity transformation, and the creation of money-like liabilities—by companies and markets other than banks. These activities are generally subject to less supervision and regulation than banks and do not have the benefit of federal deposit insurance. Nonbank banking has been central to the financial system and to financial booms and busts for more than a century. In general, market participants will seek to conduct their activities wherever the regulatory environment is most conducive.

The Panic of 1907 emanated from the call loan market, in which banks and nonbanks invested excess cash on a short-term basis to fund brokers' loans backed by stocks and bonds. The panic consisted largely of a run on the trusts, which were nonbanking institutions that performed services similar to banks without being subject to similar government supervision.

Responding to that crisis, Congress created the Federal Reserve System in large part to hold banks' reserves as an alternative to a nationwide system that channeled much of the banking system's reserves into the New York City call loan market.

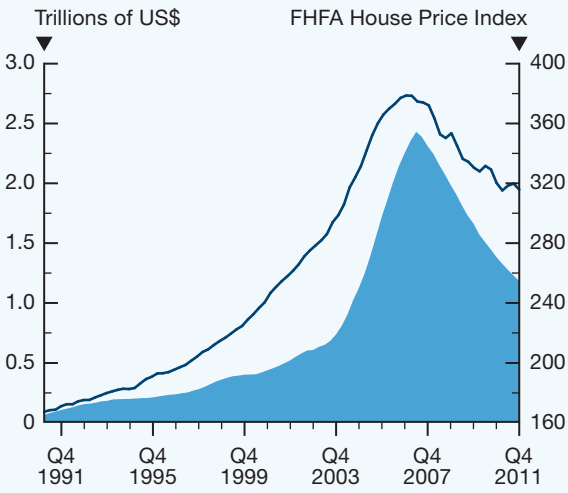
Chart B.1 Nonbank Lending Boom of the 1920s



- Loans to Brokers by Nonbanks (Billions of US$)
- Loans to Brokers by Outside Banks (Billions of US$)
- Loans to Brokers by New York Banks (Billions of US$)
- Dow Jones Industrial Average (DJIA)

Source: Board of Governors (1943), FRED, FRASER

Chart B.2 Securitized Credit Boom of the 2000s



- Private-Label MBS Outstanding (Trillions of US$)
- FHFA House Price Index (1980=100)

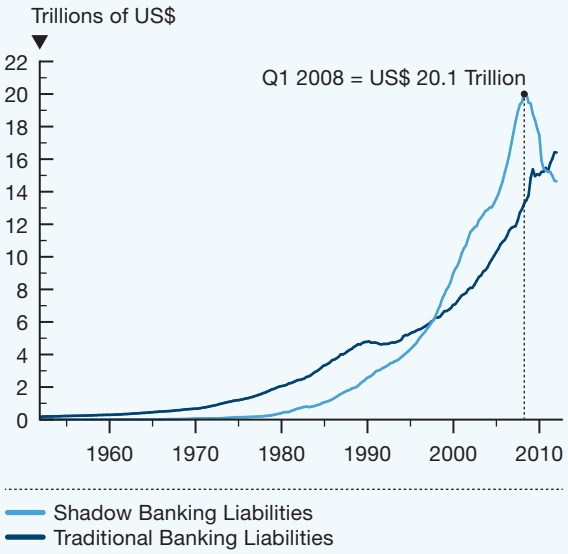
Source: FHFA, FRB, Haver Analytics

The call loan market was also central in the stock market boom in the 1920s. This time, most of the financing was provided by nonfinancial corporations with excess cash (the blue area in ***Chart B.1***), which were attracted to the relatively high returns and the secured nature of the market. This situation is analogous to the role of the securitized credit markets in the housing boom of the 2000s ***(Chart B.2)***. The subsequent crash was made worse by the flight of these investors. Even before the crash, the role played by nonfinancial corporations in fueling the stock market credit boom had been derided as "bootleg banking," and the Federal Reserve had sought in vain to limit the practice indirectly through moral suasion and by attempting to limit access to the discount window for banks that lent to those corporations (Harrison, 1931).

Building and loan associations, precursors to the savings and loan industry that collapsed during the 1980s, led the mortgage market boom during the same period; there was also an early form of private mortgage-backed securities in which mortgages were packaged and sold to investors as securities—clearly an activity that falls within the current generally accepted definition of "shadow banking."

The modern trend toward market-based or shadow banking has its roots in the late 1960s, when caps on deposit interest rates and other regulations encouraged financial markets to develop deposit-like products paying higher interest rates. The commercial paper market grew rapidly, connecting corporate borrowers with large cash investors. By the late 1970s, much of the demand in this market came from money market funds. The U.S. securitization process also began in the 1970s with prime mortgage loans. It expanded to a wide range of other asset types, including auto loans, credit card receivables, lease payments, and, finally, subprime mortgages.

Chart B.3 Shadow Banking vs. Traditional Banking Liabilities



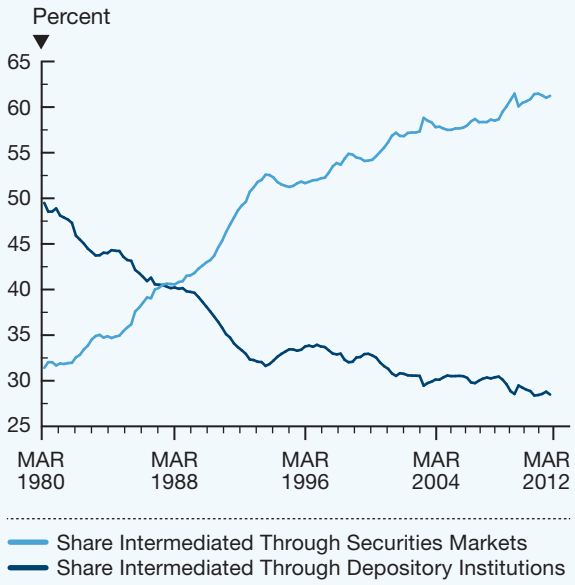
Note: Traditional bank liabilities refer to total liabilities of U.S. chartered depository institutions, foreign banking offices in the U.S., holding companies, banks in U.S. affiliated areas, and credit unions. Shadow bank liabilities (netted from overlaps) refer to the sum of total outstanding open market paper, total repo liabilities, net securities loaned, total GSE liabilities and pool securities, total liabilities of ABS issuers, and total shares outstanding of money market funds.

Source: Pozsar and others (2012), Flow of Funds, Haver Analytics, OFR calculations

The risks of these markets displacing or "disintermediating" the banking sector were widely discussed throughout this period. Academics and policymakers debated whether banks were "dead" (markets could do everything banks could do) or "special" (they provided essential payments services; they continued to innovate; and, in fact, the largest banks tended to be facilitators or financiers in the new markets) (Corrigan, 1983; Boyd and Gertler, 1994). Regulatory changes generally encouraged these developments, as evidenced by the rapid growth of shadow banking liabilities that began at the turn of the last decade ***(Chart B.3)***. The share of total credit

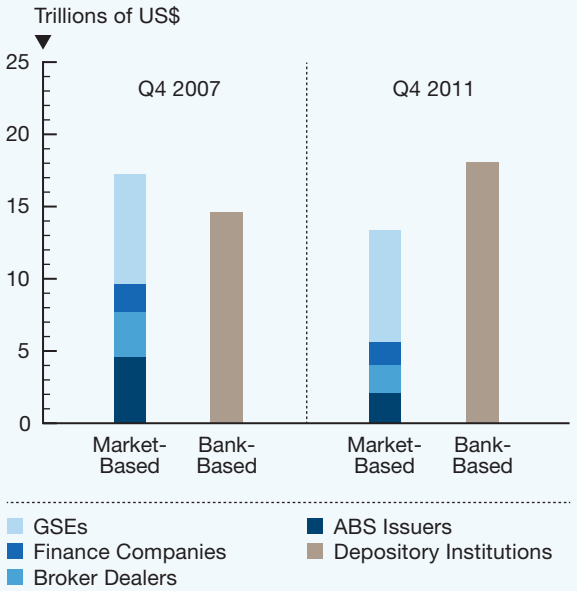
BOX B. **SHADOW BANKING—IT'S NOT A NEW STORY** - CONTINUED

Chart B.4 Origin of Private Nonfinancial Debt Outstanding



Source: Morgan Stanley calculations based on Flow of Funds

Chart B.5 Bank vs. Market Intermediated Credit Outstanding



Source: Flow of Funds, OFR calculations

intermediated through securities markets rather than banks has grown over the past 30 years, although that trend slowed since the onset of the crisis as some important market-based channels were disrupted ***(Charts B.4 and B.5)***.

The lesson from history is that the provision of basic financial services constantly evolves.

An important role for the OFR is to keep track of those changes, particularly when activities increase in markets and institutions that are not being monitored by microprudential supervisors. The OFR's efforts to identify and address data gaps in these types of markets are described further in Chapter 4.

American experience had suggested that mortgages contained only modest credit risk, when the bubble burst, the combination of poor underwriting, faulty risk transfer, and excessive leverage created extraordinary defaults and a cascade of systemic deleveraging.

In the past, the breadth, depth, and liquidity of the U.S. capital markets generally enhanced the resilience of the overall financial system by enabling companies to finance their operations efficiently and promoting the low-cost provision of essential maturity transformation and payments services. They allow investors and savers to have confidence in their ability to access their capital at the time of their choosing without significant cost. Indeed, strong capital markets were widely viewed as a backup pillar of support or a "spare tire" for the financial system in times of banking stress.[4]

However, easy liquidity—and the expectation that it would continue indefinitely—helped make credit available on relatively generous

terms in the 2000s and contributed to what in retrospect was a mispricing of both liquidity risk and credit risk among market participants and traditional lenders. In 2007, credit losses triggered a deleveraging in housing finance markets and market participants suddenly lost confidence in the creditworthiness of mortgage-backed securities and related derivatives, CDOs, and ABCP. Previously cheap short-term funding and liquidity became dear. Fire sales resulted: as individual firms rushed to improve their cash positions, they sold both troubled assets and other assets that were easier to sell, magnifying and reinforcing the effects of the deleveraging on housing, the economy, credit availability, risk appetite, and the very liquidity that had started the cycle.

Structural Vulnerabilities. The financial crisis also provides case studies in structural vulnerabilities. For example, through credit guarantees, structured credit products, and credit derivatives, a small number of large financial institutions sold or provided billions of dollars in protection against losses in the housing market. Yet, structural weaknesses in the global derivatives markets—poor regulation and opacity that undermined market confidence in times of stress—made them poor vehicles for risk transfer. Ad hoc trade execution and risk management meant that users could not gauge product risk, market risk, and counterparty risk, particularly given the proliferation of customized or bespoke transactions. As a result, risk managers who believed that they were appropriately hedging their risks were often crowded into the same risk management strategy, buying protection via credit default swaps. This concentration of credit risk was generally not understood as a threat to financial stability because of the high credit ratings and apparent financial soundness of those financial institutions that provided backstops and guarantees. However, in the housing market meltdown, the losses faced by these institutions posed serious risks to the financial system when investors and counterparties lost confidence and pulled their funding or demanded more collateral.

While these categories provide a useful framework for thinking about threats to financial stability, there is no bright line separating them. For instance, the housing boom at the heart of the financial crisis was amplified by both forces internal to the financial system (liquid securitization markets, for example) and those external to it (strong housing demand and the belief that home prices would not fall). Of course, the cyclical extremes of the boom were fueled by the interplay between them—easy credit promoted strong housing demand and rising prices, while the price gains encouraged leveraging on attractive terms.

2.1.3 Evaluate Mitigants

Macroprudential regulation should mitigate threats to financial stability by limiting the internal buildup of risk, reducing vulnerabilities, and promoting resilience to shocks. Mitigants can be described as *guardrails*, which set limits or controls on the activities of financial institutions and help to restore market discipline, and *shock absorbers*, which prevent shocks from disrupting the financial system's performance.

Such regulation should counter procyclicality, which is, as noted, the tendency of swings in financial activity to magnify the business cycle. For example, it should lean against the tendency during good times for firms to take excessive risks with thin capital and liquidity buffers and, during bad times, to act in ways that seem rational for a single firm but that have negative systemic consequences when many firms act similarly—for example, by selling assets in fire sales or by reducing lending rather than raising new capital (Hanson, Kashyap, and Stein, 2011).

Best practices for macroprudential policy dictate that policymakers cannot deliver financial stability without a tool to counter each source of financial instability. They also dictate that policymakers should assign to each target the right tool for the job—the one that has the biggest influence on the policy objective—following the "assignment principle" (Mundell,

1962). For example, if policymakers want to combat three targets—excessive leverage, insufficient liquidity, and procyclicality—a satisfactory toolkit must contain tools to address each of the three—such as capital, liquidity, and margin regulations (Kashyap, Berner, and Goodhart, 2011).

Macroprudential policy must also take into account that this toolkit will have macroeconomic consequences, just as monetary and fiscal policy—typically macroeconomic tools—may have macroprudential consequences. While the assignment principle suggests that these spillovers and potential conflicts do not preclude effective policy implementation, both financial instability and macroprudential tools to combat it may alter the transmission mechanism for monetary and fiscal policies in ways that policymakers need to recognize (Carney, 2009). Encouragingly, flexible inflation targeting likely gives central banks the flexibility to deploy macroprudential tools both in crises and in periods of stability (Carney, 2012). However, if a financial crisis impairs the traditional policy transmission mechanisms, the assignment principle may indicate that macroprudential tools be used to restore their functioning and achieve macroeconomic goals.

Mitigants are largely complementary from a microprudential and macroprudential point of view. From a microprudential point of view, the guardrails in the financial system include firm risk management, market discipline and information intermediaries (for example, rating agencies and data providers), and microprudential supervision and regulation; shock absorbers include capital and liquidity standards. From a macroprudential point of view, guardrails include stress tests, living wills for certain financial institutions, and central clearing for swaps and derivatives; systemwide shock absorbers include an orderly liquidation authority, deposit insurance and emergency liquidity provision by the central bank.

The Dodd-Frank Act introduces several measures aimed at strengthening guardrails. For example, it subjects large, complex financial companies to more stringent supervision by the Federal Reserve and it creates a new regulatory framework for derivatives, requiring most derivatives to clear through central counterparties. To strengthen shock absorbers, Dodd-Frank regulations and the Basel III agreement among international supervisors have improved capital standards, and Basel III introduced the first international liquidity standard (BCBS, 2010a; BCBS, 2010b). Dodd-Frank also introduces a new resolution regime that creates a process for breaking up and winding down failing large financial companies, which aims to contain the systemic repercussions of such events. These new guardrails and shock absorbers will also help restore market discipline by reducing the expectation that taxpayers will bail out failing companies.

The OFR must contribute to these mitigants by fulfilling its analytical mandates, which include identifying and filling data gaps; developing and maintaining metrics and reporting systems for risks to financial stability; monitoring, investigating, and reporting to Congress and the Council on changes in systemwide risks; conducting, coordinating, and sponsoring research to support and improve regulation of financial companies; assessing and reporting on stress tests and other stability-related evaluations of financial companies; conducting forensic analyses of market disruptions; conducting studies and providing advice on macroprudential policies; and promoting best practices in firm risk management.

2.2 Current Threats to Financial Stability

Cyclical threats to financial stability today include the lingering weakness in the housing finance market; the extremely low level of interest rates; the possibility of a deterioration in lending standards; and the potential impacts of the euro area sovereign debt crisis on the U.S. financial system and economy. Structural threats remain in the prevalence of data gaps and inadequate data standards in the financial sector; the ongoing challenges to risk management posed by complex trading activities, particularly at the largest financial institutions; and the run risk for money market funds and other short-term funding markets.

To analyze threats to financial stability, we look to the analytical framework laid out in the first part of this chapter. The six basic tasks—credit allocation and leverage, maturity transformation, risk transfer, price discovery, liquidity provision, and facilitation of payments—are all fundamental to the functioning of modern financial systems. The financial system is stable as long as it can provide these basic services for the economy, even under stress. By the same token, shocks can disrupt these basic functions.

As noted, two taxonomies shed further light on the sources of potential shocks. The first draws a distinction between internal and external risks. Internal risks—those arising from within the financial system—include failures of the mitigants described above, such as inadequate risk management among financial firms or insufficient regulatory shock absorbers or guardrails, while external risks include potential contagion from the European sovereign debt crisis. The second taxonomy distinguishes between cyclical and structural risks; although some risks represent a mix of both. Cyclical risks involve the familiar buildup of risks over the credit and business cycle, for example, excessive credit growth and leverage. Structural risks involve risks across the financial system at a point in time, for example, the fixed net asset value that promotes the risk of a run in money-market funds, intraday credit risks in tri-party repo, the continuing presence of large institutions that are perceived as too big to fail, or the forces that promote the migration of activity into unregulated or lightly regulated markets. The European crisis represents a combination of structural risks (a currency union without a fiscal union) and cyclical risks (the current recession).

The intersection of these two taxonomies can be helpful in categorizing the major potential threats that the OFR sees in the financial system today ***(Chart 2.2.1)***.

2.2.1 Internal Risks

Cyclical Concerns

Among risks that might arise within the financial system, the current credit environment poses two types of cyclical concerns: weaknesses in credit intermediation in the housing market and the possibility of excesses in credit markets fueled in part by historically low interest rates.

Consumer Finance. Although housing prices may be at or near the bottom, even seven years past their peak, a key financial imbalance—that is, one that is internal to the financial system—continues to restrain the housing sector. The legacy of the mortgage bust lingers on household and lender balance sheets, weighing on mortgage markets and the availability of mortgage credit. Twelve million homeowners have outstanding balances on their mortgages exceeding the current market value of their homes. Nationally, that so-called "negative equity" has been estimated at $717 billion (CoreLogic, 2012). Lenders continue to work through nonperforming loans originated before the crisis, while continuing to be exposed to the risk of "put backs" and the uncertainty surrounding proposed risk retention rules. Mortgage originations remain depressed, mortgage debt continues to contract, and even creditworthy potential homebuyers continue to have difficulty obtaining financing. As a result,

Chart 2.2.1 Current Potential Threats to Financial Stability

	Internal	External
Cyclical	• Sluggish growth and dependence on government support in housing finance • Low interest rate environment encourages "reaching for yield" • Some evidence of deterioration in underwriting standards, e.g., "covenant-lite" loans	• European sovereign debt crisis • Possible slowdown in emerging markets
Structural	• Data and analytical gaps and lack of data standards • Breakdowns in risk management and other guardrails • Short-term funding and derivatives markets • Too big to fail	• Domestic fiscal policy • Cyber attacks

the government continues to play an outsized role in the market through the Federal Housing Administration and the two government-sponsored enterprises (GSEs), which have been operating under conservatorship by the government since 2008.

Meanwhile, Americans owe $1 trillion on student loans that are predominantly held by the government. While this debt does not present direct risks to financial institutions, consumers with large student debt burdens may spend less and are more likely to have difficulty securing a mortgage. These factors could significantly depress demand for mortgage credit and dampen consumption.

Low Interest Rates. The second major cyclical issue today is the extraordinarily low level of interest rates. In early June, the 10-year Treasury yield fell below 1.5 percent for the first time. Although low rates have made an important contribution to the economic recovery, a low-rate environment creates potential stress for some investors, particularly financial institutions, such as life insurers and pension funds, that need to earn a certain return on their fixed-income portfolios to cover a fixed stream of liabilities. Low interest rates can therefore lead some investors to reach for yield by taking on additional credit risk to enhance their expected earnings.

Financial crises, including the most recent one, often emerge after long periods of low rates during which lending standards deteriorate. Council member agencies are concerned about the potential for such excesses in markets other than housing finance. They have noted recently the increased issuance of "covenant-lite" loans, which are loans that waive the typical restrictions on commercial borrowers with respect to collateral, income, or payment terms. Second, banks could be exposed to losses if they do not hedge their balance sheets to protect against higher rates in the future. The federal banking agencies issued guidance to supervised institutions about interest rate risk management in January 2010 and followed up with clarifications in January 2012 (Board of Governors and others, 2010; OCC and others, 2012).

The MF Global bankruptcy and JPMorgan's recent trading losses suggest that, against the backdrop of low returns on equity, some companies continue to take significant risks in their trading operations. The role of financial stability analysis in such situations is to consider the potential systemic impacts—for example, to determine whether the strategies on which those companies experienced losses were common in the market, whether other firms faced similar control problems, and what the

implications might be for the market if they were to fail.

Structural Concerns

Structural concerns today include the remaining intraday credit risk in the tri-party repo market and the risk of runs on money market funds. Pairing these risks together and with others is important. Structural weaknesses in the tri-party repo market may increase the risks of using short-term funding for illiquid assets. Moreover, the practice of money market funds maintaining a one-dollar net asset value can magnify this type of instability. If investors believed that the one-dollar-per-share value exceeded the true liquidation value of a fund, they would have an incentive to pull out their money before other fund investors.

Short-Term Funding Markets. Before the crisis, secured and unsecured short-term funding markets provided major sources of financing for the portfolio holdings and securities inventories of broker-dealers and other market participants. This ability to mismatch maturities provided a major source of the returns to securitization. The use of short-term wholesale funding has decreased since the crisis but it is still used substantially by large bank holding companies, including those with large broker-dealer operations.

Short-term funding markets are key focal points for the emergence of excessive leverage, liquidity risk, and new forms of interconnectivity among financial institutions, the three vulnerabilities of the financial system highlighted in Section 4.2. Short-term funding, obtained through repos, commercial paper, and prime broker lending, can be a source of instability if lenders, worried about the value of collateral or counterparty risks, make it difficult for borrowers to roll over their maturing short-term debt on economically viable terms. Those terms include the rate and tenor and, for secured funding, the haircuts on collateral. Under stress, lenders shorten tenor and increase haircuts, significantly raising the cost of funding. Swings in repo haircuts add procyclicality to the financial system. Under extreme stress, borrowers funding long-duration illiquid assets with wholesale funding could be forced to sell assets under fire sale conditions. Pressure on asset prices, in turn, reinforces the downward spiral. Short-term funding markets also face run risk in a crisis because they do not benefit from official backstops in the form of federal deposit insurance or the Federal Reserve's discount window.

Some progress has been made in addressing risks in the tri-party repo market and money market funds since the crisis. An industry task force on tri-party repo reform disbanded after some success, but the problem of intraday credit remains. The Federal Reserve is now taking a more direct supervisory approach to making the necessary changes (Tarullo, 2012). Similarly, the SEC made important reforms in money market fund regulation in 2010, including more stringent liquidity requirements, but the risk of runs remains due to the combination of a promised stable net asset value and investments in securities that can default or lose value precipitously (SEC, 2010). The SEC is reviewing further policy options for money market fund reform. Among the options are a capital requirement, in which money market funds would be required to hold a layer of equity that would absorb losses before investors incur losses; restrictions on redemption; and a move away from a fixed net asset value.

Market Integrity. For the financial system to perform its price discovery function through the interactions of buyers and sellers, markets must be transparent, fair to all participants, and not subject to manipulation. U.S. and U.K. regulators recently announced that Barclays Bank PLC, a London-based financial institution, will pay close to half a billion dollars in penalties to resolve violations arising from alleged manipulations of the London Interbank Offered Rate (LIBOR) and the Euro Interbank Offered Rate (EURIBOR). Market participants, risk managers, and regulators have relied on these rates for many years as benchmarks for the cost

of short-term, unsecured funding that in large part reflect counterparty risks.

LIBOR and EURIBOR are calculated as an average of the rates that major banks submit each day. Each bank is supposed to contribute rates that reflect its estimated cost of funds in the unsecured interbank market. An agreement between Barclays and the U.S. Department of Justice (DOJ) stated that Barclays had submitted bids that took into account trading positions of its own derivative traders or reputational concerns about Barclays itself. Regulators have an ongoing investigation into other banks' activities in the market (DOJ, 2012).

LIBOR and EURIBOR are benchmark interest rates that market participants use as the basis for pricing trillions of dollars worth of loans and securities. As the preeminent benchmarks for unsecured transactions, these rates also provide important market signals about counterparty credit risk. This type of manipulation—resulting from an opaque and closed process that allows a small number of firms to have significant influence—poses significant risks to market integrity and investor trust, and will require continuing regulatory focus.

Collateral in Secured Lending Transactions. Securitization involves a chain of activities ranging from origination at one end to financing at the other and is an important part of the shadow banking system. Securities lending and repo financing are two key activities in this chain. Lenders of securities, primarily institutional investors, offer their holdings to banks and broker-dealers who need to borrow them in order to hedge or outright short them. As collateral for the loan, the broker-dealers offer the lenders cash resulting from the short. Broker-dealers finance their securities inventory with repo, done for example with a mutual fund, using the securities as collateral. Leveraged investment funds and other providers of repo financing also play important roles.

These activities pose potential threats to financial stability through three channels:

Maturity transformation and credit risk through cash collateral reinvestment. Securities lenders can reinvest the cash collateral they receive from securities lending transactions and engage in credit and maturity transformation, taking on credit and liquidity risks. If asset prices fall and those investments turn illiquid, and if the borrowers ask for their cash collateral to be returned, these companies can lose their access to market funding. Such bank-like activities create bank-like risks without the safeguards banks enjoy.

Procyclicality of systemwide leverage and interconnectedness. Securities lenders may also obtain leverage that is sensitive both to asset prices and their own counterparty risk, creating procyclicality in securities financing markets. This procyclicality depends importantly on the changes in haircuts applied to those collateral securities, and the extent to which collateral is used more than once (collateral velocity). Haircuts rise with credit and counterparty risk, raising the cost of credit and prompting deleveraging in a downswing. Extensive collateral re-use, or rehypothecation, coupled with leverage, maturity transformation, and interconnectedness among firms, could create several threats to financial stability, including fire sales of less liquid assets. While it appears that such risk-seeking has diminished in the wake of the crisis, the current low level of returns may create pressures to stretch for yield. And the current fraught state of unsecured funding markets has intensified an already high demand for collateral in secured funding markets, one that may intensify this procyclicality.

Lack of transparency. Securities financing markets are often opaque because they are complex and rapidly evolving, and the transactions are usually bilateral. Better data are essential to understand the risks in such activities. More disclosure by market participants would also help, including

disclosures about transactions that are typically "looked through" for the purposes of financial reporting. Better risk reporting by intermediaries to their clients would help them understand the counterparty risk and cash collateral reinvestment risk of their securities lending programs.

Derivatives. When properly managed, derivatives provide value to market participants by allowing them to hedge risks or to gain exposures to real assets without having to hold those assets. Derivatives also offer a relatively cheap way to leverage market positions. But those characteristics—risk transfer and leverage—also make derivatives markets potentially an important source of threats to financial stability, particularly when poorly managed.

The crisis illustrated the dangers of poorly understood derivatives markets, particularly credit default swaps, which shift the credit risk related to a reference entity—such as a corporation, a country, or a specific bond—from a protection buyer to a protection seller. Between 2004 and 2007, credit default swaps referencing different tranches of mortgage-backed securities (MBS) became ubiquitous. CDOs that invested in MBS and synthetic CDOs that took long positions in credit defaults swaps that referenced MBS or other CDO securities also proliferated. These new financial innovations facilitated complex trading strategies that distorted incentives in the mortgage market. They also made it possible for a small number of large financial institutions—prominently, AIG, the nation's largest insurance company, and Citigroup, a commercial bank and investment bank holding company—to take outsized positions in the mortgage market.

The crisis also revealed serious structural problems in the derivatives market. The lack of transparency, limited regulation, and poor risk management created uncertainty during the financial crisis as market participants could not gauge market risk and counterparty risk. In the absence of margin requirements, AIG was able to take on those positions in mortgage-related derivatives without posting margin. The lack of transparency in the markets contributed to the uncertainty during the crisis, as financial institutions tried to understand their exposures to specific counterparties and regulators tried to understand the potential contagion effects of the failure of a large firm.

Regulators and the industry itself have taken important measures to make derivatives markets more transparent and robust. The Group of Twenty Finance Ministers and Central Bank Governors (G20) at the 2009 Pittsburgh Summit agreed that standardized derivative contracts should be traded on exchanges or electronic platforms, as appropriate, and cleared through central counterparties—meaning there is a separate institution that intermediates between the parties to a swap, which improves the management of credit risk. The G20 leaders also agreed that all over-the-counter (OTC) derivative transactions should be reported to trade repositories, which collect and store information about derivatives trades. The Dodd-Frank Act establishes those requirements in the U.S. The U.S. is also working with foreign regulators to introduce global margin standards for OTC derivative contracts that are not centrally cleared.

Since the crisis, there has been a substantial increase in the volume of swaps that are centrally cleared. Trade repositories have expanded, providing previously unavailable transparency for regulators into derivatives exposures. Also significantly improving transparency, the Dodd-Frank Act requires many types of swaps to be traded on a swap execution facility (SEF), defined in the Act as a trading platform that market participants must use to execute swap transactions. The SEC and CFTC have proposed rules for regulating SEFs (SEC, 2012; CFTC, 2012a).

In the spring of 2012, the OFR began to collect data on credit default swaps from a private-sector data repository. The data will allow the OFR and supervisors access to

information about positions that are taken by U.S.-based entities or that reference U.S.-based entities. The OFR anticipates using this data, in cooperation with the agencies, to analyze the aggregate exposures that different types of firms are taking in credit derivatives, to investigate whether undue concentrations of the AIG type are developing, and to respond to specific queries such as the extent to which U.S. entities have sold protection on troubled entities or markets.

Too Big to Fail. Capital injections to save our financial system have led some market participants to believe that some large institutions carry an implicit government guarantee, which could lead to competitive inequities within the financial system. Supervisors have taken important steps to reduce the risks posed by the potential failure of large, complex financial institutions.

Steps taken since the crisis include higher capital standards, particularly for trading activities, a proposed new global liquidity standard, and a tougher supervisory regime for large, complex financial institutions. Dodd-Frank also makes it easier for regulators to liquidate or resolve large, troubled financial companies in a way that minimizes the impact on the rest of the financial system. Title II of Dodd-Frank, which establishes the Orderly Liquidation Authority, also requires that the shareholders and creditors of the failed company and, if necessary, the industry—rather than the taxpayers—cover the cost of these failures. These measures limit the ability of the government to provide extraordinary support to these companies in a crisis. As such, these measures seek to restore market discipline by reducing the implicit government guarantee and the incentive it may create for the management of these companies to take asymmetric risks. The credit rating agencies recently reduced the "uplift" they incorporate in the long-term credit ratings of several large financial institutions to reflect these measures.

2.2.2 External Risks

Cyclical Concerns

The U.S. financial system presently confronts two external risks that are also cyclical: Europe and the domestic housing market.

Europe. While we have classified the European economic crisis, now more than two years old, among cyclical concerns, in reality it is a good example of a risk that has both structural and cyclical elements. The situation resulted from the interplay of three forces.

First, the launch of the common currency in 1999 in the face of significant economic disparities across the euro area sowed the seeds for the development of large economic imbalances. The euro brought about a significant reduction in borrowing costs for the southern European members of the monetary union on the assumption that fiscal policies would converge to the norms established by the core countries. Put simply, the markets misjudged euro area sovereign risk. Mispriced debt allowed the peripheral countries—many of which came into the EU and monetary union with rigid labor markets and poor competitiveness—to borrow heavily at increasingly cheap rates in the run up to the crisis. That borrowing occurred in the public domain in Greece, but in Ireland, Spain and Portugal, the bulk of the borrowing occurred in the private sector, which supported import consumption booms generally and in Spain and Ireland fueled domestic property bubbles. Italy is an outlier—its public debt burden is a legacy from the 1970s and 1980s, which it had some success addressing, having run primary budget surpluses for 17 years until 2008. Its low level of private sector indebtedness also contrasts with other countries in the periphery.

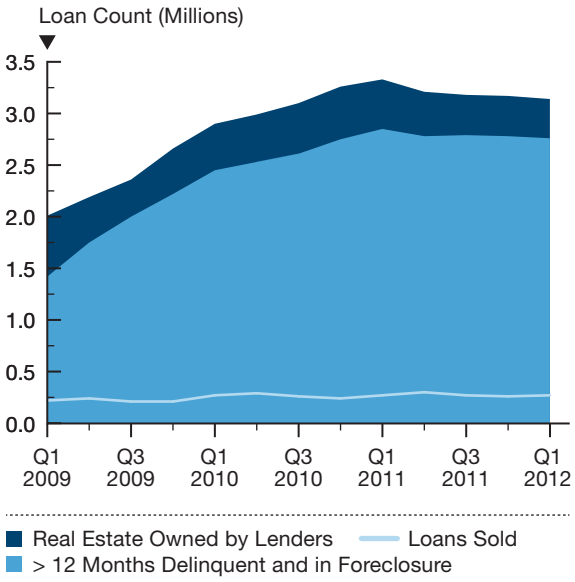
Second, the euro area lacked the necessary institutions to facilitate adjustment of economic imbalances, which became necessary in the wake of the global crisis and the end to private and public sector borrowing binges. Locked into a common currency, the periphery could not deploy monetary policy or benefit from

exchange rate flexibility to help cushion the downturn. A loss of wholesale funding and deleveraging among banks worsened the resulting squeeze on credit. Crucially, the euro area did not have a system of fiscal transfers to offset the recession-related costs in the harder-hit regions of the currency union. In addition, the absence of centralized bank supervision and support meant that national budgets were tapped for bank cleanup costs. Thus, banking sector weaknesses reinforced sovereign credit problems and vice versa.

Finally, the euro area's governance structures, which often require unanimity and must constantly balance widely varying national interests, have made it difficult to develop an effective crisis response and stay ahead of markets. Importantly, however, there has been notable progress to strengthen euro area governance and to develop a robust crisis fighting toolkit. Country fiscal and structural reform efforts are backed by significantly strengthened monitoring mechanisms and supported by resources from European financing mechanisms developed since 2010. There is recognition that more work is needed to develop institutions that enable a more comprehensive crisis response that taps the monetary union's unified strength, fosters greater fiscal and financial integration, and finds a better balance between fiscal consolidation and growth.

Spillovers from Europe to the U.S. financial system can occur through five channels. First, U.S. financial institutions have direct exposures to European banks, mainly through unsecured bank loans and secured repo loans, although these are relatively small. Second, the downturn in European economies will weaken U.S. growth. Exports to Europe account for 25 percent of total U.S. exports, or roughly 3 percent of our gross domestic product (GDP). Third, Europe accounts for half of U.S. overseas corporate profits and about one-sixth of overall U.S. corporate profits. Fourth, a weaker euro (and stronger dollar) will further blunt U.S. exports and the translation into dollars from profits abroad, and boost U.S. imports, although the near-term effects on trade likely will be small. Finally and most importantly, the flight from risky assets in Europe and the efforts of European banks to reduce the leverage on their balance sheets will raise risk premiums in U.S. markets.

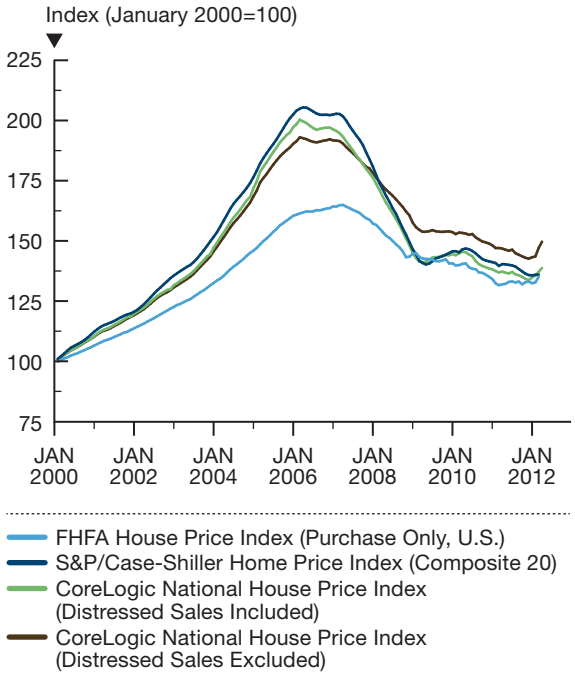
Chart 2.2.2 Shadow Inventory in the Housing Market



Source: Amherst Securities Estimate using CoreLogic Prime Serving Database, CoreLogic Securitized Loan Database, FDIC, Fannie Mae, Freddie Mac, FHA, 1010Data

Real Estate Supply and Demand. A key legacy of the crisis is that the housing market continues to face a supply overhang. Although the inventory of for-sale homes is not high by historical standards, there is a potentially much bigger "shadow" inventory consisting of properties that are stuck in the foreclosure process ***(Chart 2.2.2)***. Because foreclosed properties tend to sell at a discount to owner-occupied ones, the backlog of delinquent and foreclosable homes gives buyers an incentive to delay purchases. The anticipation of this discounted shadow inventory depresses prices today. Estimates of this shadow inventory vary significantly, with press reports quoting estimates between 1.6 and 10.3 million homes (Whelan, 2011). A third type of overhang comes from discouraged homeowners who would like to sell but are discouraged by weak demand. Improving

Chart 2.2.3 U.S. House Prices



Source: FHFA, S&P/Case-Shiller, CoreLogic, Haver Analytics

market conditions may well be met with these sellers returning to markets and limiting house price appreciation.

While housing prices may have stabilized in recent months ***(Chart 2.2.3)***, these overhangs of excess supply may continue to contribute to generally depressed home prices and limited new construction activity. The interplay between the financial (internal) and real-economy (external) imbalances has created a vicious cycle in the past. Low home prices and negative equity escalate defaults, which in turn induce losses among lenders and deleveraging by households.

Policy interventions to halt this vicious cycle have included fiscal and monetary policy as well as interventions to support both borrowers and lenders. The primary fiscal intervention was the Federal Home Buyer Credit of 2010, which provided a tax credit to first-time home buyers in an attempt to stimulate housing demand. The Fed's monetary policy—including federal funds rate changes and quantitative easing—have lowered nominal rates significantly, reducing the mortgage burden for households with adjustable rate mortgages and lowering the monthly costs for borrowers who refinance an existing home or purchase a new one.

There have also been interventions to reduce homeowner debts or payments. The largest policy initiative, the Home Affordable Modification Program, attempts to identify needy and non-strategic defaulters for principal reductions and term and rate changes by compensating the lenders for a fraction of the reduced debts. Interventions that support creditors to promote lending have included capital injections to increase bank capital, the government takeover of Freddie Mac and Fannie Mae, the purchase of securitized mortgages, and low- or no-downpayment loans through the Federal Housing Administration and the Department of Veterans Affairs.

Structural Concerns

U.S. Fiscal Policy Outlook. Sovereign credit risks for U.S. Treasuries seem remote. Real (inflation-adjusted) yields and term premiums on 10-year U.S. Treasuries have been negative for nearly a year, reflecting a flight to Treasuries from riskier assets and the portfolio effects of the Fed's large scale asset purchases ***(Chart 2.2.4)***. However, if officials do not come to agreement on policies to deal with the nation's long-term, structural fiscal challenges or on near-term fiscal policy measures, such risk premiums and those on risky assets could rise, potentially weighing on financial and economic stability.

Many policymakers agree that a credible plan for fiscal sustainability is essential to our long-term prosperity. Agreement on such a plan could boost risk appetite, improving prospects both for economic growth and for financial stability.

Before the details of a long-term fiscal consolidation plan can be worked out, however, several fiscal policy issues must be addressed around the end of the year. The Budget Control Act of 2011 mandates significant and automatic fiscal restraint on January 1, 2013. In addition, a

number of tax policies are set to expire. Under current law, the Congressional Budget Office estimates that tax increases and the budget sequestration would swing the government budget toward austerity by about 4 percent of GDP, threatening the economy with renewed recession (CBO, 2012).

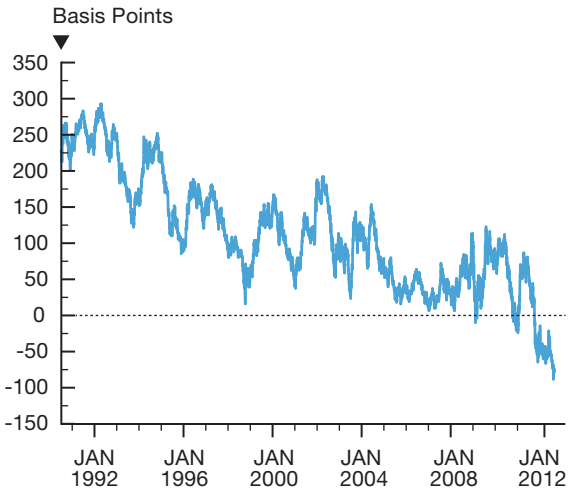
A number of outcomes are possible. On the one hand, policymakers could come to an agreement that would balance the need for near-term support for the economic recovery with longer-term fiscal consolidation. Less favorably, policymakers could choose a path that either puts in place significant consolidation in the near-term at the temporary cost of economic growth or alternatively a path that would fail to make a significant step toward consolidation. The outcome could have a significant bearing on risk premiums and the cost of borrowing.

Risk of Cyber Attack. The Council, in its 2012 Annual Report, identifies the threat of cyber attacks on the financial infrastructure—for example, attempts to gain unauthorized access into networks and systems—as a significant and increasing threat to financial stability (FSOC, 2012). Attacks have become more frequent, more targeted on specific aspects of financial institutions' infrastructure, and more disruptive. They pose particularly significant risks through the potential disruption of transaction, payment, clearing, and settlement systems.

2.2.3 Challenges to Mitigants

Financial stability mitigants share the common challenge of keeping up as technologies evolve, transactions accelerate, financial activities shift to new products and markets or overseas, and traders develop ever-more complex ways to shift risk through derivatives and other opaque products. Financial activities have a natural tendency to move to markets or jurisdictions that are subject to relatively less supervision and regulation. A comprehensive, macroprudential approach to supervision and regulation could limit such regulatory arbitrage.

Chart 2.2.4 U.S. Treasury Term Premium: Calculated for a 10-Year Zero Coupon Note



Source: FRB, Kim and Wright (2005)

Gaps and Weaknesses in Data. Leading up to and during the financial crisis, market participants and their supervisors did not have critical information necessary for assessing the buildup of leverage and liquidity and the nature and extent of interconnections among financial entities. As described in Chapter 4, an important role for the OFR is to help address gaps and weaknesses in the data that financial supervisors use to monitor those risks.

Supervisors have already made substantial progress in improving their ability to monitor the financial system. Regulated institutions, such as banks and thrifts, now file a great deal more information than they did before the crisis about their activities and exposures, both in confidential reports to supervisors and in public regulatory reports. Hedge funds and money market funds are now required to file Form PF and Form N-MFP, respectively, with regulators (CFTC and SEC, 2011; SEC, 2010). Supervisors are also working in conjunction with the International Monetary Fund and Financial Stability Board to promote improvements in data available for monitoring international financial developments.

It will be an ongoing challenge for the OFR and the supervisors to ensure that their sources of data on threats to financial stability keep pace with constantly evolving financial markets, particularly with respect to derivatives markets and other activities that have traditionally resided outside the regulatory sphere.

Need for Data Standards and Better Data Management. The crisis also revealed deep problems with the infrastructure upon which financial institutions depend for the smooth delivery of services, the functioning of markets, and the management of risk. For years, financial sector investment in the back office—where trades are processed and risks are managed—has not kept up with investment in the front office. It is too easy for the managers of financial firms to view the front office as the profit center and the back office as the cost center. Meanwhile, after years of mergers and acquisitions, the presence of redundant computer systems performing similar tasks, but with data that may be dissimilar, is common across the industry. Simply, the quality of data standards and data management in the financial sector has lagged significantly behind where they need to be.

The result is that communication is difficult within firms, among firms, and with regulators. Financial companies lack standards for basic data elements and terms, an acute problem during the crisis. When uncertainty grew in 2007 and 2008 about the risks of mortgage-related derivatives and CDOs, many financial managers were unable to measure and address risks across different desks and legal entities within their own organizations. They could not answer seemingly simple questions, such as their aggregate exposure to the housing downturn or their exposure to specific troubled counterparties. Regulators were unable to understand exposures within individual firms, compare exposures across firms, or analyze the systemic impacts as losses spread from firm to firm.

Currently, a lack of standardization hinders comparison between mortgage datasets at large financial institutions and the GSEs, and the lack of a uniform nationwide system of property identifiers makes matching of liens more difficult. If unresolved, these problems will, among other consequences, continue to affect the willingness of investors to purchase securitized mortgage products.

A critical mandate for the OFR, as described in Chapter 5, is to work with domestic and global financial regulators to promote the use of consistent standards so that financial institutions and their regulators will be able to understand and analyze these types of issues in real-time. The establishment of a global Legal Entity Identifier (LEI), which will help precisely identify parties to financial transactions, is a natural and essential priority in pursuit of that mandate. The LEI project made historic progress in the past year, including the International Organization for Standardization's publication of an LEI standard and the G20 leaders' call for implementation of a global LEI by March 2013 (ISO, 2012; FSB, 2012). The CFTC has already established the CFTC Interim Compliant Identifier (CICI) to identify counterparties in swap transactions (CFTC, 2012b). The OFR continues to promote an LEI, working with domestic and foreign regulators and standard-setters.

Need for Constant Improvements in Risk Management and Stress Testing. Improving data is essential as firms and their regulators seek to modernize the approach to risk management and stress testing in the wake of the financial crisis. Supervisors were quick to identify lessons learned with respect to corporate governance, credit risk and liquidity risk management, and the use and misuse of derivatives and other complex financial products (SSG, 2008; SSG, 2009). But these lessons are still not being applied consistently, as shown by the MF Global failure ***(Box F: Lessons from the Collapse of MF Global)***. Financial managers and their supervisors need to be vigilant as financial markets evolve, creating new risks and new

challenges for risk management. Stress testing, discussed in Section 3.2, suffered from a failure of imagination before the crisis. Supervisors now subject the largest firms to unprecedented annual stress tests. Firms that fail those tests can, among other things, be subject to dividend restrictions or be required to raise new capital. The OFR has an important statutory mandate to promote best practice in these areas by combining new insights about macroprudential oversight with traditional concerns about firms' solvency.

Model Risk. The financial crisis also illustrated the dangers to financial stability posed by the failure to account for the limitations and uncertainties associated with financial risk models. For example, two types of models in particular were implicated.

First, the market for CDOs, which in turn contributed to the bubble in MBS, relied on models that dramatically under-estimated the correlation in the performance of similar MBS, with disastrous results: nearly all CDO securities backed by MBS were ultimately downgraded by the rating agencies. The rating agencies that had used these models did not have strong empirical support for their correlation assumptions and they have since improved their disclosure of the limitations of these models (Heitfield, 2010).

Second, risk managers at financial firms and supervisory capital standards relied on value at risk (VaR) models that measured the potential losses from trading portfolios based on recent historical experience, which was relatively benign, encouraging balance sheet expansion. As the period of financial calm lengthened up to 2007, however, these models provided no indication that market relationships might change in fundamental ways. More recently, the trading losses that JPMorgan Chase announced earlier this year occurred after the company revised its VaR model, a revision that reduced the reported risk by half (Keoun, 2012).

These examples illustrate the challenges that complex models pose to risk management and corporate governance. Going forward, the tendency of financial markets to develop complex new products is likely to result in new types of model risk. Risk managers and supervisors have heightened their attention to model risk, and this will be an important focal point for the OFR.

Endnotes

1. Similar definitions are provided by Rosengren (2011) and Tucker (2011).

2. The Basel Committee on Banking Supervision, a global committee of bank supervisors, issued two relevant working papers in May 2012 that discuss links between the real economy and the financial sector and address ways to improve financial stability monitoring and the identification of potential threats (BCBS, 2012a; BCBS, 2012b).

3. "A common explanation for the procyclicality of the financial system has its roots in information asymmetries between borrowers and lenders. When economic conditions are depressed and collateral values are low, information asymmetries can mean that even borrowers with profitable projects find it difficult to obtain funding. When economic conditions improve and collateral values rise, these firms are able to gain access to external finance and this adds to the economic stimulus. This explanation of economic and financial cycles is often known as the 'financial accelerator'. [This analysis] has a long history." (Borio, Furfine, and Lowe, 2001). The authors also point to the regulatory structure itself—as in the Basel II capital regime—as a source of procyclicality.

4. "Experience tells us that alternatives within an economy for the process of financial intermediation can protect that economy when one of those financial sectors undergoes a shock" (Greenspan, 1999).

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