

4

Addressing Data Gaps

The first section of this chapter describes how the OFR will fill gaps in data needed for financial stability analysis and improve the scope and quality of those data. The second section describes recent progress and initiatives to improve measures of leverage, liquidity risk, and interconnectedness among financial institutions. The OFR's highest immediate data priorities lie in short-term funding markets; over-the-counter derivatives, particularly credit default swaps; and asset management.

4.1 Data Agenda

Implementing the OFR's data agenda follows a three-step process: (1) Identify financial stability data needs; (2) Determine gaps and weaknesses; and, (3) Prioritize and fill the gaps by better organizing existing data, promoting data standards, and sourcing new data where necessary (Chart 4.1.1). To avoid duplication, reduce regulatory burden, and take advantage of existing data sources to the extent possible, the OFR is building a comprehensive inventory of data that the Council member agencies already purchase or collect. To assure data security and confidentiality, the OFR is building a secure enclave for data storage and use.

4.1.1 Identify Financial Stability Data Needs

Financial stability data needs may arise from efforts to answer questions coming from several sources. Among them: (1) Work in support of the Council; (2) Other data needs identified through interactions with Council agencies, for example through the Council's Data Committee coordinated by the OFR; with the OFR's Financial Research Advisory Committee; or with other stakeholders; (3) The Office's own monitoring and metrics analysis of the financial system and its vulnerabilities; and, (4) The Office's risk management, stress testing analysis, crisis forensics, and other research activities.

Section 4.2 describes examples of that process in analyzing threats to financial stability posed by excessive liquidity and leverage and the interconnections among financial institutions,

and discusses some of the key markets that can create those risks.

4.1.2 Determine Data Gaps

The Dodd-Frank Act requires that the OFR rely on data already collected by Council member agencies, where possible, before requesting additional data for financial stability analysis and monitoring. To take stock of available data, the OFR has developed a comprehensive inventory of financial data collected or purchased by Council member agencies. Where there are gaps in the available data, the Act provides that the Office could help fill them by requiring financial companies to submit these data, including transaction and position data.

Gaps and weaknesses in financial data arise in several ways. First, market participants cannot know what specific information will turn out to

Chart 4.1.1 Addressing Data Gaps

Identify Financial Stability Data Needs	Determine Data Gaps	Prioritize and Fill Data Gaps
Work in support of the Council	Inventory data available to supervisors	Organize data
Other collaborations	Search external data sources	Promote data standards
OFR monitoring	Analyze existing data standards	Source data
OFR research		Manage data
Ensure security, confidentiality, and privacy of data		

be critical for assessing the risks of new products or transactions. Second, supervisors cannot foresee all uses of the information they collect for the analysis of financial stability. Third, the data they collect are frequently not comparable, which stymies analysis of links among different structures and entities. Finally, while financial data are dynamic, it is costly and difficult to change information systems and collection rules.

Chart 4.1.2 illustrates sources of such gaps. At the most basic level, a financial institution may not be collecting and reporting the relevant data about terms and conditions of all financial contracts. It may be difficult for management to keep track of the activities and risk positions of its own trades in the case of customized transactions—key information on such trades is often described in text form on contracts and in large text documents rather than in structured digital form—or to know the correct amount of information required to hold and trace the lineage of some products in order to understand the risks inherent in new products.

Even if a firm collects relevant data, it may not be able to use them effectively. For example, if all of the units in the firm do not use common definitions for similar financial exposures, its risk managers will have difficulty comparing different products, evaluating the firm’s aggregate exposures, or making linkages—

such as linking structured products to their underlying components. Circa 2006, a large financial institution may have had various business units that originated and acquired mortgages, following waves of corporate mergers and acquisitions, but each of those units may have had its own definition for a term like “subprime.” One unit may have considered any mortgage with a FICO score below 620 as subprime, while another may have used 660; or the definition could have been based on income, on the identity of the lender, or on the interest rate the borrower paid. Each institution also might have stored different amounts of details on the transactions, rendering these data incomplete across all participants.

Other barriers to comparative analysis would be the lack of a common identifier separating subprime mortgages from other types of loans or insufficient descriptive information about the details of the mortgages. Or, the firm may not be collecting the data in a standard format—the various units may use the same definitions but may be storing the data on incompatible computer platforms. In each case, the financial institution has the data but is not collecting them in a consistent and comparable way across the organization. These examples highlight the importance of data and data standards to assist with robust risk analysis and development of internal systems.

At the next level, the data may not be available for sharing across companies or supervisors. Comparing information across companies could help supervisors identify crowded trades, excessive growth in a particular sector, or other systemic issues that are difficult to discern at a single institution. Finally, supervisors may be collecting data from more than one institution, but those datasets cannot be merged with datasets from other companies or industries. For example, regulatory reports filed by banks and securities firms do not have fully comparable data categories or nomenclature, which makes it difficult to get a picture of the consolidated exposures of a complex institution with both bank and securities firm subsidiaries.

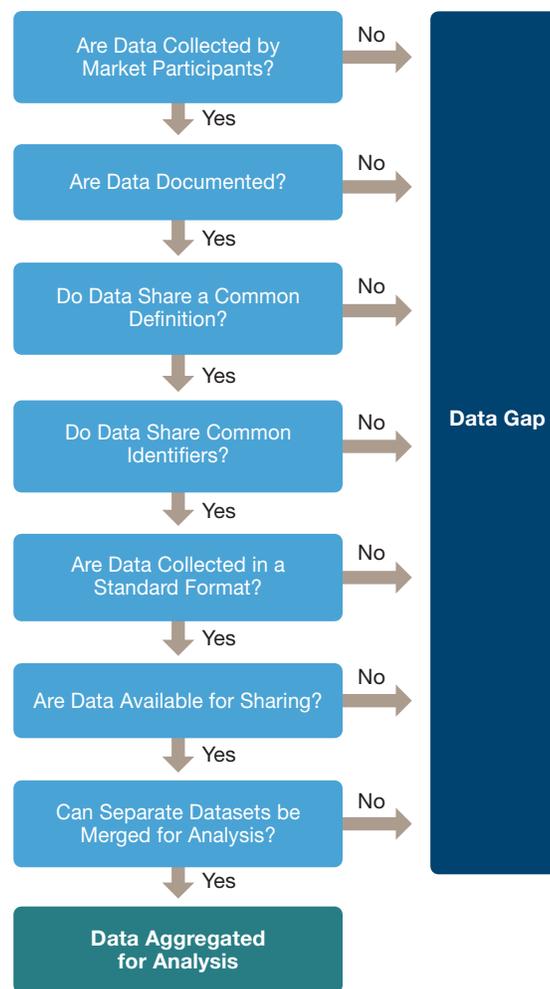
Only after all of these potential gaps have been addressed can data be consistently aggregated for comparative analysis by financial supervisors.

Interagency Data Inventory

The data inventory initiative is helping the Office identify data sources, data gaps, overlaps, and areas where data need to be made more consistent and comparable. It covers three types of data: *purchased data* (data procured from vendor sources); *collected data* (data collected from financial service firms and other sources by supervisors and regulators or directly by the OFR); and *derived data* (data derived from the previous two sources, alone or in combination).

The data inventory will allow the Office and the Council agencies to quickly locate data that can be used to analyze threats to financial stability, ensuring that they can leverage the information efficiently as allowed by the contract terms for the data. To date, the purchased data have been catalogued and metadata—data describing the data—have been stored in a searchable repository. The OFR is in the process of collecting metadata about the agencies’ collected data and will follow up with derived data, including definitions of these data, to complete this inventory. It will be updated on a regular basis.

Chart 4.1.2 Possible Sources of Data Gaps



Data from the data inventory have already been and will continue to be used by researchers in the OFR. They will also be made available, where possible, to Council member agencies to assist in identifying data sources for their research or other needs. The OFR expects to provide a service to the FSO agencies in describing where information exists before a given agency decides to procure it and before requesting new information from financial market participants. The inventory will promote efficiency and data-sharing across the agencies and avoid unnecessary burdens on financial service firms. As a part of this effort to serve the Council, the Office is working with private market vendors, where possible, to secure access to identified missing data, to simplify the process, to fill the gaps, and to increase efficiencies.

This data inventory will also afford the OFR a unique perspective on the aggregate reporting requirements facing financial institutions. Furnished with such information, the OFR can work with Council member agencies to reduce and eventually eliminate duplication in data collection. In addition, in conjunction with work on data quality and data standards, this information can help the Council to simplify and streamline the information collection process. Together these initiatives will improve the scope and quality of data collected while reducing the reporting burden.

4.1.3 Prioritize and Fill Data Gaps

The OFR has three strategies for filling data gaps:

(1) Help organize and integrate existing data gathered by the agencies. The OFR's approach begins with organizing existing data. Organizing means not only identifying and cataloguing the data, but understanding where the data are sourced and in some cases derived; what the components of the data really mean in the context of the financial contract; and how they fit into our understanding of the financial system. This activity is central to the Office's ability to monitor and assess the financial system because it is crucial to have an up-to-date picture of the processes that move capital, ownership, control, and risk among investors and financial institutions. To understand capital and risk flows, the effective macroprudential analyst must have the ability to combine data reported from different sources and to rely upon the data for analysis. For example, the OFR receives transaction and pricing data about the credit default swap (CDS) market from separate sources; a near-term objective is to connect and update reliably these two sources for monitoring purposes.

(2) Promote data standards. In some cases, data gaps can be addressed by improving the quality of data already collected through standardization. The benefits of standards are significant, and they accrue to both market

participants and supervisors. The OFR will seek to enhance the quality and usability of existing data to enhance risk management along with microprudential and macroprudential supervision. The Office will work closely with industry, Council member agencies, and international bodies to achieve a higher quality and standardization of data collections, as described in Chapter 5.

(3) Source additional data that are not currently available. Where data gaps cannot be closed through better use of already collected data or through better standards, the OFR will work with industry participants and Council member agencies to collect the necessary information and data to fill those gaps. By coordinating with other Council agencies, the Office intends to create efficiencies in future collections and mitigate burdens on those reporting the data. When collecting such data, the Office will establish and facilitate standards for those collections so that they may be used to their fullest potential.

In pursuing all three of these strategies, the overriding concern will be to take an approach that considers the burdens associated with these activities.

4.1.4 Manage Data

In many cases, the OFR will acquire, manage, and distribute economic statistics; financial industry data on companies, products, transactions, and positions; and other data required for ad hoc FSOC requests and forensic analyses.

Database management demands secure processes to extract data from sources, transform data for use, and load data into permanent storage, such as in a data warehouse and other databases optimized by data type and into analytic tools for use by researchers. The Office will work to achieve appropriate data quality on the data it manages so that all data can be used without modification or correction by all users. Wherever the data come from, the OFR

will validate that they are accurate, complete, and available for use by researchers. Metrics, including data quality and usage metrics, will be kept and reviewed on a regular basis. The Office has begun a Data Maturity Model project to measure data maturity capabilities and define best practices that will serve as a benchmark. This will help to ensure the highest quality and integrity of the data.

The Office will look to increase the transparency and accessibility of the data, particularly to researchers in the Office and Council, and also to member agencies and the public where possible. Accessibility will be based on the sensitivity of the data and the terms of the agreements or data contracts. The Office will maintain an electronic library that will contain a catalogue of all information collected that can be searched and made available based on appropriate security and access rights. This catalogue will be extended to include research papers, data, and other information in order to improve efficiency across Council members' organizations, allowing immediate access to the data, and to improve the ability to support the mission of analyzing threats to financial stability.

4.1.5 Ensure Security, Confidentiality, and Privacy of Data

Keeping data safe and secure is the highest priority for the OFR. One of the biggest challenges in analyzing threats to financial stability is to collect and store, in a secure environment, a significant amount of confidential data. Robust security for data requires strong technology, governance, and processes.

The OFR currently uses a secure analytic environment and is designing a robust data and technology infrastructure that will support traditional analysis as well as the ability to rapidly secure and analyze large amounts of data. The analytical environment rests on the foundation of technical requirements that are

well-established by the federal government (**Box G: Building a Secure Infrastructure**). Through the use of such techniques as role-based access and dual factor authentication, the OFR seeks to ensure that the technology supports data protection and secure access. The Office has several initiatives to ensure security for the data it manages:

- As part of the Treasury, the OFR inherits and can leverage the secure Treasury environment, including its infrastructure and policies and procedures.
- The OFR is putting in place additional controls for the data in the form of hardware, software, policies and procedures, and access rights, including granting access on a “need-to-know” basis.
- The OFR is in the process of defining and will publish a standard data security classification in order to map data acquired from multiple sources, including the public or other agencies. This is needed to ensure that the data can be catalogued, tagged, and handled properly with the required appropriate security measures. In addition, access control will be maintained in a central location, monitored on a continual basis, and updated as needed.
- The need to assure data confidentiality and security will restrict the scope of disaggregated data that can be directly shared with external researchers. The OFR is investigating sophisticated techniques to aggregate, mask, and make data anonymous in order to assure the security of the raw information while making the derived data available to researchers (Abbe, Khandani, and Lo, 2012).

However, even advanced technologies can be defeated by poor governance, processes, and monitoring. The OFR understands this and is developing robust reporting and monitoring

BOX G. BUILDING A SECURE INFRASTRUCTURE

Essential to the success of the OFR is the protection of the data it receives, derives, stores, and transmits. The keystone requirement for the deployment of appropriate security controls is the proper categorization of both systems and information and the related proper data handling procedures.

The OFR is developing a comprehensive security categorization methodology based on National Institute of Standards and Technology (NIST) Publication 199 and will adhere to all other NIST guidance for the deployment of baseline controls (NIST, 2004). The OFR will supplement the baseline controls specified by NIST with additional handling instructions for each category of information. These additional handling instructions provide a hardened set of security controls.

This commitment to the protection of data is emphasized in the guiding principles of our Information Security Program. Those principles include:

- Strict adherence to a data categorization and sensitivity classification methodology based on the Federal Information Security Management Act of 2002 (FISMA) and NIST Publication 199;
- Safeguarding of data that we receive, store, and distribute at least as well as they are safeguarded by the data's owner;
- Least privileged access, whereby access to systems and information is granted on an as-needed basis and only to the extent necessary for an individual to accomplish his or her mission;

- A culture of awareness whereby security is a primary concern of all personnel;
- Compliance with and subordination to higher office policies and guidance, such as FISMA, NIST, and Treasury Departmental Offices;
- Leveraging the protections inherited as part of the Treasury network and supplementing those protections to attain a higher level of protection where appropriate;
- Supplementing and strengthening the policies and controls specified by higher offices where appropriate;
- Similar security controls that reinforce each other in a layered manner; and,
- Well-defined roles and responsibilities for executing the security program with clear lines of accountability, responsibility, and authority.

An example of the OFR's commitment to an enhanced security posture is the recent construction of our secure network enclave. The OFR shares data center space with and is part of the Treasury Departmental Offices local area network, and, as such, inherits the high degree of protection provided by this network. The OFR has built additional security measures to segregate its systems from the rest of the Departmental Offices.

policies and procedures. Every member of the OFR staff who has access to confidential position and transaction data certifies that they understand that they are subject to the post-

employment restrictions set out by Dodd-Frank. Staff are not given access without explicit assent from a supervisor.

4.2 Examples of Financial Stability Data Gaps

To an important extent, the OFR's research and monitoring activities, in collaboration with the regulatory agencies, will inform its identification of data gaps. The OFR views leverage, liquidity, and interconnectedness as among the most important factors affecting financial stability. Measuring and assessing these three risk factors, among others, will always be important to the OFR's mission. Excessive leverage leaves market participants vulnerable to declines in asset values, creating the potential, in a crisis, for distressed asset sales and thus a spread of losses to other asset holders. These effects are exacerbated by liquidity mismatches when illiquid long-term assets are funded through short-term liabilities. In a crisis, losses may propagate from one institution to another through the many links that connect financial institutions in networks, including lending and liquidity provision. These factors affecting financial stability are thus interrelated and are a primary focus for the OFR's research agenda.

This section discusses leverage, liquidity, and interconnectedness in turn, emphasizing the diverse nature of these factors and identifying key information needed for comprehensive monitoring. The data needed to measure potential threats, like the factors themselves, cut across different parts of the financial system.

Based on these risk factors, the OFR's highest data and research priorities lie in short-term funding markets, including money market funds, repurchase agreement or repo markets, and securities lending; and over-the-counter (OTC) derivatives, particularly credit default swaps. Structural weaknesses in markets for both short-term funding and OTC derivatives contributed to the recent financial crisis. Both are vast and traditionally opaque. The OFR is also interested in addressing data gaps about the asset management industry.

Recent reforms have brought greater transparency to these markets, but important data gaps remain to be filled, and further analysis is needed to understand how to further enhance the resilience of the rest of the financial system to potential vulnerabilities in these markets. What follows reflects the OFR's analysis of the data needed to support

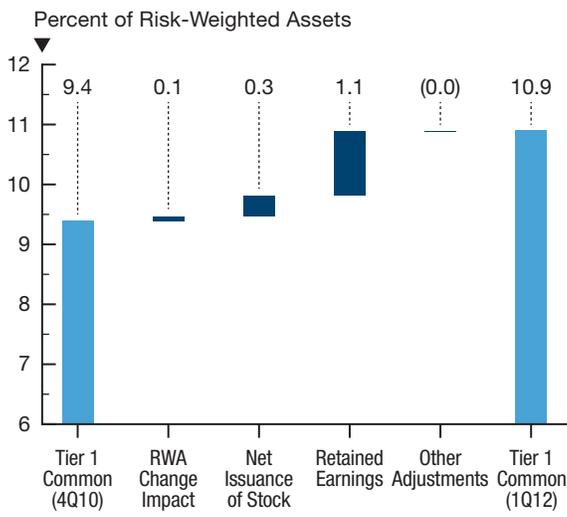
these research priorities. Identification of data needs is just the first step in the OFR's process for setting its data agenda; that process also includes setting priorities while remaining sensitive to the potential costs, considering the appropriate form of OFR involvement, and defining how to share the data.

4.2.1 Leverage

Excessive leverage is a frequent precursor to financial crises. Just as leverage multiplies gains from rising asset values, it also magnifies sensitivity to adverse events. Leverage amplifies asset bubbles as easy borrowing enables speculators to bid up prices. Of course, credit also supports economic growth. Because leverage can accumulate almost anywhere in the financial system, in both regulated and unregulated sectors, a comprehensive view is needed to identify the proper balance.

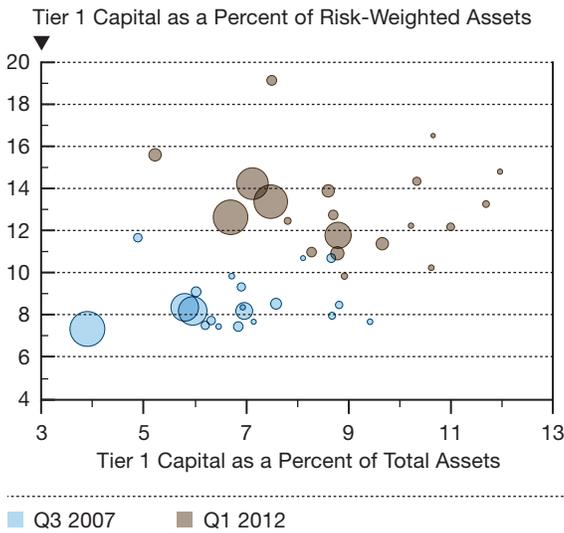
Monitoring trends in leverage requires measures of both overall leverage and the leverage in new transactions, in order to understand trends. In real estate, for example, the overall loan-to-value ratio of outstanding mortgages provides an important measure of total leverage in this sector; but the loan-to-value ratio on new mortgages provides a better indication of

Chart 4.2.1 Change in Tier 1 Common Ratios for 19 Largest BHCs



Source: FSOC (2012)

Chart 4.2.2 Tier 1 Capital Ratios for Major BHCs



Note: Top 20 BHCs by total assets as of Q3 2007 that are still in existence. Bubble sizes reflect relative total assets.

Source: FR Y-9C filings via SNL Financial, OFR calculations

current conditions. Geanakoplos and Pedersen (2011), for example, report that new leverage falls just before a crisis, while a decline in total leverage may lag by two years or more. As this observation suggests, tracking changes in marginal leverage along with total credit across many types of lending is an important component of macroprudential oversight.

The following subsections discuss drivers of leverage and data needed for measuring and monitoring leverage. Again, further work remains with respect to setting data acquisition priorities.

Bank Leverage

Leverage in the banking system is controlled through capital requirements and monitored by banking supervisors. New capital standards set by the federal banking agencies and Basel III will increase both the quantity and quality of capital by assigning higher risk weights for certain asset classes and narrowing the types of liabilities that may be counted as capital. From the fourth quarter of 2010 to the first quarter of 2012, the 19 largest U.S. bank holding companies increased their Tier 1 common ratios, a key measure of capital, from 9.4 percent to 10.9 percent of risk-weighted assets (*Chart 4.2.1*). In addition, the financial crisis demonstrated the importance of limiting leverage based on total assets as well as risk-weighted assets. Fixed risk weights inevitably miss changes in asset riskiness, as they did with mortgages and sovereign debt; an overall cap on leverage reduces opportunities for banks to exploit such gaps. While U.S. banks have been subject to a leverage ratio based on total assets for two decades, under the proposed Basel III rules, large firms would also be subject to an international leverage ratio that will capture off-balance-sheet exposure.

Chart 4.2.2 shows ratios of Tier 1 capital to total assets and risk-weighted assets for the largest U.S. BHCs. The bubble sizes reflect relative total assets. Values from 2007 are indicated in blue and values from 2012 in brown. The chart shows

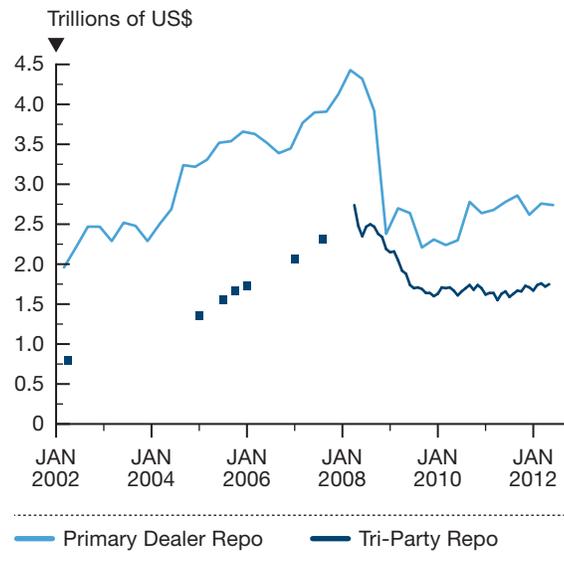
stronger capital ratios on both measures for the more recent period.

Most of a depository institution's borrowing comes from deposits and other forms of debt, but banks can also create off-balance-sheet leverage through derivatives. Off-balance-sheet leverage is more difficult to monitor, particularly because the leverage in derivative positions is often implicit and can change with market prices: swaps can change from assets to liabilities, and leverage in options depends on the strike price relative to a changing spot price. The Federal Reserve's Form Y-14, adopted in 2012, collects more granular information than previously available about off-balance-sheet exposures at bank holding companies, information that can help assemble a more comprehensive view of leverage in the banking system. This is an important positive development; however, the information on sensitivities to risk factors collected through this form can miss the effects of sudden large movements in market prices. For complex structured products in particular, sensitivities provide an incomplete picture of risk and embedded leverage. Detailed information about off-balance-sheet exposures thus remains an important data gap.

The information from Form Y-14 is a key input to the Federal Reserve's annual Comprehensive Capital Analysis and Review (CCAR). This review provides an essential perspective for monitoring leverage by publicly disclosing information about the effectiveness of bank capital and capital plans in sustaining losses under stress conditions. Information from the CCAR thus goes beyond a current snapshot of bank leverage to shed light on how leverage might evolve under adverse conditions and where additional capital might therefore be required.

Short-term wholesale funding remains a potential source of leverage and liquidity risk in the banking system. Regulatory reports, through the Call Reports filed by banks and the Y-9Cs filed by bank holding companies, provide limited insights into these risks—they are filed

Chart 4.2.3 Estimated Value of the Repo Market



Source: FSOC (2012)

only quarterly and they aggregate overnight borrowing with 90-day borrowing, obscuring the bank's exposure to a freeze in short-term funding markets. The Federal Reserve and OCC have begun to collect more granular information about liquidity exposures at the largest bank holding companies on a confidential basis through the Federal Reserve Bank of New York's daily liquidity monitoring (*Box H: Improvements in Financial System Monitoring*).

Repo and Securities Lending

Repo markets provide a critical channel for securitized short-term lending against financial assets. Leverage through repo is moderated by haircuts or over-collateralization: a larger haircut reduces the amount a borrower can borrow against the value of an asset posted as collateral. As haircuts compress and widen, repo leverage expands and contracts. A sharp increase in haircuts has the potential to trigger a rapid deleveraging. Repo leverage is difficult to measure and monitor because bilateral repo transactions are widely dispersed, as opposed to operating through a single venue or platform. Even the size of the repo market is difficult to quantify. *Chart 4.2.3* shows the scale of repo

Financial supervisors have taken important steps to expand their knowledge of the financial system in recent years. Hedge funds and money market funds are now required to file confidential new reporting forms, and thrifts now file the same public Call Reports that banks file. Also, a small group of large banks are now required to file an extensive confidential financial report as part of the Federal Reserve's new annual capital assessment exercise and stress test.

Since the crisis, financial supervisors have improved their ability to monitor developments in the financial system in important ways. Those improvements encompass new reporting requirements for institutions that are subject to federal supervision, such as banks and thrifts. In some cases, as required by Congress, supervisors have also introduced new reporting requirements for institutions that they do not supervise directly for safety and soundness, such as hedge funds.

Banks and Bank Holding Companies

Regulatory reports filed by depository institutions have been expanded. The Call Reports and the comparable forms filed by bank holding companies (the Y-9Cs) have been expanded to include, for example, more granular information about securities holdings, derivatives and trading activities, off-balance sheet commitments, and nonperforming loans. Also, starting with their March 31, 2012 filings, thrifts now file the same Call Reports that banks file. Under the Dodd-Frank Act, the Thrift Financial Report was eliminated, and thrifts became subject to the same reporting requirements as banks. Also, supervisory oversight for federal savings associations was assumed by the OCC; federal oversight for state-chartered savings associations was transferred to the FDIC; and oversight of thrift

holding companies was transferred to the Federal Reserve. As a result, these financial institutions are now subject to similar regulatory regimes as banking organizations.

The OCC has taken the lead in several large-scale projects to collect and aggregate loan-level data from large banks reflecting their exposures in mortgages, home equity, credit card, and commercial real estate loans, often working closely with the other federal supervisors. The OCC shares that information with the other supervisors and, in the case of mortgage data, with the public in the quarterly Mortgage Metrics Report. The Federal Reserve Board, the OCC, and the FDIC are working to modernize the Shared National Credit program, a longstanding interagency effort that creates and disseminates aggregate information about banks' credit exposures to large syndicated loans.

As part of its Comprehensive Capital Analysis and Review, the Federal Reserve introduced a new regulatory form, the Y-14, to be filed by the large banks that participate in the program, to support supervisory stress tests, and to improve monitoring capabilities. The Y-14 requires these companies to provide more data about various asset classes—securities risk, retail risk, wholesale risk, trading—and categories of pre-provision net revenue on a quarterly basis.

Unlike most other federal regulatory reports, the companies provide the data on a confidential basis; however, the Federal Reserve publicly releases information about the results of the stress tests performed on each bank.

Similarly, since the financial crisis the Federal Reserve Bank of New York has been collecting daily information from a small number of large bank holding companies about their liquidity exposures, including exposures in derivatives and short-term funding markets and information about counterparties.

Nonbank Financial Institutions

This year, hedge fund advisers and other private fund advisers are filing Form PF for the first time with regulators, either the SEC for investment advisers with registered private funds or the CFTC for certain commodity pool operators and commodity trading advisers dually registered with the SEC and CFTC. Form PF, a confidential reporting form implementing a mandate from Congress in the Dodd-Frank Act, requires detailed information about assets under management, the use of leverage, counterparty credit risk exposure, and trading and investment exposures. Data from the form should be available on a confidential basis to supervisors by early 2013.

The OFR monitors money market fund holdings through the funds' monthly SEC filings. The filings are required of all 2a-7 funds—funds covered by Rule 2a-7 of the Investment Company Act of 1940. Form N-MFP provides valuable disclosure on money market fund investments.

International Exposures and Data Gaps

To enhance information on sovereign debt exposures, the SEC's Division of Corporation Finance issued in January 2012 disclosure guidance on registrants' direct and indirect exposures to European sovereign debt. The purpose of the SEC's guidance was to provide investors with greater clarity and comparability in substance and presentation between registrants. The federal banking agencies' Interagency Country Exposure Review Committee (ICERC) is also currently working on a project to enhance disclosures on the Country Exposure Report (FFIEC 009) that may lead to a proposal for comment.

In November 2009, the Financial Stability Board and the International Monetary Fund issued 20 recommendations for international cooperation to fill data gaps. They issued progress reports in May 2010 and June 2011 (FSB and IMF, 2009, 2010, and 2011). Their recommendations include further investigation of measures of systemic risk (similar measures are discussed in Section 3.1 of this report); improved data on shadow banking (including disclosures on asset-backed securities); greater reporting of data on derivatives, particularly credit default swaps; and a common template for reporting by large, complex financial institutions.

transactions conducted by primary dealers and through the tri-party repo market.

The repo market is broadly divided into three components. First, the tri-party repo market operates through two large clearing banks, Bank of New York Mellon and JPMorgan Chase. Each participant in this market maintains a cash account and a securities account with one of these clearing banks. When a repo transaction occurs, the clearing bank transfers cash from the lender's cash account to the borrower's and transfers securities (collateral) from the borrower's securities account to the lender's. Second, in the Delivery versus Payment repo market, dealers engage in bilateral repo transactions with a variety of customers and with one another. Third, the General Collateral Finance (GCF) market is a blind-brokered interdealer market in which the Fixed Income Clearing Corporation (FICC) plays the role of central counterparty. Trades are netted out each day, and FICC reports net clearing amounts to the tri-party clearing banks.

The OFR tracks money market fund transactions through data collected monthly by the SEC's Form N-MFP. This is a limited but important window into repo markets. The concentration of the tri-party repo market in two clearing banks provides an opportunity for more comprehensive coverage of tri-party repo transactions that would allow the OFR to monitor potential threats in this critical component of short-term funding markets. The Federal Reserve Bank of New York currently reports aggregate weekly statistics on volumes, interest rates, and haircuts for tri-party repo, based on information collected directly from the clearing banks; these reports do not include information on the counterparties to the transactions.

But a complete understanding of the U.S. repo market is not feasible without corresponding information about bilateral repo transactions and the GCF market. Bilateral repos are currently included in aggregate data provided by primary dealer banks to the Federal Reserve

in a weekly report (the FR 2004)—although supervisors do not know how much bilateral repo business takes place outside the primary dealers—and the Depository Trust and Clearing Corporation makes monthly aggregate data on the GCF market available on its website. The OFR is engaged in acquiring and analyzing more frequent and detailed data on these markets.

Securities lending is similar to repo in that both involve a temporary exchange of securities and cash, with an interest payment when the exchange is reversed. The difference is that repo is mainly a mechanism for collateralized lending and borrowing, while securities lending is driven primarily by demand for holding a security temporarily—for example, for purposes of short selling. Typical securities borrowers are hedge funds and dealers; typical lenders are insurance companies, pension funds, and investment companies. As it is with repo, the over-collateralization required on securities lending is an important governor on leverage. There is no central information source in the securities lending market comparable to the two clearing banks in the tri-party repo market. Supervisors receive very little information about securities lending, and private vendors of information about the market rely on voluntary reporting by market participants.

A complete picture of these markets requires better data on all repo and securities lending transactions, including the parties to the transaction, collateral, haircuts, and maturities. Given the prominence of these markets in the financial crisis and their anticipated renewed importance as lending rebounds, the absence of a complete picture presents a significant data gap. The OFR will work closely with FSOC agencies to develop strategies to close this gap and will set priorities after weighing the relative advantages of different strategies.

Derivatives Markets

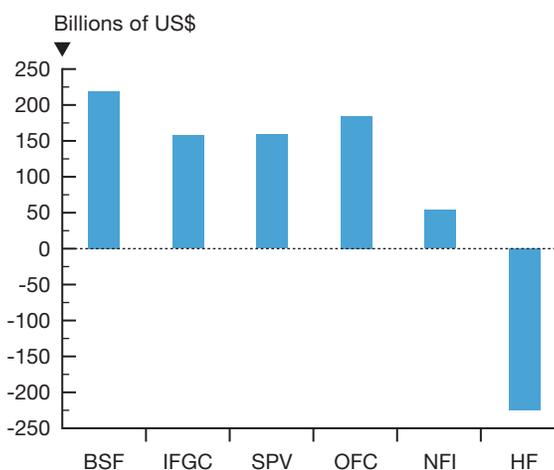
Derivatives, both exchange-traded and OTC, are sources of leverage. Because there is no purchase price to enter into a futures contract, the initial margin required by an exchange is

an important constraint on leverage. Margin requirements are public information, but there is no comprehensive database that tracks margins across exchanges and products; such a database is a potentially valuable element of a systemwide leverage monitor.

Margins on OTC derivatives are more difficult to track. As trading moves to swap execution facilities and central clearing, these markets will become more transparent and margin requirements will be easier to monitor. Indeed, Title VII of the Dodd-Frank Act requires that the details of swap transactions be reported to trade repositories. In addition to margins, total exposures through derivatives are indicators of overall leverage. Many derivatives—options, for example—are effectively equivalent to prepackaged trading strategies that use leverage to trade in the underlying assets, so increased derivatives volume is similar to increased leverage. Like leverage, greater use of swaps and options can magnify the market’s overall sensitivity to fluctuations in underlying prices.

Chart 4.2.4, updating data in Vause (2011), illustrates both progress and remaining gaps in the available data on OTC derivatives transactions. This information has become available through international coordination to improve reporting. The chart shows net credit protection bought by dealers reporting to the Bank for International Settlements (BIS), broken down by type of counterparty. The chart indicates that dealers are net sellers of protection to hedge funds and net buyers of protection from other counterparties—banks and securities firms, insurance and financial guaranty firms, special purpose vehicles, other financial institutions, and non-financial firms. This type of breakdown has become available through the BIS only since 2010, in response to heightened concerns about the opacity of the credit default swap market. At the same time, the chart points to remaining data needs—in particular, the BIS data do not include information about counterparty concentrations. The risk in the CDS market is often greater when protection sellers and reference entities

Chart 4.2.4 Net Credit Protection Bought by Dealers From Different Counterparty Groups—December 2011



BSF = Banks and Securities Firms
 IFGC = Insurance and Financial Guaranty Companies
 SPV = Special Purpose Vehicles
 OFC = Other Financial Companies
 NFI = Non-Financial Institutions
 HF = Hedge Funds

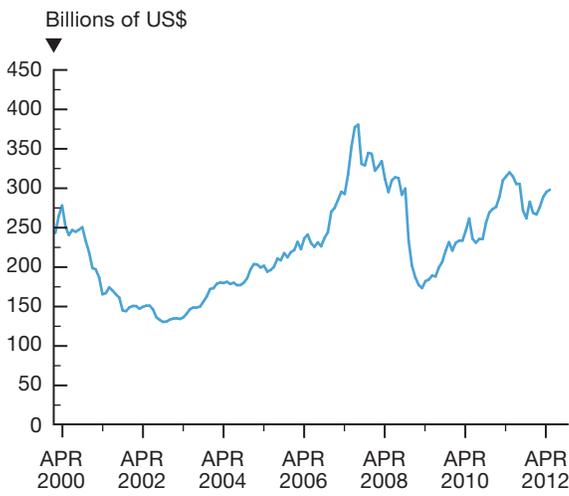
Source: BIS, OFR calculations

are in the same sector and when added contractual complexity makes CDS difficult to value. Granular data on these aspects of the CDS market are not available through the BIS statistics.

One of the important historical impediments to understanding aggregate counterparty risk associated with OTC derivatives was that even where transactional data might be available to a regulator, each party to the transaction might keep records with different identifiers for counterparty and reference asset. The global effort endorsed by the OFR to establish the Legal Entity Identifier (LEI), a single, universal naming convention for legal entities, will help mitigate the risk that supervisors will miss a buildup in these instruments.

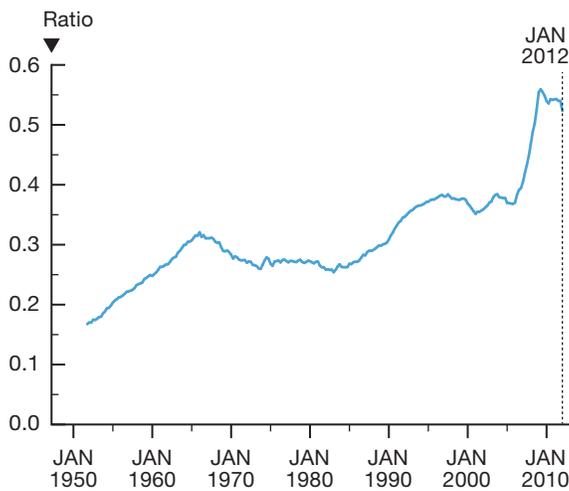
The OFR is in the process of acquiring and securing transaction, position, and pricing information on CDS contracts in collaboration with other FSOC members. Even with these data in place, important data gaps will remain, including information about collateral and netting arrangements between CDS

Chart 4.2.5 Debit Balances in Margin Accounts at Broker-Dealers



Source: NYSE, Haver Analytics

Chart 4.2.6 Ratio of Home Mortgage Liabilities to Real Estate Assets, Household Sector



Source: FRED, Flow of Funds, OFR calculations

counterparties. As these markets are global, the OFR will need to acquire data relating to foreign transactions as well, particularly for affiliates of U.S. financial institutions. For this reason, the OFR is involved in international working groups to align data acquisition and data-sharing protocols and works closely with primary regulators in the U.S. as they promulgate their rules.

Hedge Funds

Hedge fund leverage—and the fear of a rapid deleveraging—prompted the Federal Reserve Bank of New York in 1998 to coordinate the response of creditors of Long Term Capital Management to prevent a disorderly failure of that hedge fund. Fourteen years later, hedge funds have grown much larger, yet little more is known about the risks they pose to the financial system. In early August 2007, stock prices dropped sharply in a wave of hedge fund deleveraging, contributing to the nascent financial crisis.

Chart 4.2.5 shows total debit balances in margin accounts at broker-dealers, an aggregated indicator of leverage in stock market investments. The chart shows a steady buildup through mid-2007, followed by a decline to early 2009 and then another buildup to April 2011. More granular data on lending by prime brokers to hedge funds would provide regulators with an important tool in monitoring hedge fund leverage.

Through a joint effort of the SEC and CFTC, Form PF for confidential private fund risk reporting, discussed in *Box H*, now requires fund advisers to provide regulators with information regarding size, leverage, investor types and concentration, liquidity, and fund performance. The OFR has provided input into the data requirements for these rules and is preparing to obtain the data from these forms as they become available. This information will significantly expand the FSOC's ability to monitor hedge fund leverage and assess its potential impact on financial stability. Whether this information will be sufficient to monitor threats posed by hedge

funds will likely be reassessed by all involved once the data have been collected.

Households and Real Estate

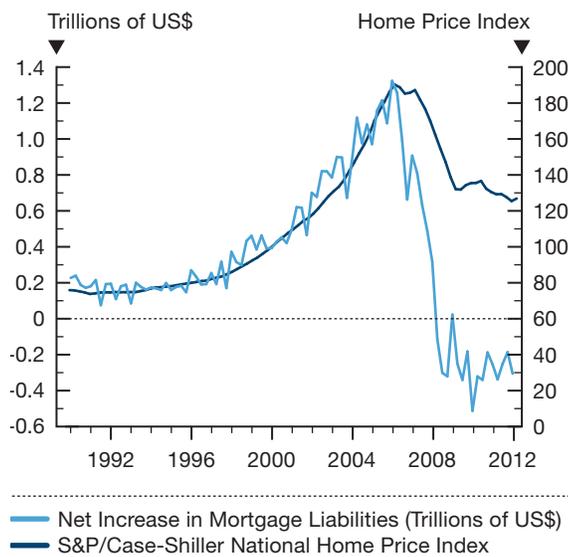
Households use debt financing for real estate and automobiles while relying on revolving credit for a wide range of purposes. Loan-to-value ratios, downpayment requirements, and credit limits provide measures of leverage in this sector. *Chart 4.2.6* tracks the ratio of home mortgage liabilities to real estate assets and shows a dramatic steepening near the end of 2005 and building up to the peak of the financial crisis. As noted previously, it is important to track these types of measures for new credit as well as for total credit outstanding. *Chart 4.2.7* shows the net increase in mortgage liabilities dropping earlier and more quickly than the house price index. *Chart 4.2.8* shows credit limits on credit card originations to subprime borrowers declining from a peak in 2006 through 2009 but climbing steadily since early 2010.

The Federal Reserve Bank of Philadelphia, with infrastructure support from the Federal Reserve Bank of Kansas City, has created an extensive warehouse of data on consumer credit. This data warehouse helps to improve information about securitization. The OFR is closely following rulemakings and policy work by primary regulators as they consider how to collect and aggregate more complete data.

Sovereign Debt

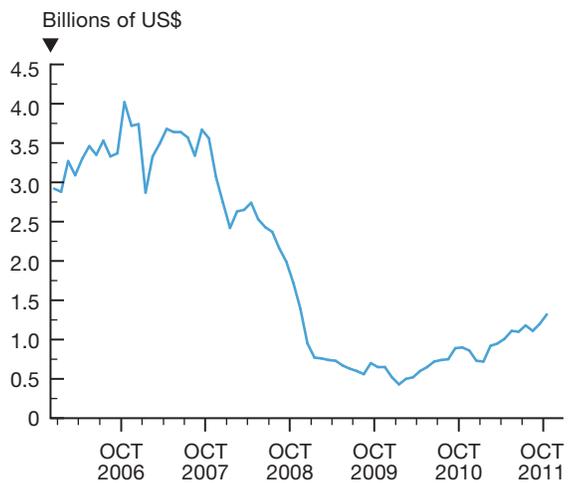
Persistent large government deficits are potentially destabilizing. As demonstrated by the chain of events set off by fears of a Greek default, the consequences of unsustainable sovereign debt growth can spread quickly across borders. The U.S. continues to enjoy historically low funding rates on its debt, but the risk of a sharp change in demand for Treasury securities must be counted among the potential threats to financial stability facing the nation. Net purchases of U.S. debt by foreign investors has become more volatile, as indicated in *Chart 4.2.9*, and a sharp pullback by these investors is potentially destabilizing. *Chart 4.2.10* compares

Chart 4.2.7 Net Increase in Mortgage Liabilities: Household Sector



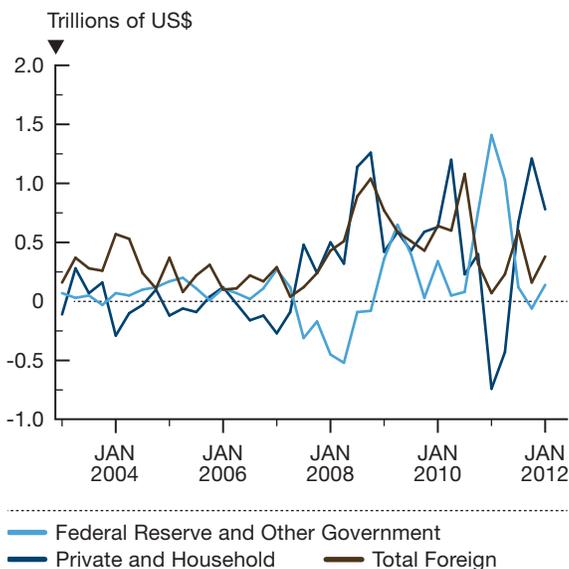
Source: Flow of Funds, S&P/Case-Shiller, Haver Analytics

Chart 4.2.8 Aggregate Credit Limit on Bankcard Originations to Subprime Borrowers



Source: Equifax

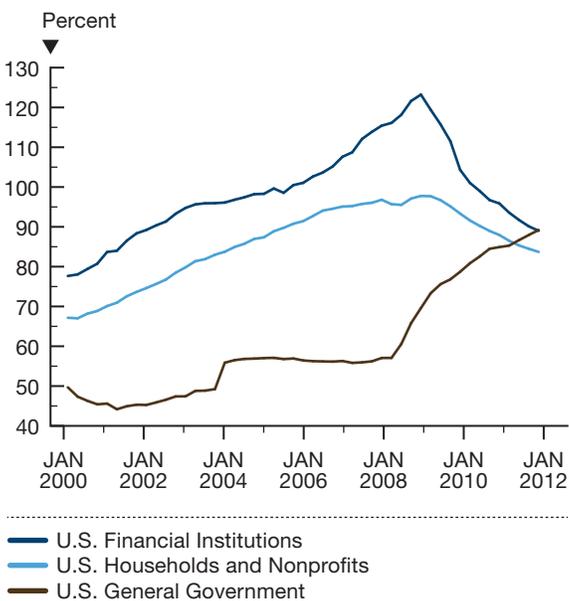
Chart 4.2.9 Net Purchases of U.S. Treasury Debt



Note: The "Federal Reserve and Other Government" category includes purchases by the Federal Reserve, state and local governments, government retirement funds, and GSEs.

Source: Flow of Funds, Haver Analytics, OFR calculations

Chart 4.2.10 Debt Outstanding as a Percent of GDP



Source: FRB, Haver Analytics

debt outstanding as a percentage of GDP for the U.S. government, financial institutions, and household sector.

Many state and local governments are also struggling to balance their budgets. Trouble in the municipal debt market could potentially spread to or from other sectors through linkages between markets. Money market funds and municipal issuers have tight and almost symbiotic connections; the municipal bond market also relies on guarantees and demand features provided by third parties—typically banks and often European banks. These considerations make government debt at all levels a necessary element of a comprehensive view of leverage.

Chart 4.2.11 shows CDS spreads for the U.S. and six states. The CDS spreads are an indication of the market's perception of credit risk in these jurisdictions. The figure suggests linkages that require further analysis: the spreads for Florida, Massachusetts, New York, and Ohio have moved in lock step, and those of California and Illinois have followed similar patterns at higher levels. For the most part, the state spread movements show comparatively little relation to that of U.S. sovereign debt.

A significant data gap in assessing the leverage of the public sector results from government accounting procedures. Accounting standards differ across government entities, and governments do not ordinarily provide fair value estimates on activities like insurance programs, pension benefits, and contingent liabilities (Lucas, 2011). The joint report of the Financial Stability Board and the International Monetary Fund discussed in **Box H** includes recommendations for standardizing government finance data and creating a public sector debt database.

4.2.2 Liquidity

Liquidity has different meanings in different contexts. It is particularly important to distinguish *market* liquidity—the ability of a market to absorb large and frequent

transactions with limited price impact and low transactions costs—from *funding* liquidity, which is the ready availability of credit to finance the purchase of financial assets or to redeem liabilities. Liquidity risk can refer to the risk that an asset may become less liquid and thus harder to sell, but it can also refer to the risk of a cash shortfall resulting from a mismatch between the timing of cash flows generated by an asset and the cash needed to fund the asset.

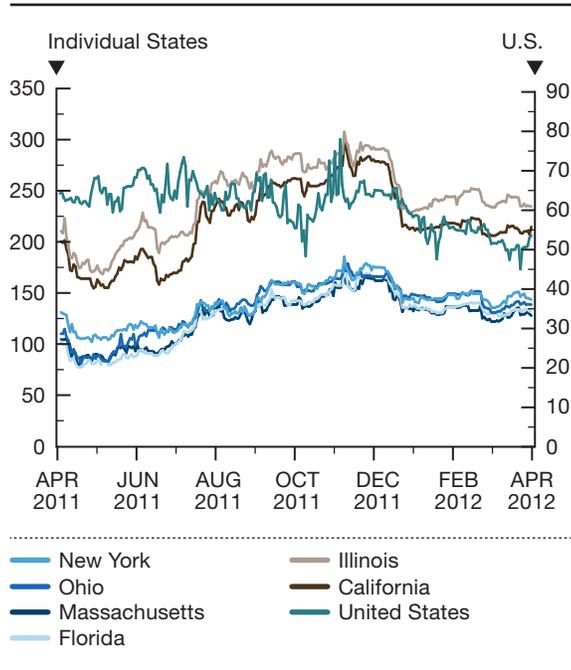
The discussion in this subsection focuses primarily on funding liquidity risk, but the two notions of liquidity risk are closely linked. If an asset has a high degree of market liquidity, it can be sold to avert the consequences of a loss of funding liquidity. Conversely, funding liquidity is of particular concern in financing the purchase of an illiquid asset. Moreover, as funding liquidity dries up, it becomes harder for leveraged investors to buy the asset, and this impairs its market liquidity.

As noted in the discussion of stress tests in Section 3.2, the two kinds of liquidity live on the two sides of institutions’ balance sheets, with market liquidity on the asset side and funding liquidity an issue for liability management. Collecting data on both sides of the balance sheet is thus not just important to reconcile the books; it is critical for assessing threats to financial stability.

Short-Term Funding Markets

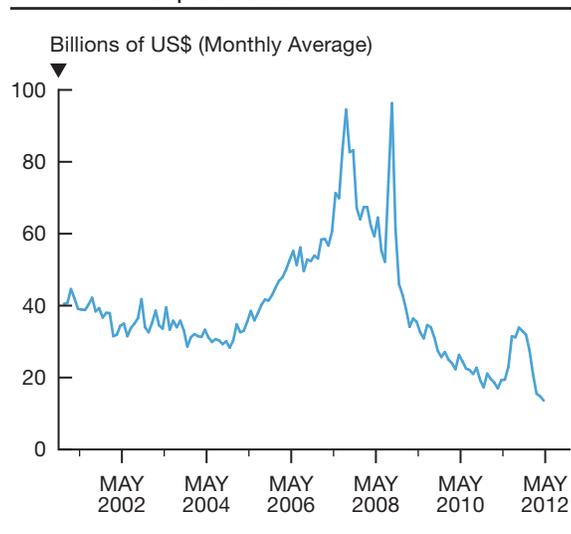
Short-term funding markets are the primary locus of funding and liquidity risk, particularly when they are used to finance illiquid long-term assets. This risk created by maturity mismatch is illustrated by a structured investment vehicle (SIV), a type of entity popular before the crisis that issued short-term commercial paper and medium-term notes and used the proceeds to invest in securities such as illiquid securitizations. Liquidity risk arose from the need to repeatedly roll over the short-term funding as it matured. A sudden pullback in funding provided by investors, triggered by uncertainty about the quality of the underlying investments, caused many SIVs to fail in 2007.

Chart 4.2.11 10-Year CDS Spreads: U.S. and Selected States



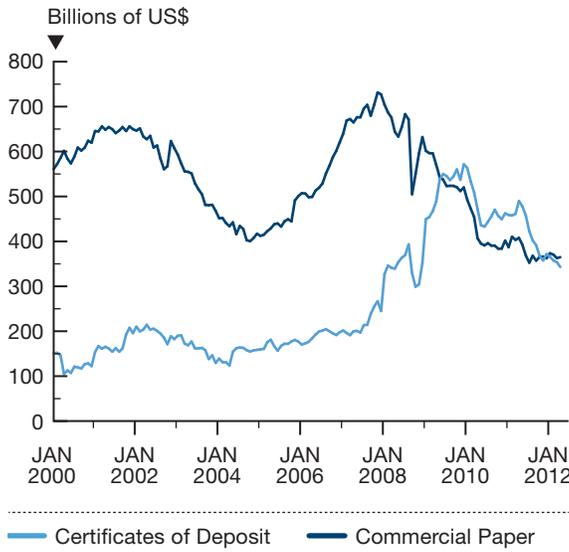
Source: Markit

Chart 4.2.12 AA Asset-Backed Commercial Paper Issuance



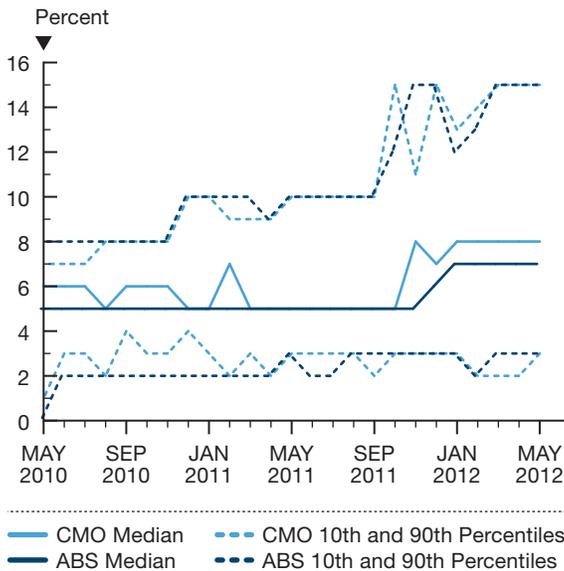
Source: FRB, Haver Analytics

Chart 4.2.13 Taxable Money Market Fund Assets



Source: Investment Company Institute, Haver Analytics

Chart 4.2.14 Margin Requirements for ABS and CMO Tri-Party Repo Collateral



Note: Some values were calculated by OFR and reflect the averages of the margins at a given percentile for investment and non-investment grade collateral.

Source: Tri-Party Repo Infrastructure Reform Task Force, OFR calculations

Investors suffered losses in some cases when SIVs sold assets at distressed prices; in other cases, SIV sponsors rescued investors despite having no prior obligation to do so.

While the SIV market came to an end in 2007, the yield spread generated through this type of maturity and liquidity transformation provides a persistent incentive for the development of products that capture this yield. Tracking the growth of financial innovations designed for maturity and liquidity transformation is a necessary part of monitoring the economy's overall liquidity risk.

Chart 4.2.12 plots the issuance of AA-rated asset-backed commercial paper, showing a collapse in late 2008. Chart 4.2.13 shows the buildup and subsequent decline in money market fund investments in commercial paper, starting in 2004. The pullback from commercial paper that starts in 2007 is offset in part by an increase in certificates of deposits, creating a tighter link—and thus greater liquidity risk—between banks and money market funds.

The repo and securities lending markets discussed above are key components of short-term funding markets. Just as the magnitude of haircuts provides a measure of leverage, the volatility of haircuts—the extent to which they fluctuate—provides a measure of liquidity risk. With volatile haircuts, the amount a borrower can borrow against assets posted as collateral can drop sharply, forcing the borrower to find an alternative source of funds quickly. In 2007–2008, haircuts on asset-backed securities widened, triggering rapid sell-offs and contributing to falling prices. In quieter times, haircuts fluctuate little and therefore provide little information about changing sentiments. Chart 4.2.14 shows increased volatility in margin requirements for repo collateralized by asset-backed securities and collateralized mortgage obligations in late 2011. More research is needed to understand the dynamics in different parts of the repo market that lead to spikes in haircuts, to “repo runs,” and thus to sudden

contractions in short-term funding (Martin, Skeie, and Von Thadden, 2012).

Money Market Funds

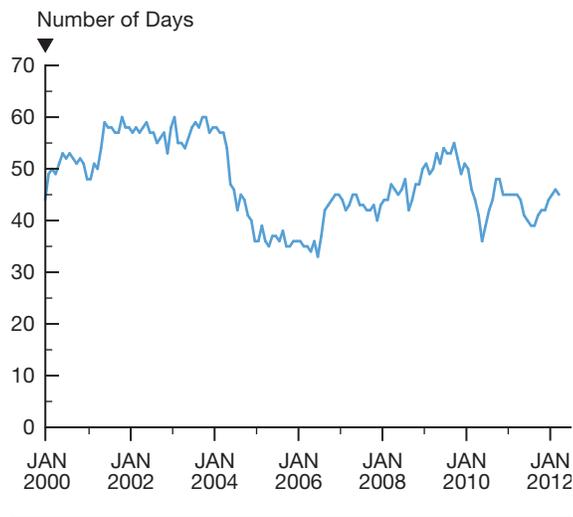
Money market funds are a major source of short-term funding, with over \$2.5 trillion in assets under management. They also transmit liquidity risk between the funds' borrowers and investors. Banks and other financial institutions are large borrowers from money market funds; a sudden withdrawal from money market funds by investors, particularly large institutional investors, thus reduces short-term funding to the financial sector. The municipal bond market also relies heavily on money market funds and is thus vulnerable to a liquidity shock hitting the funds.

A simple but important measure of liquidity in money market funds is the weighted average maturity of their assets. *Chart 4.2.15* shows that this increased between July 2006 and October 2009, dropped sharply in 2010, and is currently around 45 days. However, a more complete picture of liquidity risk requires information on investor concentration: a fund dominated by a small number of large institutional investors will generally need greater liquidity than one with a broad base of small retail investors.

The OFR monitors money market fund holdings through monthly SEC filings. The filings are required of all funds covered by Rule 2a-7 of the Investment Company Act of 1940 (2a-7 funds). Form N-MFP provides valuable disclosure on money market fund investments. Remaining data gaps include the lack of information on a fund's investor characteristics, better information on repo collateral and collateral pricing, separate reporting of coupons on investments, and more consistent reporting of issuers—a task that will be facilitated by the adoption of an LEI.

Services similar to those of money market funds are provided by funds and separate accounts just outside the 2a-7 umbrella. With stricter liquidity requirements added to 2a-7 rules in 2010, liquidity risk may have migrated to non-2a-7

Chart 4.2.15 Taxable Money Market Funds: Average Maturity of Portfolio



Source: Investment Company Institute, Haver Analytics

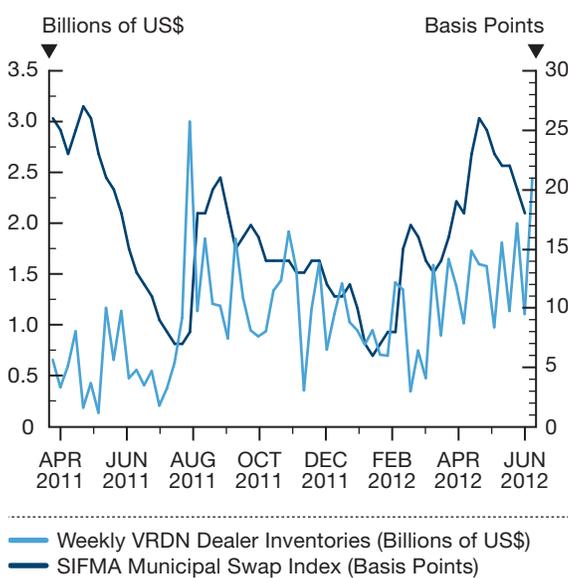
funds that invest at slightly longer maturities and take on greater credit risk.¹ The absence of data on these near substitutes for regulated money market funds could represent a data gap in monitoring liquidity and run risk in this important channel for short-term funding. The OFR will continue to work with the SEC and other FSOC members to consider this migration and its implications for risk monitoring.

Liquidity Guarantees

Liquidity guarantees—typically in the form of guarantees from third parties to provide emergency short-term funding—can protect investors and can serve as buffers against temporary mismatches in cash flows between assets and liabilities. However, guarantees are also a potential transmission channel for liquidity risk if not carefully managed and monitored. A widespread call on guarantees is likely to coincide with other stresses on the market, creating the potential for amplified risk. Moreover, skittishness regarding whether implicit guarantees will be honored can create market stress.

SIVs have lost favor with investors, but legacy asset-backed commercial paper (ABCP)

Chart 4.2.16 VRDN Dealer Inventories and SIFMA Municipal Swap Index



Source: Bloomberg

conduits continue to operate on a large scale. Approximately 7 percent of prime money market fund assets are invested in ABCP and 4 percent of money market fund assets overall. A key difference between the two structures is that ABCP conduits carry a committed liquidity guarantee from a sponsor, usually a bank. An SIV typically has a much more limited liquidity backstop or just an implicit guarantee based on the sponsor's reputation. Citigroup bailed out its SIVs even though it had not provided liquidity facilities or guarantees to these vehicles. In defining the scope of new liquidity requirements, the Basel III liquidity coverage ratio specifically identifies non-contractual contingent funding obligations that a bank may incur to avoid reputational damage.

Most money market fund investments in municipal securities take the form of variable rate demand notes (VRDNs). The demand feature allows the holder to put the security back to a liquidity provider at par, typically on a weekly basis; this feature transforms a medium- or long-term municipal security into an investment eligible for a 2a-7 fund to buy. VRDNs are usually backed by a letter of credit

or a standby bond purchase agreement from a third party, typically a bank. The potential systemic concern is the possibility of a sudden and widespread exercise of the demand option, straining the resources of liquidity providers at a time of other stresses in the financial markets. In the summer of 2011, with concerns rising over events in Europe and uncertainty about the debt ceiling in the U.S., dealer inventories of VRDNs climbed as investors seeking liquidity exercised their demand option (see *Chart 4.2.16*, which also shows the SIFMA Municipal Swap index, reflecting the rate demanded for new issues).

Monitoring liquidity guarantees is an essential element of monitoring liquidity risk. There is currently no mechanism for aggregating financial guarantees across markets. Guarantees are often difficult to observe before they are invoked, and this is particularly true of implicit or perceived guarantees. Identifying where a breakdown in an implicit guarantee has the potential to create significant disruptions to the financial system presents a difficult but important research challenge.

The freezing of the auction rate securities market in 2008 illustrates the potential risk. The major dealers in these securities had traditionally supported the market by participating in the auction when necessary. But in February 2008, weakened by a worsening financial crisis, the investment banks declined to bid, allowing a string of auction failures. Investors sued, alleging that the auction rate securities had been sold as risk-free—sold with an implicit guarantee—leading dealers to buy back many of the securities they had sold. The freezing of this market aggravated the deterioration of funding liquidity as investors moved to safer assets. With greater clarity in advance, both investors and dealers would have been better prepared for the disruption in the market.

Hedge Funds and Liquidity

Hedge funds can affect and be affected by both market and funding liquidity in numerous ways. Many hedge funds hold illiquid assets; many

also constrain their investors' liquidity through limits on redemptions, but the potential for a liquidity mismatch remains. With high leverage, the risk of such a mismatch is magnified, as a rapid deleveraging and sell-off of illiquid assets may trigger a financial crisis. Crowded trades in the form of similar positions held by many funds increase the risk of a simultaneous sell-off and point to the need for increased reporting through Form PF. Hedge funds often rely on prime brokers for short-term funding, making the funds—and their highly leveraged investments in illiquid assets—vulnerable to liquidity shocks affecting dealers that might otherwise have no direct impact on the funds. These types of interconnections in the financial system, and their implications, are the focus of the next subsection.

4.2.3 Interconnectedness

Monitoring threats to financial stability requires understanding the network of connections through which financial distress can propagate through the financial system. In fact, the same financial institutions are linked through multiple networks defined by multiple types of connections. As a result, firm failure can present a shock in the market.

One-way Credit Extension. Institutions are linked through borrowing and lending. The failure of a borrower causes a loss to the lender. Since most lenders are themselves also borrowers, large undiversified losses can cascade.

Swaps. Swap transactions create networks of counterparties. Swaps are a form of two-way credit extension because a swap initially valued at zero may become an asset for one party and a liability for the other, depending on changes in market variables. Failures can propagate through this network as well.

Ownership. A parent and a subsidiary can be a source of strength or a source of vulnerability to each other. Understanding these relationships requires the ability to track ownership networks—networks with thousands of nodes for even a single large, complex financial

institution. An important data gap preventing the understanding of financial networks is the lack of comprehensive and standardized information on ownership and various types of affiliations. The LEI helps to fill this gap, as discussed further in Chapter 5.

Service Provision. Financial institutions are interlinked through the many services they provide to each other, including mortgage servicing, custody, clearing and transfer services, brokerage, and investment management. The failure of a large, complex service provider could disrupt the functioning of many other financial institutions.

Contingent Exposures. The links in a network of contingent exposures are latent until activated by a contingency. An undrawn and uncommitted line of credit provides an example. Other examples include options embedded in other transactions and events such as downgrades that trigger collateral calls.

Guarantees. As noted in several places in this chapter, both contractual and implicit guarantees create important and sometimes vulnerable links between financial institutions. Reliable guarantees can enhance financial stability, but poorly managed guarantees can provoke a loss of confidence, and implicit guarantees can contribute to moral hazard.

Correlation and Concentration. Financial institutions operate in a shared market and are thus subject to common shocks. Investors of various types are interconnected, even if they do not transact with each other, through correlations in their asset returns. These correlations may lead them to unwind their positions simultaneously, creating a cascading decline in prices. This risk is exacerbated by crowded trades, that is, through the concentration of similar positions by many market participants. Such concentration creates fragility in the financial system and, with existing data, is difficult to detect. The development of standard product identifiers will help support the detection of risky concentrations.

These types of interconnections are illustrated through credit default swaps, short-term funding markets, and hedge funds.

Credit Default Swaps. A current focus of the OFR is the CDS market, which exhibits interconnectedness between protection buyers and protection sellers, and between CDS counterparties and reference entities. Interconnections in the CDS market have traditionally been opaque. They represent a potential threat to financial stability. Government intervention to prevent an AIG bankruptcy was prompted at least in part by fear of the potential impact on AIG's CDS counterparties. The OFR can help avert the need to make crisis decisions with limited information through ongoing analysis and monitoring of financial networks.

Short-term Funding Markets. These largely unregulated markets connect banks with funding sources that can quickly pull back in times of stress. Money market funds are a potential source of vulnerability for banks and others that rely on them for short-term funding (*Chart 3.1.1*).

Hedge Funds. Hedge funds were among the first financial institutions hit by the collapse of subprime mortgage-backed securities in 2007, and the multiple roles of hedge funds in this episode illustrate the need for better data to monitor interconnections in the financial system. Many hedge funds took leveraged positions in subprime mortgage-backed collateralized debt obligations (CDOs) and faced a liquidity squeeze as falling prices led to margin calls from investment banks. This liquidity squeeze also affected long-short equity funds with no direct subprime exposure. As market conditions worsened and investors pulled out of hedge funds, the funds withdrew assets from their prime brokers, sharply reducing liquidity at the largest broker-dealers.

Hedge funds were also active managers of CDOs and among the largest investors in first-loss positions in these pools. Their participation was

thus essential to the growth of the subprime mortgage market. Many hedge funds engaged in correlation trading, which involved taking long and short positions in different tranches of CDOs. The lack of transparency on the funds' multiple and potentially conflicting roles has led to accusations of impropriety. The many interconnections between hedge funds and the investment products at the heart of the financial crisis reinforce the need for better data on these linkages to improve the monitoring of networks in the financial system.

Across all of these instruments and markets, the ability to assess the degree and potential impact of interconnectedness depends upon the ability of financial stability analysts to uniquely define counterparties, financial products, and terms and conditions. An established LEI and similar common unique global identifiers for financial instruments would enable the aggregation of risks to identify exposures regardless of the source of the transaction data. These data standards, combined with standardized definitions and disclosures of terms such as collateral and haircuts where appropriate, are the building blocks of transactions, positions, and ownership interests. They describe the form of the connection between financial market participants and they provide insights into the mechanism by which financial instability can be transmitted and amplified.

Endnote

1. In this regard, the OCC issued a proposed rulemaking in April 2012 that would partially align the requirements for short-term bank common and collective investment funds with the SEC's revisions to Rule 2a-7 (OCC, 2012).

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