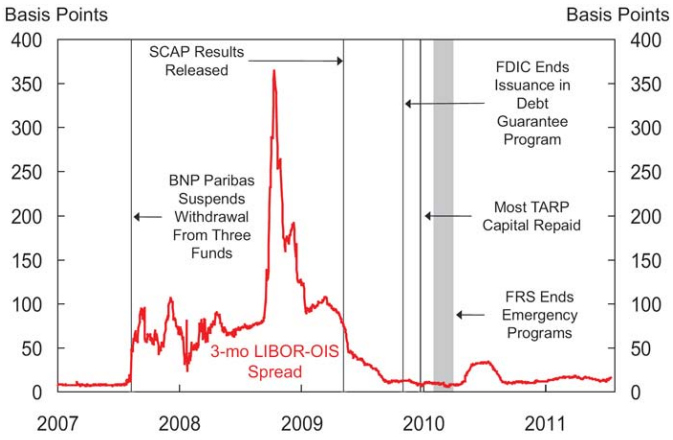
5 Financial Developments

Over the past 30 years, the inner workings of the U.S. financial system grew increasingly complex and interconnected amid technological advances and globalization. These developments were generally intended to further facilitate the allocation of risk, increase liquidity, and enhance pricing in order to improve the provision of financial services. But the financial crisis illustrated that complex new forms of financial activity also can produce instability and imbalances that can pose extraordinary costs to the real economy.

Most observers only became aware of these powerful destabilizing forces in the summer of 2007, when the interbank market seized up ***(Chart 5.0.1).*** It took more than two years of unprecedented interventions for financial markets to return to more normal functioning.

Chart 5.0.1 The Financial Crisis in the Interbank Market



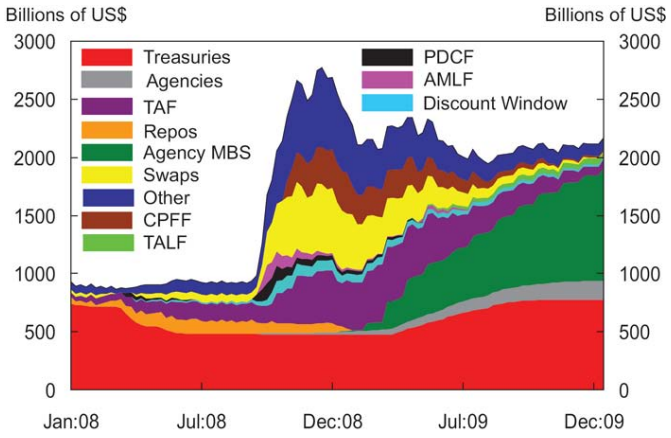
Source: Bloomberg

5.1 Restoration of Private Sector Funding and Capital

To maintain the key functions of the financial system during the extraordinary disruptions of the crisis, governments provided unprecedented liquidity, guarantees, and capital support to markets and institutions. With the exception of housing finance, most of the explicit U.S. government support has been replaced by private sector sources.

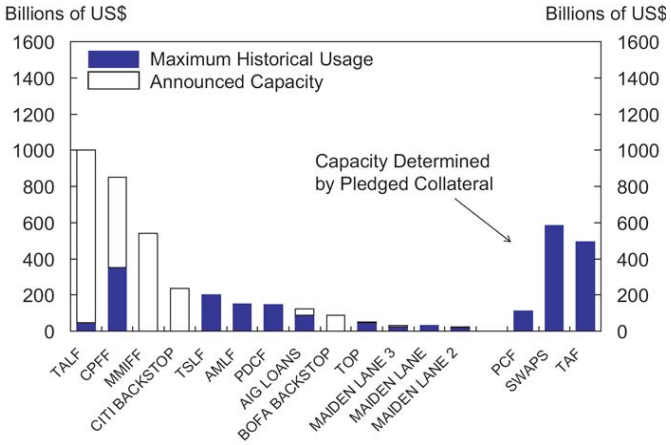
Government support proved effective in reducing the severity of the crisis. Congress passed the Dodd-Frank Act to address the weaknesses in the financial system revealed during the financial crisis and to help prevent another crisis. As Section 6 of this report outlines, implementation of the Dodd-Frank Act is progressing. The Dodd-Frank Act requires enhanced capital requirements for financial institutions and stronger supervision, risk management, and disclosure standards for the largest firms that pose the greatest risk to the system. It also requires the establishment of an orderly liquidation regime for financial companies that otherwise might be perceived as "too big to fail." At the same time, the Dodd-Frank Act eliminated several avenues of government support for firms in a crisis to improve market discipline.

Chart 5.1.1 Federal Reserve Balance Sheet: Assets



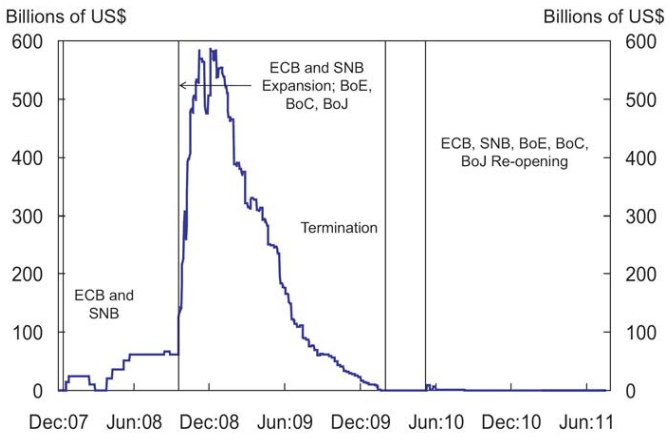
Source: Federal Reserve

Chart 5.1.2 Federal Reserve Facilities



Source: Federal Reserve

Chart 5.1.3 US$ FX Swap Facility Usage Since Inception



Source: FRB

5.1.1 Liquidity Support

Official support was first provided to banks to address liquidity pressures. Liquidity programs broadened to directly or indirectly support the firms and related secondary markets that had increasingly facilitated risk transfer in the global financial system leading up to the crisis. Liquidity support wound down in 2009 as secondary markets returned to more normal functioning.

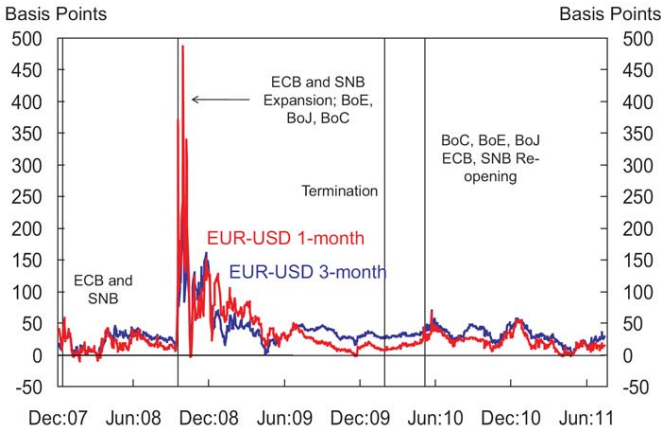
The Federal Reserve provided substantial liquidity support to global markets and institutions ***(Chart 5.1.1)***. That support at first was in the form of extended discount window lending in new ways to banks and, then, emergency lending to independent investment banks that traditionally did not have access to the discount window. Later, facilities were introduced to deal with malfunctioning in specific secondary markets—such as those for repurchase agreements (repos), asset-backed commercial paper, and asset-backed securities—and to support certain institutions.

Federal Reserve facilities were designed to provide collateralized funding at rates above those prevalent for creditworthy borrowers when markets were functioning normally, but below rates available to such borrowers when markets were functioning poorly. Thus, as secondary markets normalized, private sector funding naturally replaced government funding. Use of the facilities relative to announced capacity varied widely, and some of them stabilized markets with little or no drawdown ***(Chart 5.1.2)***.

The first facilities, the Term Auction Facility (TAF) and the central bank liquidity swap lines, were introduced in late 2007 amid pronounced strains in short-term wholesale funding markets. The TAF provided term funding to depository institutions with access to the Federal Reserve's primary credit facilities through an auction process and helped to address domestic dollar funding pressures.

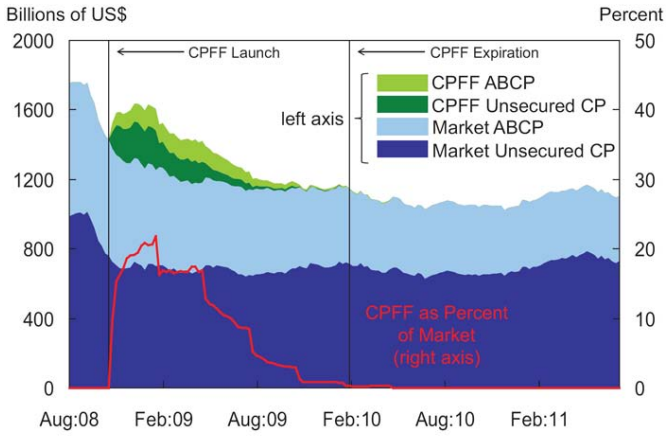
The swap lines gave foreign central banks the capacity to provide U.S. dollar funding directly to institutions in their jurisdictions, enhancing

Chart 5.1.4 EUR-US$ FX Implied Basis Spreads



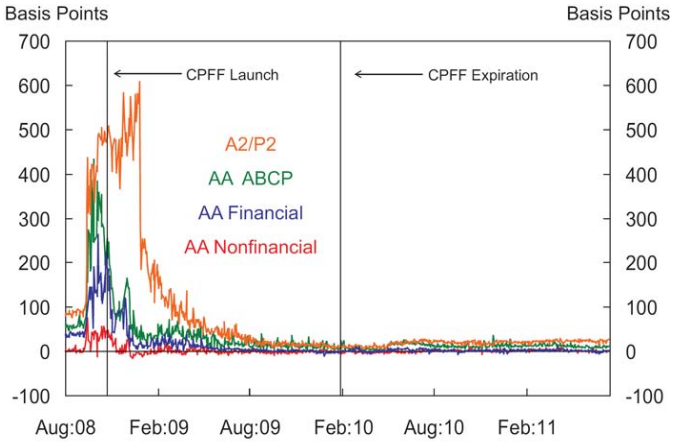
Source: Bloomberg, Reuters, Tullett

Chart 5.1.5 CPFF Support of Commercial Paper Market



Source: FRB, FRBNY, FSOC calculations

Chart 5.1.6 30-Day CP Rates Less 1-Month OIS Rates



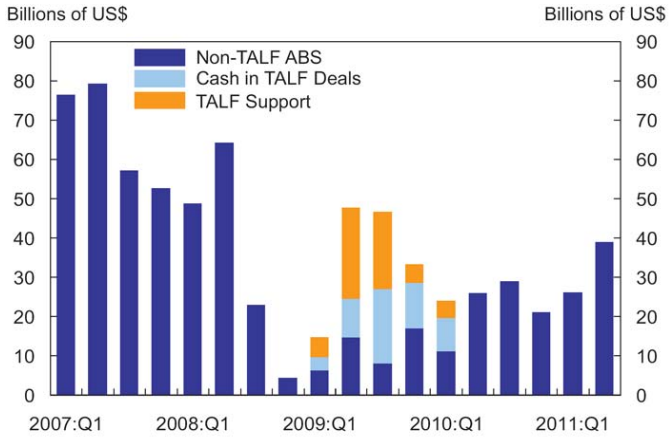
Source: FRB, Bloomberg

U.S. financial stability by relieving pressures in U.S. dollar funding markets and reducing incentives for foreign financial institutions to sell dollar assets at fire-sale prices. The swap lines expired on February 1, 2010, as market conditions normalized and the pricing of funds from the facility became unattractive. However, the Federal Open Market Committee reauthorized currency swap lines in May 2010 in response to the reemergence of strains in short-term U.S. dollar funding markets associated with the fiscal crisis in the peripheral euro area. Use of the swap lines has been minimal since May 2010, reaching a peak of $9.2 billion compared with a previous peak of $586 billion ***(Charts 5.1.3*** and ***5.1.4)***.

Among the many new facilities that were introduced at the height of the crisis, the Commercial Paper Funding Facility (CPFF) and Term Asset-Backed Securities Loan Facility (TALF) involved a wide range of market participants. For example, the CPFF helped financial and nonfinancial firms meet short-term funding requirements by offering collateralized liquidity directly to both secured and unsecured commercial paper (CP) issuers when private markets were frozen after the failure of Lehman Brothers in September 2008. The CPFF self-liquidated according to plan, falling from 20 percent of the market at its peak to less than 1 percent by late 2009 ***(Chart 5.1.5)***. Improvements in market conditions over time, evidenced by contracting spreads, allowed some borrowers to obtain financing from private investors ***(Chart 5.1.6)***. However, decreased use of the CPFF was also driven by a significant decline in the supply of commercial paper, as issuers reduced the size of CP programs and other sources of funding became available.

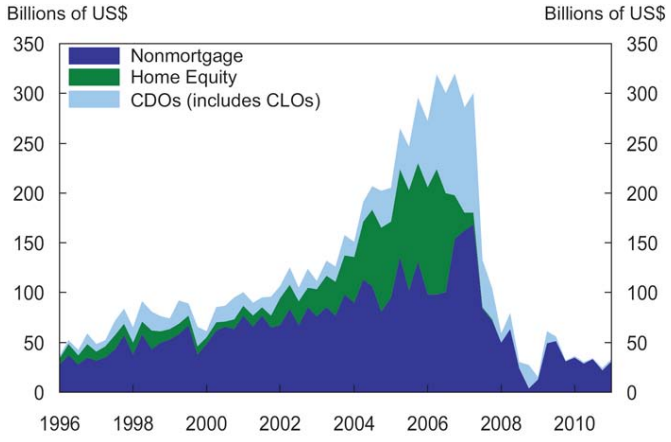
As the recovery progressed, unsecured domestic financial issuers exited the CPFF first, followed by European banks and finally by issuers of asset-backed commercial paper (ABCP). For unsecured domestic financial issuers, the facility was a critical temporary source of funding through the worst of the crisis. European banks required more time to exit the CPFF, because they had limited

Chart 5.1.7 Nonmortgage ABS Issuance



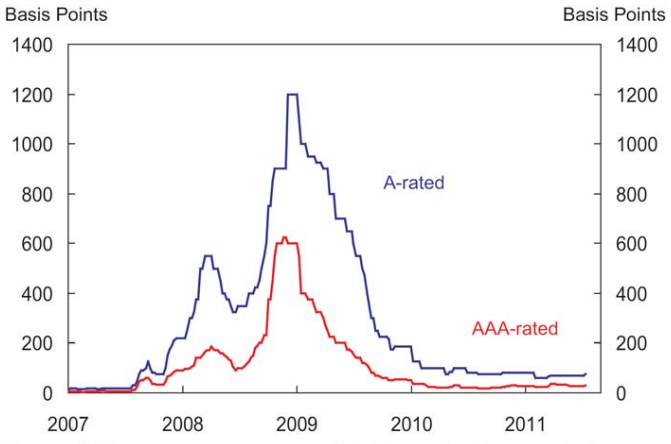
Source: JPMorgan, FRBNY

Chart 5.1.8 ABS Issuance



Source: Asset Backed Alert

Chart 5.1.9 Securitized Auto ABS Spreads



Source: JPMorgan

Note: 3-year duration, spreads to swaps.

options to meet dollar funding needs. For ABCP issuers, the CPFF provided a safety net that allowed them to gradually downsize their ABCP programs with minimal market disruption.

The TALF was established in 2008 as a temporary facility to address the severe deterioration of liquidity in securitized markets that provide critical sources of funding for consumer, small business, and commercial real estate lenders. Unlike subprime residential mortgage securitizations, the seizure in market functioning in the nonmortgage asset-backed security (ABS) and commercial real estate mortgage-backed security (CMBS) markets was not driven by credit concerns but rather by a lack of liquidity. Investors fled indiscriminately from all securitized credit, even though ABS and CMBS structures generally performed well during the crisis. Liquidity provided by TALF helped finance three million auto loans, one million student loans, and 900,000 small business loans. TALF-levered investors led renewed demand for consumer ABS and CMBS. Later, as secondary and then primary market spreads narrowed in these markets, issuance became increasingly less reliant on TALF. This restoration of private funding is most clearly seen in the nonmortgage ABS market ***(Charts 5.1.7***, ***5.1.8***, ***5.1.9***, and ***5.1.10)***.

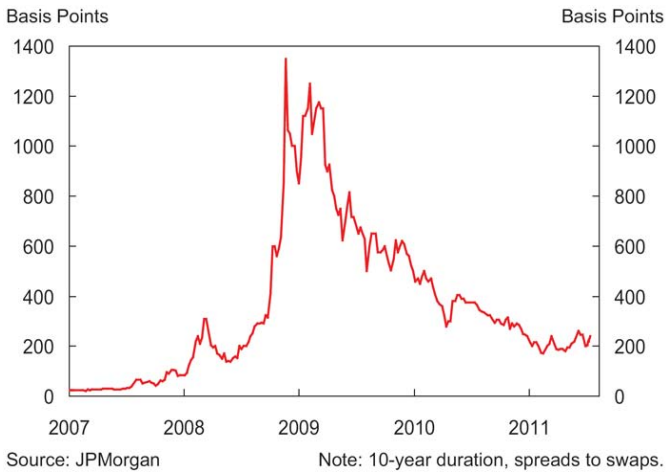
All Federal Reserve loans extended during the crisis were well collateralized. A large fraction of TALF loans have been repaid early. Remaining loans are current in their payments and well collateralized. All other loans were repaid on time, in full, with interest.

5.1.2 Guarantee Support

Temporary programs to guarantee deposits, unsecured bank debt, and investor assets in money market mutual funds helped stabilize investor confidence.

In October 2008, at the peak of the financial crisis, the FDIC introduced the Temporary Liquidity Guarantee Program (TLGP). In addition to the Transaction Account Guarantee Program, the TLGP guaranteed, for a fee, unsecured debt with a term of up to three years issued by financial entities participating in its Debt

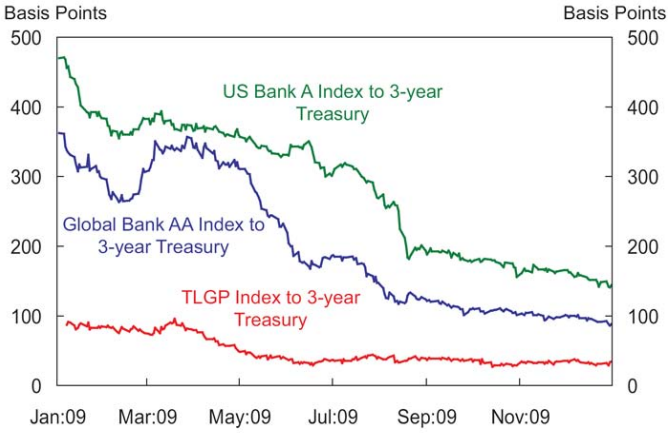
Chart 5.1.10 CMBS AAA Spread



Source: JPMorgan

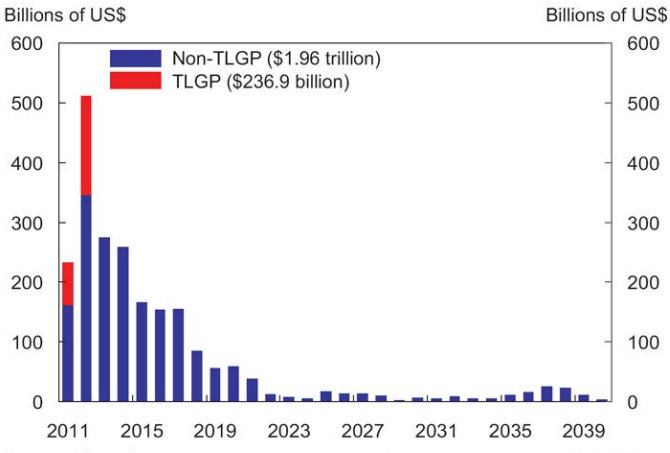
Note: 10-year duration, spreads to swaps.

Chart 5.1.11 Debt Spreads vs. 3-year U.S. Treasury Securities



Source: Bloomberg, FDIC

Chart 5.1.12 Total Debt Outstanding for TLGP Firms



Source: Bloomberg

Note: Dates by maturity, as of 6/30/2011.

Guarantee Program (DGP). The issuance of new guaranteed debt expired on October 31, 2009, and the guarantee on outstanding debt expires on December 31, 2012. The NCUA also introduced temporary guarantees to stabilize the corporate credit union system.

The DGP enabled financial institutions to meet their financing needs during a period of systemwide turmoil and record-high credit spreads. On January 7, 2009, less than three months after the first TLGP medium-term note was issued, the spread between a composite of three-year TLGP debt and three-year U.S. Treasury securities was 88 basis points, while the comparable spread on nonguaranteed bank debt was 458 basis points ***(Chart 5.1.11)***. By the end of the DGP issuance period on October 31, 2009, these spreads had decreased by about two-thirds.

Banks and their holding companies are now issuing nonguaranteed debt at volumes comparable to pre-crisis levels. At the peak of the TLGP, the FDIC guaranteed almost $350 billion of debt outstanding. As of June 30, 2011, the total amount of remaining FDIC-guaranteed debt outstanding was $236.9 billion, of which $70.7 billion will mature in 2011 and the remaining $166.2 billion will mature in 2012 ***(Chart 5.1.12)***. The majority of the debt exposure resides within the largest financial entities.

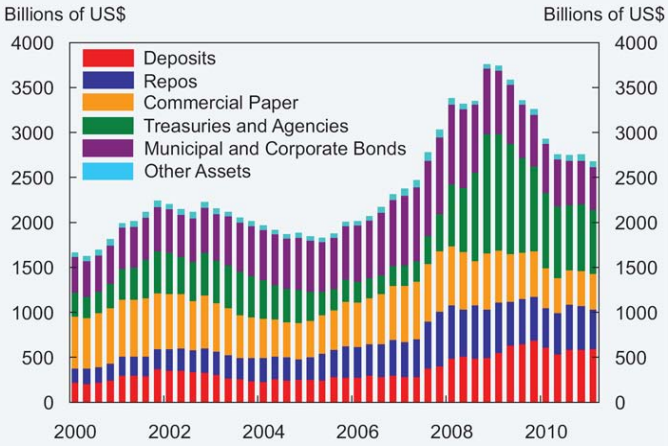
The Treasury Department announced its temporary money market fund guarantee program on September 19, 2008, to stop the run on money market funds (MMFs) ***(Chart 5.1.13)***. Certain structural features of MMFs can produce incentives for investors to cash in shares if they fear that a fund will suffer a loss ***(see Box D: Money Market Funds)***. The temporary guarantee program provided coverage to shareholders for amounts they held in participating MMFs at the close of business on September 19, 2008. The guarantee would have been triggered if a participating fund's net asset value fell below $0.995 per share. The temporary guarantee, along with Federal Reserve facilities aimed at stabilizing markets linked to MMFs, was successful in restoring

Box D: Money Market Funds

The run on money market funds (MMFs) added considerably to market stress during the financial crisis. Some of the key features of MMFs that make them susceptible to runs remain today.

Money market funds are mutual funds that offer individuals, businesses, and governments a convenient way to pool investments in money market instruments. MMFs provide an economically important service by acting as intermediaries between shareholders who desire liquid investments, often for cash management, and borrowers who seek term funding. The composition of MMF assets has recently remained stable among various government and short-duration assets ***(Chart D.1)***.

Chart D.1 Money Market Fund Assets



Source: Flow of Funds

MMFs generally invest in the highest rated (A1/P1-rated) short-term collateral. SEC Rule 2a-7 places stringent limitations on MMF holdings of lower rated securities. MMFs must comply with the rule, which permits these funds to maintain a stable net asset value (NAV) per share, typically $1, through the use of amortized cost accounting and rounding. However, if the mark-to-market per share value of a fund's assets falls more than one-half of 1 percent, or below $0.995, the fund must reprice its shares, an event known as "breaking the buck." MMF investors benefit from the simplicity and convenience of the stable NAV feature and from the risk management, monitoring, and diversification services that MMFs provide. However, several of these MMF features contribute to their fragility.

Investors' Incentives and the Fixed NAV

The stable, rounded $1 NAV fosters an expectation that MMF share prices will not fluctuate. However, when shareholders perceive that a fund may suffer losses, each shareholder has an incentive to redeem shares before other shareholders, causing a run on the fund. Such redemptions can accelerate the likelihood of a break-the-buck event to the extent that the fund's asset sales to meet redemptions significantly depress the market value of the fund's remaining assets. In such a scenario, the ability of early redeemers to receive the full $1 NAV is essentially subsidized by the losses absorbed by remaining shareholders.

Maturity Transformation and Liquidity

MMFs offer shares that are payable on demand, but they invest in cash-like instruments and in short-term securities that are less liquid. Redemptions in excess of the cash-like assets (or liquidity buffer) may force funds to sell their less liquid assets. When money markets are strained, funds may not be able to obtain full value (that is, amortized cost) for such assets in secondary markets and may incur losses. Investors thus have an incentive to redeem shares before a fund has depleted its cash-like liquidity buffer.

Low Risk Tolerance

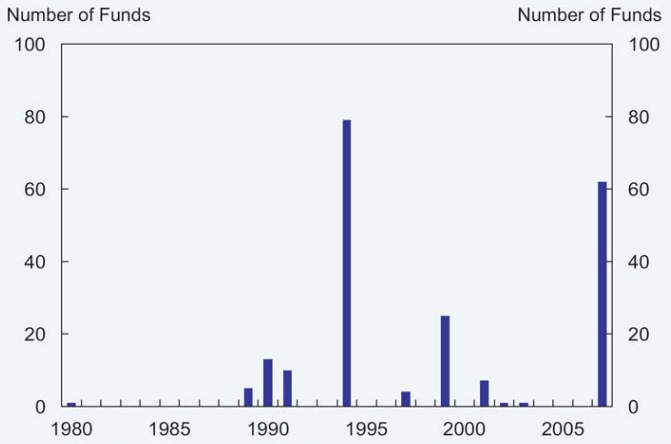
Risk-averse investors are attracted to MMFs because they offer yield above that of a risk-free asset yet have a history of maintaining stable value and meeting all withdrawal requests on demand. These investors are prone to flight when losses appear possible. In particular, institutional investors, which currently account for about two-thirds of assets under management in MMFs, exhibit extreme aversion to absorbing even small losses. Institutional investors tend

to be less tolerant of fluctuations in share prices, have larger amounts at stake, and are quicker to respond to events that may threaten the stable NAV.

Expectation of Sponsor Support

MMFs invest in assets that may lose value, but funds have no formal capital buffers or insurance to absorb loss and maintain their stable NAV. When losses do occur, MMFs have historically relied on discretionary sponsor support to maintain a stable NAV and preserve the franchise value of fund management businesses ***(Chart D.2)***. That support may come in the form of capital contributions or the purchase of assets that have lost value, for example.

Chart D.2 Money Market Fund Sponsor Support



Source: Moody's

Note: 2007, 2008, and 2009 are aggregated.

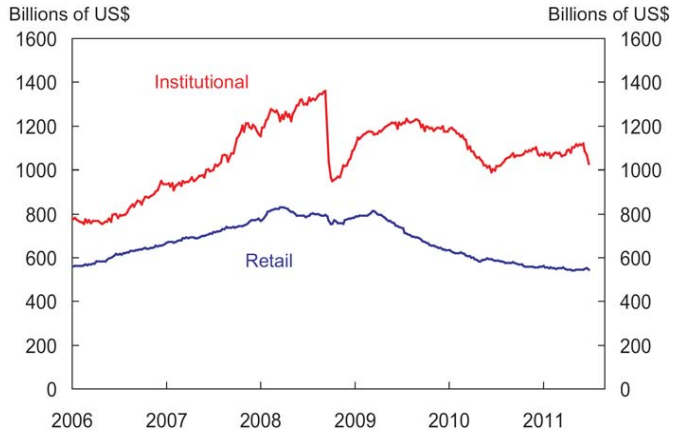
Sponsors do not commit to support an MMF in advance, however, because an explicit commitment may require the sponsor to consolidate the fund on its balance sheet. Thus, although investors ostensibly bear the risk of an MMF breaking the buck, sponsors have in the past borne that risk themselves, fostering the perceived safety of MMF investments. Moreover, the uncertainty about the availability and sufficiency of such support during crises, and the fact that many MMFs lack deep-pocketed sponsors, contribute to their susceptibility to runs.

Expectation of Government Support

Given the unprecedented government support of MMFs during the crisis in 2008 and 2009, even sophisticated institutional investors and fund managers may have the impression that the government would be ready to support the industry again with the same tools. This expectation may give fund managers incentives to take greater risks than are prudent and may reduce sponsors' incentives to support funds in times of stress. Such expectations may be particularly misaligned given that Congress has since prohibited the Treasury from using the fund that it used to support the MMFs for this purpose.

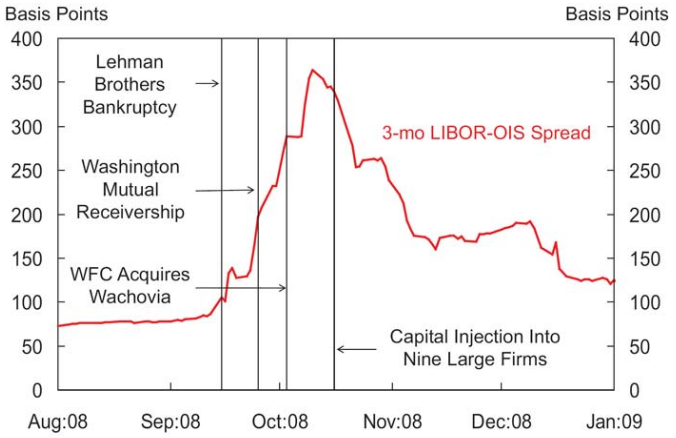
In February 2010, the SEC adopted new rules for MMFs to make these funds more resilient to market volatility and to credit and liquidity risk. First, the SEC introduced new risk-limiting restrictions, including increased liquidity requirements, restrictions on the ability of MMFs to purchase lower quality securities, and maturity restrictions that reduce the maximum allowable weighted average maturity of funds' portfolios. Funds also are required to stress test their ability to maintain a stable NAV. Second, the SEC's new rules permit a fund's board—if it determines that the fund's NAV per share is at imminent risk of falling, or has fallen, below $1—to suspend redemptions promptly and liquidate its portfolio in an orderly manner to limit contagion effects on other funds. Finally, the new rules impose requirements to disclose portfolio holdings and mark-to-market (shadow) NAV, which gives the SEC a window on MMF activity and helps investors impose strong market discipline. Although these new rules are a positive first step, the SEC recognizes that they address only some of the features that make MMFs susceptible to runs, and that more should be done to address systemic risks posed by MMFs and their structural vulnerabilities.

Chart 5.1.13 Prime Money Market Fund Assets



Source: ICI

Chart 5.1.14 The Financial Panic in the Interbank Market



Source: Bloomberg

Chart 5.1.15 Price-to-Book Ratio of 6 Large Complex BHCs

Source: Bloomberg, FRBNY

Note: Market-cap weighted average.

investor confidence; it expired in September 2009 without any claims.

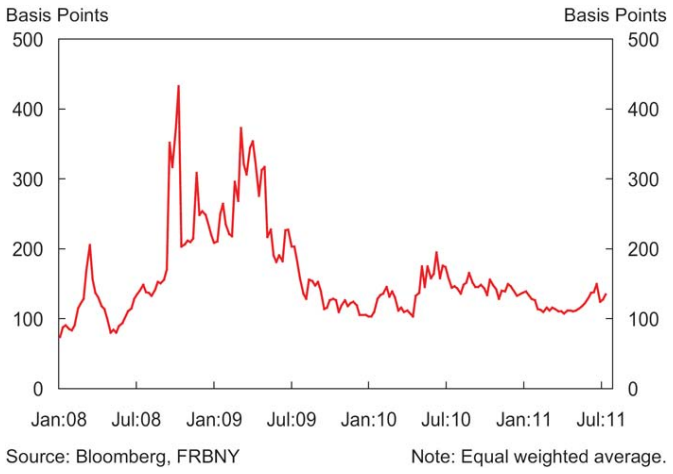
5.1.3 Capital Support

Government capital injections were required to stabilize regulated financial entities at the peak of the crisis. Many U.S. financial institutions were able to replace government capital with private sources as investors gained confidence from the Supervisory Capital Assessment Program (SCAP), financial conditions normalized, and the economy began to recover.

During the financial panic in September 2008, market participants became acutely concerned about the solvency of the nation's regulated banking institutions, particularly after the failure of the largest thrift institution and the acquisition of the fourth-largest bank holding company (BHC) by the fifth-largest BHC. One measure of the extent of concern is the behavior of the LIBOR-OIS spread, which captures the premium that banks require to lend to each other in the short-term money market ***(Chart 5.1.14)***. This spread jumped from under 100 basis points to over 350 basis points. With well-functioning secondary markets and the absence of counterparty solvency fears, this spread is typically under 25 basis points ***(Chart 5.0.1)***.

To restore confidence and directly bolster the capital base of the banking system, the Treasury Department drew on the $700 billion that Congress had made available through the Troubled Asset Relief Program (TARP) to address the market dislocation. It immediately injected $125 billion of capital into nine institutions. Over the next few months, the Treasury Department injected a total of $204.9 billion of capital through the Capital Purchase Program and invested $40 billion through the Targeted Investment Program. Despite the massive government intervention to support the banking system, access to private capital was severely limited. Many large banks had market capitalizations well below their book value ***(Chart 5.1.15)***, and measures of default risk were exceptionally high ***(Chart 5.1.16)***.

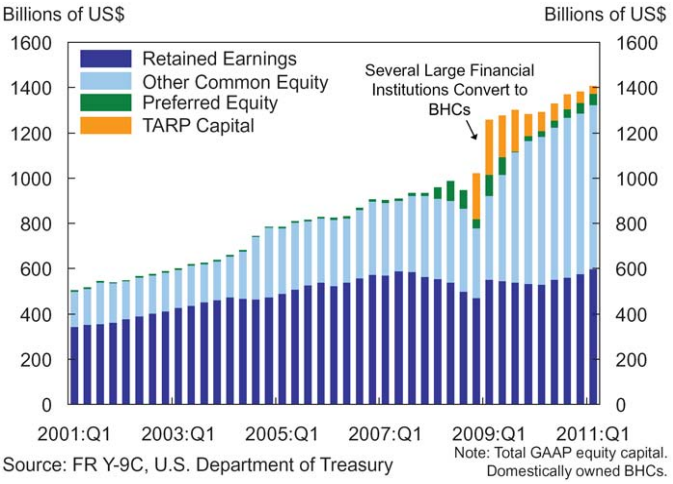
Chart 5.1.16 CDS Spreads of 6 Large Complex BHCs



Source: Bloomberg, FRBNY

Note: Equal weighted average.

Chart 5.1.17 Aggregate Large BHC Total Equity Capital



Source: FR Y-9C, U.S. Department of Treasury

Note: Total GAAP equity capital. Domestically owned BHCs.

In 2009, the SCAP provided an assessment of the capital needs of the 19 largest BHCs under alternative macroeconomic scenarios to ensure that they could continue to provide key financial services, even if the recession was longer and deeper than the consensus forecast. Ten of the 19 BHCs were told that they needed to raise additional capital of $75 billion in the aggregate. The presence of an additional government backstop of capital to banks and the confidence-enhancing clarity produced by the SCAP assessment reopened the equity market for most of the large banks. As of first quarter 2011, banks had raised over $300 billion in equity from the market and conversions and returned $220 billion of their TARP funds to the Treasury ***(Chart 5.1.17)***.

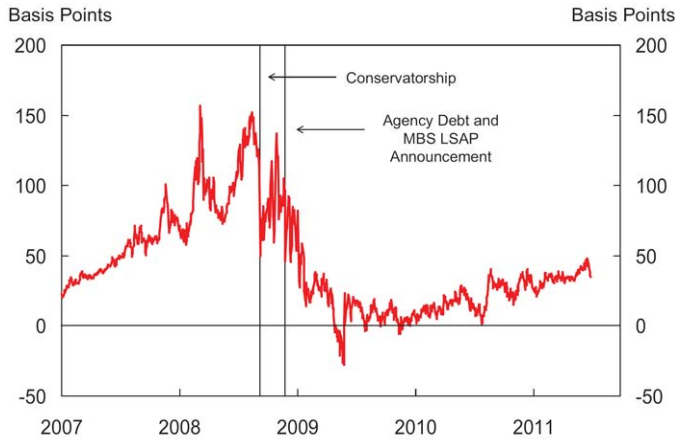
5.1.4 Housing Finance Support

The housing finance market was the first and biggest market to lose liquidity during the financial crisis. Substantial government intervention sustained the market during the crisis and remains in place today.

Mortgage-related losses led to capital shortfalls at the two government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, and a sharp decline in net income at the Federal Home Loan Bank System (FHLB). The federal government injected capital into Fannie Mae and Freddie Mac to stabilize the mortgage market, and the FHFA placed restrictions on capital distributions at several Federal Home Loan Banks.

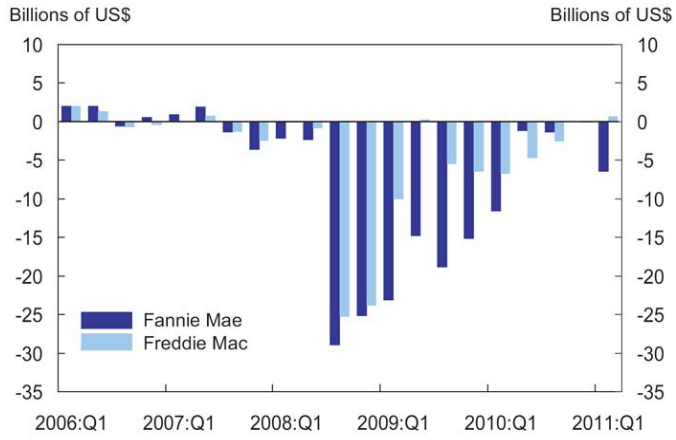
Fannie Mae and Freddie Mac reported a $109 billion combined net loss in 2008 owing to rising defaults on loans underlying the mortgage-backed securities (MBS) they had guaranteed in their securitization businesses (agency MBS) and to losses on their direct investments in MBS. These losses eroded the two companies' capital and led to a steep widening of spreads in the MBS market relative to Treasury yields, which in turn increased the cost of new mortgage loans to homeowners.

Chart 5.1.18 Fannie Mae Option-Adjusted Spreads



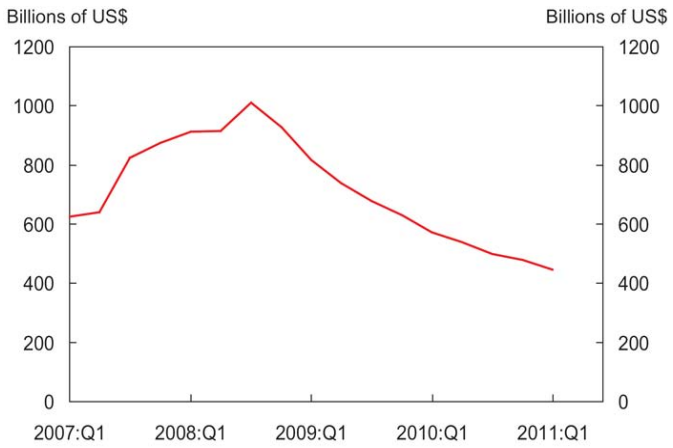
Source: Barclays Capital Note: 30-year current coupon spread to Treasuries.

Chart 5.1.19 GSE: Net Income and Losses



Source: SEC filings, company reports

Chart 5.1.20 FHLB Bank Advances



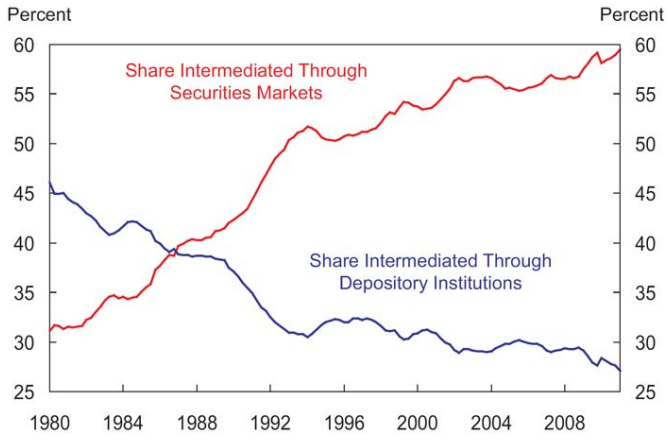
Source: FHFA

To stabilize the mortgage market, FHFA placed Fannie Mae and Freddie Mac into conservatorship, and Treasury entered into a senior preferred stock purchase agreement in September 2008 to ensure that these two GSEs would have a positive net worth. Joint action by the FHFA and the Treasury Department, coupled with large purchases in the agency MBS market by Treasury and the Federal Reserve, stabilized the agency MBS market. These combined actions resulted in a sharp improvement in spreads and restored a measure of calm to the agency MBS market ***(Chart 5.1.18)***.

Treasury and FHFA increased the funding commitment to $200 billion for each GSE in May 2009, then amended the agreement again in December 2009. The December amendment added flexibility to the funding commitment by setting it at $200 billion plus any cumulative deficiency amount determined for quarters in calendar years 2010, 2011, and 2012, less any amount by which assets exceed liabilities at December 31, 2012, and less any existing amount of funding under the commitment. This ensured that the GSEs would have a positive net worth as losses continued to mount. Treasury holdings of GSE preferred stock as of first quarter 2011 totaled $162.4 billion at a net cost after dividend payments of $138.2 billion. The funding commitment will become fixed again on December 31, 2012 ***(Chart 5.1.19)***.

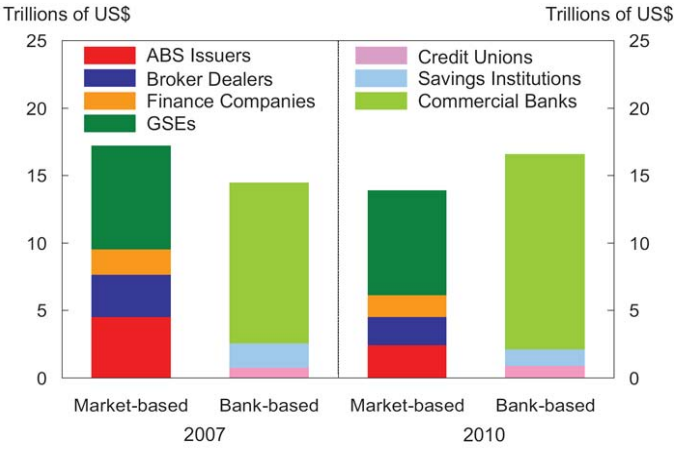
The FHLBs fared better than Fannie Mae and Freddie Mac, and became an important source of funding for many struggling financial institutions during the crisis. Since peaking at the end of 2008, FHLB advances have declined sharply ***(Chart 5.1.20)***. Despite the increase in advances in 2008, net income for the consolidated system declined by 57 percent in 2008 compared with 2007, primarily because of losses on private-label securities at 6 of the 12 banks. Net losses were reported by three Federal Home Loan Banks in 2008 and four in 2009. Several of the banks became subject to restrictions on dividends and capital because of their weakened financial condition.

Chart 5.2.1 Origin of Private Nonfinancial Debt Outstanding



Source: Flow of Funds, Morgan Stanley calculations

Chart 5.2.2 Bank vs. Market Intermediated Credit Outstanding



Source: Flow of Funds, FSOC calculations

5.2 Evolution of the Financial System

Over the past 30 years, market-based intermediation of credit, such as securitization, increased relative to bank-based intermediation, such as direct lending ***(Chart 5.2.1)***. Many of these market-based intermediation channels became severely disrupted during the financial crisis and shrank in size ***(Chart 5.2.2)***. Meanwhile, the crisis reinforced the secular increase in the concentration of the banking sector and changes in its business model.

Economic growth, demographics, and financial innovation have been factors behind the large increases in the financial asset holdings of U.S. households and businesses. While most asset management firms, pension funds, and insurance institutions were only indirectly affected by the crisis, the crisis highlighted their importance in providing both short-term and long-term funding to the financial sector.

Technological advances, changes in regulation, and globalization have produced dramatic changes in trading and market-making practices. The greater complexity of the financial system has been supported in part by developments in financial infrastructure and the increasing use of electronic payments and computerized record keeping.

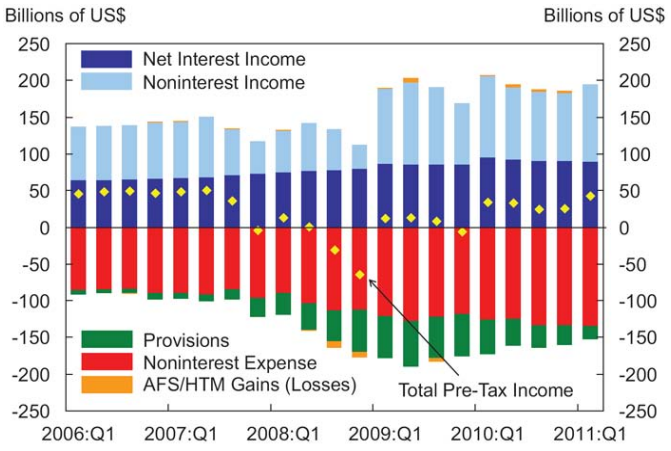
Part I. Institutions

5.2.1 Bank Holding Companies

The financial crisis has changed the landscape for the largest BHCs. While the income of BHCs has improved significantly over the past two years, it remains substantially below the pre-crisis level. Assets held by foreign banking organizations (FBOs) in the United States have increased notably since the crisis.

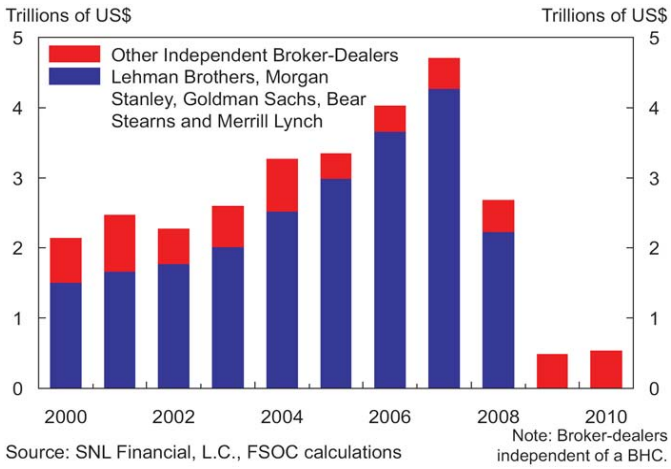
Most commercial banks in the United States are owned by a BHC, which can own other subsidiaries, such as a broker-dealer. Bank holding companies are regulated by the Federal Reserve on a consolidated basis and are subject to capital standards similar to those of banks. There are nearly 5,000 BHCs in the United States, with aggregate assets of about

Chart 5.2.3 Large Bank Holding Company Pre-Tax Income



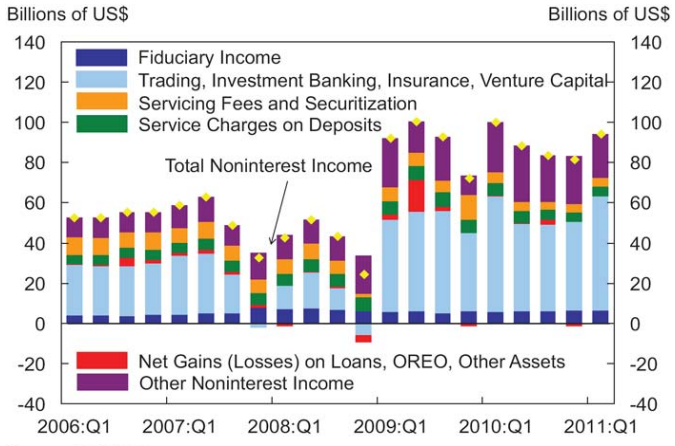
Source: FR Y-9C Note: Includes only domestically owned BHCs that file Y-9C reports.

Chart 5.2.4 Independent Broker-Dealer Assets



Source: SNL Financial, L.C., FSOC calculations Note: Broker-dealers independent of a BHC.

Chart 5.2.5 SCAP Bank Noninterest Income



Source: FR Y-9C

$17 trillion. Most of these companies own only one commercial bank. There are 75 companies with assets over $10 billion which, combined, account for over 85 percent of all BHC assets.

Pretax net income across all BHCs totaled $116.7 billion in 2010 ***(Chart 5.2.3)***. While this was a significant improvement over the previous two years, it was nearly 40 percent below the 2006 level. Net revenue (net interest income plus noninterest income) held up fairly well through the crisis. However, as asset quality deteriorated, provisions for loan losses increased sharply.

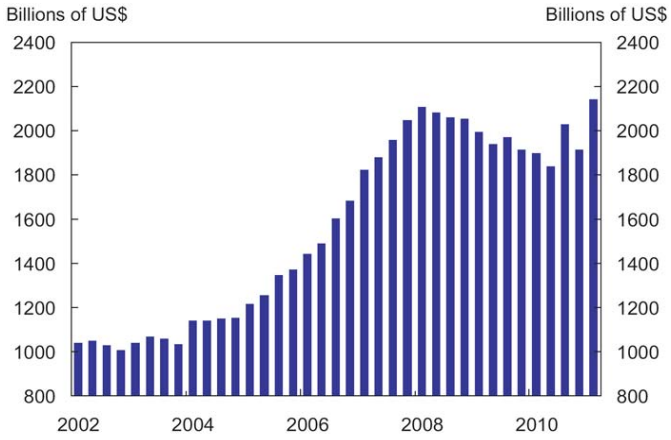
The financial crisis had a profound effect on large complex financial institutions (LCFIs). Several large banking organizations were acquired by LCFIs as a result of mergers or FDIC-assisted transactions. Additionally, four of the five largest independent broker-dealers were either acquired by or converted to BHCs in 2008 ***(Chart 5.2.4)***. These developments added more than $2 trillion to total BHC assets and had implications for the business models of the largest BHCs, as they now derive a higher share of income from investment banking and trading activities ***(Chart 5.2.5)***.

The assets held by FBOs in the United States have increased notably since the financial crisis ***(Chart 5.2.6)***. The percentage of U.S. commercial banking deposits held by FBOs has been relatively constant over the past decade. Primarily through acquisitions, they expanded their presence in activities less dependent on deposit financing, such as repo, securities and derivatives trading, prime brokerage, and other investment banking activities. FBOs hold a large and increasing percentage of their U.S. assets outside of domestically chartered BHCs.

5.2.2 Insured Depository Institutions

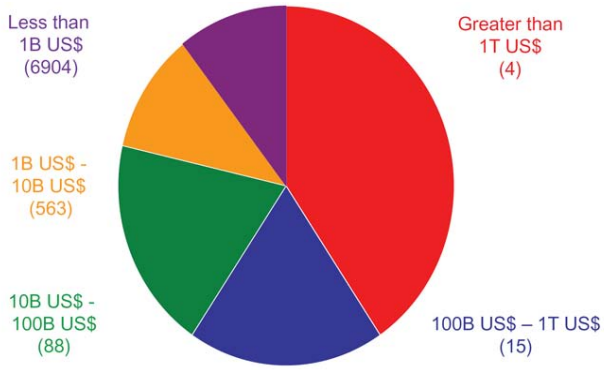
The commercial banking industry has become increasingly concentrated over recent decades among fewer, larger institutions, a trend that has accelerated since the financial crisis. While revenue held up fairly well, the industry set aside nearly one-third of revenue in loan loss provisions over the past two years.

Chart 5.2.6 Assets of Foreign Bank Branches and Agencies



Source: FFIEC 002

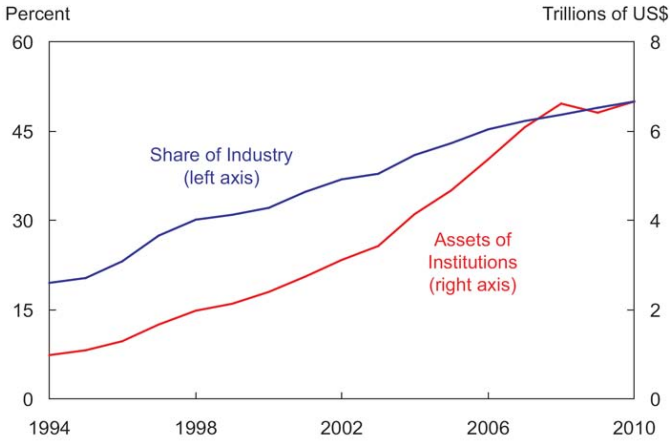
Chart 5.2.7 Asset Distribution of FDIC-Insured Institutions



Source: FDIC

Note: Total Assets $13.4T, as of 2011:Q1.

Chart 5.2.8 Assets of the Ten Largest Depository Institutions



Source: FDIC

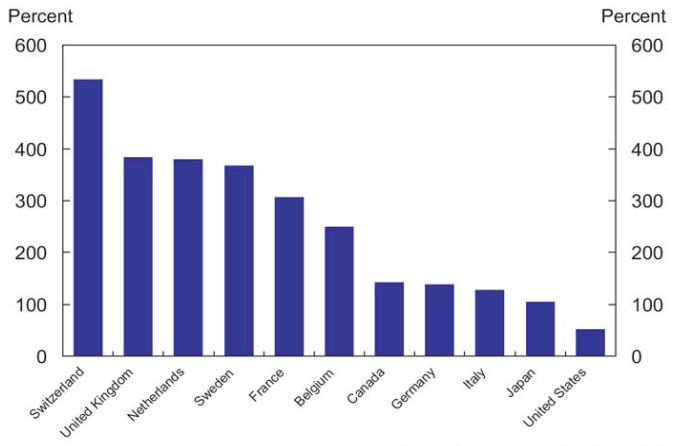
Commercial Banks and Thrifts

The banking industry is composed of more than 7,500 commercial bank and thrift institutions. Of these, more than 6,900 institutions have assets less than $1 billion, while 88 institutions have assets between $10 billion and $100 billion, and 19 institutions have assets over $100 billion ***(Chart 5.2.7)***. Over the past few decades, the industry has become increasingly concentrated among fewer, larger institutions as they expanded to achieve economies of scale and branched across state lines, and as federal legislation enabled them to conduct trading and other investment banking activities. Failures, mergers, and subdued new chartering activity during and after the crisis have contributed to further consolidation. Over the past decade, the number of institutions has fallen by 25 percent, and the 10 largest institutions now hold approximately 50 percent of industry assets ***(Chart 5.2.8)***. Overall, there has been a steady, long-term increase in assets at commercial banks and thrifts as population and wealth rose. Over the past decade, industry assets have risen from 75 percent of GDP to 90 percent.

Despite the rising concentration over recent years, the U.S. banking industry remains much less concentrated than banking in many other countries, and the size of the largest banks relative to GDP is still low when compared to other countries ***(Chart 5.2.9)***. Small banks and credit unions remain an important source of financing for consumers and businesses, particularly small businesses, in communities across the country.

Pretax net income for the U.S. banking industry totaled $122.5 billion in 2010 ***(Chart 5.2.10)***. While this was a significant improvement over the previous two years, it was 44 percent below the 2006 level. Industry net revenue held up fairly well throughout the crisis, rising each year from 2006 to 2010, but provisions for loan losses increased sharply beginning in 2007 and peaked in 2009, when they absorbed 103 percent of the industry's net revenue. The industry set aside nearly $625 billion in loan loss provisions between 2008 and 2010, which was nearly one-third of industry net revenue.

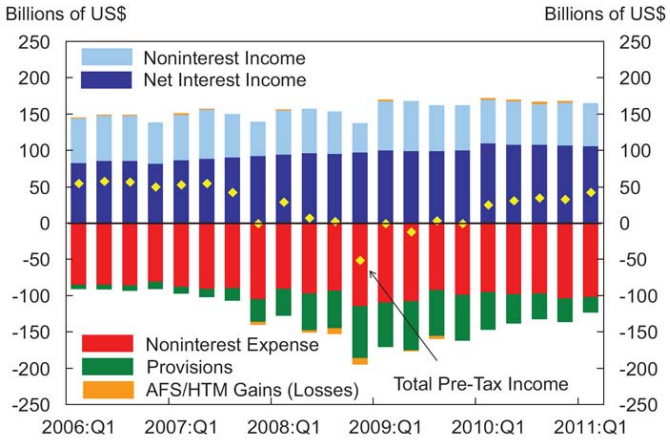
Chart 5.2.9 Largest 4 Banking Institutions as Percent of GDP



Source: FDIC

Note: As of December 31, 2010.

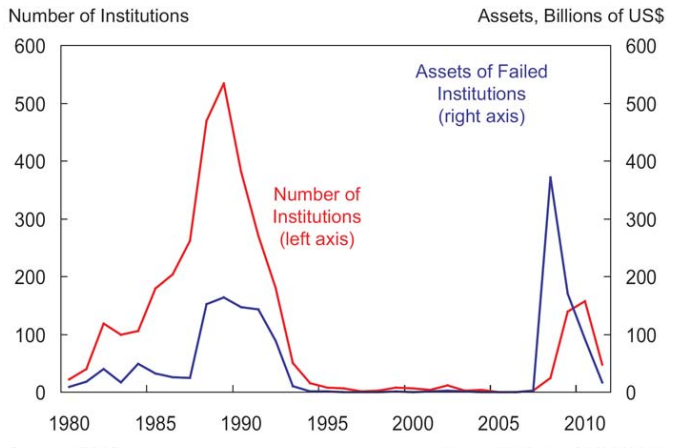
Chart 5.2.10 Commercial Bank and Thrift Pre-Tax Income



Source: FDIC

Note: Includes all chartered commercial banks and thrifts.

Chart 5.2.11 FDIC-Insured Failed Institutions



Source: FDIC

Note: 2011 as of 6/30/2011.

As the crisis has unfolded, 370 bank and thrift failures have occurred through June 30, 2011, or 4.5 percent of institutions operating at the beginning of 2008. While the level of bank and thrift failures remains elevated, the rate is beginning to decline. Although fewer institutions have failed since the beginning of the financial crisis compared with failures during the savings and loan crisis of the late 1980s and early 1990s, the value of failed-bank assets has been much higher this time ***(Chart 5.2.11)***. At the end of first quarter 2011, the number of institutions on the FDIC's "problem" list (institutions with financial, operational, or managerial weaknesses that threaten their continued financial viability) was 888, nearly 12 percent of all institutions.

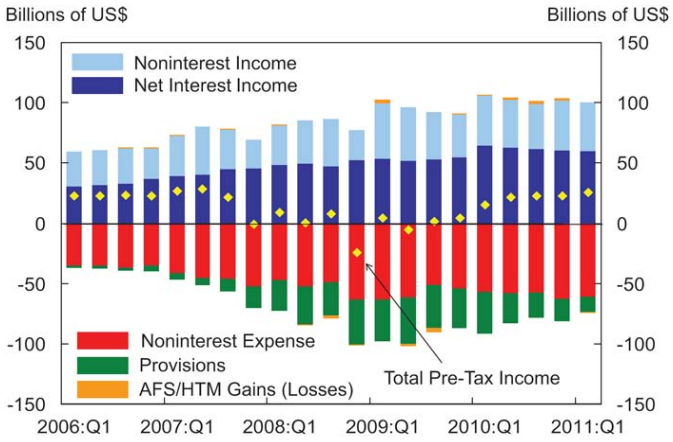
The nation's largest banking institutions (those with over $100 billion in assets) have recovered from the financial crisis to a greater extent than community banks (institutions with less than $1 billion in assets). Pretax net income is down nearly 75 percent at community banks from the 2006 level, while it is down by 12 percent at the largest institutions ***(Charts 5.2.12*** and ***5.2.13)***. Although both the largest institutions and community banks have benefited from reductions in loan loss provisions, community banks have experienced a smaller increase in net revenue than large banks. In addition, community banks continue to deal with credit problems associated with their still-sizable commercial real estate portfolios.

Credit Unions

Credit unions are nonprofit, cooperative financial institutions. Members pool their funds, and these funds are then lent to members. Credit unions differ from commercial banks and thrifts in that the members are also the owners. Currently, there are nearly 7,300 retail credit unions with approximately $940 billion in assets and 26 corporate credit unions, which are organized to provide services to the retail credit unions.

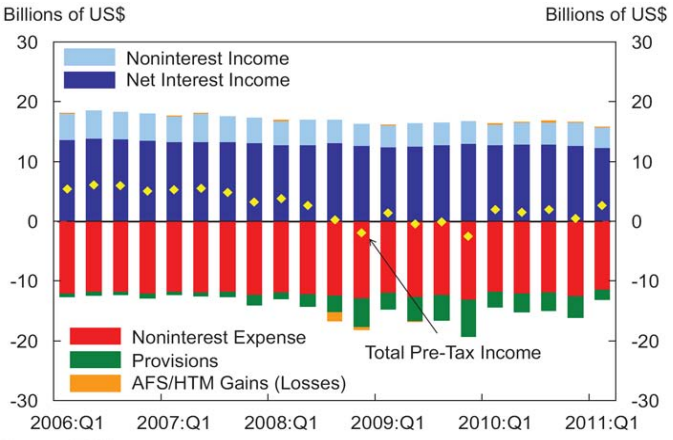
The credit union experience was similar to that of commercial banks: the system experienced a deterioration of asset quality during the financial crisis, although delinquency rates and

Chart 5.2.12 Large Bank Pre-Tax Income



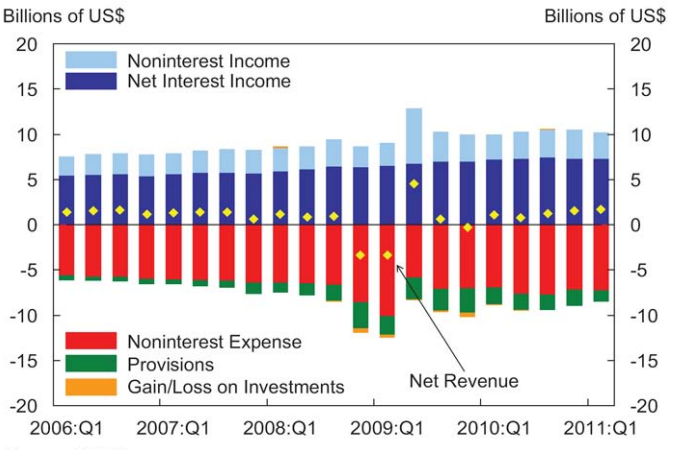
Source: FDIC Note: Chartered commercial banks and thrifts w/ assets >100 Billion.

Chart 5.2.13 Community Bank Pre-Tax Income



Source: FDIC Note: Chartered commercial banks and thrifts w/ assets <1 Billion.

Chart 5.2.14 Federally Insured Credit Union Income



Source: NCUA

provisions have been less severe than those in the banking industry ***(Chart 5.2.14)***. Credit union net revenue totaled $4.6 billion in 2010, up significantly from the previous two years but 20 percent below the 2006 level. Net income rose by 33 percent from 2006 to 2010, while provisions for loan losses peaked in 2009, when they absorbed nearly 20 percent of net income.

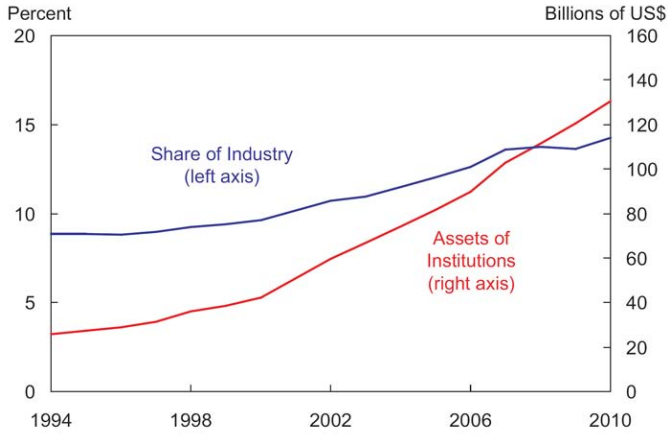
As in the banking industry, assets in the credit union system have increased and the system has become more concentrated, although less so than commercial banking ***(Chart 5.2.15)***. Assets of the credit union system rose from 4.4 percent of GDP to 6.2 percent over the past decade. The number of credit unions has fallen by nearly 30 percent over the same period, with the 10 largest institutions now holding nearly 15 percent of system assets. The severe economic downturn led to losses at retail credit unions and the failure of several large corporate credit unions, as a result of declines in the value of mortgage-related assets held by these institutions. To address these failures and reform the corporate credit union system, key regulatory reforms have been implemented to improve capital, restrict investments, enhance asset-liability management, and enhance corporate governance provisions.

5.2.3 Specialty Lenders

Specialty lenders are important providers of credit to a number of markets that have not been fully served by the traditional banking industry. Specialty lenders struggled through the financial crisis because of their heavy reliance on the capital funding markets, but they have recovered to a large extent and are continuing to serve their customer base.

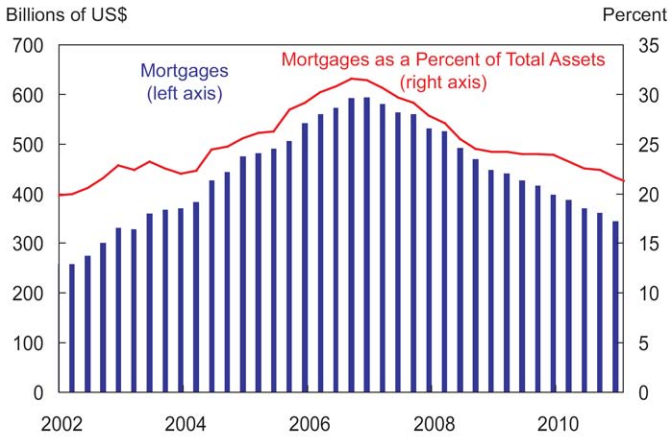
The specialty lending sector, which plays a significant role in market-based intermediation, grew dramatically before the crisis as market-based intermediation expanded. Much of the growth was in mortgage lending backed by Fannie Mae and Freddie Mac, the two large GSEs. Finance companies and real estate investment trusts (REITs)—tax-advantaged legal entities that are required to hold 75 percent of their assets in and generate 75 percent of their income from mortgages and mortgage-related

Chart 5.2.15 Assets of the Ten Largest Credit Unions



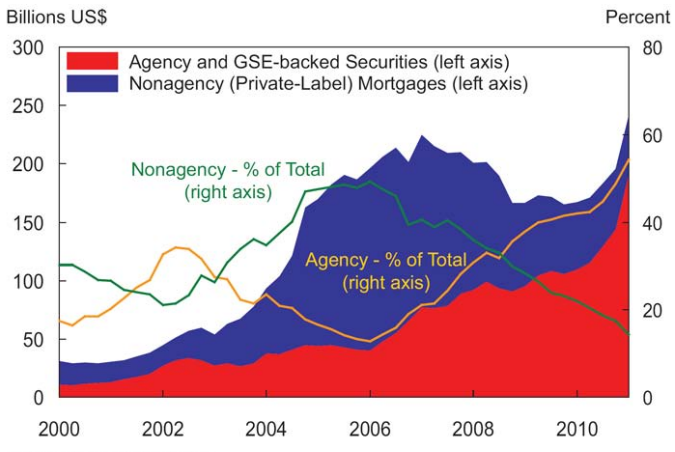
Source: NCUA

Chart 5.2.16 Finance Company Mortgage Assets



Source: Federal Reserve

Chart 5.2.17 Real Estate Investment Trust (REIT) Assets



Source: Federal Reserve

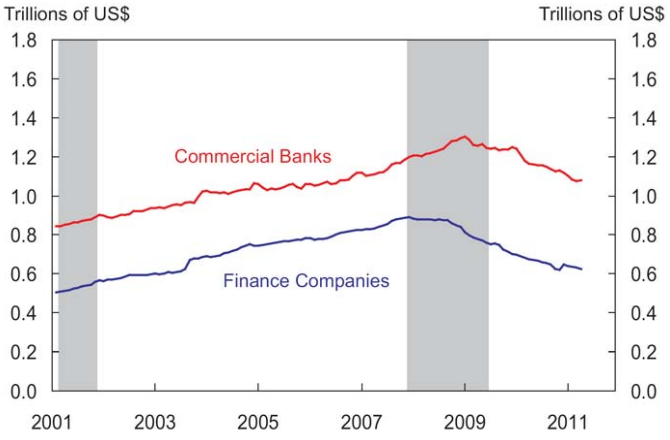
holdings—played an increasing role ***(Charts 5.2.16*** and ***5.2.17)***. Mortgage lending by these firms contracted sharply following the collapse of the securitization business model. Recently, however, REITs have attracted private capital for agency MBS investment because of the high dividend yields they offer, facilitated by the low-rate environment and steep yield curve.

With the government's conservatorship of the two large GSEs, the remaining specialty lending sector can be split into three broad types: small niche firms, finance entities that are captive to a manufacturer, and large diversified firms. Specialty lenders remain an important provider of credit to households and businesses for the purchase and leasing of a wide variety of goods and services, including automobiles, household durables, education, office equipment, and commercial aircraft. At year-end 2010, finance companies owned or managed approximately $600 billion in nonmortgage consumer loans and leases and approximately $500 billion in business loans and leases ***(Charts 5.2.18*** and ***5.2.19)***.

The sector is concentrated; for example, approximately three-quarters of consumer receivables on the balance sheet of finance companies at the end of 2010 were held by only 10 companies. The larger specialty lenders generally are either captive subsidiaries of major manufacturing firms that provide financing for the purchase of the parents' products or diversified entities involved in a variety of consumer and commercial business lines. Captives and diversified specialty lenders' businesses are generally global in scope.

Specialty lenders have traditionally relied heavily on the debt markets for funding, because they have only limited deposit offerings, usually through a wholly owned thrift subsidiary or an industrial loan corporation. The traditional business model for many of the large finance companies depends on access to markets for secured and unsecured debt, as well as support from parent manufacturing companies ***(Chart 5.2.20)***. During the financial crisis, certain specialty nonmortgage lenders adopted a BHC structure, which made them eligible to receive government assistance under the TARP.

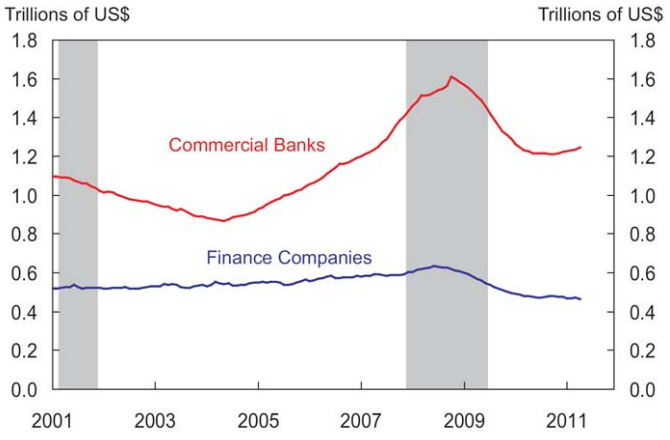
Chart 5.2.18 Consumer Loans Outstanding



Source: Federal Reserve

Note: Loans owned and securitized.

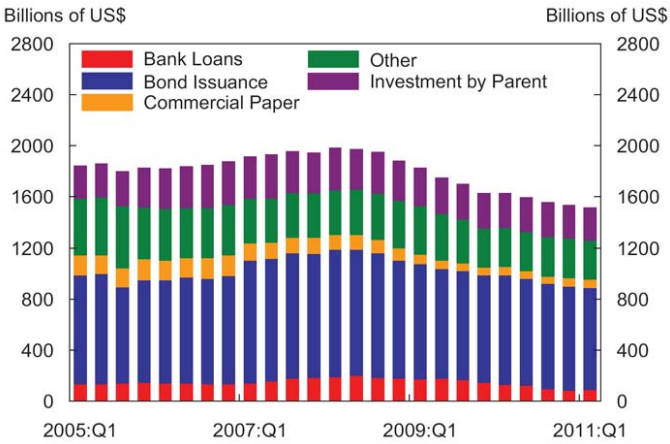
Chart 5.2.19 Business Loans Outstanding



Source: Federal Reserve

Note: Loans owned and securitized.

Chart 5.2.20 Finance Company Liabilities



Source: Flow of Funds

Small specialty lenders, numbering in the thousands, are primarily focused on a specific industry niche or geographic area. These firms obtain financing mainly through bank loans and equity capital; therefore, they may be vulnerable to changes in bank underwriting standards as well as the creditworthiness of their customers. In general, these lenders serve higher risk segments of the economy.

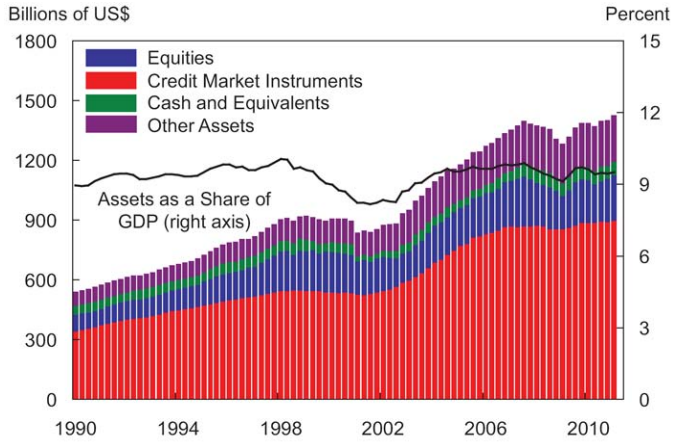
5.2.4 Insurance

The insurance industry is an important source of long-term funding to the economy through its investment of premium income. Insurance companies, with some notable exceptions, generally withstood the financial crisis and have since strengthened their balance sheets. Their investment portfolios have improved along with general financial market conditions. The segment of the industry that provided financial guarantees on mortgages and mortgage-related assets experienced severe difficulties.

Insurance companies are broadly classified into two primary groups: life insurance companies, which sell life insurance, annuities, and other retirement products; and property/casualty insurance companies, which sell personal, professional, and commercial liability insurance. In order to meet future insurance payouts, all insurers invest their premium income in a wide range of assets, thereby providing important long-term funding to the economy. The different asset and capital composition of the life and property/casualty industries reflects distinct claim and benefit payment patterns. In particular, property/casualty companies tend to hold higher credit quality instruments and have greater liquidity needs than life insurance companies ***(Charts 5.2.21*** and ***5.2.22)***.

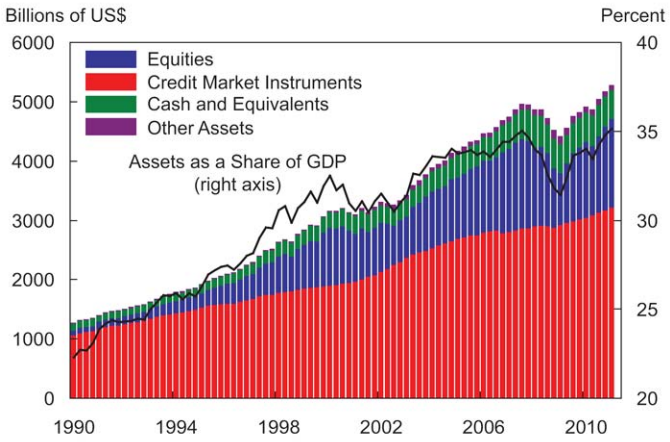
Insurers faced challenges during the financial crisis as asset prices fell sharply and some noncore activities such as securities lending produced large losses. However, the industry withstood the financial crisis quite well in terms of providing insurance services to consumers and businesses. Only 28 of approximately 8,000 insurers became insolvent in 2008 and 2009,

Chart 5.2.21 Property and Casualty Insurance: Assets



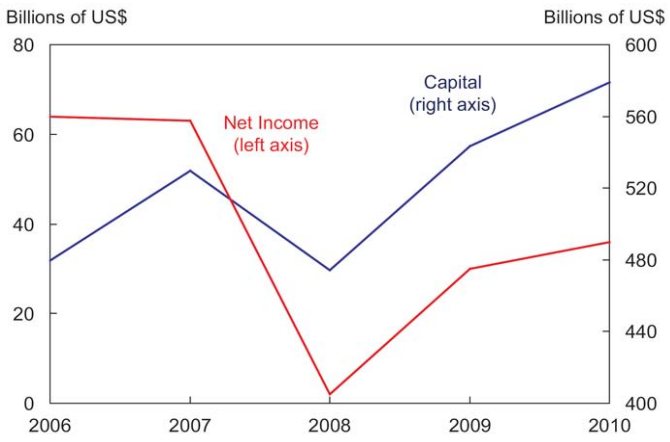
Source: Flow of Funds

Chart 5.2.22 Life Insurance: Assets



Source: Flow of Funds

Chart 5.2.23 Property and Casualty Insurance: Capital and Income



Source: NAIC

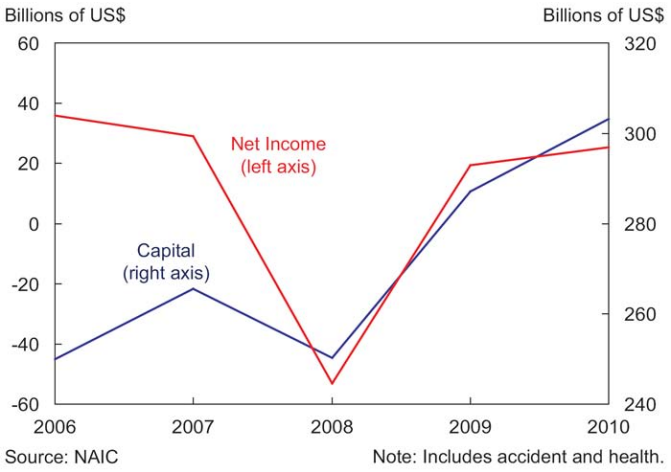
and those insurers are being resolved pursuant to applicable state law. The improvement in financial markets has strengthened the insurance sector's balance sheet and the sector generally is financially healthy.

The property/casualty industry has been in a soft market cycle for the past few years, characterized by highly competitive markets and reduced insurer pricing power. The industry as a whole realized positive net income in 2009 and 2010 ***(Chart 5.2.23)***, and net investment income has remained relatively stable. The industry faced higher than usual claims exposure for the first six months of 2011 due to severe weather in parts of the United States. Similarly to the property/casualty industry, the life insurance sector has experienced reduced premium volumes along with an increase in both policyholder claims and administrative expenses ***(Chart 5.2.24)***. However, these effects were somewhat offset by increases in investment income.

During 2010, general financial market conditions improved and were reflected in insurance company investment portfolios in several ways. Valuation concerns have diminished. Comparisons of fair value to carrying value are less negative, reducing the pressure to take impairments. Improved market conditions also led to more flexibility in managing portfolios without the negative impact of realized losses. However, insurers, state regulators, and the FIO are carefully monitoring exposures to commercial real estate, residential MBS (RMBS), municipal bonds, securities lending, euro area exposures, and derivatives.

The financial guaranty and mortgage guaranty segments of the industry, which are a relatively small portion of the industry as measured by premium income, experienced severe difficulties associated with the decline in house prices and market activity, the increased volume in residential real estate foreclosures, and the impairment in the RMBS market. In particular, due to severe losses, the future viability of the financial guaranty segment (monoline insurers) remains uncertain, with only one monoline group actively writing insurance.

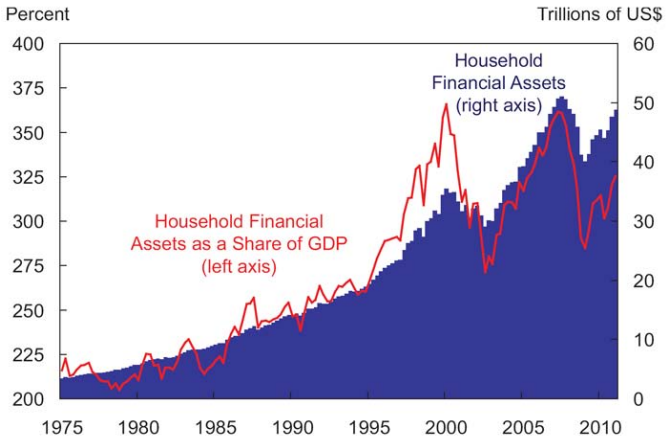
Chart 5.2.24 Life and Other Insurance: Capital and Income



Source: NAIC

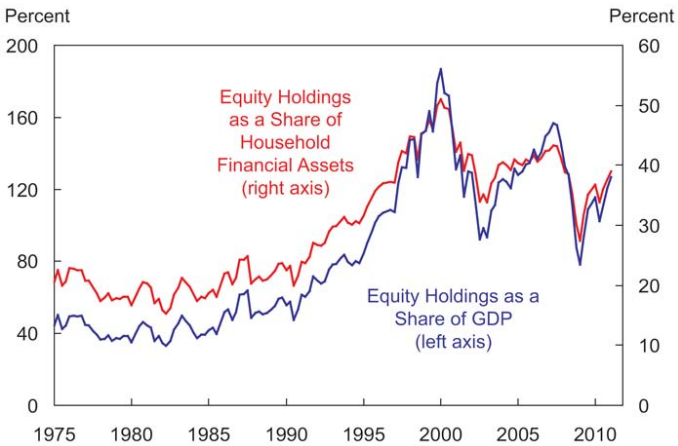
Note: Includes accident and health.

Chart 5.2.25 Household Financial Assets



Source: Flow of Funds, BEA

Chart 5.2.26 Household Equity Holdings



Source: Flow of Funds, BEA

5.2.5 Asset Management

The U.S. asset management industry, with more than $35 trillion under management, is an integral part of the financial system. It has grown with the long-run increase in U.S. household financial assets. A wide range of asset management vehicles, including pension funds and hedge funds, play an important role in the financial system as providers of capital.

The U.S. household sector has built a large stock of financial assets over the past three decades ***(Chart 5.2.25)***. Equity holdings increased over this period and now make up a sizable percentage of both financial assets and GDP ***(Chart 5.2.26)***. Demographic trends should continue to support asset growth, as the baby-boom generation, with its increasing life expectancy, continues to accumulate assets for retirement over the next few years. The aging of the population eventually may have implications for asset allocations.

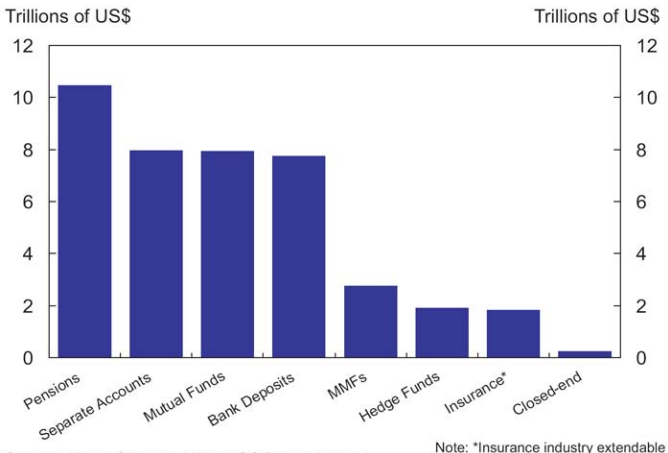
Savers have access to a wide array of investment products through many types of asset managers and vehicles, including money market funds and mutual funds, insurance and retirement funds, and private equity and hedge funds ***(Chart 5.2.27)***.

Mutual Funds and Closed-End Funds

Mutual funds are open-end investment companies, registered and regulated under the Investment Company Act of 1940. According to the Federal Reserve's Flow of Funds report, mutual fund assets under management as of first quarter 2011 were about $11 trillion, with approximately $2.7 trillion in MMFs and $8.3 trillion in other mutual funds. Among non-money-market funds, 65 percent of assets are in equity funds and 35 percent are in bond or hybrid funds.

The MMF sector has grown significantly in recent decades and now plays a dominant role in some short-term credit markets ***(see Box D: Money Market Funds)***. While total assets under management have declined since their peak in 2009, MMFs continue to purchase a large share of private short-term debt issuance.

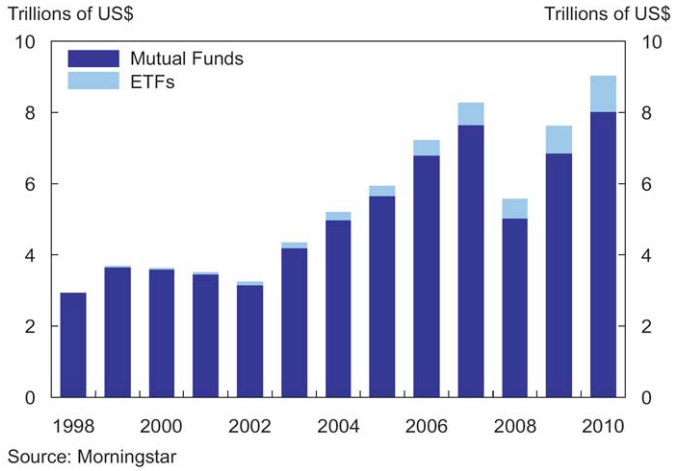
Chart 5.2.27 Investment Management Industry



Source: Flow of Funds, HFR, FSOC calculations

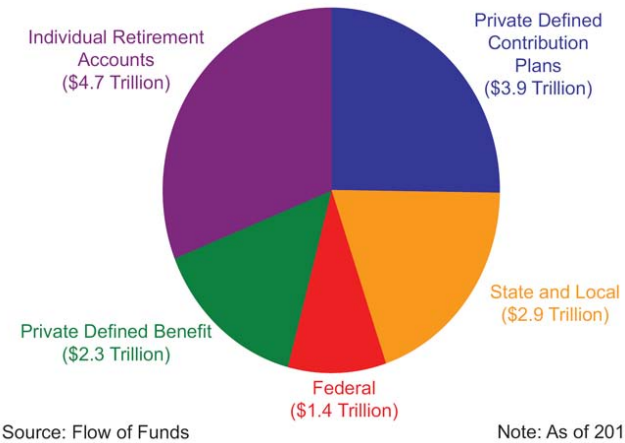
Note: *Insurance industry extendable accounts estimated. Data as of 2010:Q4.

Chart 5.2.28 U.S. Mutual Fund and ETF Assets



Source: Morningstar

Chart 5.2.29 Retirement Funds by Type



Source: Flow of Funds

Note: As of 2010:Q4.

Other mutual fund assets, excluding MMFs, have increased 60 percent since year-end 2008, driven more by increases in the value of assets than by fund flows. Over this period, there have been large net inflows to emerging market equity funds, while net flows to domestic and other advanced country equity funds have been flat. Bond funds have seen net inflows over recent years: $900 billion has flowed into bond and hybrid funds since May 2008.

Mutual funds are liquid, holding at least 85 percent of their assets in liquid securities, and are required to redeem investors' shares for cash within seven days of an investor's request for redemption. Exchange traded funds (ETFs), shares of which can be bought and sold on an intraday basis in secondary markets, have taken market share from mutual funds ***(see Chart 5.2.28*** and ***Box E: Exchange Traded Funds)***.

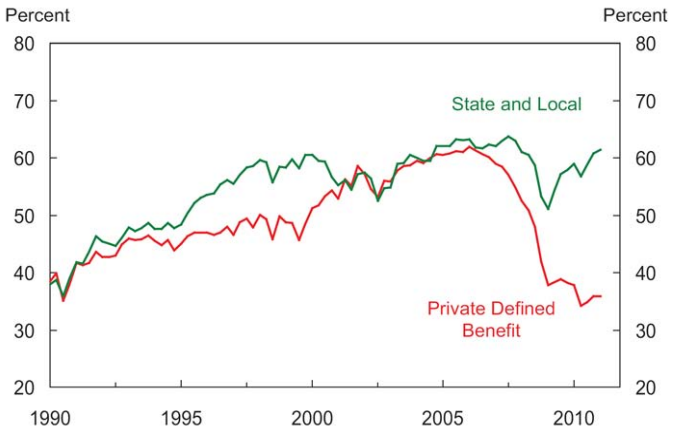
The use of leverage by mutual funds is generally constrained by statutory restrictions. Specifically, mutual funds' explicit leverage is limited by an applicable asset coverage ratio of 300 percent. Mutual funds may take on additional implicit leverage via derivatives, although the SEC places limits on this activity.

The closed-end fund sector is much smaller, with assets under management of $250 billion as of the end of first quarter 2011. These funds issue nonredeemable equity securities that are traded on an exchange; thus, unlike mutual fund investors, closed-end fund shareholders look to the secondary market for liquidity in their shares. Under their regulations, closed-end funds are able to undertake greater leverage than mutual funds.

Retirement Funds

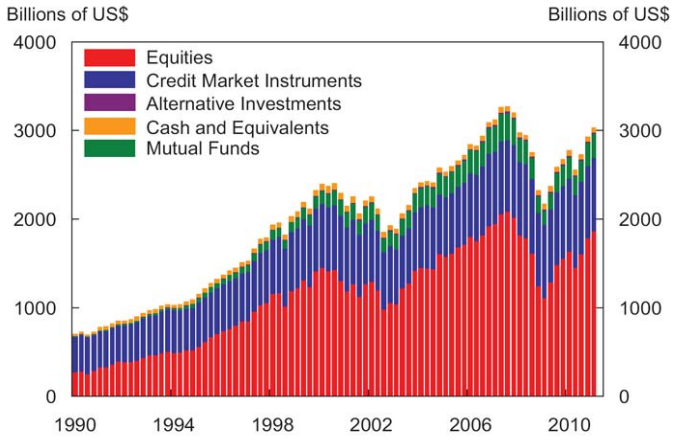
Retirement funds constitute an important category of U.S. household financial assets and are a source of long-term funds for the financial system. As of year-end 2010, the combined assets under management of private and public pensions stood at over $14.0 trillion. Government-managed pension plans make up just over one-quarter of total retirement funds ***(Chart 5.2.29)***. There are three main types of retirement funds: funds privately managed by

Chart 5.2.30 Pension Fund Assets Allocated to Equities



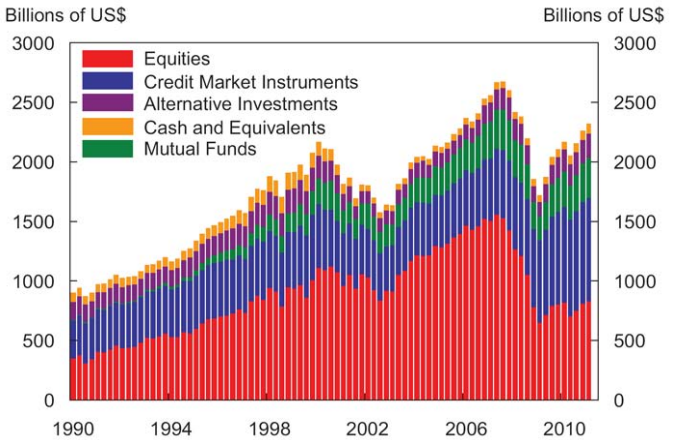
Source: Flow of Funds

Chart 5.2.31 State and Local Government Pension Plans



Source: Flow of Funds

Chart 5.2.32 Private Defined Benefit Pension Plans



Source: Flow of Funds

individuals (for example, IRAs); defined benefit pension plans, in which certain future benefits are promised to beneficiaries; and defined contribution plans, which do not guarantee future benefits.

Retirement funds have traditionally divided their assets among fixed-income securities (whose cash flows are managed to match the likely schedule of payouts in retirement), mutual funds, and equities (which offer the benefit of higher expected return). Between 1990 and 2006, the allocation to equities increased in state and local government defined benefit plans as well as private ones. Since the crisis, private defined benefit plans have sharply decreased their allocation to equities, while state and local government funds, which are typically defined benefit plans, have not adjusted their allocation ***(Chart 5.2.30)***.

The declines in equity market valuations from 2007 levels led to substantial investment losses across retirement fund types ***(Charts 5.2.31***, ***5.2.32***, and ***5.2.33)***. As a result of these losses and the decline in the assumed discount rates for these plans, the market value of assets fell significantly below the present value of liabilities for many private and public defined benefit plans. Public pension funds face more significant funding shortfalls than their corporate counterparts owing to their larger, longer term liabilities, lower sponsor contributions in recent years, and the challenges facing state and local sponsors in making adequate plan contributions in the current fiscal environment ***(Chart 5.2.34)***.

Investment Managers

Investment managers oversee approximately $8 trillion in separately managed accounts. This number has rebounded from $6 trillion at the end of 2008 but is still below the peak of $8.6 trillion in 2007.

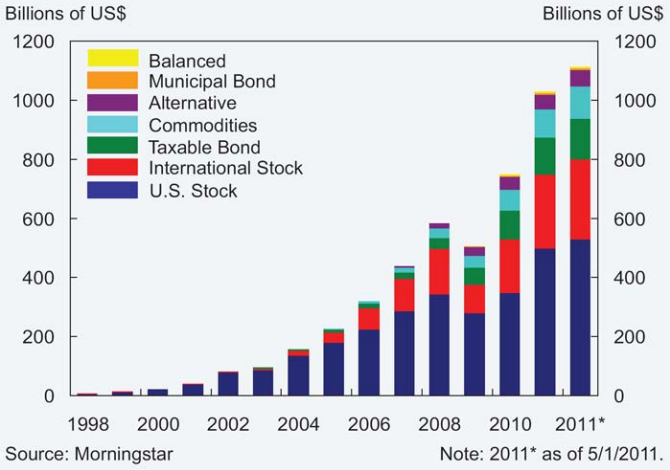
In separately managed accounts, investment losses fall solely on the account owner, so these accounts generally do not raise direct financial stability concerns. However, investment managers who pursue similar strategies across accounts and in associated managed funds (in part to capture economies

Box E: Exchange Traded Funds

Exchange traded funds (ETFs) have grown to account for an increased share of the fund management sector. While regulations restrict synthetic-based ETFs in the United States, they are an important part of the European ETF market.

ETFs are generally passively managed, index-tracking funds traded on an exchange. While ETFs are relatively low-margin products for fund sponsors and market makers, they are rapidly gaining popularity as a means of achieving low-cost exposure to nearly any market index, including emerging markets and commodities. Additionally, unlike traditional open-end mutual funds, ETF shares can be bought and sold on an intraday basis in liquid secondary markets. Since their inception in the 1990s, ETFs have grown to account for more than $1 trillion in assets, or approximately 13 percent of the long-term mutual funds industry ***(Chart E.1)***.

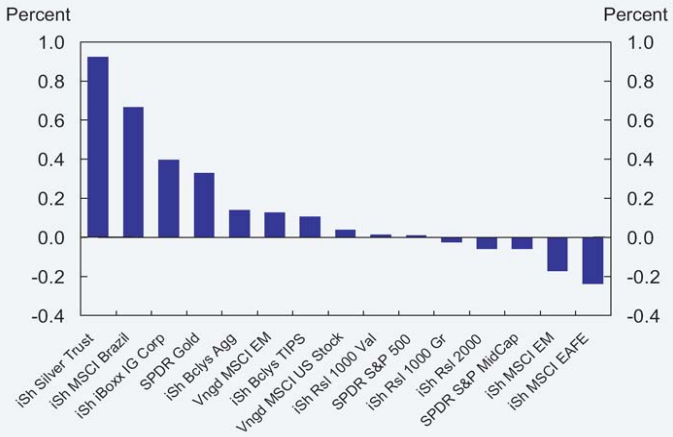
Chart E.1 U.S. Exchange Traded Funds (ETFs)



Source: Morningstar Note: 2011* as of 5/1/2011.

U.S.-domiciled funds make up approximately two-thirds of global offerings. About 97 percent of total net assets of U.S.-domiciled ETFs are passively managed, seeking to mimic market or sector indexes such as the S&P 500. For the most part, these index funds hold a portfolio of underlying securities that replicate the return of the index, though they may exhibit small divergences from their net asset value (NAV) as a result of cash management or portfolio sampling issues ***(Chart E.2)***. While tracking errors may be small, such deviations could lead to inefficiencies for institutional investors that are using ETFs to put on large hedged positions.

Chart E.2 Major ETF Divergence From Net Asset Value (NAV)



Source: Morningstar Note:12 month premium/discount from NAV as of 3/24/11.

The U.S. ETF market generally provides long, unleveraged exposure to an underlying asset or asset class. Some ETFs enter into securities lending transactions to supplement returns and lower fees, which may somewhat increase their leverage and liquidity risk.

About 3 percent of total U.S.-domiciled ETF assets are synthetic, offering 2–3 times leverage through the use of derivatives. Synthetic ETFs have experienced limited growth in the United States, partly because strict regulatory standards limit the use of derivatives to replicate underlying indexes. These standards are applicable to the roughly 90 percent of ETFs registered under the Investment Company Act of 1940 (40 Act). For example, in March 2010, pending a review of current practices, the SEC froze the ability of new ETF sponsors to introduce 40 Act ETFs that would make significant investments in derivatives. U.S. rules require that a 40 Act ETF sponsor be separate from its ETF market maker, and that domestic ETFs must hold at least 85 percent of their portfolios in liquid assets. Together, these rules have limited flexibility to engage in derivatives-based activity and have rendered many synthetic structures uneconomical.

In contrast, nearly half of European-domiciled ETFs synthetically replicate the underlying index using swaps and other derivatives. This increased complexity may lead to decreased ETF liquidity during times of heightened market volatility. Additionally, market participants—including banks providing swaps—might take on increased funding risk if ETFs suffered from a sudden loss of liquidity. U.S. investors and regulators should be alert to the possibility of liquidity or counterparty exposure risks emanating from foreign-domiciled ETFs spilling over to domestic institutions and markets.

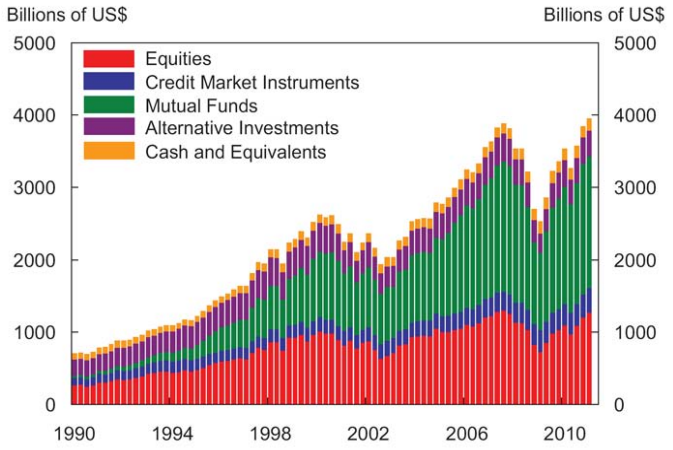
ETFs differ from another type of synthetic security: exchange traded notes (ETNs). ETNs are similar to ETFs in that they are traded on an exchange and provide returns based on an underlying benchmark or strategy. However, ETNs are actually structured notes that represent unsecured claims on the issuer rather than a claim on the underlying reference asset. (Structured notes are discussed in Section 5.2.8.)

The rise of ETFs has been driven, in part, by the perception that liquidity is unavailable in traditional open-ended mutual funds. ETF shares are traded on exchanges like ordinary stocks, which enhances the ability of investors to quickly take on and shed risk. ETF sponsors do not restrict the daily creation or redemption of ETF shares by authorized liquidity providers. These authorized participants may be broker-dealers executing client orders or arbitragers exploiting and eliminating departures of ETF prices from their underlying portfolios. In contrast, mutual funds can only be bought or redeemed with the sponsor at the close of each day and may be subject to redemption fees.

However, while these sources of liquidity generally benefit investors, they may also imply avenues through which liquidity could become constrained. For example, if a sponsoring broker-dealer were unable or unwilling to provide liquidity, the bid-ask spread could widen, leading to heightened price volatility. A departure of arbitragers from the market could result in ETF shares trading at a persistent discount or premium relative to their NAV, thus increasing tracking errors.

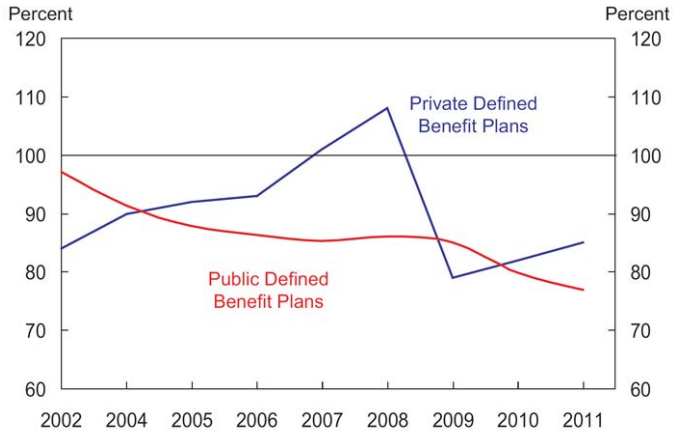
Indeed, illiquid trading conditions triggered extreme volatility in the pricing of ETFs during the May 6, 2010, flash crash ***(see Section 5.3)***.

Chart 5.2.33 Private Defined Contribution Pension Plans



Source: Flow of Funds

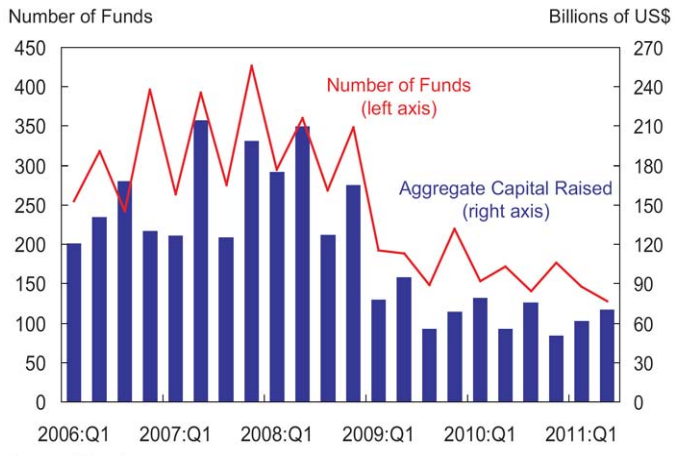
Chart 5.2.34 Public and Private Pension Funding Level



Source: NASRA, Goldman Sachs Global Market Institute

Note: 12/31/2010 public pension data is preliminary.

Chart 5.2.35 Private Equity



Source: Preqin

of scale) could pose broader risks to financial markets by increasing the volume, and thus impact, of managers' trading. Investment managers, along with mutual and pension funds, are generally not overtly leveraged.

Alternative Investments: Private Equity

Private equity—investments in a company's nonlisted equity capital—is an alternative form of financing to public equity and debt for firms that are unable to secure traditional funding or as a supplement to other capital. Private equity offers investment returns that are potentially enhanced by active ownership and strategic management, with investments taking the form of venture capital or buyouts of public shareholders. Characterized by long-term investment horizons with locked-up capital and high risk-return profiles, private equity has become a component of many diversified portfolios. Many private equity investments saw substantial losses in the crisis, and the number of private equity funds has fallen, along with the capital raised by these funds ***(Chart 5.2.35)***.

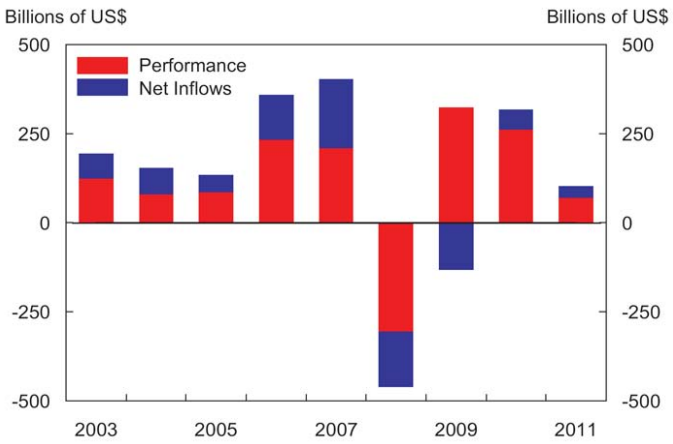
Alternative Investments: Hedge Funds

Assets managed by hedge funds increased 19 percent in 2010 and currently stand at approximately $2 trillion, near the pre-crisis peak level reached in early 2008. Hedge funds continue to draw institutional investor interest, in part because of the perception that hedge funds are relatively less correlated to broad asset class movements. Industry growth has resumed despite somewhat lackluster performance in recent quarters ***(Charts 5.2.36*** and ***5.2.37)***.

Following the crisis, institutional investor preferences for larger, more established funds with longer track records led to a greater concentration of industry assets at larger firms ***(Chart 5.2.38)***. However, flows have recently shifted toward medium-sized firms.

Leverage in the industry remains below pre-crisis levels, with factors related to both the demand for and supply of leverage playing important roles. The forced liquidations and large redemptions some funds experienced during the financial crisis have prompted

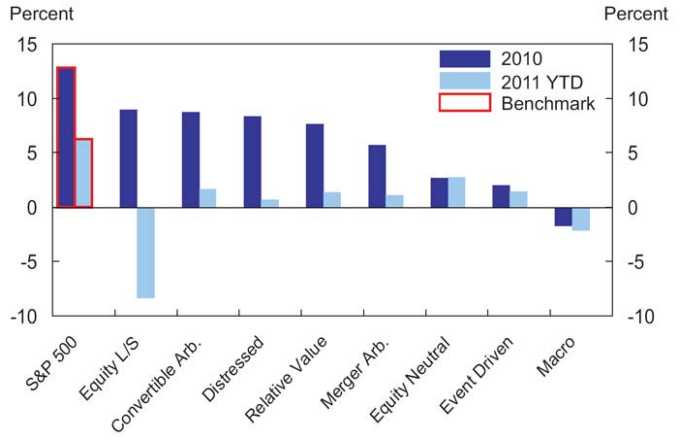
Chart 5.2.36 Change in Hedge Fund AUM



Source: HFR, FSOC calculations

Note: 2011 is YTD as of Q1.

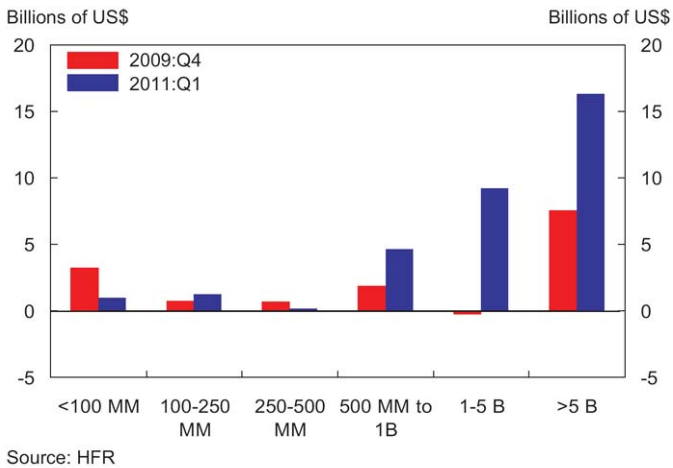
Chart 5.2.37 Hedge Fund Performance By Strategy



Source: HFR

Note: YTD through 6/30/2011.

Chart 5.2.38 Distribution of Net Asset Flows by Size of Fund



Source: HFR

less demand for leverage, with many funds preferring a liquidity cushion in the event of adverse market moves. Stricter regulatory capital requirements and internal changes to prime brokers' financing practices have also led to a reduced supply of leverage. Nonetheless, both the demand for and supply of leverage are above the lows of early 2009, especially among fixed-income arbitrage, credit trading, and global-macro funds.

Historically, regulators have had little reliable, detailed information regarding the activities of any particular hedge fund or hedge funds in general, which is of concern because of their increased role in the financial system. For example, hedge fund lenders may be increasingly important sources of funding for middle-market companies that have little access to public capital markets. Having information on hedge funds could be helpful for monitoring emerging financial market vulnerabilities that could affect hedge funds and the parties with whom they trade or from whom they obtain leverage (such as prime brokers). In January 2011, the SEC and the CFTC jointly proposed a new data collection form that would gather detailed information from hedge funds.

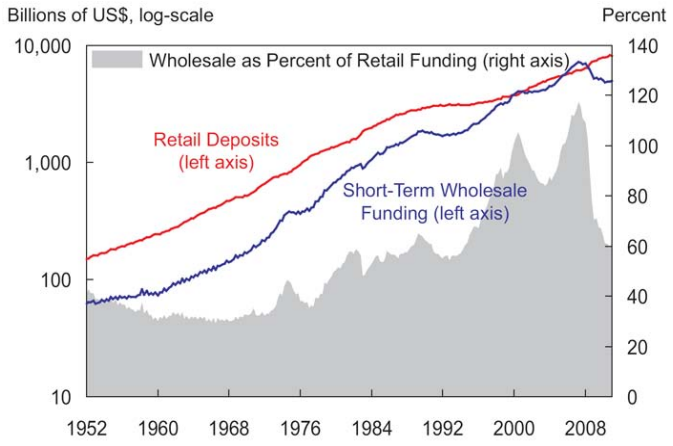
Part II. Markets and Infrastructure

5.2.6 Short-Term Wholesale Funding

Short-term wholesale funding markets play a central role in the financial system by providing financial intermediaries with funding to support their activities. However, these markets are inherently fragile owing to the frequent need to roll over maturing debt and the sensitivity of institutional investors to perceptions of risk. The larger footprint of short-term wholesale debt markets in the financial system before the crisis likely reduced market and institutional resiliency.

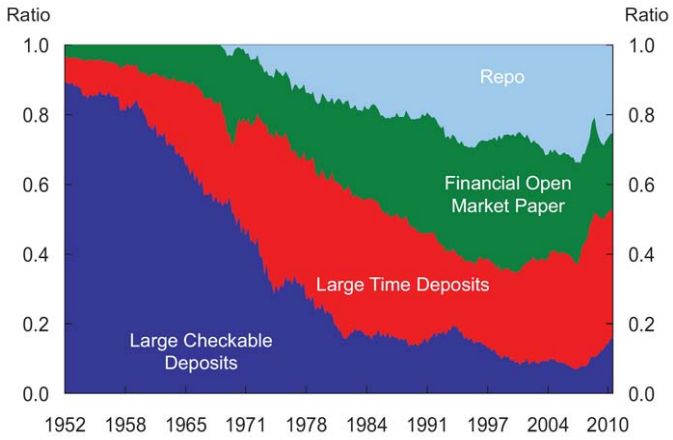
Like retail bank deposits, short-term wholesale funding markets play an important role in the financial system by providing financial intermediaries with liquidity to support their activities. On the other side of these transactions, short-term wholesale debt—which includes large time and checking

Chart 5.2.39 Retail Deposits vs. Short-Term Wholesale Funding



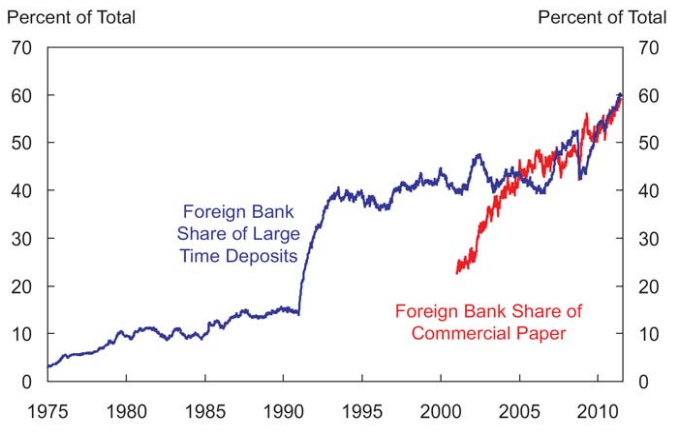
Source: Flow of Funds

Chart 5.2.40 Composition of Short-Term Wholesale Funding



Source: Flow of Funds, FSOC calculations

Chart 5.2.41 FBO Share of US$ Short-Term Wholesale Debt



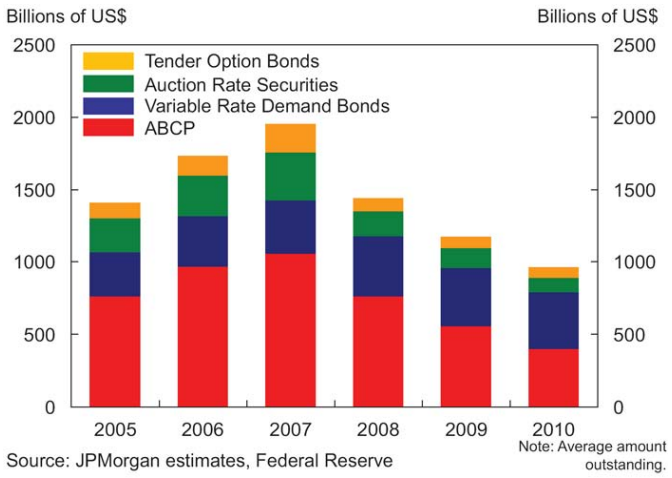
Source: Federal Reserve

deposits, repos, and CP—meets the demand of institutional cash managers, such as large corporations, for liquid investments. Growth in these markets outpaced that of retail deposits in recent decades, driven by technological, regulatory, economic, and other factors that have changed financial institution and investment management practices ***(Chart 5.2.39)***. In particular, institutional cash managers once kept most of their liquid funds in checkable or time deposit accounts at banks. Since the 1970s, however, they have placed a large and increasing portion of their liquid funds in MMFs and other intermediaries, which, in turn, invest heavily in repos, CP, and other short-term debt markets that do not have access to the FDIC's deposit insurance ***(Chart 5.2.40)***.

The proportion of short-term wholesale U.S. dollar debt issued by foreign banks increased markedly before the crisis and remains elevated. Many foreign banks have large U.S. dollar funding needs because of their holdings of U.S. assets and because of the increasingly global nature of banking. Rather than incur the restrictions and costs associated with establishing a U.S.-chartered commercial bank, many foreign institutions meet dollar funding needs by issuing large time deposits from foreign branches located in the United States or through funding subsidiaries that issue commercial paper. Even though foreign branches have access to the Federal Reserve's discount window, they are not allowed to issue insured deposits. By the end of 2006, foreign banks issued 45 percent of unsecured financial CP, sponsored 60 percent of ABCP conduits, and issued 42 percent of commercial bank large time deposits. Although sponsorship of ABCP conduits has declined, foreign banks constitute an even larger share of unsecured CP and large time deposits ***(Chart 5.2.41)***.

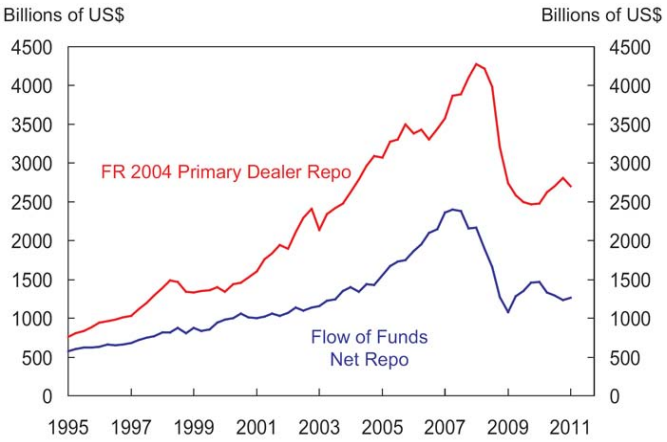
The growth of different forms of short-term debt instruments also corresponds with the broader trends of nonbank credit intermediation and the heightened importance of capital markets. Credit intermediation involving entities outside the banking system—so-called shadow banking—increased substantially leading up

Chart 5.2.42 Short-Term Collateralized Debt



Source: JPMorgan estimates, Federal Reserve

Chart 5.2.43 Estimated Size of Repo Market



Source: Federal Reserve

to the crisis. Significant reliance on short-term wholesale funding made these entities and the complex web of activities they supported more vulnerable to shocks than insured depository institutions.

These entities also became a source of vulnerability to the commercial banking system. For example, banks and other financial institutions implicitly and explicitly supported a large volume of short-term wholesale funding instruments, including ABCP conduits and a variety of other short-term collateralized debt ***(Chart 5.2.42)***. Before recent accounting reforms ***(see Box F: Improvements in Regulatory Capital and Accounting Measures of Assets)***, assets underlying these funding arrangements were generally off-balance sheet. This kind of accounting allowed for favorable capital treatment, bolstered equity returns of the sponsoring institution, and reduced perceptions of the risk associated with these arrangements. However, investors' concerns regarding the quality of ABCP collateral, the viability of financial guarantors, and the ability of financial institutions to provide the promised liquidity support prompted a sharp contraction in demand for these instruments beginning in mid-2007. Banks and other financial institutions purchased the underlying assets out of implicit or explicit obligation, placing significant strain on their funding and capital positions.

A major portion of the pre-crisis increase in the short-term wholesale funding markets was associated with the repo market. By using securities as collateral, repurchase agreements facilitate the extension of low-cost short-term financing to holders of high-quality securities. While the size of the repo market is difficult to estimate because of netting and accounting conventions, it had clearly grown rapidly leading up to the crisis and had become a key funding source for broker-dealers and hedge funds ***(Chart 5.2.43)***. Changes to bankruptcy laws that allowed lenders to take possession and liquidate repo collateral—notwithstanding the automatic stay otherwise applicable in the bankruptcy process—likely reduced the cost of securities financing, increased securities market

Box F: Improvements in Regulatory Capital and Accounting Measures of Assets

A firm's capital allows it to absorb unexpected losses on its assets. For regulators to enforce appropriate capital standards, they need a comprehensive measure of the firm's total risk exposure. Before the crisis, many financial institutions avoided higher capital charges relating to particular assets by holding them in off-balance-sheet vehicles. In addition, some capital risk charges did not appropriately reflect the risk of certain asset classes. Regulatory changes and accounting rules have been implemented to address these issues, and more changes are planned.

Consolidating Assets on Balance Sheet

In June 2009, the U.S. Financial Accounting Standards Board (FASB) introduced two amendments to financial accounting standards that change the way companies account for transfers of financial assets and special-purpose entities. The amendments, which took effect for most financial institutions in January 2010, addressed the weakness that financial statements did not fully reflect material assets and liabilities associated with certain securitizations in which the securitizers retained an interest but did not have to record them on their balance sheets.

Amendments to Accounting Standards Codification (ASC) Topic 860, "Transfers and Servicing," revised the requirements for derecognizing assets. Among other changes, the amendments eliminated the concept of a "qualifying special-purpose entity," thereby subjecting more mortgage- and asset-backed securitizations to consolidation on the balance sheet. An institution that sells certain loan participations is required to retain those interests on its balance sheet unless it transfers those participations on a strictly pro- rata basis as to both payment and default risk.

Similarly, ASC Topic 810, "Consolidation," requires that a bank consolidate on its balance sheet certain "variable interest entities" that previously were permitted to remain off the balance sheet. Specifically, ASC 810 may require consolidation if an affiliate of the bank retains control over the financial assets and retains certain economic rights or obligations with respect to the assets.

ASC 860 and ASC 810 require additional disclosures regarding holdings of variable interests, transfers of financial assets, and continuing involvement with transferred assets. Securitization requirements introduced by the Dodd-Frank Act, mandating the retention of an economic interest in the credit risk of assets that an entity securitizes, could lead to consolidation of newly securitized assets under these requirements.

Leverage Ratio

U.S. regulators also require insured commercial banks and savings institutions to satisfy a leverage ratio requirement. A leverage ratio provides for a base of capital relative to assets and thus constrains the extent to which institutions can lever themselves. The ratio provides a backstop against the possibility of model risk or other mis-measurement of risk in the risk-based capital rules. For many years, the U.S. leverage ratio did not incorporate off-balance-sheet exposures, on the theory that those are captured by the risk-based capital requirements. Among other changes, the new Basel III agreement includes a leverage ratio standard that applies to both on- and off-balance-sheet exposures, including an add-on for potential future exposure for over-the-counter derivatives. Section 171 of the Dodd-Frank Act establishes the risk-based and leverage capital requirements that are generally applicable to insured banks as a floor for certain regulatory capital rules.

Risk-Based Capital

The basis of risk-based capital is an assessment of how much risk a given class of exposure contains. The standards for performing this assessment have changed over time. Both insurance and banking regulators use risk-based capital measures as one tool in their assessment of the safety and soundness of supervised institutions.

Banks and Savings Institutions

The original Basel capital standards used fixed weights for particular types of credit risk exposure. For example, certain single-family residential mortgage loans received a risk weight of 50 percent, while commercial loans received a weight of 100 percent. For institutions with large exposures to market risk, risk weights are derived from value-at-risk calculations for general market risk and either a standardized approach or value-at-risk approach for idiosyncratic risks. In addition, risk weights are applied to off-balance-sheet exposures, including counterparty credit risk arising from derivatives and some lending commitments.

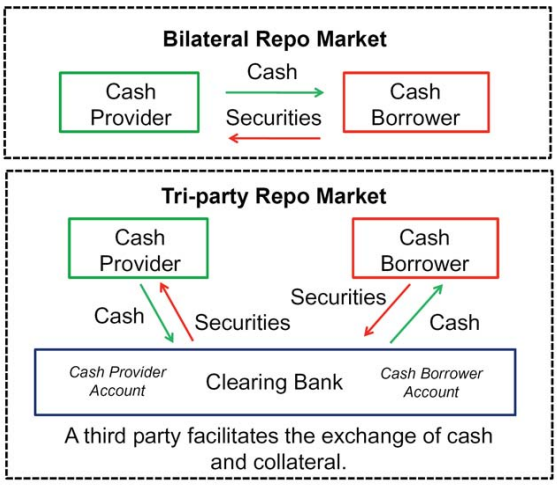
In 2007, the U.S. regulators issued a rule implementing Basel II for internationally active banks and bank holding companies (BHCs). Basel II incorporates operational risk exposure and relies more on firms' internal data regarding the riskiness of exposures. The rule requires a banking organization to demonstrate the rigor of its internal risk measurement systems to its supervisor for at least one year before using those systems for risk-based capital purposes. Currently a number of BHCs (representing the majority of U.S. banking system assets) are in this "parallel run" stage and are making the necessary systems refinements to exit the parallel run.

The new Basel III agreement enhances the coverage of market risk. Certain high-risk positions, such as structured credit, will now face much higher capital charges. Basel III also introduces explicit charges for the mark-to-market losses (also known as credit valuation adjustments) of counterparty credit risk and makes it more costly to extend credit to other financial institutions. These new requirements will make it more expensive for institutions to engage in activities that were destabilizing during the financial crisis.

Insurance Companies

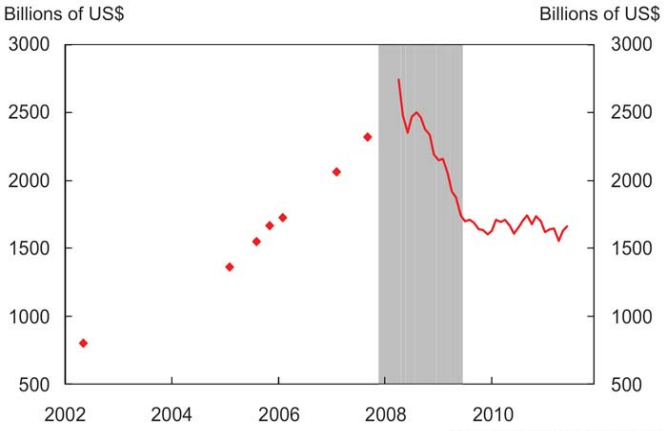
A significant component of risk-based capital for U.S. insurance companies is based on an assessment of credit quality of (and hence the risk of loss on) an insurer's investment portfolio. For bonds rated by at least one of the nationally recognized statistical rating organizations (NRSROs), state insurance regulators for many years relied on a formulaic approach to translating NRSRO ratings into NAIC designations. Beginning in 2009 for residential mortgage-backed securities (RMBS) and 2010 for commercial mortgage-backed securities (CMBS), the state insurance regulators changed the process by which individual holdings of insurers are assigned designations of creditworthiness. This change was made because of volatility and risk in the residential and commercial mortgage markets. The new approach focuses on modeling each security and developing expected recovery values assuming the securities are held to maturity. Significantly, the expected recovery values are compared with individual companies' carrying values, reflecting the different risk profile of securities held at significant discounts to par value. NRSRO ratings assume holding at par, but in a volatile marketplace securities are frequently purchased at deep discounts. In an economic environment that has seen extreme stress, conservative valuation rules under statutory accounting principles require an insurer to take capital impairments. The new process of evaluating and designating the creditworthiness of insurer-held RMBS and CMBS more accurately reflects the risk of loss.

Chart 5.2.44 Bilateral vs. Tri-party Repo Market



Source: FSOC

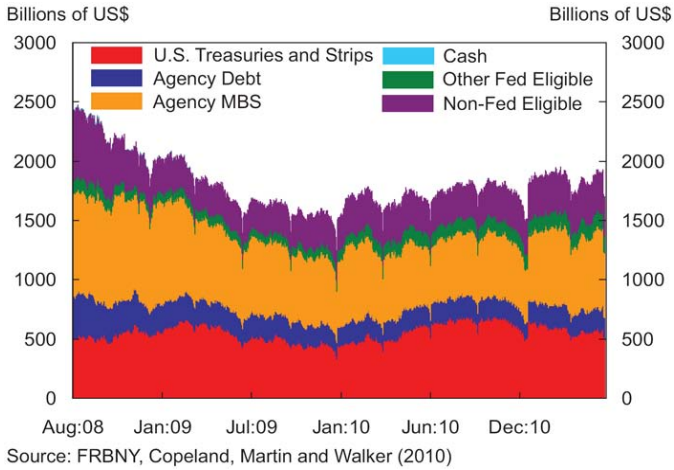
Chart 5.2.45 Estimated Value of the Tri-party Repo Market



Source: FRBNY White Paper, Tri-Party Repo Infrastructure Reform Task Force

Note: Limited data were provided by clearing banks prior to April 2008. These figures are estimates based on the data provided.

Chart 5.2.46 Tri-party Repo Collateral



Source: FRBNY, Copeland, Martin and Walker (2010)

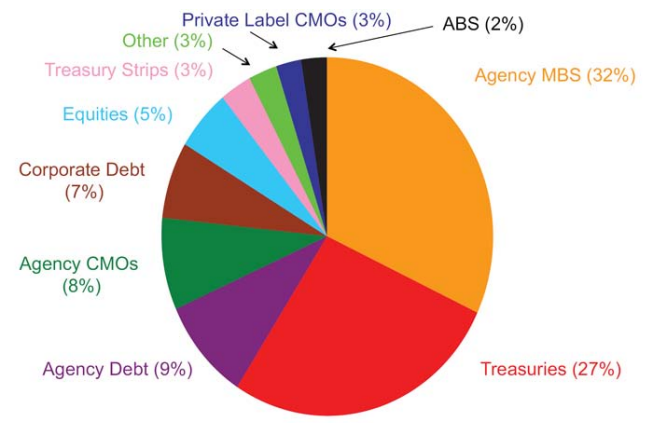
liquidity, and facilitated the growth of parts of the asset management industry. However, the use of the repo market as an important source of short-term leverage increased funding vulnerabilities among key investors and intermediaries during the crisis.

Repos can be transacted either bilaterally between two market participants or through an intermediary, such as a clearing bank, which administers the exchange of cash and collateral between dealers and lenders ***(Chart 5.2.44)***. Initially smaller and limited to U.S. Treasury and agency collateral, the tri-party market grew to $2.7 trillion in 2008 ***(Charts 5.2.45)***, fueled by increases in securities issuance (which boosted the secured financing need of market makers), large inflows of funds into MMFs, and cost reductions associated with centralized collateral management at the clearing bank. Despite the decline in the size of the market, tri-party repo remains a key source of financing for broker-dealers and other financial market participants ***(Charts 5.2.46*** and ***5.2.47)***.

The providers of funds in short-term wholesale markets are institutional investors such as corporations and asset managers motivated primarily by liquidity and safety of principal. Strong growth in the cash and liquid asset holdings of the corporate and asset management sectors in the years before the crisis supported the issuance of short-term wholesale debt. These cash investors often use money market funds and other intermediaries to diversify counterparty exposures and centralize risk management and operations. The growing prevalence of short-term wholesale debt—as well as the size and risk sensitivity of the institutional investor base—likely reduced market and institutional resiliency before the crisis.

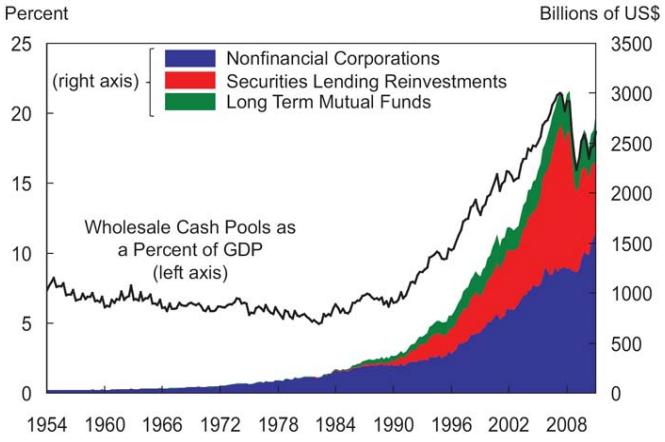
Growth in liquid asset and cash holdings was particularly pronounced in the corporate and securities lending sectors in the pre-crisis period ***(Chart 5.2.48)***. Cash and related investments among corporations have increased at rates exceeding GDP, and they are a larger share of total assets than in the early 1990s. In addition, the growth in the securities

Chart 5.2.47 Tri-party Repo Collateral Distribution



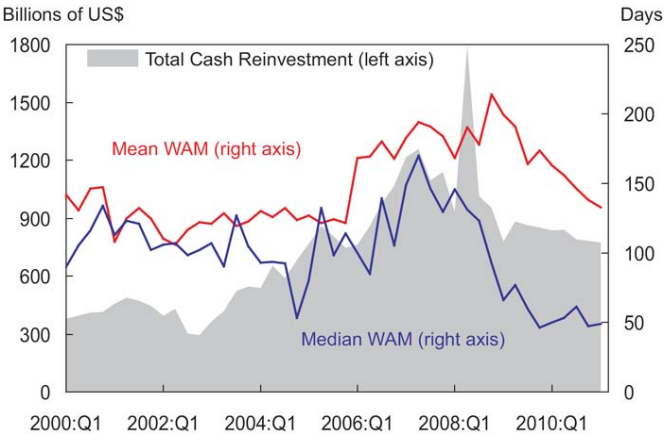
Source: Tri-Party Repo Infrastructure Reform Task Force Note: As of 6/2011.

Chart 5.2.48 Wholesale Cash Investors



Source: Flow of Funds

Chart 5.2.49 Securities Lending Cash Reinvestment



Source: The Risk Management Association

lending industry—which supplies securities to broker-dealers, hedge funds, and others in exchange for cash collateral—has prompted a substantial increase in related short-term investing. Cash collateral reinvestment from securities lenders grew from about $300 billion in 1999 to about $1.2 trillion in 2007. During this period, large broker-dealers expanded their prime brokerage business with leveraged hedge funds that engaged in fee-generating activities such as securities lending. However, lower demand for securities among broker-dealers and hedge funds, as well as heightened counterparty concerns among securities lenders, prompted a sharp decline in securities lending and related cash reinvestment volumes ***(Chart 5.2.49)***. In addition, the weighted average duration of cash reinvestment declined as cash management agents reduced risk in response to the crisis.

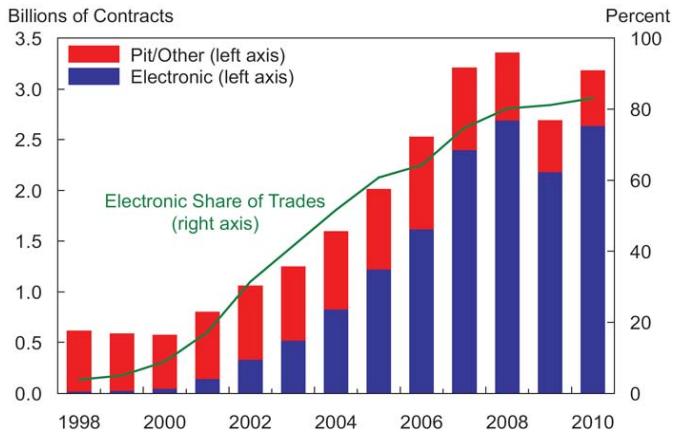
5.2.7 Financial Infrastructure

Advances in technology and improvements to infrastructure—such as exchanges, central counterparties, and data repositories—have altered the landscape significantly, providing financial markets with improvements to efficiency and transparency.

Exchanges and Electronic Trading Platforms

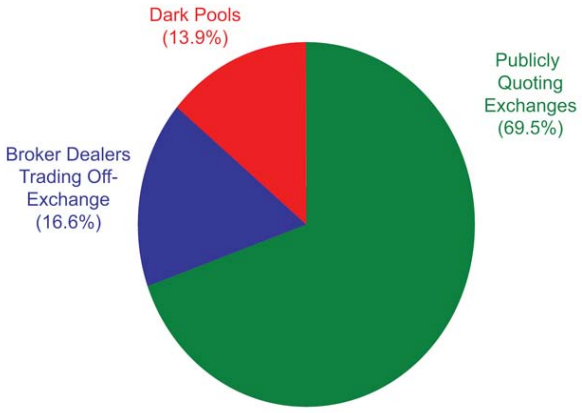
Changes in technology and trading practices have affected exchanges, encouraging a migration of trading from exchange floors to electronic trading platforms. For example, electronic trading accounted for approximately 83 percent of volume in U.S. futures markets in 2010 ***(Chart 5.2.50)***. There has also been a notable increase in the use of algorithmic trading. Extraordinarily high-speed computer programs facilitate both large-block trading on the part of professional investors seeking to minimize their impact on prices (execution algorithms), and proprietary trading strategies that can rapidly buy and sell the same security or future many times per second (high-frequency trading). The latter type of computerized trading is believed to account for 50 percent or more of total volume.

Chart 5.2.50 U.S. Futures and Options Trading



Source: CFTC

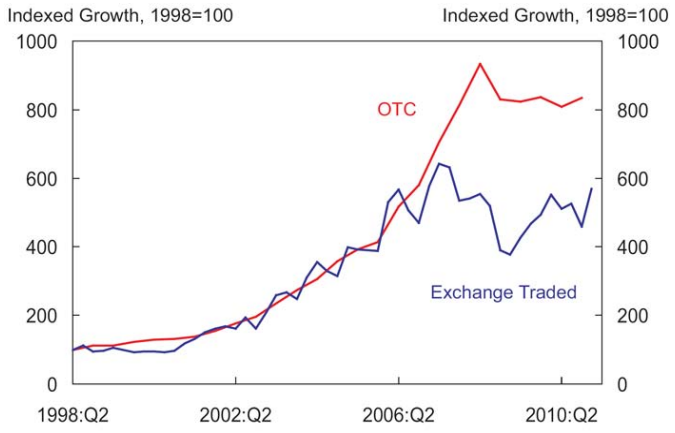
Chart 5.2.51 Trading Venues for U.S. Equities by Market Share



Source: Rosenblatt Securities

Note: As of 5/31/2011.

Chart 5.2.52 OTC and Exchange Traded Derivatives Growth



Source: BIS

Note: Notional values.

Additionally, these types of trading venues have become more fragmented. Over the past 18 months, the market share of reported trading volume executed on undisplayed venues (composed of "dark pools" and broker-dealers executing trades internally) has increased to more than 30 percent ***(Chart 5.2.51)***. As of May 2011, no single publicly quoting exchange platform had more than one-fifth of market share.

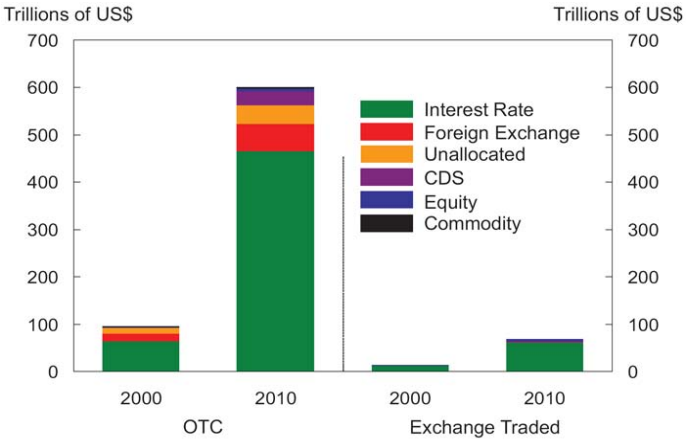
Infrastructure Supporting Derivatives Markets

Infrastructure supporting derivatives markets is also undergoing significant change, with certain asset classes—such as the interest rate swap market—driving these developments. Trading, central clearing, and reporting in OTC derivative trades are likely to undergo significant changes as regulators begin finalizing, adopting, and enforcing rules that further strengthen OTC markets through organized platform trading, central clearing of standardized products, and mandatory trade reporting.

Historically, because OTC derivatives instruments are designed to allow market participants flexibility in customizing transactions, they have been significantly less standardized and less liquid than their listed (or exchange traded) counterparts. The proportion of OTC relative to exchange traded derivatives varies widely by asset class. For example, virtually all credit derivatives are traded OTC, while in equities, there is significant liquidity in exchange traded futures and options globally ***(Charts 5.2.52***, ***5.2.53***, and ***5.2.54)***. For this reason, many OTC derivatives trading and risk management functions were conducted in a bilateral and distributed manner, without the use of organized trading platforms or centralized clearing arrangements. This made it difficult to quantify and characterize global activity and manage counterparty credit risk exposures.

Trends toward organized platform trading and central clearing are helping to address these challenges. In conjunction with increases in organized platform trading, the use of central counterparties in the United States, as well as the different types and volumes of derivatives cleared by them, is increasing ***(Chart 5.2.55)***. A central counterparty clearinghouse

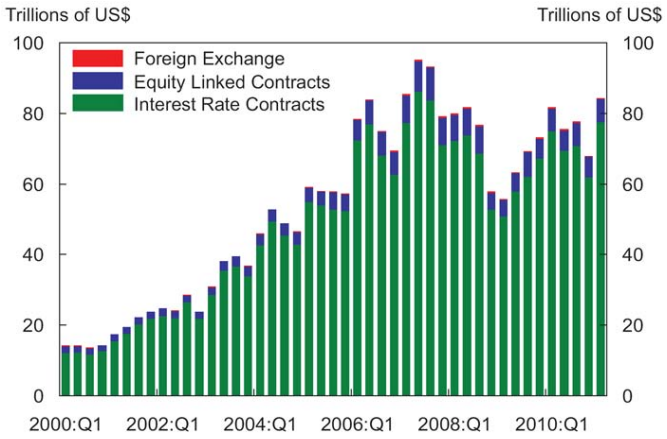
Chart 5.2.53 OTC and Exchange Traded Derivatives



Source: BIS

Note: Notional values.

Chart 5.2.54 Exchange Traded Derivatives



Source: BIS

Note: Notional values.

Chart 5.2.55 U.S. Regulated Derivatives Central Counterparties

Entity	Assets Cleared	Status
CME Group	Interest Rate, Credit, Commodities, Energy	Active
CME Group	Foreign Exchange	Active
ICE Clear Europe	Credit, Interest Rate, Energy	Active
ICE Clear Credit	Credit	Active
IDCG	Interest Rate	Active
LCH.Clearnet	Interest Rate, Energy	Active
NYPC	Interest Rate	Active
NGX	Energy	Active
Options Clearing Corp.	Equity	Proposed

Source: FSOC

Note: As of June 2011.

serves principally to ensure performance of the contractual obligations of the original counterparties to derivatives transactions and to manage the day-to-day risks and default risk associated with these obligations and counterparties, each of whom is a member of the clearinghouse. This is accomplished by interposing the central counterparty between bilateral participants, so that it becomes the buyer to every seller and the seller to every buyer ***(Charts 5.2.56*** and ***5.2.57)***. This arrangement allows the central counterparty to hold little or no net market exposure and to provide its core function of centrally managing the credit and operational risks arising from the obligations incurred by its members.

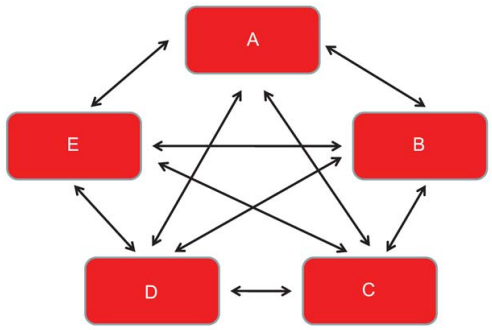
Efforts to enhance market transparency in the derivatives markets are also benefiting from advances in trade reporting. Three major OTC derivatives trade repositories currently operate and support credit, interest rate, and equity derivatives markets. In other asset classes, including commodity and foreign exchange markets, industry efforts to develop centralized trade repositories are under way, including the issuance of public requests for proposals.

Outside derivative markets, participants in fixed-income markets are also increasingly using trade reporting systems to track transactions as they occur. For example, since 2005, the Financial Industry Regulatory Authority, the self-regulatory organization for securities firms (formerly the National Association of Securities Dealers), has required that broker-dealers report virtually all secondary market transactions in U.S. corporate bonds to the Trade Reporting and Compliance Engine.

Payment and Settlement Systems

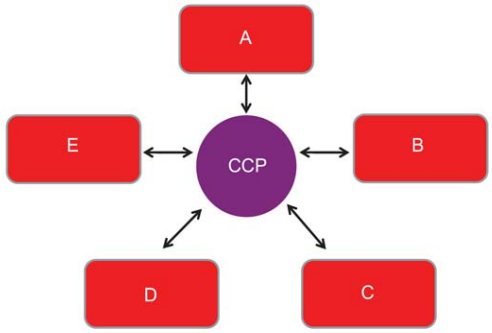
Wholesale financial infrastructure in the United States handles, on a daily basis, over $13 trillion in U.S. payment, settlement, and clearing activity—nearly the amount in dollar terms of the goods and services that the U.S. economy produces annually ***(Chart 5.2.58)***. This activity includes many types of transactions, such as multinational companies borrowing foreign currency to support international trade, brokers

Chart 5.2.56 Bilateral Execution



Source: FSOC

Chart 5.2.57 Execution Through Central Clearing



Source: FSOC

Note: CCP is a central counterparty.

Chart 5.2.58 Average Daily US$ Payment Flows in 2010

Category	Amount (Trillions of US$)
General Payments	
Fedwire Funds	2.4
CHIPS	1.5
Government Securities	
Fedwire Securities	1.5
FICC	4.8
Foreign Exchange (CLS)	1.9
Money Markets Instruments (DTC)	0.3
Equity, Bond, and ETFs (NSCC)	0.9
Total	**13.3**

Source: Federal Reserve Board

Note: CLS US$ settlement flows only

buying stocks or bonds on behalf of clients, and large financial institutions accessing short-term funding markets to borrow billions of dollars overnight to cover daily funding needs. The smooth functioning of these complex and interconnected systems, both privately and publicly run, is vital to the financial stability of the U.S. economy ***(Chart 5.2.59)***.

The settlement of money can occur on the books of a central bank, a commercial bank, or a private sector financial infrastructure. Fedwire Funds is a dedicated funds transfer network operated by the Federal Reserve Banks; it allows commercial banks to settle payment obligations for their own business purposes and on behalf of their clients on the books of the central bank. It is also a cash settlement agent for many other private sector systems to facilitate their payment, clearing, and settlement activity. Fedwire Securities Service, which allows for the transfer of securities, was implemented by the Federal Reserve to reduce risk, expense, and delay in the transfer of securities; it also plays a role in the clearing and settlement of U.S. Treasuries and other government-related securities. The Clearing House Interbank Payments System (CHIPS) is the largest private wholesale payment system for settling large payments between financial institutions ***(Charts 5.2.60*** and ***5.2.61)***. New private systems have emerged to meet the growth of cross-border payments. For example, CLS Bank International (CLS), which virtually eliminates the settlement risk associated with foreign exchange transactions, is the largest multicurrency cash settlement system in the world.

Since the 1990s, payment and settlement systems have gone through significant changes with the introduction of risk-reducing features such as real-time gross settlement (RTGS) for large-value payment systems and delivery versus payment (DVP) for securities settlement systems. Before this, most large-value payment systems operated as deferred net settlement systems, which settle at the end of the day. RTGS systems, which settle on a continuous basis, allow for payments to

Chart 5.2.59 U.S. Financial Infrastructure

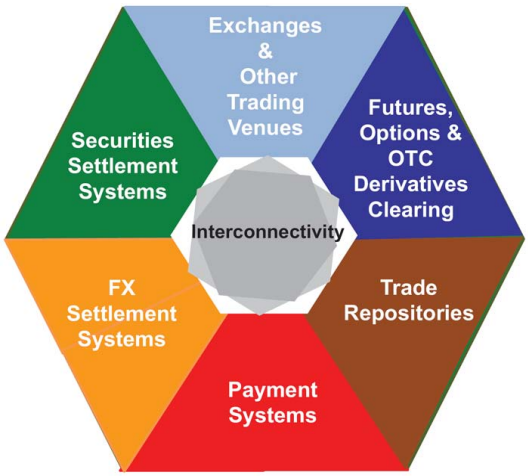
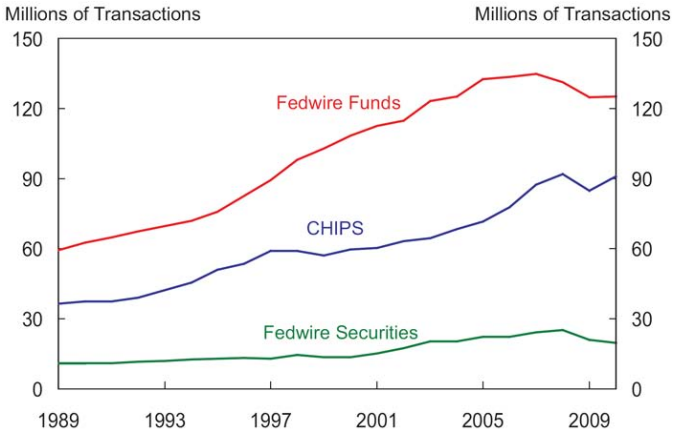
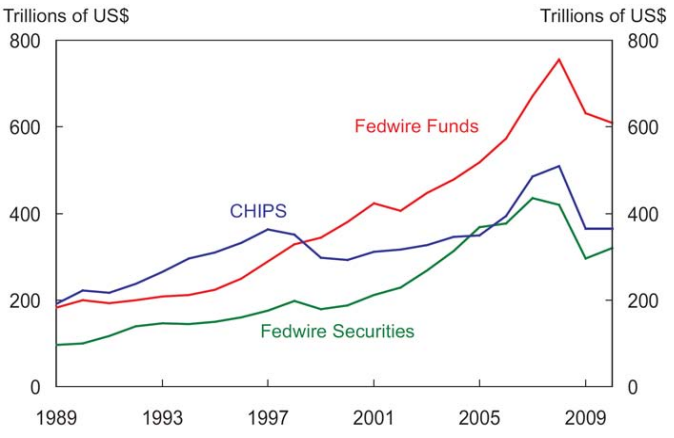


Chart 5.2.60 Annual Payment Clearing Volumes



Source: Federal Reserve, The Clearing House

Chart 5.2.61 Annual Payment Clearing Values



Source: Federal Reserve, The Clearing House

be finalized throughout the day. This reduces the buildup of potential intraday exposures, lowering the amount of liquidity used (mainly central bank money) while reducing costs. Similarly, DVP systems—which allow for the gross, simultaneous settlement of securities and funds—ensure that delivery occurs if, and only if, payment occurs. These changes were largely driven by advances in information and communication technology and have resulted in the immediate, final, and irrevocable settlement of funds and securities.

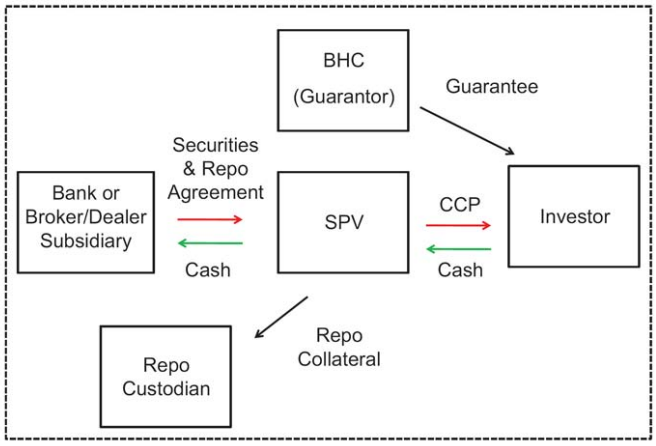
5.2.8 New and Emerging Financial Products

The introduction and growth of new products is partly driven by firms and markets seeking new avenues of funding and trading liquidity.

Against a backdrop of a slowdown in credit growth, the dominance of the GSEs in securitized mortgages, and uncertainty over new regulations, the introduction of new financial products has been limited. Nonetheless, innovation is already occurring in response to regulatory pressures designed to increase the strength and resilience of the system.

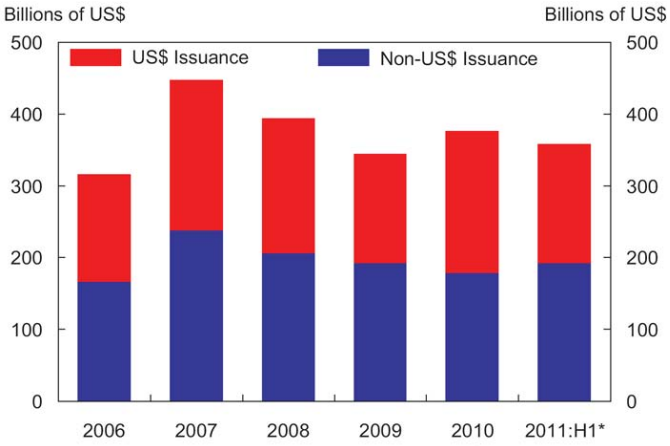
For example, prudential regulators are setting standards that will require banks and financial institutions to extend the maturity of their liabilities, while the SEC is requiring MMFs to shorten the term of the assets they hold. These new requirements have led to the introduction of collateralized commercial paper, which meets the liquidity requirements for investments by MMFs and satisfies the need for financial institutions to extend funding beyond one month to meet the new stressed funding ratio requirements. Collateralized CP is intended to expand funding sources for a variety of debt and equity securities currently funded via tri-party repo. The bank sets up a special purpose vehicle (SPV) to face the bank on repo transactions. The SPV funds itself with proceeds from CP issuance to cash investors, using the proceeds to enter into traditional repo agreements rather than to buy term assets, as an ABCP conduit would ***(Chart 5.2.62)***.

Chart 5.2.62 Collateralized Commercial Paper Market



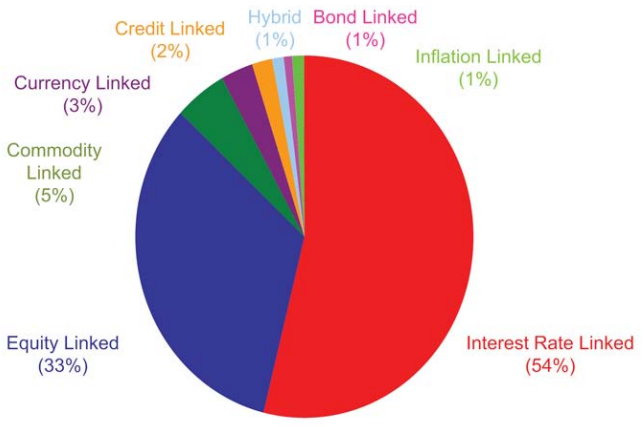
Source: FSOC

Chart 5.2.63 Global Structured Note Issuance



Source: mtn-i Note: Global issuance converted to US$, *2011:H1 annualized.

Chart 5.2.64 US$ Structured Notes by Asset Class



Source: mtn-i Note: January 2010–June 2011 Issuance.

For issues of collateralized CP to date, accounting treatment of the SPV limits the opportunity for regulatory capital arbitrage. Ratings of the structures are pegged to the rating of the sponsoring bank and do not receive a "ratings uplift" above the bank's rating based on support from potentially illiquid, difficult-to-price collateral or other structural features. Although collateralized CP issuance has been negligible, increased activity could give rise to potential vulnerabilities, particularly as the products evolve.

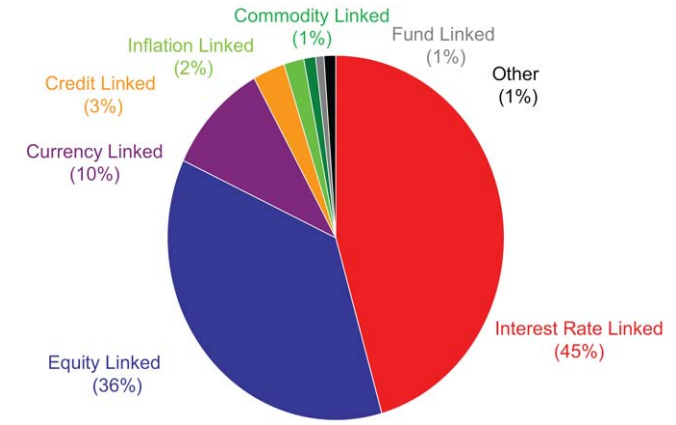
Financial innovation can also involve the evolution of existing products in new forms. Two examples are exchange traded funds (ETFs) and structured notes. ETFs have experienced rapid growth and offer an increasing diversity of fund types ***(see Box E: Exchange Traded Funds)***.

Structured notes, issued primarily by banking entities, are an important source of funding for some institutions. These notes are senior unsecured debt instruments that have a derivative element. The return on structured notes is based in part on the performance of one or more underlying reference assets, such as equities, commodities, or interest rates. While the return on a structured note depends on that of a reference asset, the structured note remains a recourse obligation of the issuer and is subject to default risk.

Unlike many other structured products, issuance of structured notes has been broadly maintained around pre-crisis levels ***(Chart 5.2.63)***. U.S. dollar-denominated structured notes are concentrated in interest-rate-linked and equity-linked products to a slightly greater extent than non-U.S. dollar-denominated notes ***(Charts 5.2.64*** and ***5.2.65)***.

For financial institutions, structured notes offer an alternative source of unsecured funding, fee income from design and distribution, and a potentially economical way to distribute trading book risk. Structured note designs are very heterogeneous and can embody a high degree of complexity, leverage, or optionality, presenting challenges for issuing

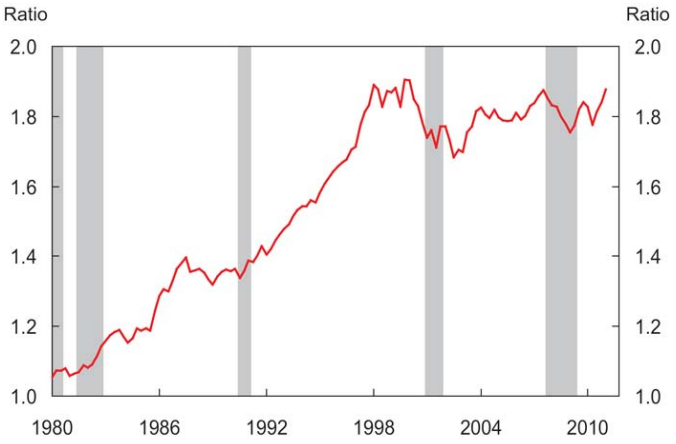
Chart 5.2.65 Non-US$ Structured Notes by Asset Class



Source: mtn-i

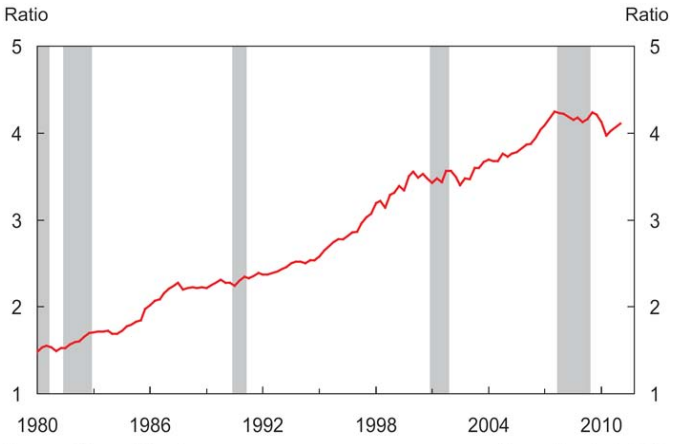
Note: January 2010–June 2011 Issuance.

Chart 5.3.1 Financial to Private Sector Gross Liabilities



Source: Flow of Funds

Chart 5.3.2 Financial Sector Gross Liabilities to GDP



Source: Flow of Funds

Note: Nominal GDP.

firms' market and liquidity risk management. Also, the embedded derivatives require firms to dynamically hedge most structured notes, exposing the issuer to gap risk—the potential of losses owing to a sudden and sustained movement in underlying prices. Firms may therefore need to rely on consistent access to liquid markets.

5.3 Resilience of the Financial System

Many parts of the financial system were not sufficiently resilient to function through the financial crisis without government support. Interconnections among financial institutions were complex and poorly understood. Improvements in capital, funding structures, transparency, and regulatory and accounting standards have been undertaken to enhance the resilience of the financial system, but further improvement is necessary in a number of areas.

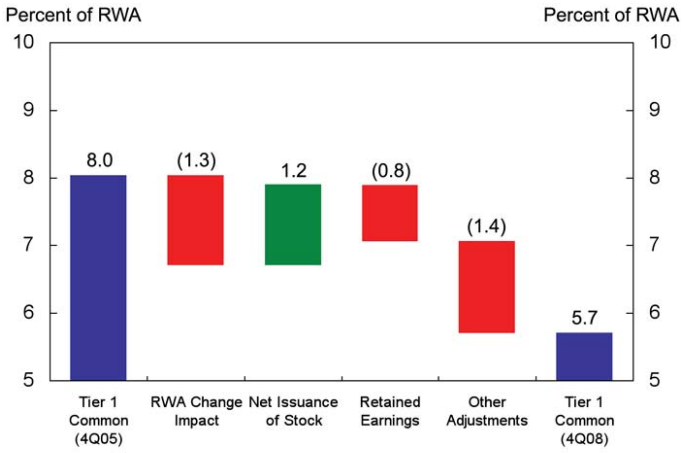
5.3.1 Capital

Capital levels and the capital quality of financial institutions have increased significantly since the financial crisis owing to a return to profitability, capital raising, regulatory changes, and a dramatic drop in distributions to shareholders.

For leveraged financial institutions, capital acts as a shock absorber for unexpected losses. Because the financial system is highly interconnected, low capital of institutions in one part of the system can have adverse effects on other parts of the system. Financial institutions have significant obligations to each other: the U.S. financial sector had gross liabilities of about $61.7 trillion at the end of first quarter 2011, almost twice the gross liabilities of the nonfinancial private sector ***(Chart 5.3.1)***. The gross liabilities of the financial sector, which were about one-and-a-half times GDP in the early 1980s, have been more than four times GDP in recent years ***(Chart 5.3.2)***.

As a result of the interconnections in the financial sector, the disorderly insolvency of a financial institution—or the fear of such an event—can impair the ability of the entire

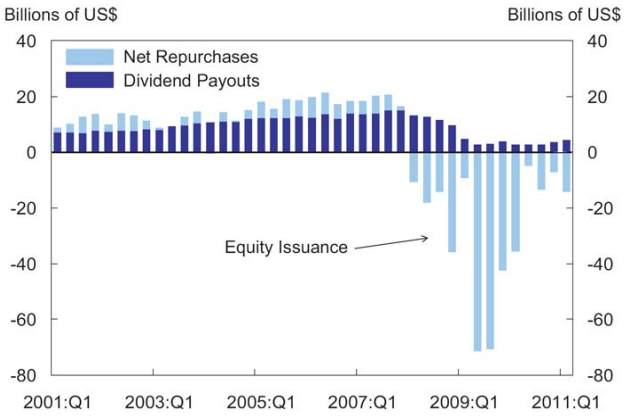
Chart 5.3.3 Change in Tier 1 Common Ratios for Large BHCs



Source: FR Y-9C

Note: Domestically owned BHCs.

Chart 5.3.4 Large BHC Dividends and Repurchases



Source: FR Y-9C

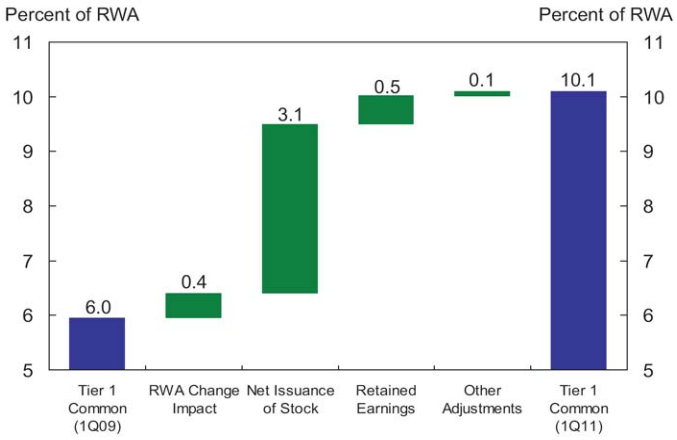
Note: Domestically owned BHCs.

financial system to provide its services to the real economy, which in turn can adversely affect the real economy. Therefore, a financial institution's insolvency can potentially have a more severe impact than the insolvency of a nonfinancial business. Consequently, because capital acts as a shock absorber for unexpected losses, it is central to the financial system's resilience to adverse developments and the resilience of the entire economy.

The crisis illustrated that many parts of the U.S. financial system were undercapitalized relative to the risk posed by unexpected losses in their assets ***(Chart 5.3.3)***. For example, a number of asset classes that had some of the lowest risk weights according to regulatory capital requirements experienced severe losses in the crisis ***(see Box F: Improvements in Regulatory Capital and Accounting Measures of Assets)***. These classes included residential mortgages, highly rated MBS and structured securities, and trading activities. Further, the crisis showed that some of the capital instruments held by banks to meet regulatory requirements were less able than anticipated to absorb the losses during this period.

The overall U.S. financial system now has a much higher level and quality of capital than it did in 2007 for several reasons. One source of improvement is the exigent assistance provided by the government to Fannie Mae and Freddie Mac. Another temporary source of the improvement was the preferred capital provided through the TARP, most of which has since been repaid to the government. A permanent source of improvement is the increase in privately sourced high-quality capital at regulated banking institutions ***(Chart 5.1.17)***. Many banks also lowered or suspended capital distributions during the crisis, some in response to government insistence ***(Chart 5.3.4)***. The rise in capital ratios for the system also partly reflects the failure of weak specialty mortgage finance institutions, which removes undercapitalized firms from the aggregate. The remaining specialty finance companies primarily are

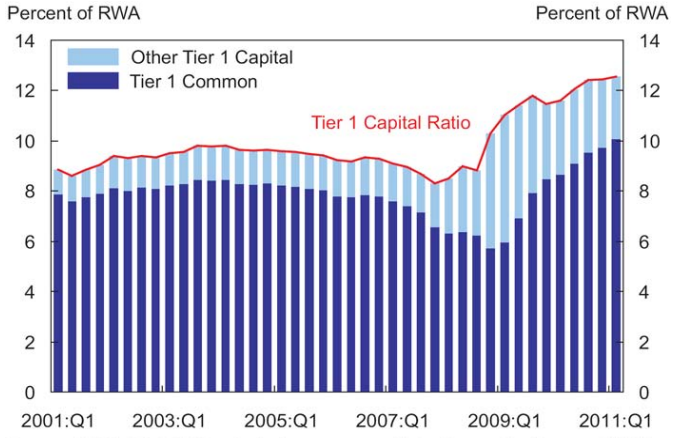
Chart 5.3.5 Change in Tier 1 Common Ratios for Large BHCs



Source: FR Y-9C

Note: Domestically owned BHCs.

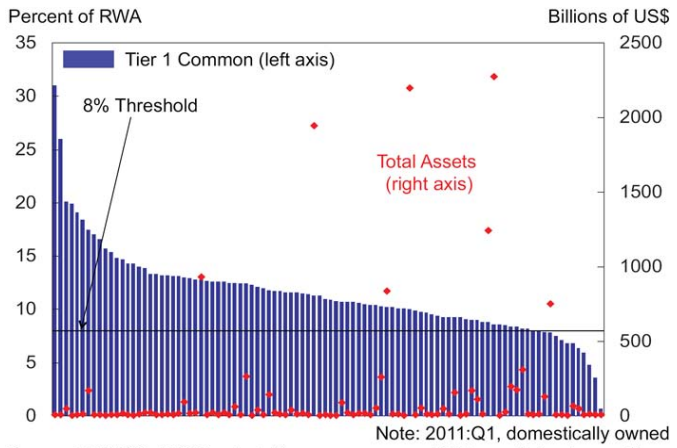
Chart 5.3.6 Aggregate Large BHC Capital Ratios



Source: FR Y-9C, FSOC calculations

Note: Domestically owned BHCs.

Chart 5.3.7 Tier 1 Common at the 100 Largest BHCs



Note: 2011:Q1, domestically owned BHCs, excludes two outliers.

Source: FR Y-9C, FSOC calculations

stronger, better-capitalized institutions focused on secured business and consumer lending.

The SCAP focused on the level of common equity of the 19 banking firms assessed using a measure based on common equity that was consistent with existing regulatory rules, referred to as tier 1 common, relative to risk-weighted assets. Tier 1 common is higher quality than other forms of capital. Under the SCAP, some firms were required to raise additional capital in 2009 so that their tier 1 common ratio would remain above 4 percent in a hypothetical, more adverse macroeconomic scenario.

The aggregate dollar amount of tier 1 common equity at BHCs increased by $333 billion to $912 billion from first quarter 2009 through first quarter 2011, and the tier 1 common ratio increased by 4.1 percentage points to 10.1 percent. These increases were due to private capital raising, conversion of preferred equity to common equity, and retained earnings ***(Chart 5.3.5)***. In addition, reserves for expected loan losses increased by $22 billion to $200 billion over this period. Consequently, as of first quarter 2011, the banking system had $1.11 trillion of tier 1 common equity plus loan loss reserves to absorb losses.

The vast majority of the top 100 U.S. BHCs now hold sufficient amounts of high quality tier 1 common equity, to easily exceed regulatory minimums for all forms of capital ***(Charts 5.3.6*** and ***5.3.7)***.

Stronger bank capital and liquidity standards have been a key element of the G-20 financial sector reform objectives, and the United States has been significantly involved with the Basel Committee on Banking Supervision and its oversight body, the Group of Governors and Heads of Supervision, to help this work progress. This global regulatory framework for bank capital (often referred to as "Basel III") was published on December 16, 2010. The new framework strengthens the resilience of the banking system through a number of prudential measures ***(see Box G: Analytical Basis for Basel III Capital Standards)***. Staff at the federal banking agencies are currently working

Box G: Analytical Basis for Basel III Capital Standards

Capital—the excess of assets over liabilities—is the most important measure of a bank's viability. Banks need to hold sufficient capital to handle financial stress, since the owners of a bank's capital must bear unexpected losses. Determining the appropriate level of capital is a challenging task for banks and their supervisors. Since the global financial crisis, international supervisors have introduced new standards that will lead to much higher capital levels.

Highlighting the importance of capital and the need for consistency, international supervisors on the Basel Committee on Banking Supervision have agreed to an international standard since 1988 (Basel I). The standard was revised significantly in 2004 (Basel II).

During the financial crisis, many banks and other large financial institutions did not have sufficient capital to reassure creditors and other counterparties that they would survive as going concerns. Supervisors launched a range of analytical projects to determine the appropriate level for a new capital standard.

The result of those efforts was the Basel III accord, which was agreed to in late 2010. The new standard includes a higher minimum capital requirement of 4.5 percent of risk-weighted assets, which is the amount of capital that a bank would generally need to be regarded as a viable concern; a new "capital conservation buffer" of 2.5 percent to provide a cushion during financial shocks and enable banks to remain above the 4.5 percent minimum; and more stringent risk-weights on certain types of risky assets, particularly securities and derivatives.

Crucially, Basel III also defines capital more narrowly than the previous Basel agreements. The new tier 1 common capital measure is limited mainly to common equity, because common stockholders are the only investors who are reliably available to absorb losses during a financial crisis.

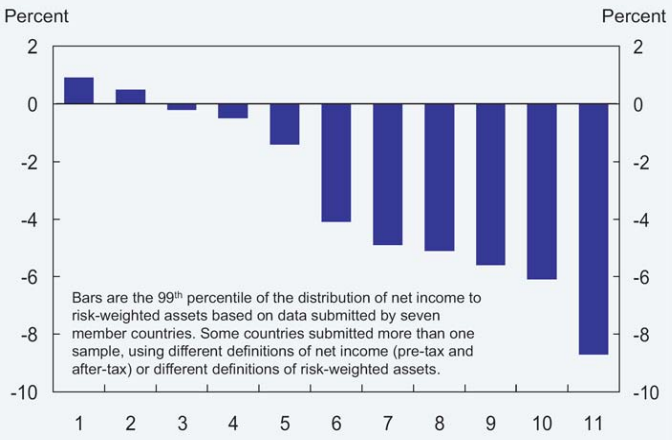
Banks will be significantly more resilient to financial shocks under the new standard.

To determine the 2.5 percent conservation buffer, supervisors examined stress test results from several jurisdictions as well as historical data on the experience of banks during the recent financial crisis and earlier stress episodes. The buffer is designed to partly mitigate the impact of pro-cyclicality on bank balance sheets: building capital in good times and shrinking during periods of stress.

To determine the 4.5 percent minimum standard, supervisors analyzed the historical distribution of net income in the banking industry relative to risk-weighted assets. Unlike the calibration of the conservation buffer, which was based on periods of stress, the calibration of the minimum was meant to apply across all points in time.

The analysis provided important insights into the scale of losses experienced historically by banks in various countries. The chart illustrates the 99th percentile of losses experienced by banks in the countries that participated in the Basel discussions. In other words, 99 percent of the time, banks performed better than these levels ***(Chart G.1)***. The assumption underlying this

Chart G.1 Return on Risk-Weighted Assets: 99th Percentile



Source: Basel Committee on Banking Supervision

analysis is that if capital were set at a level that could absorb a high-percentile net loss realization during a period of stress, creditors and counterparties would view the bank as a viable concern. The table shows the same calculations for U.S. bank holding companies, looking at different periods, samples of banks, and percentiles ***(Chart G.2)***.

There are some reasons to treat these numbers with caution as to the true extent of possible losses. First, if a bank failed, its last quarters of (presumably) very large losses might not be captured in the data. In addition, any losses that were avoided as the result of interventions—including actions such as guarantees, loss-sharing arrangements, and resolution funds—would not be reflected in these data.

According to these results, the 99th percentile experience for net income relative to risk-weighted assets ranged from a 1 percent gain to a loss of more than 8 percent. The median value across all countries was a loss of 4 percent. Taking various adjustments into account (under the new standard, risk-weighted assets will generally be higher than under the old standard), the committee viewed these results as confirming the new 4.5 percent regulatory minimum.

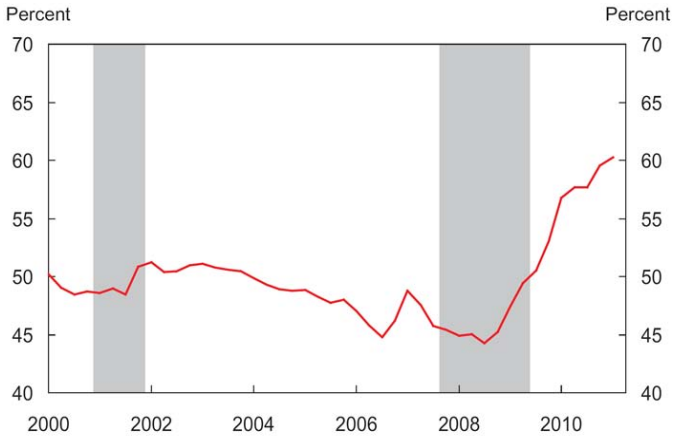
Chart G.2 Percentile of the Distribution of After-Tax Net Income to RWA for U.S. BHCs

		Percentile						
	Number of Observations	*95/5*	*99/1*	*99.5/0.5*	*99.9/0.10*	*99.95/0.05*	*99.97/0.03*	*99.99/0.01*
Annual, 1981-2009								
Sample	9,534	-1.01	-5.44	-7.45	-13.07	-17.30	-19.41	-29.18
Top 20	580	-1.35	-4.08	-4.91	-6.50	-6.50	-6.50	-6.50
Below Top 20	8,954	-0.93	-5.52	-7.53	-13.08	-17.30	-19.41	-29.18
Rolling four quarters, 1986-2009								
Sample	26,862	-1.13	-5.77	-7.89	-14.86	-20.35	-24.23	-28.48
Top 20	1,775	-1.36	-2.95	-4.76	-6.50	-11.32	-11.32	-11.32
Below Top 20	25,087	-1.10	-5.95	-8.11	-14.90	-21.30	-24.35	-28.48
Rolling six quarters, 1986-2009								
Sample	25,039	-1.38	-7.33	-10.31	-18.33	-25.18	-28.59	-34.35
Top 20	1,711	-1.15	-3.74	-4.81	-7.76	-11.22	-11.22	-11.22
Below Top 20	23,328	-1.42	-7.51	-10.59	-19.67	-30.04	-30.04	-34.35
Rolling eight quarters, 1986-2009								
Sample	23,335	-1.33	-7.94	-11.72	-21.34	-29.22	-33.33	-39.18
Top 20	1,652	-0.62	-3.96	-5.64	-7.99	-8.87	-8.87	-8.87
Below Top 20	21,683	-1.42	-8.37	-11.99	-21.88	-29.96	-34.89	-39.18

Source: Federal Reserve, FR Y-9C Reports

Note: Figures are the ratio of net income after taxes to risk-weighted assets. Risk-weighted assets are estimated for 1981 to1992 based on the average relationship of RWA to total assets during the period when both variables are available. The sample consists of all top-tier BHCs with total assets greater than $1 billion (in 2005 dollars) at the beginning of each year. Top-twenty BHCs are by assets in each year.

Chart 5.3.8 Core Deposits as a Percent of Total Liabilities



Source: FDIC, FSOC calculations

Note: FDIC-insured institutions.

together to implement Basel III standards in the United States.

As bank balance sheets have improved, regulators have been assessing requests by banks to resume or increase capital distributions to shareholders. The Federal Reserve evaluated these requests as part of its efforts to ensure that large complex banking institutions improve their capital planning ***(see Box H: Improving Capital Planning)***.

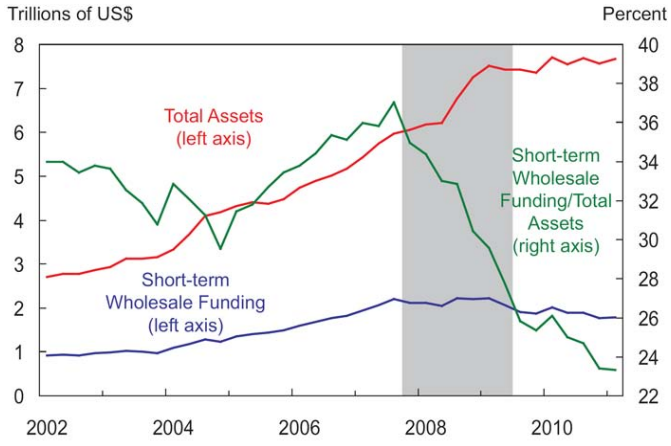
5.3.2 Liquidity

Since the financial crisis, financial institutions have taken steps to manage their liquidity more conservatively. Banks and other financial institutions have reduced their reliance on short-term wholesale funding markets and have extended the maturity of their liabilities.

The liquidity risk faced by a financial institution is a function of the liquidity of its assets relative to the term and reliability of its funding. A greater reliance on wholesale funding markets, particularly those for short-term debt ***(see Section 5.2.6)***, can potentially place significant strains on financial intermediaries during periods of market stress. If liquid assets are not sufficient to meet an abrupt withdrawal of less stable short-term liabilities, then an institution may be forced to sell less-liquid assets at a discount. Losses from such asset "fire sales" and broader price declines can undermine the financial condition of even healthy institutions, potentially leading to contagion effects that are quickly transmitted to the broader financial system.

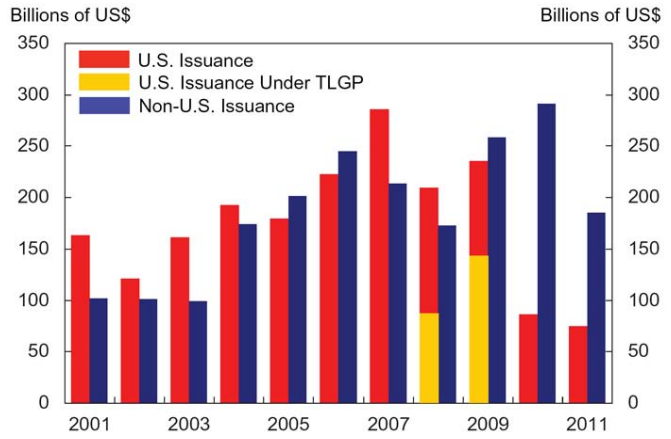
One of the key factors that contributed to the financial crisis was insufficient analysis and management of liquidity risk by participants in short-term money markets. During the crisis, weaknesses in the liquidity risk profiles of financial institutions became evident and required a significant expansion of government support that went well beyond the traditional safety net extended to regulated depository institutions ***(see Section 5.1).*** Exposure of these weaknesses has given financial institutions and market participants a better

Chart 5.3.9 Short-Term Wholesale Funding at Large BHCs



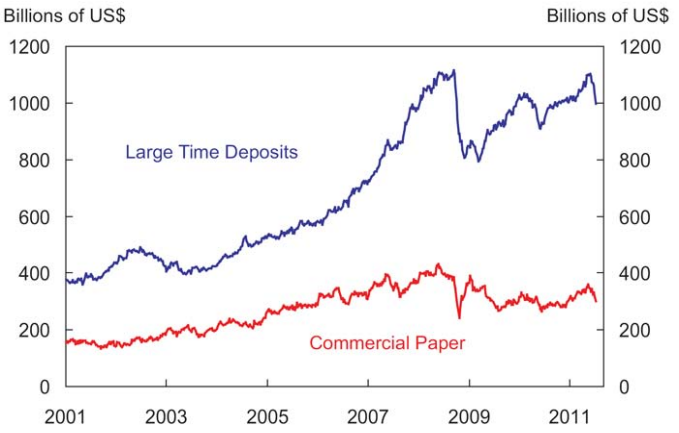
Source: FR Y-9C Note: Aggregation of BAC, C, JPM, and WFC.

Chart 5.3.10 Domestic vs. Foreign US$ Bank Debt Issuance



Source: Dealogic Note: 2011 YTD as of 7/11/2011.

Chart 5.3.11 Foreign Bank Issuance of US$ Short-Term Debt



Source: Federal Reserve Note: CP includes domestic issuers w/ foreign parent.

understanding of the vulnerabilities in these markets and, in particular, of the importance of liquidity risk management.

Liquidity risk in the U.S. financial sector has fallen since the crisis, as financial institutions have more liquid assets and more stable liabilities on their balance sheets. On the liability side, short-term wholesale debt outstanding has declined since the crisis while retail deposits have increased. Indeed, core deposits now make up a larger percentage of the total liabilities of FDIC-insured institutions and support a greater portion of their less liquid loan assets ***(Chart 5.3.8)***. The reduced reliance on short-term wholesale debt for funding also has been notable among larger U.S. institutions ***(Chart 5.3.9)***. This shift has been driven in part by a general "flight-to-quality" away from riskier investments as well as higher levels of deposit insurance coverage. In addition, the low short-term interest rate environment of recent years has lowered incentives for nonfinancial corporations to sweep their cash balances out of banks into overnight investments.

The long-term debt profile of U.S. financial institutions has also improved, in part because longer term funding needs have been modest given strong deposit inflows and subdued private nonfinancial credit growth. New issuance of longer term debt by financial institutions has been low despite the large volumes of maturing government-guaranteed and nonguaranteed debt ***(Charts 5.3.10*** and ***5.1.12)***. On the asset side, U.S. financial institutions have enhanced their liquidity profile by increasing balances of highly liquid securities such as Treasuries, agency debt, and agency MBS on their balance sheets.

In contrast to domestic institutions, foreign financial institutions continue to have elevated levels of short-term wholesale debt outstanding ***(Chart 5.3.11)***. Their issuance of long-term U.S. dollar denominated debt also remains elevated. Outside of a decline in foreign-bank support of ABCP conduits, the composition of foreign bank short- and long-term wholesale U.S. dollar-denominated debt appears to

Box H: Improving Capital Planning

Financial institutions' processes for managing and allocating their capital resources are critical to their individual health and performance, and to the stability and effective functioning of the U.S. financial system. In the recent Comprehensive Capital Analysis and Review (CCAR), the Federal Reserve conducted a forward-looking evaluation of the internal capital planning processes of large complex bank holding companies (BHCs). The evaluation found that all of the large firms needed to bolster their capital planning.

The CCAR was the first in-depth and cross-sectional investigation of the capital planning process of large U.S. financial institutions ever conducted. Nineteen large U.S. BHCs were required to submit comprehensive capital plans and additional supervisory information, and these submissions were evaluated across five areas:

1. Capital assessment and planning processes
2. Capital distribution policy
3. Plans to repay any government investment
4. Ability to absorb losses under several scenarios
5. Plans for addressing the expected impact of Basel III and the Dodd-Frank Act

The CCAR was a substantial strengthening of previous approaches to ensure that large BHCs have thorough and robust processes for managing and allocating their capital resources. The CCAR built on lessons regulators learned during the financial crisis about the importance of a forward-looking and comprehensive approach to capital adequacy. This includes an assessment of the level and composition of a banking organization's capital resources under stressed economic and financial market conditions. The CCAR's forward-looking evaluation encompassed both quantitative assessments and qualitative reviews of large BHC's processes for assessing, and strategies for managing, their capital resources. This analysis complements comparisons of current capital amounts relative to regulatory minimum requirements, internal management targets, and capital levels at peer institutions. In addition, while traditional approaches have tended to evaluate individual capital actions in isolation, the CCAR took a longer run, holistic view of a firm's strategy and management of its capital resources over a two-year period. Finally, the CCAR expanded on traditional practices by undertaking this assessment of the largest BHCs simultaneously, thus allowing the process to be informed by a horizontal perspective of the financial condition of and outlook for these firms.

An important innovation in the CCAR is the expectation that large BHCs will submit annual comprehensive capital plans to the Federal Reserve. These plans will describe their strategies for managing their capital over a minimum 24-month forward-planning horizon. While the specific elements of the plan may evolve over time, the following are some of the key components:

- A description of the firm's current regulatory capital base, including key contractual terms of its capital instruments and any plans to retire, refinance, or replace the instruments over the planning horizon.
- A description of all planned capital actions (e.g., dividends, share repurchases, and issuance), as well as anticipated changes in the firm's risk profile, business strategy, or corporate structure over the planning horizon.
- A description of the firm's processes and policies for determining the size of dividend and common stock repurchase programs under various conditions.
- The firm's assessment of potential losses, earnings, and other resources available to absorb such losses in stressed economic and financial market environments, and the resulting impact on a firm's capital adequacy and capital needs over the planning horizon.
- An assessment, accompanied by supporting analysis, of the post-stress capital needed by the firm to continue operations, including its functions as a credit intermediary.

The CCAR is a key method through which the Federal Reserve will hold BHCs—and their boards—to high standards in the critically important areas of assessing capital needs on the basis of all a firm's activities and firm-wide risk exposures, and ensuring that the firm uses strong capital planning and management practices to make decisions that can affect capital. While many of the firms have made significant progress in enhancing their capital planning practices over the past 18 to 24 months, the evaluation found that all of the large firms needed to continue efforts to bolster their capital planning.

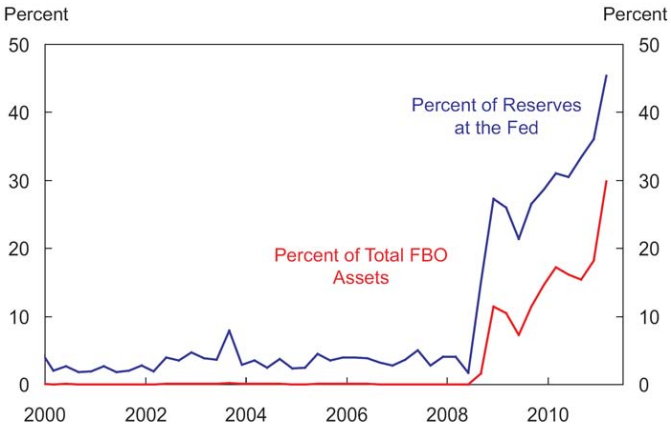
A large majority of the 19 firms that participated in the CCAR proposed some form of capital distribution in 2011; most of the proposals involved a common dividend increase at some point in 2011. Some of the proposed increases were extremely modest, while others were more substantial. In nearly all cases, however, the levels of proposed dividend payments remained well below the levels that prevailed before the recent crisis. A number of firms proposed common share repurchase programs; in many cases, these repurchase programs were accompanied by proposed dividend increases. Several firms also requested the early redemption or retirement of trust-preferred securities that currently qualify as tier 1 capital but will be phased out as a result of the Dodd-Frank Act.

Each of the participating firms that requested increased capital distributions in 2011 was informed in March 2011 whether the Federal Reserve had any objection to the proposed increases. If the Federal Reserve did not object to the distributions proposed in a firm's plan, the firm was free to make the distributions, subject to ongoing monitoring of its financial condition and operating environment.

In the case of an objection, the firm had the option of submitting a revised plan for consideration as early as second quarter 2011. BHCs are expected to address any supervisory concerns with the initial plans as part of their resubmissions.

Consistent with the overall supervisory goals of the CCAR, the focus of the stress scenario used in the evaluation was on assessing the sensitivity of the firms' own projections of capital under both baseline and stress scenarios to alternative assumptions and estimates. The Federal Reserve's development of independent supervisory estimates for losses and available resources was central to the evaluation of the firms' capital plans. However, the intensity and comprehensiveness of the analysis was tailored to each firm and portfolio, depending on several factors. These included the materiality of the estimate to the firm's post-stress capital position, the Federal Reserve's assessment of the reliability of the firm's internally generated estimates, and the width of the margin by which the firm's estimates indicated it would meet the CCAR's quantitative criteria.

Chart 5.3.12 Reserves Held by Foreign Bank Branches



Source: FFIEC 002, Flow of Funds Note: U.S. branches and agencies of foreign banks.

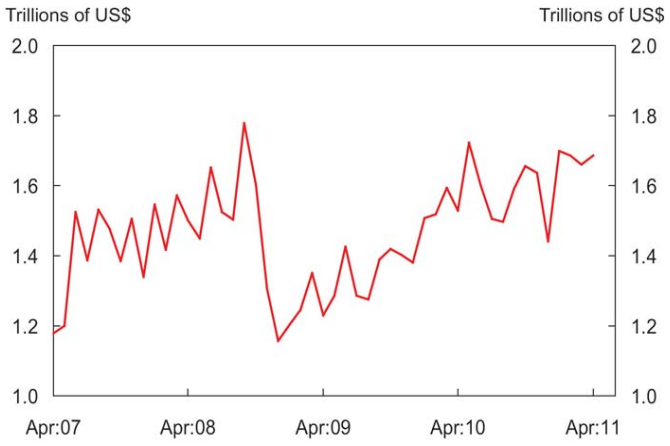
have changed little in the past couple of years. However, the liquidity risks from these institutions may be mitigated because of greater asset liquidity on their balance sheets. Indeed, at the end of first quarter 2011, FBOs held nearly 30 percent of their assets in the form of reserves at the Federal Reserve ***(Chart 5.3.12)***. While somewhat elevated, spot and forward-looking indicators of dollar funding market stress remain well below levels reached during the crisis and mid-2010.

A number of reforms will strengthen the liquidity profiles of financial institutions and thus enhance their ability to withstand a severe stress scenario without government support. The Basel III agreement includes new liquidity standards for banks and BHCs—the latter encompassing the largest U.S. broker-dealers—that will require financial firms to finance more of their assets and activities with more stable sources of funding.

This new liquidity framework has two new minimum requirements. First, the Liquidity Coverage Ratio (LCR) seeks to promote the short-term resilience of a bank's liquidity risk profile through a standard for high-quality liquid resources sufficient to survive an acute stress scenario lasting 30 days. Second, the Net Stable Funding Ratio (NSFR) addresses resilience over a longer, one-year horizon by setting a minimum level of stable funding sources relative to the liquidity profile of a bank's assets, taking into account contingent liquidity needs associated with, for example, off-balance sheet commitments. After an observation period, the LCR is scheduled to be introduced in 2015 and the NSFR is scheduled to be introduced by the start of 2018.

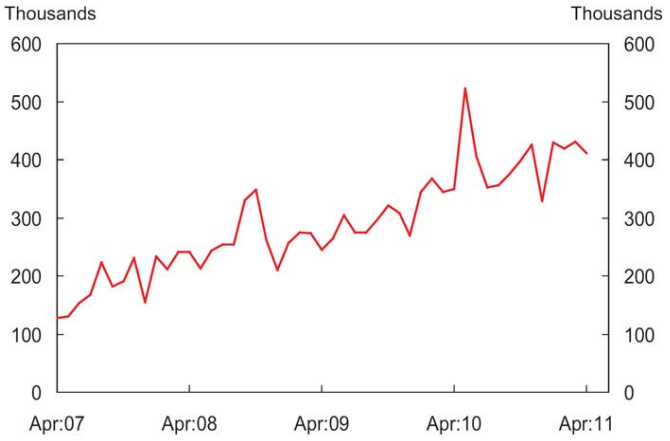
In their oversight of BHCs and broker-dealers, supervisors are reviewing the dedicated liquidity facilities of each business line. In addition, accounting standards have been revised so that financial institutions can no longer treat certain short-term funding structures as off-balance sheet. These changes should limit the possibility that these structures will receive "favorable" regulatory and financial statement treatment that

Chart 5.3.13 Average Daily Value of CLS Transfers



Source: CLS

Chart 5.3.14 Average Daily Volume of CLS Transfers



Source: CLS

obscures the risks posed to the institution and the financial system ***(see Box F: Improvements in Regulatory Capital and Accounting Measures of Assets)***.

5.3.3 Financial Infrastructure

Financial infrastructure functioned relatively well during the crisis, although the crisis revealed weaknesses and potential stresses, notably in tri-party repo and mortgage servicing, that a number of public- and private-sector initiatives have begun to address. While these initiatives should improve efficiency and market functioning, they also could increase the concentration and interconnectedness of financial markets in the global economy.

Large-value payment, clearing, and settlement systems were tested by the significant disruptions and shocks in financial markets during the crisis and its aftermath, but they generally continued to operate smoothly throughout this period. Robust risk management helped to ensure that market infrastructure operated both safely and efficiently. In addition, the government's support for financial firms and markets, especially the Federal Reserve's liquidity provisions, also indirectly eased liquidity pressures faced by financial infrastructure.

A good example of the smooth operation of financial infrastructure was in the global foreign exchange market. CLS, a system that began operating in 2002 with the purpose of addressing settlement risk in the foreign exchange market, is widely credited with maintaining confidence for continued interbank trading and settlement of foreign exchange. In fact, CLS was able to handle successfully heightened values and volumes of transactions during the 2008 financial crisis as well as during the 2010 peripheral European sovereign debt crisis ***(Charts 5.3.13*** and ***5.3.14)***.

Many of the new developments and trends in infrastructure are expected to help mitigate pre-settlement risk, while enhancing efficiency as well as market and regulatory transparency. One such development is the use of central

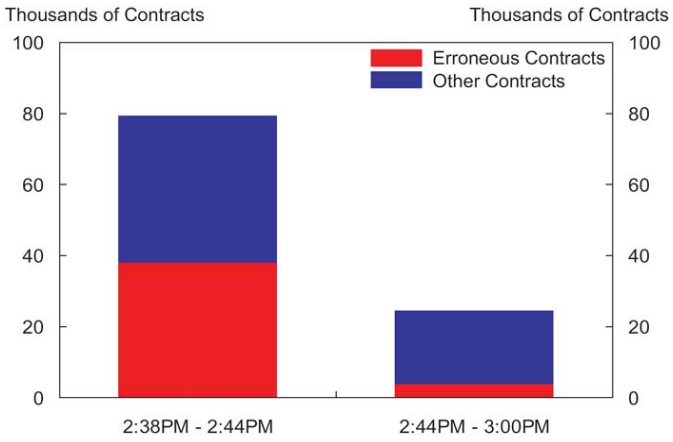
counterparty clearinghouses for facilitating trades in various derivatives and other financial products. In such arrangements, a central counterparty clearinghouse acts as a guarantor while providing multilateral netting efficiencies to reduce the counterparty credit and liquidity risks faced by market participants. Although central counterparties are principals to the transactions they clear, they do not stand to profit from changes in the market value of those transactions, and thus have stronger incentives to develop effective risk management measures and to monitor their members for potential stress. Central counterparties also can play an important role in safely managing a default of a major counterparty.

Mandatory reporting requirements, which apply to both exchange traded and centrally cleared derivatives as well as OTC derivatives, are expected to help increase the transparency of open positions in these markets. Pre-trade transparency will be enhanced through the publication of quotes and pre-trade interest for transactions; post-trade transparency will be improved through detailed reporting to regulators and the release of basic transaction information to the public.

Among its other potential benefits, electronic trading allows for wider participation and reduced costs for many financial intermediaries and other market participants. Also, through established standards for trading procedures and record keeping, electronic trading reduces the opportunities for market manipulation.

However, electronic and complex trading practices also can increase the likelihood of operational failures and malicious attacks that could threaten the stability of financial markets. In one case of an operational error, on September 13, 2010, data intended to be placed into the Globex test environment as part of the CME Group's normal testing regimen was inadvertently introduced into the live trading system. This mistake resulted in a large number of erroneous trades in a six-minute period, with additional errors occurring subsequently ***(Chart 5.3.15)***. These erroneous orders moved prices by a significant amount

Chart 5.3.15 Globex CME September 13, 2010 Incident



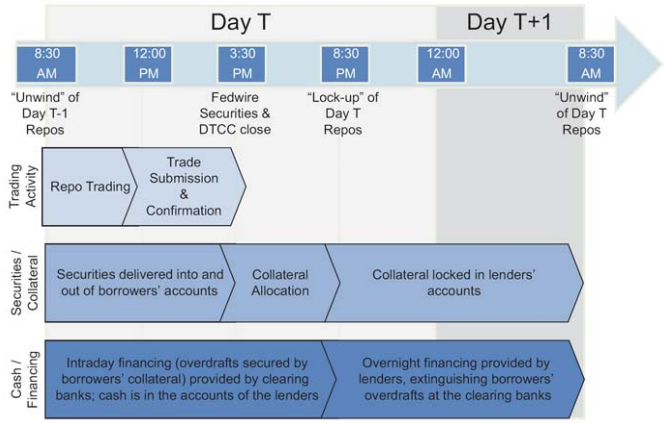
Source: CME

in six of the eight energy and metals markets that had significant trading volume, highlighting the potential for operational errors to affect market behavior. The potential for a malicious attack was illustrated when, on February 5, 2011, suspicious files were detected on the U.S. servers hosting a NASDAQ OMX web-facing application. While these suspicious files were removed immediately and there was no evidence that customer information was accessed or acquired by unauthorized parties, the incident serves as an important reminder that trading and clearing infrastructures are susceptible to intentional disruption and must be safeguarded accordingly.

The advent of global trade repositories and central clearing in OTC markets along with trends in consolidation among existing clearinghouses and exchanges is likely to increase the concentration in financial markets and the interdependencies across multiple systems and markets. For example, the financial environment that once had numerous independent clearinghouses now has fewer and larger clearinghouses, each with a global footprint. Many of the same globally-active banks participate in all of the major clearinghouses, or act as agent banks and liquidity providers to these clearinghouses. As a result of these developments, financial infrastructure is becoming more interconnected, highlighting the need for careful supervision.

In the international arena, G-20 leaders agreed to reforms of the derivatives regulatory frameworks, including requiring standardized derivatives to be centrally cleared and, where appropriate, traded on regulated platforms. U.S. regulators have also been key participants in revising CPSS-IOSCO standards on financial market infrastructures to enhance standards for payment, clearing, and settlement systems supporting global financial markets. These proposed principles will help to address the potential risks resulting from increased use of infrastructure such as central counterparties. In addition, the United States is leading a global effort to develop minimum standards for margins on derivatives that are not centrally cleared.

Chart 5.3.16 Current Tri-party Repo High Level Process Flow



Source: FRBNY White Paper

Chart 5.3.17 Tri-party Concentration by Asset Class

Collateral	Concentration of Top 3 Dealers
ABS Investment Grade and Non Investment Grade	39.9 %
Agency CMOs	43.4 %
Agency Debt and Strips	40.6 %
Agency MBS	33.2 %
CMO Private Label Investment Grade	45.3 %
CMO Private Label Non Investment Grade	**53.3 %**
Corporate Investment Grade	41.5 %
Corporate Non Investment Grade	43.1 %
Equities	45.0 %
Money Market	**60.5 %**
US Treasuries excluding Strips	44.8 %
US Treasury Strips	**53.4 %**

Source: Tri-Party Repo Infrastructure Reform Task Force Note: as of 6/2011.

Tri-party Repo

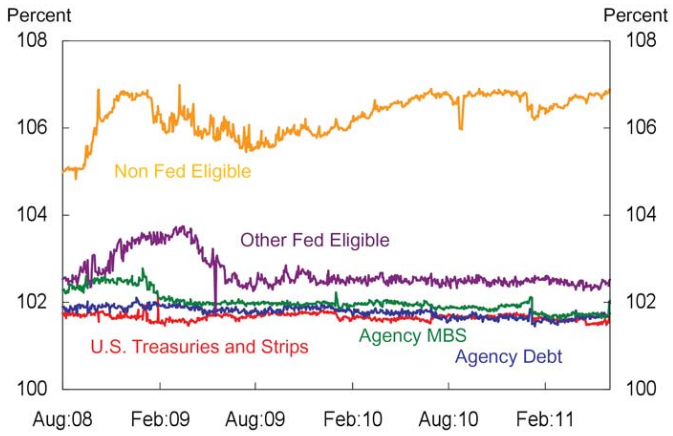
A notable exception to the smooth operation of payment, clearing, and settlement systems through the financial crisis was the tri-party repo market. The weaknesses in the settlement infrastructure in this market and the attendant flaws in the risk management practices of borrowers, lenders, and the two clearing banks significantly amplified market instability. These weaknesses, if they are not addressed, will continue to have the potential to exacerbate volatility in the overall financial system during times of stress.

Currently, all tri-party repo contracts, including those that are not scheduled to mature that day, are "unwound" each morning. This process returns cash to the repo buyers (lenders) and allows the repo sellers (borrowers, who are typically broker-dealers) to use the securities in their portfolios to settle other trades outside the tri-party repo market during the trading day. New repo contracts are not settled until the early evening. Under these arrangements, for most of each business day, the clearing banks extend hundreds of billions of dollars of intraday credit to individual dealers between the morning contract unwind and the evening settlement, at which time lender funds from the new repo contracts can be credited to the borrowers' accounts. Thus, there is an ongoing handoff of dealer exposure between lenders who bear it overnight and clearing banks that bear it during the business day ***(Chart 5.3.16)***.

This arrangement proved to be extremely destabilizing during the crisis, particularly in light of the significant concentrations of dealer collateral being financed ***(Chart 5.3.17)***. As the financial condition of some major securities dealers deteriorated, large lenders to these institutions began to withdraw their cash. Lender withdrawals thus contributed to an adverse feedback loop that exacerbated counterparty credit risk and asset price volatility, and eroded the capital and funding capacity of many financial institutions.

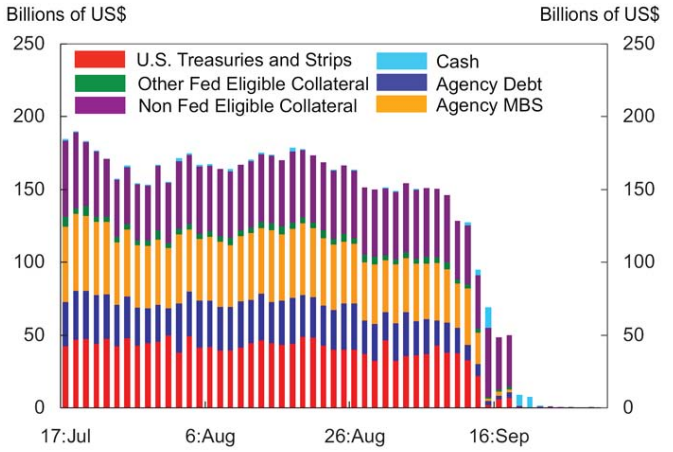
Within the tri-party repo market infrastructure, the role of the two clearing banks further intensified these dynamics. As some major

Chart 5.3.18 Tri-party Repo Aggregate Median Haircut



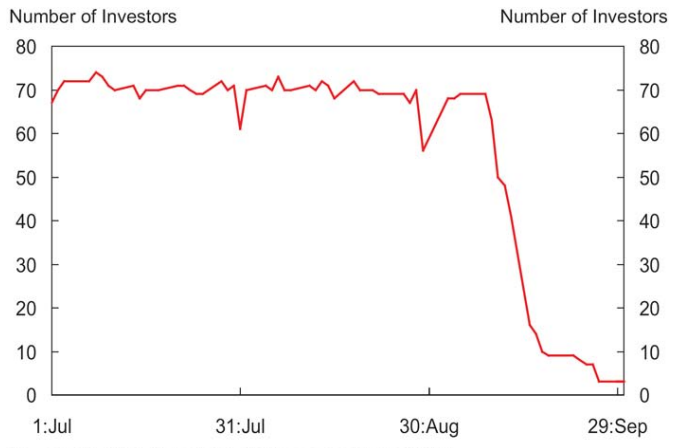
Source: FRBNY, Copeland, Martin and Walker (2010)

Chart 5.3.19 Lehman Tri-party Repo Assets in 2008



Source: FRBNY, Copeland, Martin and Walker (2010)

Chart 5.3.20 Lehman Tri-party Repo Cash Investors in 2008



Source: FRBNY, Copeland, Martin and Walker (2010)

securities dealers faced greater difficulty financing their securities portfolios overnight, clearing banks became more concerned about assuming exposure to these dealers by unwinding their trades and providing intraday credit to them. Many market participants had assumed that the clearing bank would always be available to unwind repo contracts, return cash to lenders, and finance dealers during each trading day. They were not prepared for the possibility that it would refuse to do so. This belief, and the market's reliance on clearing bank intraday credit to fund 100 percent of market activity during the trading day, obscured the credit and liquidity risks faced by participants in these transactions. Dealers were exposed to significant rollover risk because of their heavy reliance on short-term funding, which translated to a large concentration of repos maturing on any given day that needed to be replaced by new borrowings. And because these risks were not well understood beforehand, neither lenders nor clearing banks were well prepared to dispose of the collateral they would have to take on in the case of a dealer default. Given the severe strains at that time and the lack of preparedness, many cash lenders behaved like unsecured investors and rapidly closed out their repo books with troubled dealers rather than managing the credit risk exposure by raising haircuts, narrowing eligible collateral, and decreasing counterparty limits ***(Charts 5.3.18***, ***5.3.19***, and ***5.3.20)***.

The Tri-Party Repo Infrastructure Reform Task Force was launched to address some of these vulnerabilities in the tri-party repo market. The Task Force is an industry working group formed under the auspices of the Payments Risk Committee, a private-sector body sponsored by the Federal Reserve Bank of New York. The group includes representatives from institutions that are significant participants in the tri-party market, including lenders, borrowers, and the two clearing banks.

Since the Task Force issued initial recommendations in May 2010, the industry has made significant progress in improving market transparency through its monthly reporting of market volume, collateral composition, and

margin ranges charged by tri-party repo lenders for each type of collateral, which should help lay the groundwork for additional reforms. On June 27, 2011, the two clearing banks implemented collateral substitution functionality. Allowing dealers access to collateral needed to settle trades without requiring an unwind of all tri-party repo transactions each morning represents an important prerequisite for a meaningful reduction in the market's dependence on intraday credit.

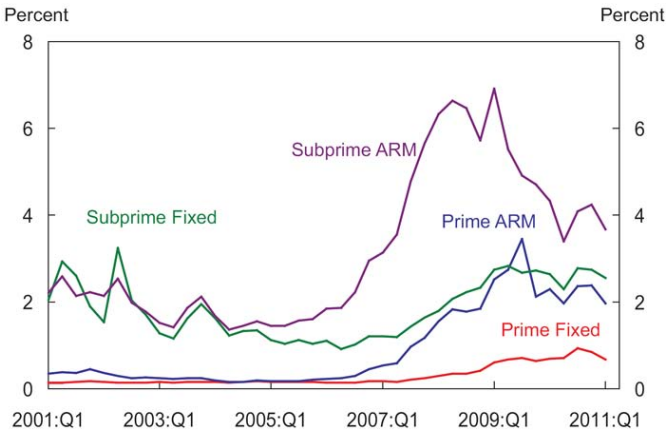
Additionally, the Task Force is on track to shorten the daily period during which clearing banks are providing intraday credit: the settlement time was moved back from 8:30 am to 10:00 am on July 25 and will be moved back further to 3:30 pm on August 22. It will also require three-way post-trade confirmation of deal details such as trade tenor as a prerequisite for settlement, starting on August 29.

However, much work remains to implement other recommendations, particularly moving market participants away from relying on clearing banks for extensions of intraday credit. The complications in addressing these issues reflect the complexities associated with compressing an end-of-day settlement process to one hour, implementing technology to support collateral substitution, and enforcing a cap on intraday credit provided by clearing banks. Consequently, the Task Force recently acknowledged that it will need time beyond 2012 to achieve these objectives. In addition to technological and infrastructure challenges, the Task Force's composition, which spans a diverse array of market participants with varied economic interests, likely has affected its timetable.

Mortgage Servicing

Another weakness in the financial infrastructure revealed during the financial crisis and after was in the systems that handled the servicing of residential mortgages. As the rate of foreclosure originations increased, disclosures of widespread irregularities in foreclosure paperwork prompted an interagency investigation ***(Chart 5.3.21)***. Evidence emerged during lawsuits brought by borrowers

Chart 5.3.21 Residential Mortgage Foreclosure Starts Rate



Source: Mortgage Bankers Association Note: NSA.

facing foreclosure that critical paperwork was deficient. For example, reports surfaced of foreclosure affidavits sworn without document review and of improper notarizations, coupled with allegations of falsified documents used in foreclosure proceedings. The matter became known as "robosigning" for the rapid, seemingly automated, manner in which flawed paperwork was generated by some mortgage servicers initiating foreclosures.

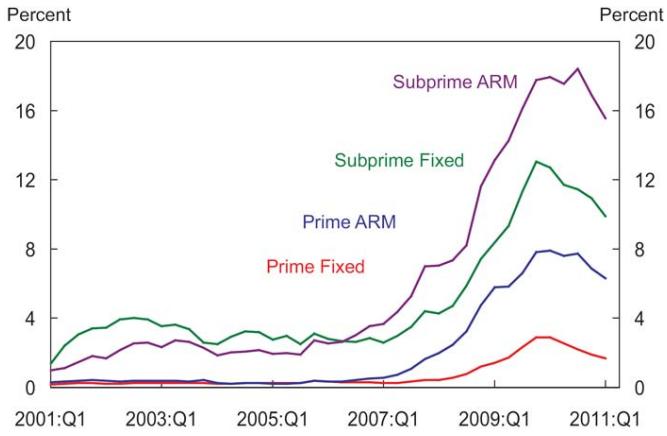
Some of the nation's largest servicers conceded possible flaws in their foreclosure procedures and, by mid-October 2010, had instituted self-imposed moratoriums on foreclosures while they conducted reviews. The federal banking regulatory agencies examine the banks' internal assessments, compliance with state foreclosure laws, and adequacy of controls and governance. Subsequently, some agencies took enforcement action against a number of servicers. Additionally, state mortgage regulators are conducting examinations of state licensed mortgage servicers.

Questions also arose from borrowers facing foreclosure about whether the parties seeking foreclosure actually owned the loans and if they had legal standing to pursue foreclosure. Issues related to the transfer of ownership of a mortgage, either as a whole loan or as part of the securitization process, and procedures for recording such transfers were factors contributing to these questions.

An additional risk is that mortgage security investors could challenge whether mortgages were transferred to securitization trusts in accordance with contractual and legal requirements. The primary concern is that document custody and transfer issues with notes and mortgages could render many private securitizations invalid.

Another ongoing issue is that many loans underlying securitizations might not meet the representations and warranties made at the time the mortgages were initially securitized or sold. This has led to requirements that mortgage originators or their successors repurchase mortgages from investors in MBS

Chart 5.3.22 Residential Mortgage Delinquency Rate



Source: Mortgage Bankers Association Note: 90+ days delinquent, NSA.

or from Fannie Mae and Freddie Mac. This risk has risen significantly as a result of high mortgage delinquencies ***(Chart 5.3.22)***. A few banks have reached settlements with the GSEs but mortgage repurchases are likely to remain elevated in the years to come.

5.3.4 Market Functioning

When markets function well, the pricing of risks and flows of funds occur unimpeded. Overall, since the major market dislocations experienced in late 2008, most markets have facilitated orderly trading and price discovery. However, certain markets have exhibited short-term dislocations, in part owing to a variety of factors pertaining to technological change and interconnectedness.

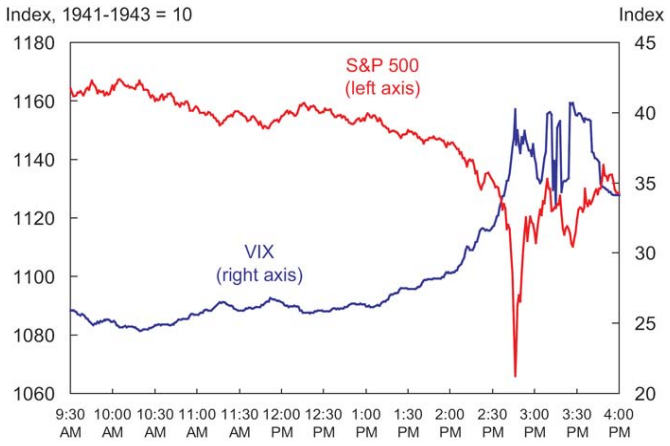
Technology has significantly altered the landscape of financial markets over recent years, with implications for the resilience of market functioning. Electronic trading, which enables extremely fast execution of orders, has led to a sizable shift in market structure, allowing for wider participation, reduced trading costs, and very short-term trading strategies that take advantage of arbitrage opportunities.

In a normal market environment, and for an investor seeking to execute a small order, the result of increased electronic trading is near-immediate execution. However, even though technology leads to fast trade execution, it can also contribute to shrinking liquidity in times of market dislocation. A number of these market developments were featured prominently during a period of extreme market volatility on May 6, 2010.

The Flash Crash

On May 6, 2010, between 2:40 pm and 3:00 pm, major indexes in both the futures and equities markets plummeted more than 5 percent in a matter of minutes before rebounding almost as quickly ***(Chart 5.3.23)***. Approximately two billion shares traded during this time with a total volume exceeding $56 billion. Over 98 percent of all shares were executed at prices within 10 percent of their 2:40 p.m. value. However, some equities experienced more severe upward and

Chart 5.3.23 S&P 500 and VIX on May 6, 2010



Source: Bloomberg

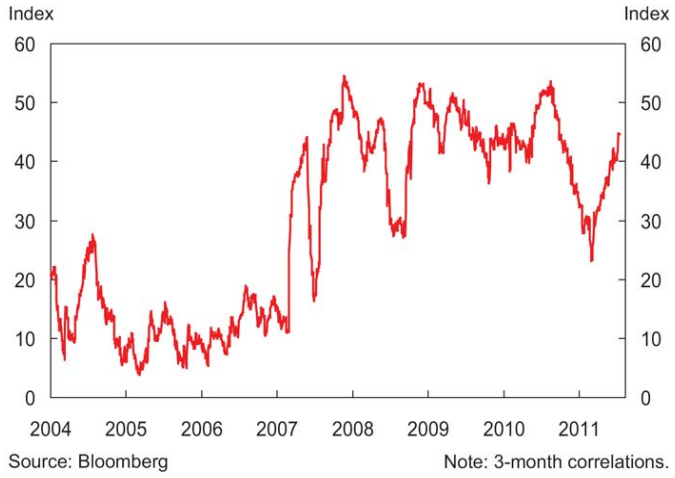
downward price movements. In particular, more than 20,000 trades in more than 300 securities were executed at prices more than 60 percent away from their values just before the onset of the flash crash. These trades were subsequently labeled erroneous and thus cancelled by the exchanges and Financial Industry Regulatory Authority.

The rapid decline in major market indexes initially began in the Chicago Mercantile Exchange S&P 500 E-mini futures contracts (S&P 500 E-mini), as a large sell order coupled with subsequent selling pressure from high-speed algorithms overwhelmed the immediately available demand. Cross-market arbitragers who bought the S&P E-mini as it declined offset their exposures through sales of individual equities or ETFs, thereby transmitting the selling pressure to other markets. With selling pressure increasing in many markets and prices dropping rapidly, many electronic market makers who were simultaneously active in several markets either widened their spreads or withdrew from trading entirely, leading to an evaporation of liquidity in many securities. Issues with data feeds resulting from delays at some exchanges also prompted participants to withdraw from markets, reducing potential purchasers and helping to allow the price declines to accelerate.

ETFs accounted for 70 percent of the 326 securities for which trades were reversed, meaning their share prices fell by at least 60 percent from the previous day's close. Bid-offer quotes from dealers widened significantly and market makers were unable to transact efficiently in the underlying basket and maintain the price of an ETF share close to the net asset value of its underlying securities. This highlights the importance of liquid markets for the efficient operation of this product.

A number of points pertaining to the functioning of markets can be drawn from this incident. First, under stressed market conditions, the automated execution of a large sell (or buy) order can trigger extreme price movements. Second, the interaction between automated execution programs and algorithmic trading strategies, which ordinarily would reduce

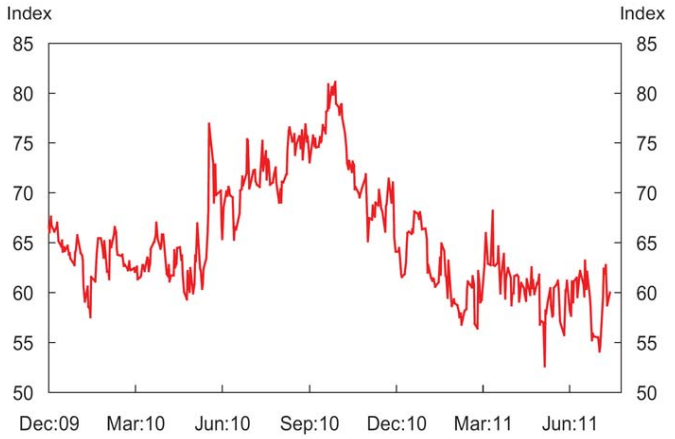
Chart 5.3.24 Citi FX/Equity Realized Correlation Index



Source: Bloomberg

Note: 3-month correlations.

Chart 5.3.25 S&P 500 Implied Correlation Index



Source: CBOE and Bloomberg

asset mispricing through exploiting temporary arbitrage opportunities, can under some circumstances quickly erode liquidity and result in disorderly markets. In particular, during the flash crash, high-speed trading algorithms chased market orders to the level of stub quotes—bids to buy or offers to sell a stock at a price so far away from the prevailing market that it is not intended to be executed, such as a bid to buy at $0.01 or an offer to sell at $100,000. Such transactions, clearly outside the scope of rational pricing, were later canceled, and the SEC later approved rules to eliminate stub quotes. In another response to the flash crash, regulators added new circuit breakers to halt trading under disorderly market conditions, with the aim of restoring investor confidence by helping to ensure that markets operate only when they can effectively carry out their critical price-discovery functions.

Heightened Correlations Across Assets

Tighter linkages between some markets were evident during the crisis. For example, on many occasions investors pulled away from assets perceived to be risky, such as equities, in favor of U.S. Treasuries and other assets perceived to provide a safe haven. Beyond the developments associated with the financial crisis, there have been a number of developments that potentially could lead to stronger linkages and higher correlation between assets and across markets. These developments include the rapid spread of information, economic integration, and globalization of capital flows.

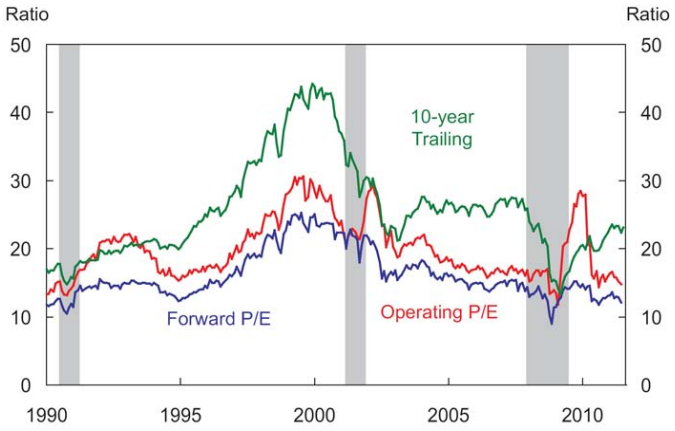
As one example of stronger linkages across financial markets, correlations across equity markets and currencies generally remain at elevated levels relative to those of the mid-2000s ***(Chart 5.3.24)***. Even so, another measure shows that correlations among equities have declined since mid-2010 ***(Chart 5.3.25)***.

Chart 5.4.1 Dow Jones U.S. Total Stock Market Index

Source: Dow Jones

Note: 12/31/1970 = 830.27.

Chart 5.4.2 Price-to-Earnings Ratio for Corporate Equities



Source: Thomson Financial

5.4 Prices and Incentives

Appropriate pricing of financial assets and instruments, along with proper incentives to take on risk, are central to maintaining financial stability. For example, the two large GSEs encouraged housing purchases and real estate investment over other sectors, which misaligned incentives in the financial system. Currently, the pricing of risk in a number of important markets—including corporate equities, corporate bonds, and real estate—appears to be in line with historical averages. Compensation for risk in the market for loans to low-rated, high-yield corporate borrowers remains in the range experienced in the last credit cycle. While the values of commodities and agricultural land are at long-run highs, there does not appear to be substantial leverage in those markets.

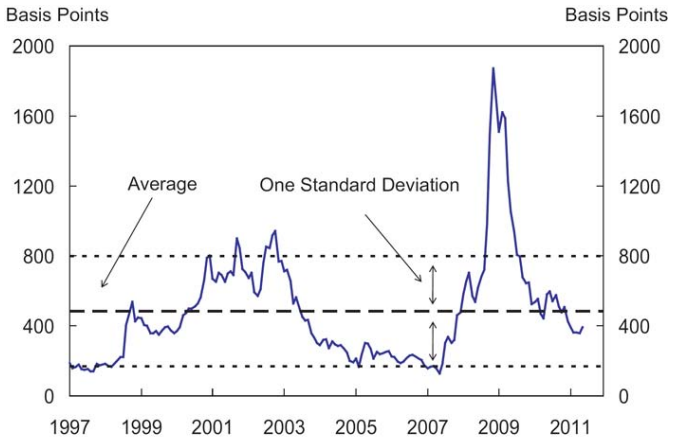
5.4.1 Securities Markets

Prices of securities reflect a variety of factors, including investors' outlook for future cash flows from a particular asset and the premium they demand to compensate for the risks associated with that asset. When the price of an asset rises, it could be because investors raised their forecast of future cash flows or because they lowered the risk premium. Distinguishing between these two reasons is empirically challenging. When an asset's valuation is high, it may be vulnerable to reduced investor willingness to hold risk or to a decline in investors' evaluation of the asset's future outlook.

Equities

Equity market values have rebounded considerably from their March 2009 lows ***(Chart 5.4.1)***. A valuation measure of corporate equities typically used by analysts is the ratio of a stock's price to the earnings of the corporation. This measure can be computed using realized current operating earnings, forward-looking estimates of future earnings, or trailing earnings. The price-to-earnings (P/E) ratios for the S&P 500 index appear in line with their average over the past 20 years ***(Chart 5.4.2)***. Investors also

Chart 5.4.3 High-Yield Credit Risk Premium



Source: FSOC calculations based on market consensus

compare the return on a risky investment asset such as stocks to a low-risk asset such as Treasury bonds to determine the risk premium. With interest rates currently very low, this second measure suggests that the valuation of corporate equities could still be somewhat below historical norms.

Corporate Bonds

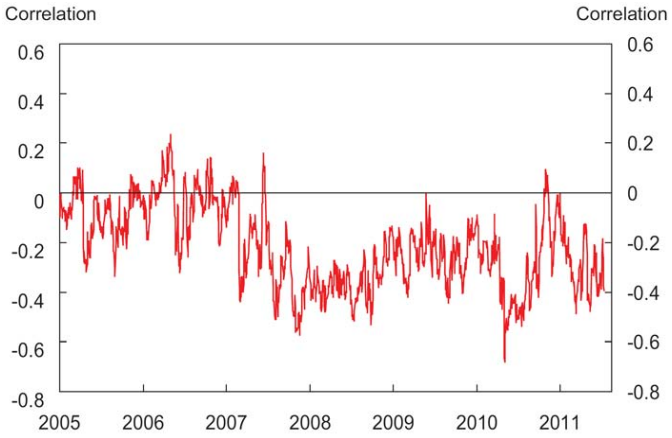
In corporate credit markets, the high-yield credit risk premium can be viewed as a proxy for risk appetite. The premium rises when investors are less willing to take on risk and demand higher compensation for a given level of risk; conversely, the premium declines when investors are more willing to take on risk. Calculation of the credit risk premium using estimates of the consensus default rate, which in early 2011 was approximately 2 percent, reveals that the credit risk premium is below its historical average but within recent ranges ***(Chart 5.4.3)***. As discussed in Section 4.2, there are several reasons why corporate defaults have been lower than expected since the beginning of the financial crisis, including improved fundamentals of high-yield companies and the ability of companies to refinance near-term maturing debt in capital markets.

U.S. Treasuries

Investors in long-term Treasuries must consider the risk associated with movements in nominal interest rates over the life of the security. In particular, if nominal rates rise, the secondary market price of the security will fall. Because this interest rate risk is greater for longer maturity bonds, investors generally require additional compensation to hold longer-maturity debt. That compensation is often referred to as the "term premium."

Investors have tended to increase their investment in U.S. Treasuries in periods of financial stress because they see Treasuries as relatively safe and liquid—in other words, a safe-haven investment. In these periods, investors appear to be more willing to accept a lower risk premium for longer maturity Treasuries. The correlation between stock prices and Treasury returns—a measure of this safe-haven demand—

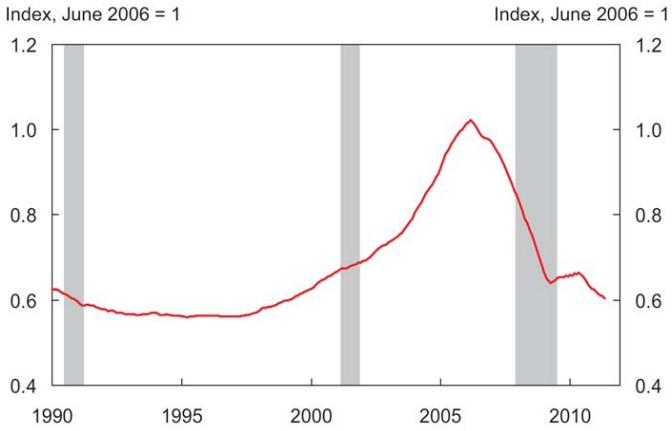
Chart 5.4.4 Correlation of Stock Prices and Treasury Returns



Source: FRB staff calculations

Note: S&P 500 Index and 5-minute returns of 10-year Treasuries used in exponentially weighted moving average.

Chart 5.4.5 Price-to-Rent Ratio for Residential Property



Source: CoreLogic and BLS

turned sharply negative as the financial crisis started to unfold in 2007. The correlation turned sharply negative again in early 2010 and in early 2011, periods when European sovereign debt problems escalated, also suggesting safe-haven demands ***(Chart 5.4.4)***.

5.4.2 Real Estate Markets

Rapid growth in credit for real estate purchase and investment can produce large imbalances. Assessments of valuations are challenged by the illiquidity inherent in real estate and the lack of comparability among property types.

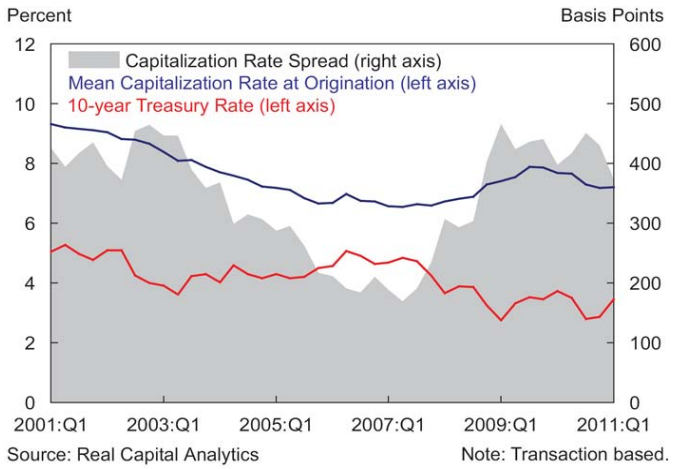
Residential Real Estate

In evaluating residential real estate prices, the ratio between the price of a single-family house and the rent it could obtain is analogous to the P/E ratio for stocks. However, calculating this ratio in the case of real estate is more difficult because, unlike stocks, residential property is very illiquid, real estate provides significant nonmonetary returns to households, and properties are seldom exactly comparable. Moreover, aggregate indexes of home prices and rents probably measure the prices and rents of different properties. Despite these qualifications, indexes based on price-to-rent ratios for residential real estate can still provide information about broad trends in the valuation of housing. One such index reached a record high in 2006, at the peak of the housing boom, but has since reversed essentially all of the increase between the late 1990s and 2006. The most recent readings put this residential real estate valuation metric about in line with its average over the 1990s ***(Chart 5.4.5)***.

Commercial Real Estate

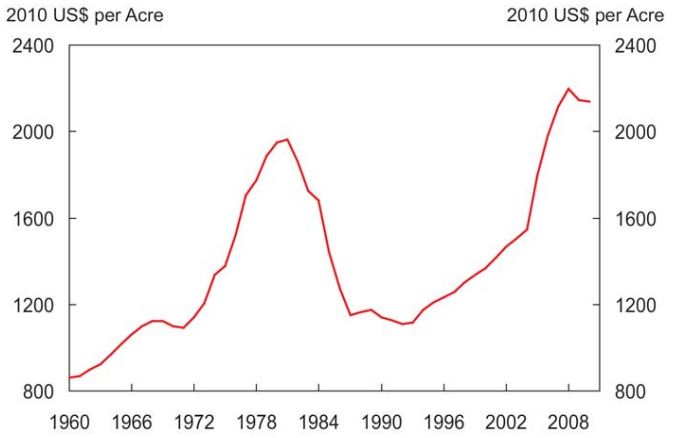
Notwithstanding that commercial real estate (CRE) values have broadly declined, it is useful to observe trends in capitalization rates—the ratio of income produced by a property to the property value—on newly originated loans ***(Chart 4.1.15)***. Capitalization rates broadly fell over the course of 2010 and the first part of 2011, signaling higher CRE valuations. The bulk of recent commerical property sales have involved higher quality properties in major cities, where valuations have increased

Chart 5.4.6 Capitalization Rate and Spread



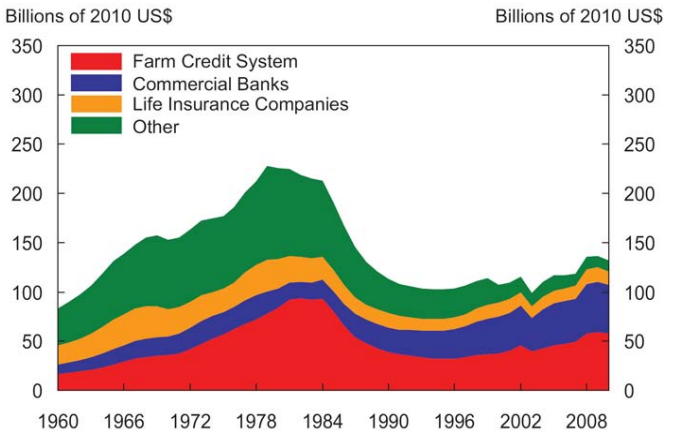
Source: Real Capital Analytics Note: Transaction based.

Chart 5.4.7 Farm Land Prices



Source: USDA, FRB staff estimates

Chart 5.4.8 Agricultural Real Estate Debt Outstanding



Source: USDA, FRB staff estimates

relative to the rest of the market. Valuations in these markets have also benefited from a lower interest rate environment, which has contributed to the decline in capitalization rates. However, the spread between the capitalization rate and the risk-free rate remains elevated compared with pre-crisis levels, signaling that investors are currently applying a higher risk premium ***(Chart 5.4.6)***.

Agricultural Land

Agricultural land values have increased, driven by rising commodity prices, favorable export conditions, and low interest rates. On an inflation-adjusted basis, agricultural land values are now near the highest levels of the past 50 years ***(Chart 5.4.7)***. Currently, in the aggregate, incomes in the U.S. farm sector are performing well, forecasts for production and demand are positive, and debt levels in general do not appear excessive. However, if farm incomes fall owing to a decline in either domestic or export demand, or an increase in operating costs, then agricultural land values may be susceptible to a decline.

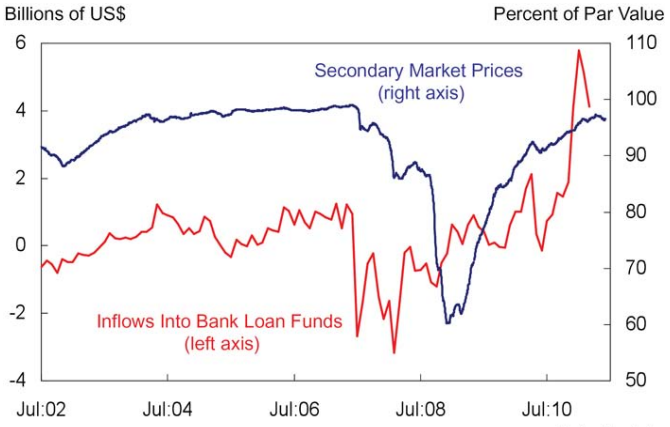
Adjusting for inflation, current agricultural real estate debt levels remain significantly below the levels of the late 1970s ***(Chart 5.4.8)***. The Farm Credit System and community banks that specialize in agriculture lending have the bulk of exposures to agricultural land. While the extent to which high agricultural land prices reflect their underlying fundamentals is uncertain, a sizable decline in land values could have an adverse impact on the financial institutions that hold farm loans. These institutions will need to maintain prudent lending standards in the face of high and rising land values.

5.4.3 Loans

During a prolonged period of low interest rates, some institutions may reach for yield by increasing duration, lending to lower rated borrowers, or employing more leverage. Such concerns today are focused in the market for low-rated corporate credits, referred to as the leveraged loan market.

Leveraged loans—a form of floating rate instrument that would provide protection

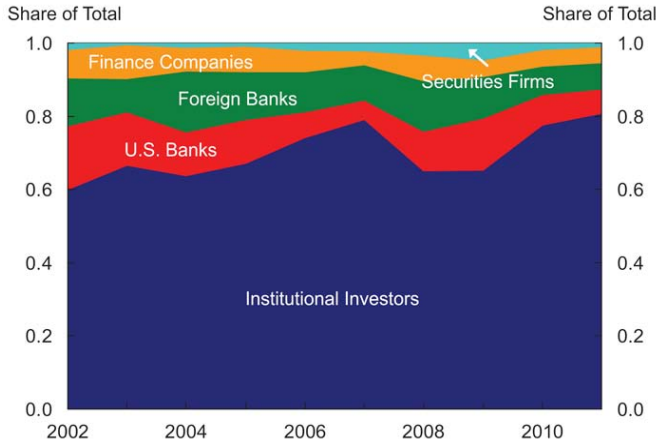
Chart 5.4.9 Syndicated Leveraged Loan Market



Source: ICI, LSTA/Thomson Reuters LPC MTM Pricing

Note: Mark-to-Market Pricing.

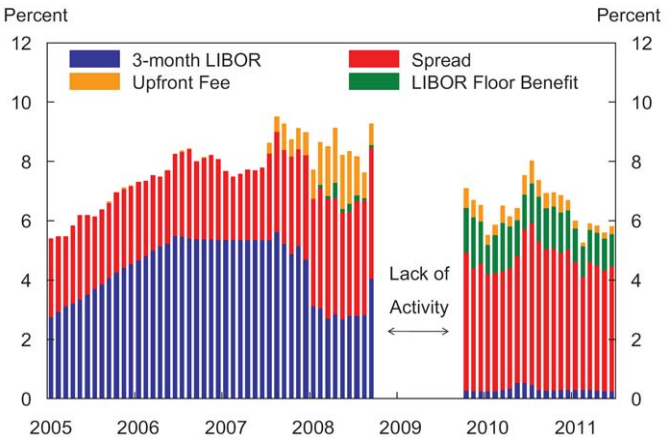
Chart 5.4.10 Composition of Leveraged Loan Investors



Source: S&P LCD

Note: Data through 2011:H1.

Chart 5.4.11 All in Cost of Leveraged Loans



Source: S&P LCD, Bloomberg

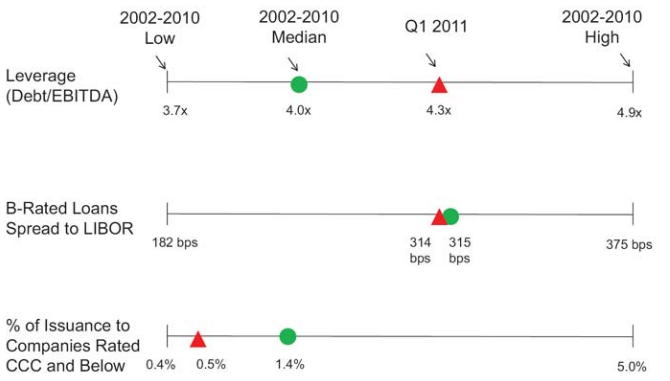
against interest rate risk relative to fixed rate instruments in a rising rate environment—have attracted strong investor interest. Bank loan funds, for example, have experienced record high inflows, bolstering secondary market prices and filling the gap left by maturing collateralized loan obligation vehicles ***(Chart 5.4.9)***. Most leveraged loans are not retained by bank arrangers; rather, they are increasingly sold to institutional investors ***(Chart 5.4.10)***. Unlike the peak of the market in 2006–07, little evidence exists that leverage is being employed on any significant scale in the funding of loans through repos or total return swaps, suggesting that the potential for a rapid and disorderly deleveraging in this market is limited.

The all-in cost of leveraged loans has been driven lower by the low-rate environment, although the average spread required by investors is higher ***(Chart 5.4.11)***. The lower cost has facilitated heavy loan refinancing: nearly three-quarters of issuance in early 2011 and more than half of issuance in 2010 was for this purpose. While issuance of leveraged loans has been robust, outstanding loans have declined, in part reflecting paydowns from robust bond issuance ***(Chart 4.1.3)***.

Most metrics for leveraged loan and high-yield bond deals remain in the middle of the range experienced through the last credit cycle, from 2002 to 2010 ***(Chart 5.4.12)***. Issuance by the lowest rated borrowers (for example, those rated CCC by S&P) remains muted compared with levels seen during 2006 and 2007.

Relative to overall total loan issuance, there is less issuance of loans for leveraged buyouts, and those issued tend to require higher equity contributions. However, issuance of certain loan structures has been increasing since 2009. Loan issuance for the purpose of financing a dividend or shareholder buyback, also known as a dividend recapitalization, reached historically high levels in early 2011 owing to low interest rates and strong demand for loan assets. Additionally, covenant-lite loans—those that do not provide investors with the traditional protection of maintenance covenants—have recently made up a high percentage of issuance

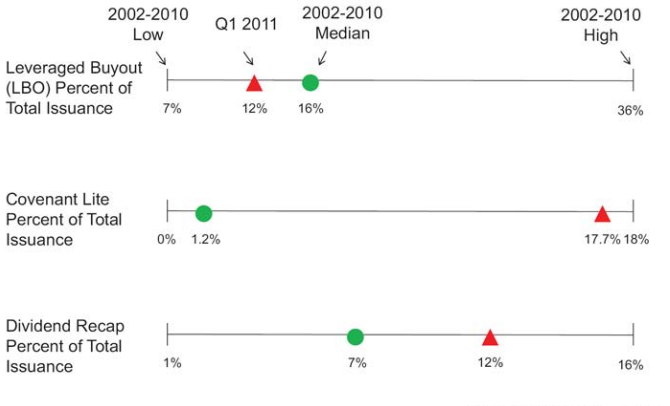
Chart 5.4.12 Leveraged Loan New Issuance Metrics



Source: S&P LCD, FSOC calculations

Note: 2002-2010 annual average of all deals.

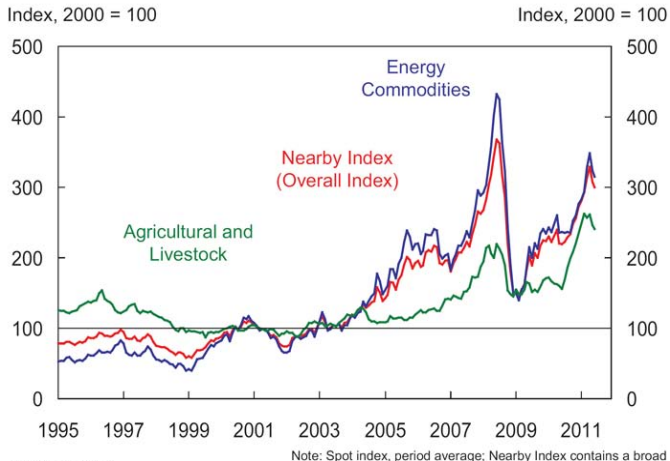
Chart 5.4.13 Leveraged Loan New Issuance Characteristics



Source: S&P LCD, FSOC calculations

Note: 2002-2010 annual average of all deals.

Chart 5.4.14 Commodity Prices



Source: S&P

Note: Spot index, period average; Nearby Index contains a broad cross-section of commodities, including industrial metals.

(Chart 5.4.13). While neither of these issuance types may be indicative of a new vulnerability, they do reflect an increase in investor risk appetite as well as the dynamics of market competition, including pressures on fund managers to invest inflows and on arranging banks to maintain market share.

Mitigating these trends, bank underwriters have lower warehouse risk, that is, the risk of losses on assets that they are holding prior to sale. This is partly because deals are smaller than they were before the financial crisis. Also, unlike the fully committed transactions seen during 2006 and 2007, banks report that financings are currently arranged on a "best efforts" basis, in which underwriters do not commit to take on the risk of the entire loan before syndication but maintain contractual flexibility after the commitment to adjust the pricing and structure of loans (at the expense of borrowers) to market-clearing levels if necessary.

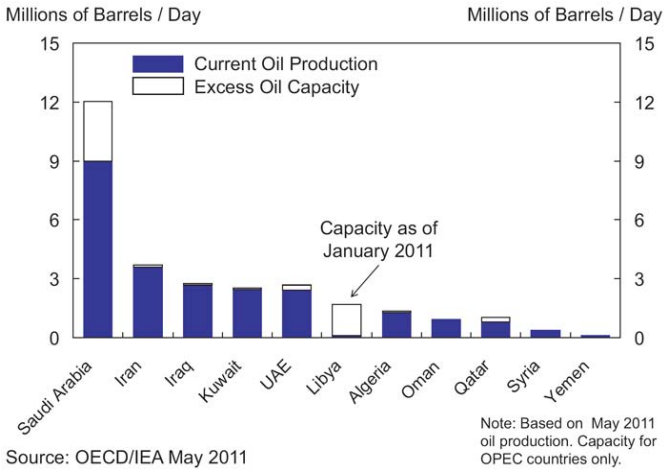
5.4.4 Commodities

Commodities prices are subject to standard demand and supply factors. Additionally, financial instruments that track commodities play an increasing role in the market.

Commodity prices rose in 2010 and early 2011. Energy prices rose strongly in the first half of 2011, but they have not reached the levels seen in mid-2008. Prices for a number of agricultural and industrial commodities have reached record levels in nominal terms ***(Chart 5.4.14)***. The global economic recovery, particularly the robust growth in many major emerging market economies, has been a major factor behind the recent strength in commodity prices.

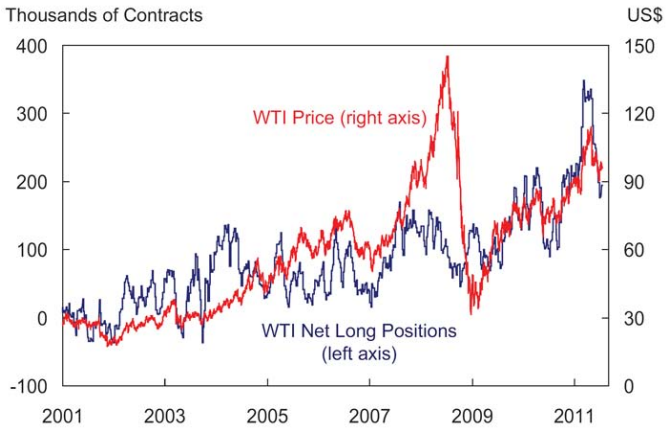
Oil prices generally have tracked the improving world economy, with the spot price of Brent crude oil, a standard for world oil prices, rising from a low of just under $34 per barrel in December 2008 to over $120 per barrel in spring 2011 before falling a little more recently. The price of West Texas Intermediate, a standard in the United States, has followed a similar pattern. Demand growth since the recession has come largely from emerging economies, as consumption in the Organisation for Economic Co-operation and Development

Chart 5.4.15 Middle East Producers: Production and Capacity



Source: OECD/IEA May 2011

Chart 5.4.16 Oil Market Price and Net Long Positions



Source: CFTC, Bloomberg

countries has grown very little during this period. Price movements in early 2011 reflected events in Libya and elsewhere in the Middle East and North Africa. While Libya accounted for only 2 percent of global supply in 2010, concerns focus on the uncertainty regarding the long-term damage to Libya's production infrastructure and to further supply impacts from the political unrest across the region. The lack of spare capacity among foreign oil producers and concerns about future long-run production growth have also added to price pressures ***(Chart 5.4.15)***.

The increased financialization or trading of liquid, synthetic financial products based on less liquid physical commodities is evidenced by the growth in commodity ETFs ***(Chart E.1)***. Additionally, the liquidity of commodity futures markets, which provide a critical price-discovery function for physical markets, is supported by speculative market makers. A rapid sell-off and spike in volatility in crude oil, refined energy, and silver markets in May 2011 coincided with an unwinding of speculative positions, which had reached record levels in a number of commodities ***(Chart 5.4.16)***. In a dynamic similar to that of the flash crash, the speed and magnitude of price declines in these markets revealed that the automatic liquidation of positions may have contributed to reduced liquidity and downward price pressure.

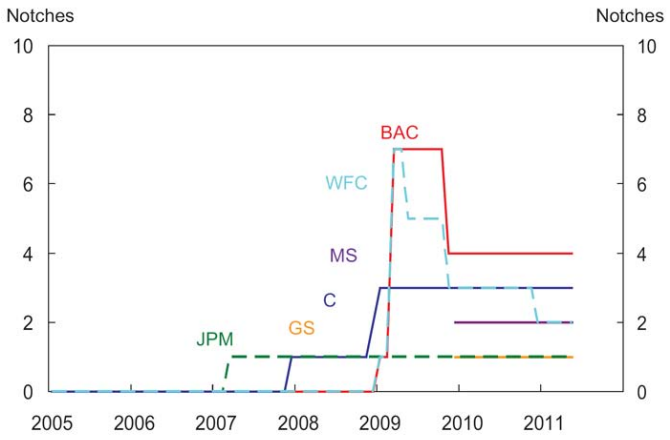
5.4.5 Incentives

Programs and policies can affect incentives for risk taking in financial markets. It is crucial that programs and policies are designed with appropriate safeguards, such as with deposit insurance, to provide financial system participants with proper incentives to help maintain a well-functioning financial system.

Deposit Insurance

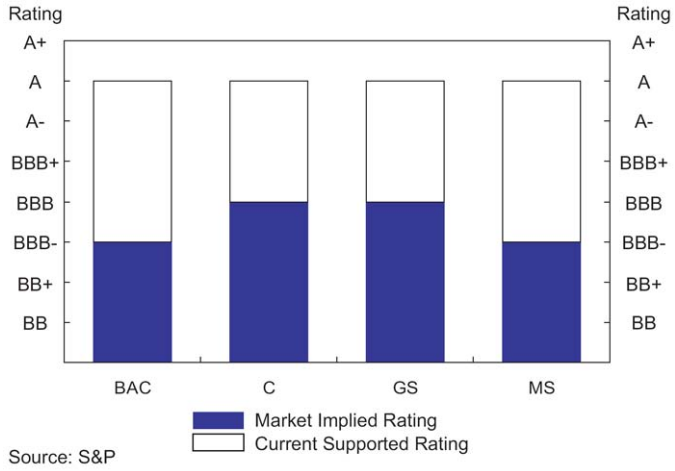
Congress created federal deposit insurance in 1933 in response to the thousands of bank failures that occurred in the 1920s and early 1930s. Deposit insurance promotes financial stability by maintaining public confidence in the banking system, ensuring that depositors continue to place their money in the system, and limiting the incentives for depositors to

Chart 5.4.17 BHC Systemic Uplift



Source: Moody's, FSOC calculations

Chart 5.4.18 S&P Current Actual & Market Implied Rating



Source: S&P

Chart 5.4.19 Current Long-Term Ratings and Uplift

	S&P Ratings		Moody's Ratings		
	HoldCo SR LT-Rating	Notches Uplift	HoldCo SR LT-Rating	LT-Rating Status	Notches Uplift
BAC	A	2	A2	On Review for Downgrade	4
C	A	2	A3	On Review for Downgrade	3
GS	A	1	A1	Stable	1
JPM	A+	0	Aa3	Stable	1
MS	A	2	A2	Stable	2
WFC	AA-	0	A1	On Review for Downgrade	2

Source: Moody's, S&P

quickly withdraw their money when banks become troubled. During the most recent crisis, depositors remained confident that their money was safe and insured deposits provided a stable source of funding for individual banks and the banking system as a whole.

Still, government-provided deposit insurance has the potential to lead to excessive risk-taking at banks. Insured depositors do not have an incentive to monitor the decisions management makes on behalf of the equity holders, who reap the gains on the upside but have limited liability on the downside. To address this moral hazard, banks are subject to prudential supervision, capital regulation, activity restrictions, and risk-based pricing of deposit insurance.

The enactment of the Dodd-Frank Act has led to a number of significant changes to FDIC deposit insurance and, to a lesser extent, NCUA share insurance. The Act permanently raised the deposit insurance limit from $100,000 to $250,000 and temporarily extended deposit insurance coverage to the full balance of non-interest-bearing transaction accounts through the end of 2012.

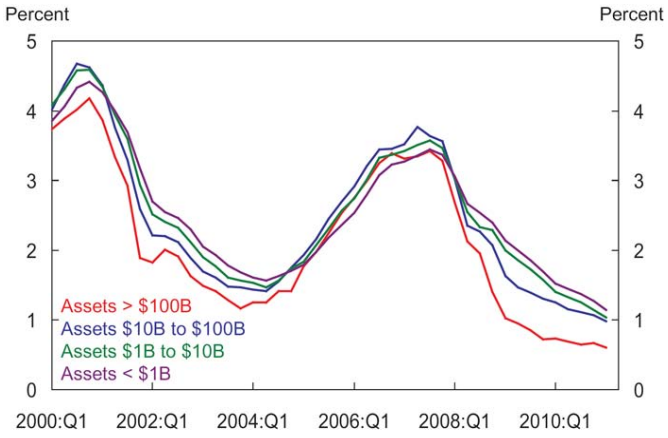
The Dodd-Frank Act made a number of other significant changes to FDIC deposit insurance. First, it changed the basis for calculating the assessment that insured depository institutions pay the FDIC from domestic deposits to a measure of total assets less shareholder equity. This change generally will shift the overall assessment burden away from community banks and toward the largest banks, which rely less on domestic deposits for their funding. This change will better align an institution's deposit insurance assessment with the impact that its failure would have on the FDIC's Deposit Insurance Fund (DIF). Second, the Dodd-Frank Act raised the minimum reserve ratio for the DIF balance from 1.15 percent to 1.35 percent of insured deposits and requires the FDIC to achieve the minimum reserve ratio by September 30, 2020. Third, the Act provided new flexibility to the FDIC in setting a long-run target reserve ratio for the DIF, which the FDIC has set at 2 percent. This should enable the FDIC to build

Chart 5.4.20 Current Short-Term Ratings

	S&P Ratings		Moody's Ratings	
	HoldCo SR ST-Rating	ST-Rating Status	HoldCo SR ST-Rating	ST-Rating Status
BAC	A-1	Stable	P-1	On Review for Downgrade
C	A-1	Stable	P-1	On Review for Downgrade
GS	A-1	Stable	P-1	Stable
JPM	A-1	Stable	P-1	Stable
MS	A-1	Stable	P-1	Stable
WFC	A-1+	Stable	P-1	Stable

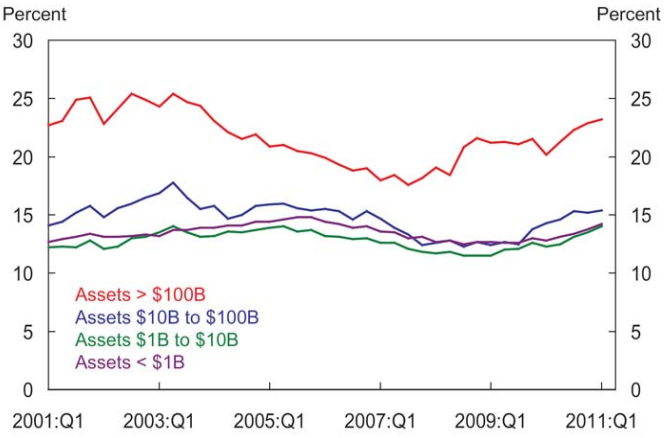
Source: Moody's, S&P

Chart 5.4.21 Interest Expense as a Percent of Total Liabilities



Source: FDIC Note: Data for FDIC-Insured banks and thrifts.

Chart 5.4.22 Noninterest-Bearing Liabilities to Total Liabilities



Source: FDIC Note: Data for FDIC-Insured banks and thrifts.

up a larger balance during better economic times, maintain a positive balance during periods of stress, and establish more stable assessment rates over the economic cycle.

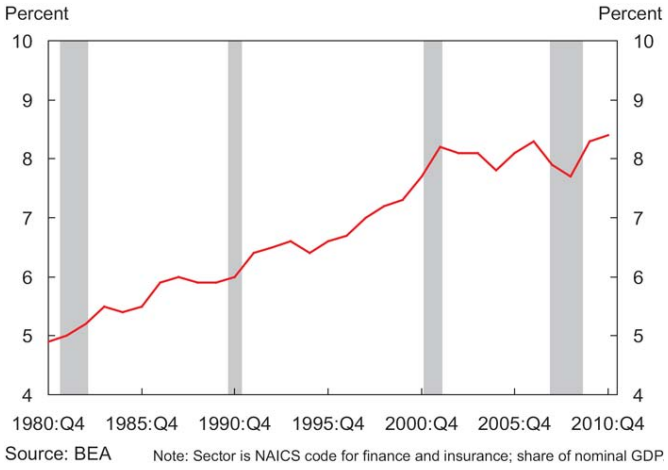
Large Complex Financial Institutions

Some large complex financial institutions can derive benefits from the perception that they are "too big to fail." Institutions that are perceived to be difficult to resolve in an orderly manner if they fail can undermine market discipline. The distortions induced by "too big to fail" may be evident in the creditworthiness assigned to these firms by credit rating agencies and more directly in their funding costs.

Credit rating agencies factor an explicit "uplift" into the ratings of certain financial institutions over their stand-alone credit ratings on the basis of perceived government support. The support embedded in firms' uplifted ratings increased dramatically in 2008 and persists. However, analysis based on credit default swap pricing for these large complex financial institutions suggests that markets are not factoring the ratings uplift into their evaluation of these companies' long-term debt ***(Charts 5.4.17***, ***5.4.18***, and ***5.4.19)***. The uplift does have a direct benefit for the short-term funding rating for these firms, which is currently the top tier A-1/P-1 rating ***(Chart 5.4.20)***. This rating allows these firms to access certain short-term wholesale funding markets that they would not be able to access with a lower rating.

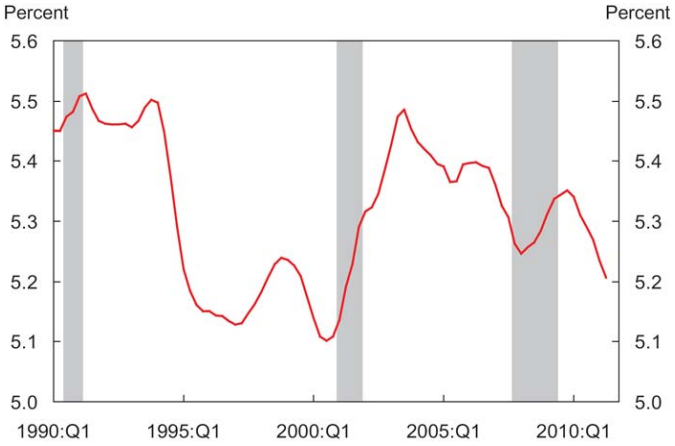
Large banks with over $100 billion in assets have greater access to market funding and a lower total funding cost than smaller institutions, as measured by the interest expense on total liabilities ***(Chart 5.4.21)***. The lower funding cost for larger banks is partly due to their greater ability to bundle a range of services to attract low-cost deposits; larger banks have also benefitted from the full guarantee on transaction accounts ***(Chart 5.4.22)***. Market-based factors also play a role. Larger institutions have access to market-based short-term sources of funding, such as through MMFs, which are currently providing funding at historically low rates.

Chart 5.4.23 Value Added Share of Financial Sector



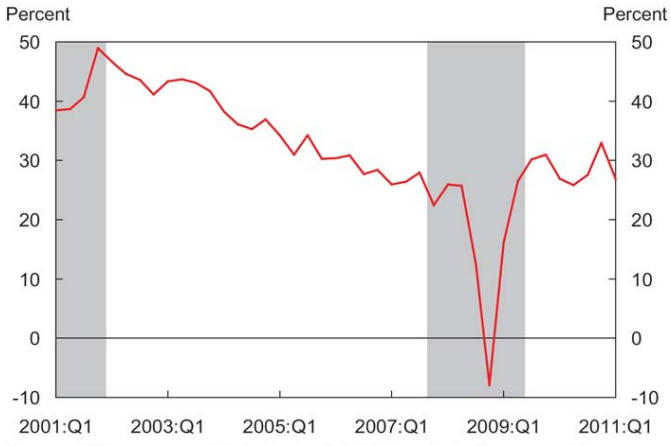
Source: BEA Note: Sector is NAICS code for finance and insurance; share of nominal GDP

Chart 5.4.24 Financial Sector Share of Nonfarm Payroll



Source: BLS Note: SA, Sector is NAICS code for finance and insurance.

Chart 5.4.25 Financial Sector Share of Corporate Profits



Source: BEA Note: Sector is NAICS code for finance and insurance.

Credit rating agencies have said they will review their U.S. bank support assumptions in the coming year on the basis of the enhanced resolution authority established under the Dodd-Frank Act ***(see Box I: Addressing Issues Related to Large Complex Financial Institutions*** and ***Section 6.1.2)***. As credit rating agencies consider the likelihood and potential impacts of a reduction in official support, they have placed certain firms' ratings on review for potential downgrade.

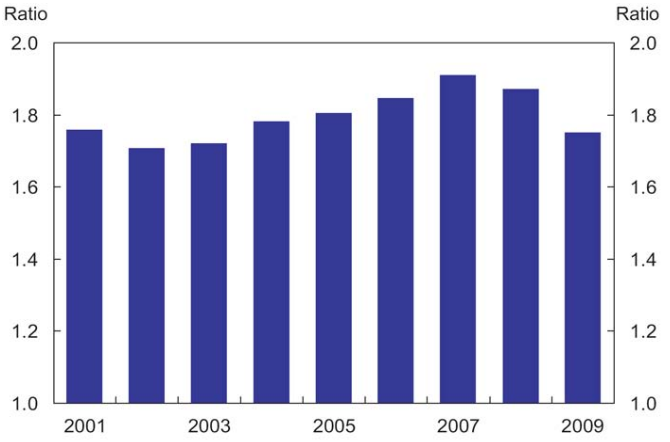
Compensation

As the financial system became more complex and globalized, the contribution of the financial sector to U.S. output increased by about 60 percent from 1980 to 2000 ***(Chart 5.4.23)***. This increased contribution was achieved with little change in the share of employment in the financial sector ***(Chart 5.4.24)***. Since 2000, its share of GDP has remained around 8 percent and its employment share just above 5 percent. With the exception of the recent recession, finance accounted for 25 percent to 50 percent of all corporate profits over the past decade ***(Chart 5.4.25)***.

Labor compensation in the financial sector is considerably higher than in many other industries and also tends to depend more heavily on complicated incentive structures. Average annual compensation in finance between 2001 and 2010 was 70 percent to 90 percent higher than in other industries ***(Chart 5.4.26)***. Specifically, average compensation in investment banking and securities dealing was 300 percent to 450 percent higher ***(Chart 5.4.27)***. The labor compensation share of value added in finance has fallen abruptly as many firms have made substantial changes to their compensation structures, partly to increase capital buffers through retained earnings ***(Chart 5.4.28)***.

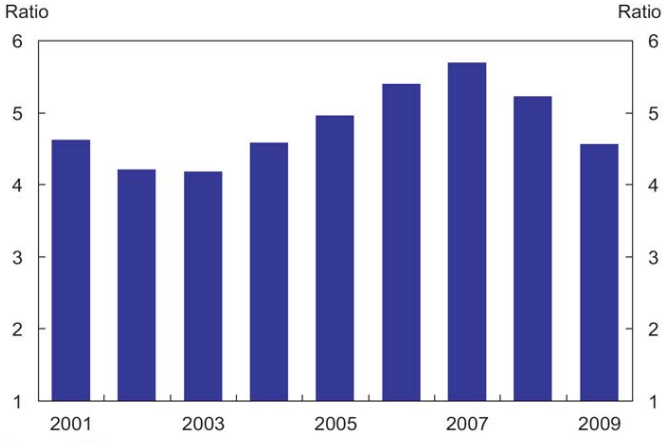
Compensation has grown dramatically for senior executives at the largest, most complex financial institutions. For example, in 1989, the chief executives at the seven largest BHCs earned an average of $2.8 million, or 97 times the median U.S. household income of $28,906 for that year. In 2007, the CEOs at the six largest BHCs earned an average of $26

Chart 5.4.26 Financial Sector Wages to All Wages



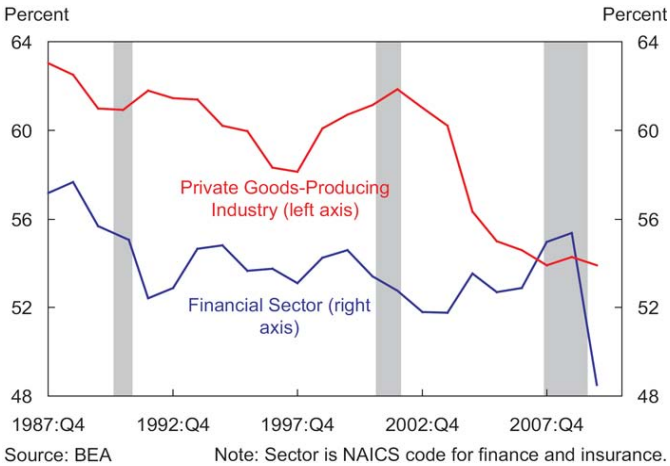
Source: BLS Note: Sector is NAICS code for finance and insurance.

5.4.27 Investment Banking Wages to All Wages



Source: BLS Note: Sector is NAICS code for investment banking and securities dealing.

5.4.28 Compensation Share of Industry Value Added



Source: BEA Note: Sector is NAICS code for finance and insurance.

million, or 516 times the median household income of $50,233 for that year. In 2007, these CEOs earned 2.3 times the average total compensation of the CEOs at the top 50 nonbank companies.

Because they affect the incentives of current and prospective employees, compensation programs are critical tools that can contribute to the success of financial institutions. If they are properly structured, they can help to attract and retain qualified staff and to align employee performance with organizational objectives. However, if they are not properly structured, compensation practices can lead to excessive risk taking by an institution's employees and have the potential to undermine the safety and soundness of the financial institution as well as that of the financial system itself. The G-20 leaders called for reform of compensation and endorsed the Principles for Sound Compensation Practices issued by the Financial Stability Board (FSB) in April 2009. Since then, many financial institutions have reexamined their compensation practices and are reevaluating possible links between incentive compensation and risk-taking behavior.

In June, 2010, the U.S. federal bank regulatory agencies issued supervisory guidance to ensure that incentive compensation arrangements at banking organizations take risk into account and are consistent with safe and sound practices. The guidance stated that incentive compensation programs should provide employees incentives that appropriately balance risk and financial results; they should be compatible with effective controls and risk-management; and they should be supported by strong corporate governance.

Subsequently, on March 30, 2011, as required by the Dodd-Frank Act, a broader set of financial regulatory agencies issued a proposed rule on incentive compensation that will apply to investment advisers, broker-dealers, and other entities, as well as banking organizations. The proposed rule, which is discussed more fully in Section 6.3.5, would apply to certain financial institutions with more than $1 billion in assets and would prohibit compensation arrangements that could encourage inappropriate risks.

Box I: Addressing Issues Related to Large Complex Financial Institutions

Large complex financial institutions (LCFIs) can be an efficient means of providing financial services to the economy. However, in the absence of an appropriate regulatory structure and robust risk management practices, the benefits of LCFIs can be outweighed by the risk they pose to the stability of the financial system, especially in times of severe market stress. The Dodd-Frank Act puts in place a number of measures to mitigate this risk.

In the years preceding the crisis, the structure of many commercial banks, investment banks, and insurers had become increasingly complex, with numerous subsidiaries that spanned the globe ***(Chart I.1)***.

Chart I.1 Complex Financial Institutions in 2007

Institution	Total Subsidiaries	% Foreign Subsidiaries	Countries of Operation
Citigroup	2,435	50%	84
Bank of America	1,407	28%	29
Morgan Stanley	1,052	47%	46
JPMorgan	804	51%	36
Lehman Brothers*	433	45%	20
Goldman Sachs	371	51%	21
Merrill Lynch*	267	64%	25

Source: Bankscope, 2007. Note: *Parent company inactive.

The LCFIs at the center of the 2008 crisis could not be wound down in an orderly manner when they became nonviable. Major segments of these companies' operations were subject to the U.S. Bankruptcy Code, as opposed to bank receivership or other specialized insolvency laws, or they were located abroad and therefore outside U.S. jurisdiction for insolvency purposes. In the midst of the crisis, policymakers in several instances provided government assistance instead of letting these companies file for bankruptcy. They were concerned that creditor losses and other uncertainty associated with the bankruptcy process would cascade through the global financial system. These concerns were realized when the prime brokerage assets of Lehman Brothers in the U.K. were frozen following that firm's bankruptcy.

Among the goals of the Dodd-Frank Act are to work toward ensuring that the risks posed by LCFIs are prudently managed and subject to adequate oversight, and eliminating the "too big to fail" risk and the necessity for government assistance to nonviable financial companies. The law, including provisions in Title I and Title II, uses the following tools to accomplish these goals.

Designation of Nonbank Financial Companies

The Council is authorized to designate nonbank financial companies as subject to enhanced prudential standards and supervision by the Federal Reserve. The Council must consider various factors in determining whether to make this designation, including leverage; off-balance-sheet exposures; and the nature, scope, size, scale, concentration, interconnectedness, and mix of activities of the company.

Enhanced Prudential Standards and Supervision

Major financial companies—bank holding companies with assets over $50 billion and designated nonbank financial companies—will be subject to enhanced prudential standards and supervision by the Federal Reserve to ensure that they have sufficient buffers to withstand severe financial stress. Strengthened capital and liquidity requirements will be core elements of these enhanced standards.

The Dodd-Frank Act also requires regulators to establish remedial actions to be taken when a financial company that is subject to enhanced prudential standards is experiencing increased financial distress. These remedial actions are intended to minimize the probability that such a company will become insolvent and harm the stability of financial markets.

Concentration Limits

The Dodd-Frank Act establishes a financial sector concentration limit. This limit generally prohibits a financial company from merging or acquiring another company if the total consolidated liabilities of the combined entity would exceed 10 percent of the aggregate consolidated liabilities of all financial companies. This limit should help avoid a financial system that is over-reliant on any particular firm, as well as acquisition-driven growth that is not accompanied by appropriate risk management systems and processes.

Detailed Resolution Plans

Financial companies subject to enhanced prudential standards are required to maintain detailed resolution plans that would facilitate a resolution under the Bankruptcy Code. The Dodd-Frank Act also requires, if necessary, changes in the structure or activities of these companies to ensure that they meet the standard of being resolvable in a crisis.

Orderly Liquidation Authority

Enhanced prudential standards and supervision by the Federal Reserve will help mitigate the risks posed by LCFIs. However, if such an institution fails, the orderly liquidation authority—under which company shareholders and unsecured creditors bear the losses of failure—provides the government with the tools and authority to resolve a failed institution in a manner that limits broader systemic impact and taxpayer cost during times of severe market stress. This new framework should help strengthen market discipline and discourage the subsidization of excessive risk taking that occurred before the crisis.

These provisions, together with other elements of regulatory reform, such as regulation of the over-the-counter derivatives market and the implementation of international Basel III capital standards, are aimed at achieving a more resilient financial system that is better able to withstand the level of stress that occurred during the financial crisis.