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Reference Guide to U.S. Repo Securities and Securities Lending Markets

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Reference Guide to U.S. Repo and Securities Lending Markets

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Abstract¹

This paper is intended to serve as a reference guide on U.S. repo and securities lending markets. It begins by presenting the institutional structure, describing the market landscape, the role of the participants, and other characteristics, including how repo and securities lending activity has changed since the 2007-09 financial crisis. The paper then discusses vulnerabilities in the repo and short-term wholesale funding markets and efforts to limit potential systemic risks. It next provides an overview of existing data sources on securities financing markets, and highlights specific shortcomings related to data standards and data quality. Lastly, the authors discuss a near-term agenda to help fill some of the data gaps in repo and securities lending markets.

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1 Introduction

This reference guide focuses on the market microstructure, vulnerabilities, and data gaps in the U.S. securities financing markets, where firms transact using repurchase agreements (repo) or securities lending contracts. Repos allow one firm to sell a security to another firm with a simultaneous promise to buy the security back at a later date at a specified price. The economic effect of this transaction is similar to that of a collateralized loan. Securities lending involves a short-term loan of stocks or bonds in exchange for cash or noncash collateral. The economic effect of this transaction can be similar to that of a repo especially in cases when a securities lending transaction is collateralized by cash. Under current U.S. market practice, repos are mainly used to borrow cash using securities as collateral. Securities lending contracts are mainly used to access collateral securities using cash as collateral. Such transactions enable firms to establish short positions, hedge, and facilitate market-making activity.

The importance of repo and securities lending in the U.S. financial markets is evidenced by their prevalent use. Although daily volumes in the repo market have declined since the crisis, they still dwarf the amount transacted in unsecured cash markets. Due to a lack of data, there is a wide range of estimates of total repo and securities lending activity. For example, total repo activity at its peak level before the 2007-09 financial crisis ranged from \$5 to \$10 trillion.² In the current post-crisis era, our estimate of total repo activity is around \$5 trillion and our estimate of the outstanding value of securities on loan is just under \$2 trillion. Both repo and securities lending markets came under pressure during the 2007-09 financial crisis. [Gorton and Metrick \(2012\)](#) and [Copeland, Martin, and Walker \(2014\)](#) describe different mechanisms through which runs occur in repo markets, and [Krishnamurthy, Nigel, and Orlov \(2014\)](#) emphasize the role of collateral in propagating a run. In addition, [Keane \(2013\)](#) discusses the risks associated with securities lending and advocates for greater regulatory and market scrutiny of this activity.

² Market size estimates vary partly due to different time periods and estimation techniques. [Copeland, et al. \(2012\)](#) estimate the outstanding value of repo and reverse repo activity at \$3 trillion and \$2 trillion, respectively, whereas [Gorton and Metrick \(2012\)](#) and [Singh and Aitken \(2010\)](#) estimate total repo activity is around \$10 trillion. Incidences of double-counting may inflate some of the higher estimates.

Coming out of the financial crisis, regulators have focused on reforming practices in both repo and securities lending markets.³

Policymakers need comprehensive and timely data about the institutional structure of the U.S. securities financing markets and their vulnerabilities to inform financial stability monitoring and policy analysis. In Section 2, we review the basic mechanics of repo and securities lending activity, and describe the main users of these contracts and their motivations. This section also highlights the central role that securities dealers play in both markets, where, alongside their own trading activity, they also act as intermediaries (see also [Pozsar, 2014](#)). In Section 3, we describe the main vulnerabilities of repo and securities lending. We discuss ongoing efforts to improve the robustness of the settlement process for repo contracts and highlight outstanding risks. Further, we discuss risks specific to securities lending, such as the common practice of indemnification, where the agent facilitating a securities lending transaction may offer certain guarantees to the securities owner. In Section 4, we describe data sources on repo and securities lending activity available to regulators and the public. We highlight specific gaps related to data coverage and data quality. While fairly comprehensive and granular data are available for the triparty repo market and the General Collateral Financing Repo (GCF Repo®) Service, data available on bilateral repo and securities lending transactions are spotty and incomplete.⁴ Finally, in Section 5, we conclude by proposing a near-term agenda to assist with filling some of the data gaps in repo and securities lending activities.

2 Market Overview

This section provides an overview of how U.S. repo and securities lending markets function. Securities dealers have historically been central to both activities as intermediaries. Figure 1 shows a stylized balance sheet of a traditional securities dealer that intermediates the

³ See the Financial Stability Oversight Council annual reports. International efforts are also under way. For example, the Financial Stability Board (FSB) is taking steps to address weaknesses in repo and securities lending markets. See the FSB, “Strengthening Oversight and Regulation of Shadow Banking: Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos,” August 29, 2013, at http://www.financialstabilityboard.org/wp-content/uploads/r_130829b.pdf?page_moved=1.

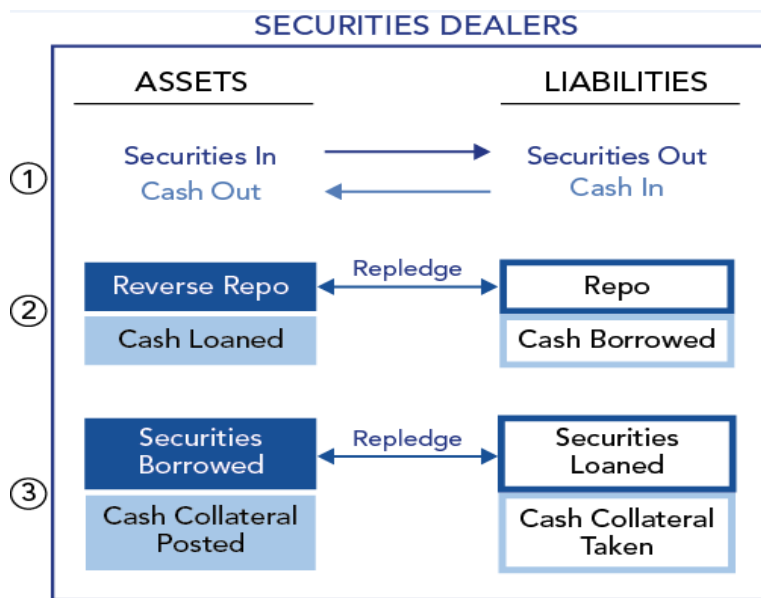
⁴ GCF Repo® Service (GCF Repo) is a registered FICC service mark.

flow of cash and collateral in the market. Securities enter the dealer's balance sheet on the asset side and leave on the liability side, and cash moves in the opposite direction, entering on the liability side and leaving on the asset side (see Figure 1, line 1). Security and cash movements are generated by either a motivation to raise/lend cash (via repos/reverse repos, see Figure 1, line 2), or a motivation to borrow/lend securities (via securities borrowing/lending transactions, see Figure 1, line 3).⁵ The net effect of these flows are inventories, which result in either long or short positions in securities, or equivalently, short or long positions in cash. The "repledge" labels in Figure 1 highlight that securities received as collateral from repo and securities lending contracts can be repledged (or reused) to settle reverse repo and securities borrowing contracts.

Figure 1 also highlights the economic similarities between repo and securities lending contracts. To minimize their own funding costs, securities dealers raise cash wherever it is the cheapest and lend cash at the highest rate within established risk management limits. Dealers also obtain collateral wherever it is the cheapest and repledge collateral wherever it is the most valuable. Once cash and collateral are in the hands of a dealer, the method the dealer uses to acquire the cash or collateral has limited relevance.

⁵ From the perspective of a dealer, repos are trades in which the dealer has promised to deliver securities against cash, whereas reverse repos are trades in which the dealer has promised to deliver cash against securities. Similarly, securities lending are trades in which the dealer has promised to deliver securities in exchange for cash or noncash collateral, and securities borrowing are trades where the dealer receives securities and delivers cash or non-cash collateral.

Figure 1: Cash and Securities Flow through the Balance Sheet of a Securities Dealer



Note: Securities received as collateral from repo and securities lending contracts can be repledged (or reused) to settle reverse repo and securities borrowing contracts.
Source: OFR analysis

2.1 Repo Activity

2.1.1 Role and basic mechanics

A repo contract is economically equivalent to an interest-bearing cash loan against securities collateral. The difference between the sale and repurchase price of securities specified in a repo contract is reflected in the implied interest rate. For example, if a firm agrees to sell \$9 million in Treasuries today and repurchase those same Treasuries for \$9.09 million in a year, the implied interest rate is 1 percent. The securities are used as collateral to protect the cash investor against the risk that the collateral provider is unable to repurchase the securities at the later date (the repurchase date), as initially agreed. The cash investor typically demands that the market value of collateral exceeds the value of the loan. The amount by which the loan is over-collateralized is called a haircut (for a discussion on haircuts see Section 2.1.4).

Repo contracts can also be used to borrow securities. In this case, the collateral provider earns a return by investing the cash it receives from the cash investor at a higher rate than that implied by the repo contract. For example, the collateral provider may negotiate a repo to pay an implied interest rate of 1 percent, with the knowledge that he can reinvest the received cash in a money market instrument and earn 2 percent. The cash investor is willing to earn a below-market rate on his cash, because the securities posted as collateral are “special,” meaning they have an intrinsic value which the cash investor will attempt to monetize ([Duffie, 1996](#)).

The repo market has a long history and has gone through a number of institutional changes. Repo financing has been used by Federal Reserve banks to provide credit to member banks since 1917 (Beckhart, Smith and Brown 1932). During the 1920s, the Federal Reserve Bank of New York used repos with securities dealers unaffiliated with a bank to encourage the development of a liquid secondary market for banker’s acceptance notes ([Garbade, 2006](#)). With the passage of the Treasury-Federal Reserve Accord of 1951, the interdealer repo market began to develop.

The U.S. repo market is comprised of two segments, based on differences in settlement: triparty repo and bilateral repo. A triparty repo involves a third party, which is a clearing bank. The clearing bank provides back-office support to both parties in the trade, by settling the repo on its books and ensuring that the details of the repo agreement are met. In the U.S., triparty repo services are currently offered by Bank of New York Mellon Corp. (BNY Mellon) and JPMorgan Chase & Co. (JPMorgan), both of which provide clearing and settlement services to securities dealers. In contrast, in a bilateral repo, each counterparty’s custodian bank is responsible for the clearing and settlement of the trade.

There are four main distinctions between bilateral and triparty repos:

- timing of settlement,
- settlement risk protections,
- cost of clearing and settlement, and

- the ability to specify that any security within a general asset class can serve as collateral.

First, with respect to the timing of settlement, a collateral provider in a bilateral repo usually delivers its securities, or agrees which specific security will be delivered, by 11 a.m. ([Fleming and Garbade, 2003](#)).⁶ In triparty repo, collateral providers tend to finalize their securities allocation decision later in the day. Second, securities posted as collateral for a triparty repo cannot be repledged outside the triparty platform. This design feature protects the collateral providers against settlement fails on the closing leg of the repo. In the case of bilateral repo, the cash investor receives full control over movement and use of the securities posted as collateral, exposing the collateral provider to the possibility of a settlement failure on the closing leg of the repo. Third, triparty repo leverages the technology of the clearing banks to handle and value a wide variety of securities, which may enhance operational efficiency for customers depending on their size and sophistication. Clearing and settling bilateral repos, in contrast, is handled by the trading counterparties and entails higher operational costs. Fourth, triparty repo typically assumes a transaction involving “general collateral,” where the cash investor agrees to accept any securities within an asset class, such as U.S. Treasuries. Bilateral repos, by contrast, typically require that specific securities identified at the CUSIP level be agreed upon when the trade is executed.

2.1.1.1 Bilateral repo

When negotiating a bilateral repo, two parties agree on the terms of trade, including the principal amount of the repo, the interest rate paid by the collateral provider, the type of securities to be delivered, the haircut to be applied for the collateral pledged, and the maturity of the repo.⁷ See Figure 2 for a schematic of a bilateral repo. In the opening leg of a repo, the collateral provider delivers securities to the cash investor in exchange for cash. In the closing leg,

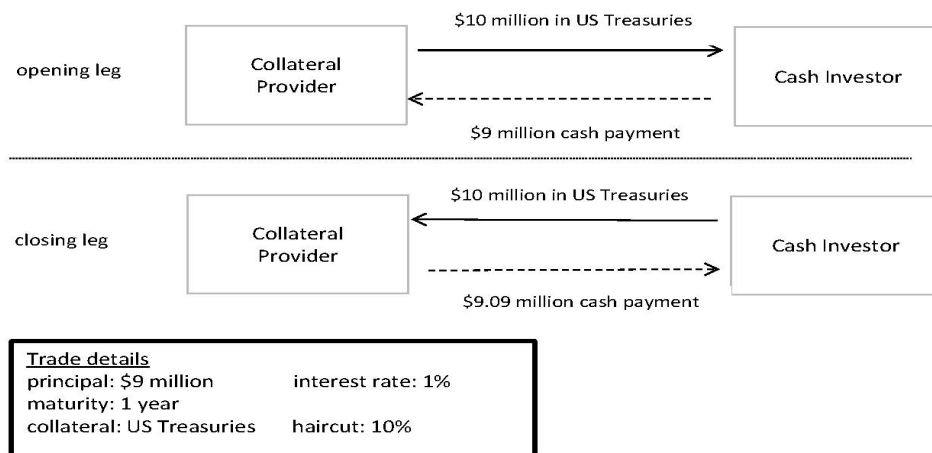
⁶ This describes a generic practice. However, a number of market participants employ proprietary repo trading systems that allow the dealer to transmit the collateral information later in a day.

⁷ The interest rate in repo agreements is inferred from the price differential between the sale price of securities and the repurchase price.

these flows are reversed; the cash investor returns the securities to the collateral provider in exchange for cash.

There are two main motivations for transacting in the bilateral repo market instead of triparty. First, securities dealers prefer to rely on bilateral repo to acquire securities. Both the ability to repledge and the earlier settlement timing favor the use of bilateral repo. The triparty repo platform is designed to support general collateral repo trades, which are used to secure funding. Second, securities dealers rely on bilateral repo as a way of providing funding to their clients. Dealers typically run matched books, taking both sides of a trade and serving as an intermediary between their clients and large cash pool investors. For example, dealers may provide funding to mortgage real estate investment trusts (mREITs) using bilateral repo contracts, where the mREIT posts mortgage-backed securities (MBS) as collateral. In this context, the advantages of a bilateral repo are the dealer’s control of the securities posted as collateral and the timing of settlement, both of which enable the dealer to repledge the collateral in order to earn a return on another trade.

Figure 2: Example of a Bilateral Repo



Note: The haircut is equal to one minus the ratio of the cash invested over the value of the collateral received.
Source: Authors’ analysis

2.1.1.2 Triparty repo

Triparty repo contracts settle on the books of the clearing bank, where cash and securities are moved between the cash investor's and collateral provider's respective accounts. The clearing bank does not take on the role of principal, but rather acts as an agent, ensuring that the terms of the repo contract are upheld.⁸ Clearing banks effectively perform back-office operations for both securities dealers and cash investors and, due to their efficiency, have become an important platform used by securities dealers for short-term funding. Relative to bilateral repo, triparty repo appeals to securities dealers because trades are settled later in the day, allowing dealers to access funding for securities acquired in the early afternoon.

The triparty repo service provides protection to both parties. Cash investors protect themselves from a dealer default by negotiating a haircut, which requires the dealer to over-collateralize the repos. Collateral providers are protected from settlement fails, because the securities they post as collateral remain in the custody of the clearing bank and cannot be reused outside the clearing banks' triparty repo settlement platform. Lastly, triparty repo offers greater flexibility in collateral management. For example, smaller and less liquid pieces of collateral can be posted. Clearing banks have developed technology to optimize their use of collateral ([Copeland, et al., 2012](#)). Collateral securities can easily be substituted to provide dealers with the cheapest funding option, while still meeting investors' collateral guidelines.

GCF Repo, introduced in 1998 by the Fixed Income Clearing Corporation (FICC), also settles on the triparty platform. GCF Repo is designed for FICC's netting members (securities dealers) to trade cash and securities among themselves based on negotiated rates and terms.⁹

⁸ Before the Federal Reserve Bank of New York's triparty repo infrastructure reforms took place, the clearing banks did take on the role of principal during the business day. Significant progress has been made to reduce the principal role of the clearing banks although they still act in this capacity for a small segment of the triparty repo market. For information on the reforms, see http://www.newyorkfed.org/banking/tpr_infr_reform.html. Clearing banks also act as securities intermediaries for both counterparties, transferring security entitlements to the collateral to and from the seller and buyer.

⁹ Currently, securities dealers account for the vast majority of GCF Repo activity. FICC seeks to expand the types of financial institutions allowed to participate to include insured credit unions (see SEC filing [34-73391](#)) and registered investment companies (see SEC filing [34-71265](#)).

GCF Repo trades are completed on an anonymous basis through interdealer brokers.¹⁰ FICC acts as a central counterparty in GCF Repo, interposing itself and serving as the legal counterparty to each side of the repo transaction for settlement purposes. FICC also provides a netting service, allowing dealers to offset their repo and reverse repo positions for trades where the securities posted as collateral are of a similar type.

In Figure 3, we present an example of a GCF Repo trade, with terms similar to the bilateral repo example presented in Figure 2. A distinguishing feature of GCF Repo is the role of FICC as the central counterparty. In a GCF Repo contract, the haircut is zero percent. As a risk management precaution, the FICC sets eligibility thresholds for GCF Repo participants, collects margin, and requires that institutions post collateral to a clearing fund.

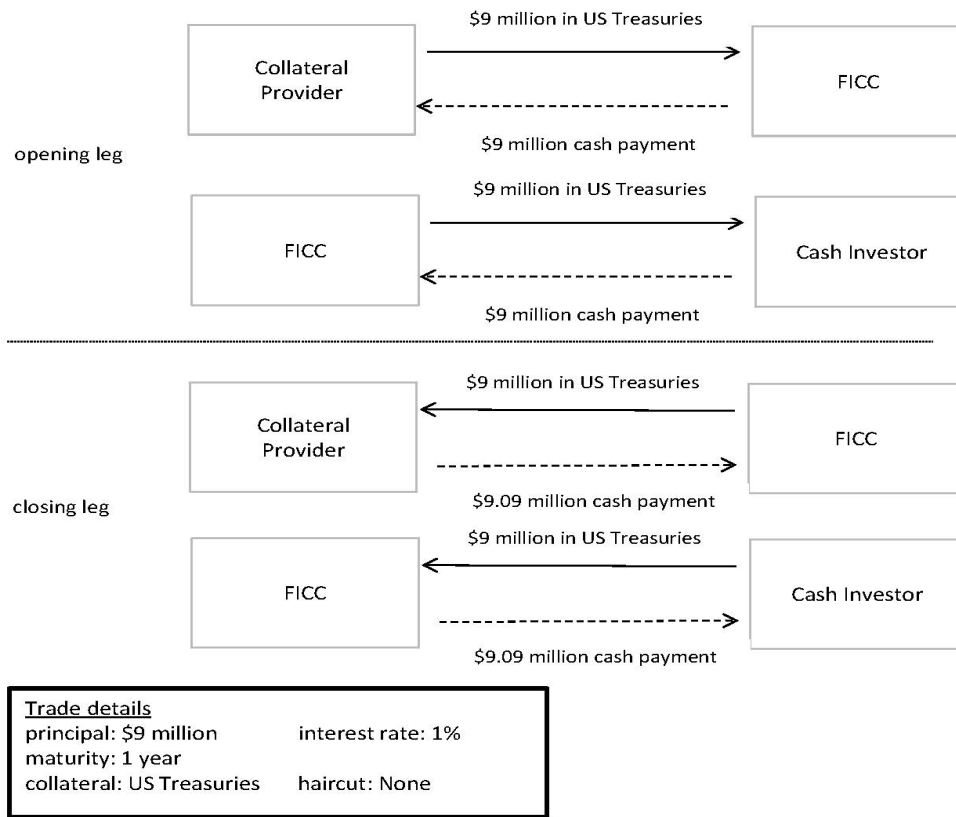
GCF Repo is designed as a general collateral repo, where FICC defines the set of permissible collateral classes, including Treasuries, and Fannie Mae and Freddie Mac fixed rate mortgage-backed securities (MBS).¹¹ Dealers rely on GCF Repo contracts for a variety of functions, including raising funds and seeking collateral to fulfill triparty repo obligations ([Agucci, et al. 2014](#)).

GCF Repos are settled on the books of BNY Mellon and JPMorgan using the triparty repo settlement platform. The settlement process allows for a tight connection between GCF Repo and triparty repo. Both types of trades are settled on the transaction day and, importantly, GCF Repo is settled before triparty repo. This enables dealers to repledge securities obtained as collateral in GCF Repo into triparty repo. A detailed overview of the GCF Repo settlement procedure is provided in [Agucci et al. \(2014\)](#).

¹⁰ Interdealer brokers are specialized securities companies that act as middlemen in nearly every type of securities market to effect transactions among dealers who trade as principals in these markets. See the Securities Industry and Financial Markets Association's (SIFMA) March 20, 2007 statement at <http://www.sifma.org/news/news.aspx?id=3936>.

¹¹ At present, nine generic securities types are eligible for the GCF Repo Service. See <http://www.dtcc.com/~media/Files/Downloads/Clearing-Services/FICC/GOV/GCF%20Collateral%20Eligibility%20Jan%202014.ashx>.

Figure 3: Schematic of a GCF Repo Trade



Source: Authors' analysis

2.1.2 Market size

In this section, we provide a rough estimate of the total size of the U.S. repo market and its various segments. Insufficient data on the bilateral segment of the repo market precludes us from offering a more precise analysis. Section 4 discusses data gaps in more detail. In Section 5, we outline the ongoing efforts to fill these data gaps.

The Federal Reserve's Form FR 2004, also known as the Government Securities Dealers Reports, is the main source of information on U.S. primary dealer market-making activity.¹² This form includes total repo and reverse repo activity, by collateral class and maturity (Section 4.1 has further details of this dataset). The total amount of repo that primary dealers enter into is substantial, almost \$2.2 trillion in repo and just under \$2 trillion in reverse repo.

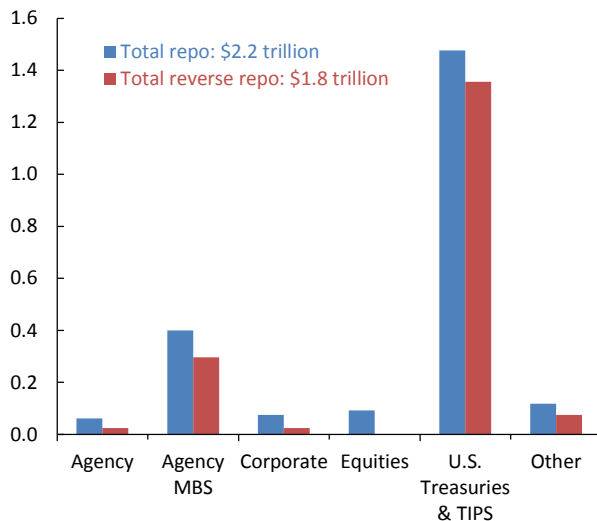
A repo trade between primary dealers shows up twice in the Form FR 2004 data, once as a repo and then again as a reverse repo, representing both legs of the trade. Thus, summing up the repo and reverse repo numbers would result in double-counting and inflate total activity in the U.S. repo market. Unfortunately, the size of the interdealer market is not known and, therefore, the extent of the double-counting cannot be determined. As a result, we measure repo and reverse repo activity separately.

Form FR 2004 data only cover activities of primary dealers. Therefore, any estimate based on that data is likely to underestimate the total size of the repo market. Discussions with market participants suggest that the nonprimary dealer's market share is smaller than that attributed to the primary dealers, but growing.

¹² As of August 2015, 22 institutions were designated as primary dealers: Bank of Nova Scotia, New York Agency, BMO Capital Markets Corp., BNP Paribas Securities Corp., Barclays Capital Inc., Cantor Fitzgerald & Co., Citigroup Global Markets Inc., Credit Suisse Securities (USA) LLC, Daiwa Capital Markets America Inc., Deutsche Bank Securities Inc., Goldman, Sachs & Co., HSBC Securities (USA) Inc., Jefferies LLC, J.P. Morgan Securities LLC, Merrill Lynch, Pierce, Fenner & Smith Incorporated, Mizuho Securities USA Inc., Morgan Stanley & Co. LLC, Nomura Securities International, Inc., RBC Capital Markets, LLC, RBS Securities Inc., SG Americas Securities, LLC, TD Securities (USA) LLC, and UBS Securities LLC.

Figure 4: Total Primary Dealer Repo and Reverse Repo Activity (\$ trillion)

Primary dealers mainly transact in repos and reverse repos collateralized by U.S. Treasury and agency MBS securities



Note: Agency represents all non-MBS issued by federal agencies or government-sponsored enterprises. Agency MBS are all MBS issued by federal agencies or government-sponsored enterprises. Corporate is corporate debt, including commercial paper. TIPS is Treasury Inflation-Protected Securities.

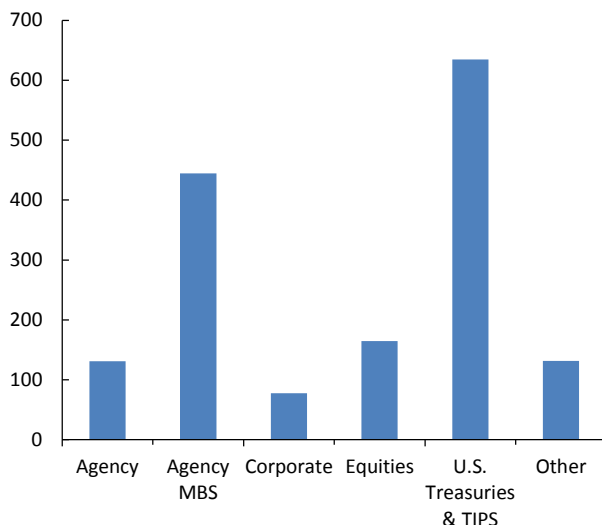
Source: Federal Reserve Form FR 2004, June 2015

Monthly triparty repo and GCF Repo data published by the Federal Reserve Bank of New York show triparty repo trades are mostly collateralized by U.S. Treasuries and agency MBS (see Figure 5).¹³ Similarly, GCF Repo trades are mostly collateralized by U.S. Treasuries and agency MBS.

¹³ See the Federal Reserve Bank of New York's [Tri-Party Repo Infrastructure Reform website](#).

Figure 5: Collateral Composition in the Triparty Repo Market (\$ billions)

Participants in the triparty repo market mainly use collateral consisting of U.S. Treasury and agency MBS securities



Source: Federal Reserve Bank of New York, June 2015

Using the triparty repo, GCF Repo, and Form FR 2004 data, we arrive at rough estimates of the size of each repo segment. Because they come from different sources and cover different samples, we make a few adjustments. First, as detailed in [Copeland et al. \(2014\)](#), we scale up the Form FR 2004 repo number to account for non-primary dealer activity, assuming that primary dealers represent 80 percent of total triparty repo activity.¹⁴ Then, we deflate total triparty repo volumes to remove the value of collateral posted to satisfy haircut requirements. The timing of the data released across the data sources does not match up precisely, but no adjustment is made since the difference in timing is usually no more than one or two days.¹⁵

¹⁴ The estimated average share of triparty repo activity attributed to primary dealer declined from 90 percent since 2012 (see [Copeland et al. \(2012\)](#)). Any change to this assumption may affect the repo market size calculations.

¹⁵ The triparty repo data also include pledges, unlike the Form FR 2004 repo data. Our bilateral repo estimate is thus biased downwards by the total value of pledges in triparty repo. An alternative approach is to use the FR 2004 total “securities out” measure, which includes repos, pledges, and securities lending. Using this number and subtracting out triparty repo and GCF Repo results in an estimate of bilateral repo that is biased upwards by the amount of securities lending executed by primary dealers. In the aggregate, the total value of pledges or securities lending is quite small relative to repo. Either approach yields similar results on the relative size of bilateral repo and triparty repo activity.

We present our estimates on the size of each repo segment from the standpoint of the securities dealer’s balance sheet in Figure 6. When a dealer enters into a repo agreement, the cash it borrows are considered liabilities, hence the decomposition of total repo from the Form FR 2004 data into triparty repo, GCF Repo, and bilateral repo segments all appear under “Dealer Liabilities.” From this decomposition, we estimate that U.S. repo activity is split at \$1.84 trillion in triparty and \$1.58 trillion for bilateral repo. The triparty repo segment is primarily institutional cash pools that enter into repo contracts with securities dealers ([Pozsar, 2011](#)). We have little information on dealers’ counterparties in the bilateral repo segment, though according to market sources, a significant share of bilateral repo activity is interdealer.

Figure 6: Outstanding Daily U.S. Repo and Reverse Repo, by Underlying Segment

		Assets		Liabilities	
		Reverse Repo		Repo	
		\$ billions	%	\$ billions	%
Dealer Repo	Triparty (total)	305	13%	1,839	54%
	exGCF	-	0%	1,534	45%
	GCF	305	13%	305	9%
	Fed*	-	0%	-	0%
	Bilateral	1,945	82%	1,576	46%
	Dealer Total	2,250	95%	3,415	100%
Non dealer Repo	Triparty (total)	127	5%		
	Fed**	127	5%		
	Nondealer Total	127	5%		
Grand Total		2,377		3,415	

Note: The estimates are made using Form FR 2004 Securities Out number for dealer liabilities and repo number for dealer assets.

*Primary dealer participation in the Federal Reserve’s Reverse Repurchase Agreement Facility (RRP) is de minimus. See “Reverse Repo Data by Counterparty Type since 9/23/2013 (Data updated as of March 31, 2015)” at <http://www.newyorkfed.org/markets/omo/dmm/temp.cfm>.

**The Federal Reserve RRP volume is the average daily outstanding of the overnight and term RRP from January 1, 2015 through June 10, 2015.

Sources: Federal Reserve Form FR 2004 (June 10, 2015), Federal Reserve Bank of New York (June 10, 2015), authors’ calculations.

We can also decompose dealers’ reverse repo activity. With reverse repos, securities received as collateral show up as assets on the dealer’s balance sheet. Because dealers use triparty repo mostly for funding, reverse repo activity is executed either through GCF Repo or bilateral repo. We find that the vast majority of reverse repo activity is bilateral (see Figure 6).

Some repo activity takes place without a dealer acting as an intermediary. A main example of this activity is the Federal Reserve’s Reverse Repurchase Agreement (RRP) facility, which is discussed in more detail in Section 2.1.3.4. Through this facility, the Federal Reserve enables a variety of financial institutions to invest cash directly with the Federal Reserve on a triparty basis.¹⁶ Although primary dealers are eligible to invest via the RRP with the Federal Reserve, the most active RRP participants are money market mutual funds. For this reason, we place the average daily usage of RRP facility on the nondealer balance sheet in Figure 6.

At present, dealers appear to represent the largest participants in the repo market. However, nondealer repo activity has likely increased, and without appropriate data collections, will be challenging to monitor. Advances in technology and changes in the regulatory landscape have made it more efficient for cash investors and collateral providers to engage in repo trades directly, bypassing a dealer.¹⁷ The nature of these nondealer repos is a brokerage transaction between cash investors and collateral providers.

2.1.3 Main participants and their motivations

2.1.3.1 Securities dealers

Securities dealers operate as intermediaries between those who lend cash collateralized by securities, and those who borrow securities by posting cash or noncash collateral. These two groups are mostly comprised of large, institutional investors of cash pools ([Pozsar, 2011](#)) and levered investors, respectively.¹⁸ Dealers also stand between those looking to earn extra yield by lending securities and those looking to borrow specific securities. Typically, these groups include buy-and-hold asset managers (such as pension, mutual, and insurance funds) and short-sellers (such as hedge funds), respectively.

¹⁶ The Federal Reserve’s list of eligible RRP counterparties is at http://www.newyorkfed.org/markets/expanded_counterparties.html.

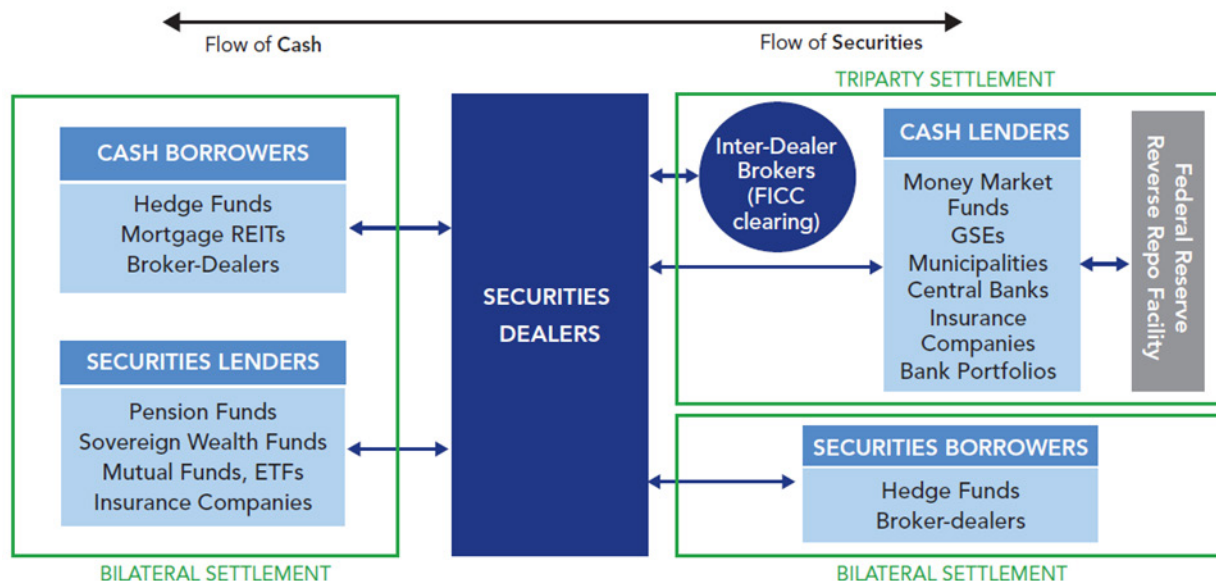
¹⁷ For example, Direct Repo™ is a service, where a broker acts as an agent between two nondealer counterparties. See <http://www.avmsolutions.com/avms-RepoLiquidity-direct.aspx> for more information. Nondealer counterparties may also engage directly in a repo transaction without an intermediary.

¹⁸ These groups of investors are also referred to as “cash providers” and “cash borrowers” ([Aguilar, Bookstaber and Wipf, 2014](#)) or “cash PMs” and “risk PMs” ([Pozsar, 2014](#)).

As intermediaries, securities dealers provide several services. They provide transactional liquidity by making markets in cash and collateral. They enable credit transformation, by sourcing cash from conservative cash investors such as money market funds and lending to riskier levered investors such as hedge funds. They also provide maturity transformation, by sourcing cash on a short-term basis while lending funds on a longer-term basis, although maturity transformation performed by securities dealers appears to have declined since the 2007-09 crisis. Figure 7 illustrates the various ways dealers transact with market participants (see Section 3.1 for a discussion of risks associated with dealer activities).

Figure 7: Key Repo Participants

Securities dealers are intermediaries for other market participants



Source: OFR analysis

2.1.3.2 Cash lenders

Cash lenders (or cash investors) use repo as a way to securely invest cash. Typical cash investors are money market mutual funds and cash collateral reinvestment accounts managed for securities lenders and corporate treasuries, as well as financial institutions, such as banks, securities dealers, equities, and derivatives exchanges. The motivation for cash investors to

invest in repo is to earn a return while having some protection, in the form of collateral, against losing their principal in cases of default. Cash investors often use the triparty platform for its operational efficiency. [Alkan et al. \(2013\)](#) estimate more than half the cash invested in the triparty repo market comes from money funds and securities lenders' cash collateral reinvestment accounts.

2.1.3.3 Cash borrowers

Cash borrowers enter into repo contracts to finance their securities positions or obtain leverage. Firms such as hedge funds or mREITs typically engage a securities dealer to access the repo market. Securities dealers provide collateralized financing to their clients and repledge securities collateral to obtain funding from cash investors. In this cash intermediation chain, a dealer typically uses bilateral repo to provide funding to others, while using triparty repo to fund itself.

Repo contracts can also be used to obtain specific securities. Some common reasons to borrow a specific security are to cover short sales, remedy failures to deliver securities to settle a transaction, or cover a hedge of a position. Firms managing large portfolios of securities, such as registered investment companies, pension funds, central banks, or insurance companies are the main providers of specified collateral securities. Securities lending contracts are another way for financial institutions to lend securities to one another on a secured basis (see Section 2.2).

2.1.3.4 Federal Reserve

Historically, the Federal Reserve has conducted temporary open market operations by entering into repo and reverse repo transactions with primary dealers. These trades are intended to adjust the level of the aggregate quantity of bank reserves such that the federal funds rate stays close to the policy rate established by the Federal Open Market Committee (FOMC). Temporary open market operations are implemented in conjunction with the Federal Reserve's permanent open market operations, when the Federal Reserve buys (sells) securities outright from (to) primary dealers. In the current environment, where banks have abundant reserves and the federal funds rates trades within the 0 to 25-basis point target range set by the FOMC, there has not been a need to conduct temporary open market operations ([FRBNY, 2014](#)). In accordance with the

Dodd-Frank Wall Street Reform and Consumer Protection Act, the Federal Reserve now provides transaction-level data on its repo and reverse repo trades with primary dealers.¹⁹ These data complement operational data also available from the Federal Reserve Bank of New York.

In 2013, the Federal Reserve began conducting a series of overnight reverse repurchase operations called the RRP. The RRP provides eligible counterparties an opportunity to invest cash at the Federal Reserve on a collateralized basis. The RRP is a temporary, supplementary tool to support the Federal Reserve’s program that pays banks interest on excess reserves held at the central bank.²⁰ In addition to primary dealers, money market mutual funds, banks, and government-sponsored enterprises are allowed to participate in the RRP, provided eligibility conditions are met.²¹ Money market mutual funds, on average, account for 80 percent of total RRP utilization (see [Frost et al., 2015](#)).

Although the Federal Reserve publishes trade-level RRP data with a two-year lag, the offered rate and total amount of cash invested are publicly available on the trade date. The types of participating cash investors are also available with a three-month lag.

2.1.4 Key attributes

The terms of a repo agreement include the principal amount, tenor (time to repayment), interest rate, haircut, and collateral type. The principal amount is the price paid by the cash investor for the securities on the opening leg of the repo. Also relevant is the principal amount adjusted for the price paid when the securities are repurchased by the collateral provider. The amount of overcollateralization, also referred to as the “margin,” corresponds to the difference between the amount of cash and the value of securities sold, and is generally expressed as a percentage of the amount of cash.²² For example, if \$102 of securities collateralizes a cash loan of \$100, the overcollateralization or margin is 2 percent. Collateral type specifies the securities to

¹⁹ See <http://www.newyorkfed.org/markets/openmarket.html>.

²⁰ See <http://www.federalreserve.gov/newsevents/press/monetary/20140917c.htm>.

²¹ See http://www.newyorkfed.org/markets/expanded_counterparties.html.

²² The margin is equal to the ratio of the value of collateral posted over the amount of cash lent minus one. An alternative measure is called the “haircut,” which is equal to one minus the ratio of the cash lent over the value of the collateral posted (see [Copeland, Martin, and Walker, 2014](#)).

be delivered by the collateral provider. For general collateral repos, the specification may be general, such as any U.S. Treasury security. The repo contract can also allow a cash investor to require that a specific security be delivered, such as a 10-year 4.25 percent U.S. Treasury bond.

Margins are a tool to enable repo lenders to mitigate their exposure to market and credit risk, by specifying an additional amount of collateral beyond the value of the cash lent that serves as a shock absorber if market movements reduce the value of assets pledged. The cash investor bears credit risk when the market value of the collateral securities declines below the principal amount of the repo. The cash investor faces the risk that he may not be able to recover the principal amount should the collateral securities be liquidated upon a counterparty default. In this case, a margin, or over-collateralization of the loan, protects the cash investor from fluctuations in the value of the securities posted as collateral. The collateral provider also bears credit risk in a repo. For instance, the collateral provider may not be able to cover the cost of replacing the securities posted as collateral if the cash investor fails to return them. This can occur not only when the cash investor defaults, but also if there is a settlement failure.

As discussed in Section 2.1.1.2, a major innovation with the introduction of triparty repo was to simultaneously protect the cash investor and collateral provider from certain risks. The design of the triparty repo does not allow for settlement fails on the closing leg of the repo, offering settlement risk protection to the collateral provider, whereas margins provide over-collateralization to investors. Settlement fails do not occur because the securities posted as collateral remain on the books of the clearing bank, within its triparty repo settlement system. The collateral provider, then, knows that its securities will be returned once it makes full payment. There remains, of course, credit risk to the collateral provider associated with a default by the cash investor.

Tenor is also an important characteristic for understanding and monitoring the repo market. The majority of repo trades are for a fixed term, such as overnight, one week, or one month. However, other tenor arrangements are possible. For example, repo trades can be open, evergreen, callable or puttable, extendible, floating rate, and convertible. Open trades are rolled over each day, keeping all aspects of the repo fixed except for the rate. Each day, however, either

counterparty has the option of not rolling over the trade, implying that the effective tenor of open trades is overnight. Evergreen trades are long-term contracts with an option of either counterparty being able to discontinue the trade with an agreed-upon notice period. For example, a one-year repo with a 30-day evergreen option implies that at any point within the one-year term of the repo either counterparty can invoke the option to discontinue the trade with a 30-day notice. The implication is that such a repo effectively has a 30-day maturity structure. Finally, call and put repos are trades where one of the counterparties has the right to discontinue the repo, with an agreed-upon notice period.

2.1.5 Legal arrangements

A repo transaction is structured legally as a simultaneous agreement between counterparties to engage in a sale of securities on an initial date, with a repurchase of the securities by the initial seller at a later date. U.S. repo transactions are typically documented with the Securities Industry and Financial Markets Association's (SIFMA) Master Repurchase Agreement,²³ the SIFMA/International Capital Market Association (ICMA) Global Master Repurchase Agreement, or a customized agreement to encompass specific deal points or assets to be exchanged between the counterparties. Most U.S. repo dealers use the Master Repurchase Agreement, governed by New York state law, for domestic U.S. counterparties, and the Global Master Repurchase Agreement, governed by English law, with international counterparties. Section 8 of the Master Repurchase Agreement states that "All of Seller's interest in the Purchased Securities shall pass to Buyer on the Purchase Date..." Typically, however, terms in the repurchase agreement provide for certain rights of ownership to be "synthetically retained" by the seller. For example, interest or dividend paid on securities sold under a repurchase agreement is rebated to the seller of the securities.

Though structured as a sale, the economic effect of a repo transaction is similar to that of a secured loan. However, unlike a secured loan, a repo transaction provides significant protections to creditors from the normal operation of U.S. bankruptcy laws, such as the

²³ See <http://www.sifma.org/services/standard-forms-and-documentation/mra.-gmra.-msla-and-msftas/>.

automatic stay and avoidance provisions.²⁴ Consequently, in the event of counterparty's insolvency, the counterparty holding the securities — the cash lender — may liquidate the securities held, and accelerate or terminate the agreement.²⁵

2.2 Securities Lending Activity

Securities lending operations facilitate asset redistribution in financial markets by supporting global capital market activities and trade settlement, and, therefore, play an important role in managing financial risk. According to the International Organization of Securities Commissions (IOSCO), securities lending has existed since the 19th century, but started gaining momentum only in the 1960s with the growth in the interdealer market for loans of equities.²⁶ In the 1970s, U.S. custodian banks started lending securities to securities dealers on behalf of their clients.²⁷ Securities lending activity developed initially as an outgrowth of agent banks' custody services and the need to facilitate trade settlements.

Securities lending received another boost with the development of dealer intermediation between cash borrowers and lenders. The emergence of new trading strategies, hedging, and arbitrage further increased demand for securities lending. By effectively increasing the supply of securities, securities lending improves global market liquidity and enhances price discovery. On the other hand, securities lending activities may pose risks, as discussed in Section 3.2.

2.2.1 Role and basic mechanics

Simply put, the securities lending business can be viewed as the collection of rental fees on idle assets through fully-collateralized loans. More precisely, securities lending is the market practice by which securities are transferred temporarily from one party, a securities lender, to another, a securities borrower, for a fee (see Figure 8). This transfer is secured by collateral,

²⁴ 11 U.S.C. §§ 362(b)(7) and 546(f).

²⁵ 11 U.S.C. § 559.

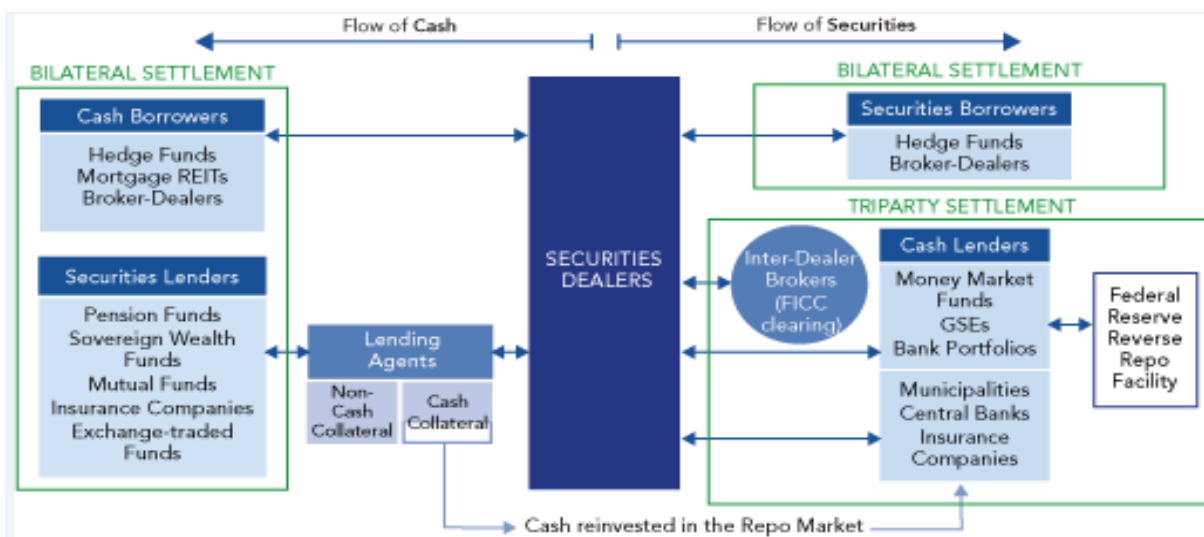
²⁶ Technical Committee of the International Organization of Securities Commissions (IOSCO) and Committee on Payment and Settlement Systems (CPSS), "Securities Lending Transactions: Market Development and Implications," July 1999, at <http://www.bis.org/publ/cpss32.pdf>.

²⁷ Office of the Comptroller of the Currency, "Comptroller's Handbook, Custody Services," January 2002, at <http://www.occ.gov/publications/publications-by-type/comptrollers-handbook/custodyservice.pdf>.

which can be cash, another security, or another form of financial commitment such as a letter of credit. Normally, securities lending is facilitated by a third party, a “securities lending agent.” This paper focuses on securities lending collateralized by cash or other securities, which forms the bulk of collateral used in such operations (collateral in the form of other financial commitments is analyzed in [Lipson, Sabel, and Keane \(2012\)](#)).

Figure 8: Main Securities Lending Participants

Securities dealers and lending agents act as intermediaries between securities lenders and securities borrowers



Source: OFR analysis

Securities lenders seek out securities lending services from agent banks in order to obtain incremental revenue. On the other side of the trade, securities borrowers, mainly acting through securities dealers, often engage in such transactions to cover short sales, remedy failed trades, or hedge risks. Normally, lending agents manage the securities lending process and communicate with securities dealers, which seek securities for their own operations and on behalf of their clients. Borrowed securities may be further reused in other securities lending or repo trades, subject to the terms of the original loan. Therefore, repo and securities lending should be viewed merely as transactional forms; either can be used to borrow cash or securities. Usually, it is the client’s preference that drives the choice of the legal agreement. For example, pension funds tend

to transact under securities lending agreements, while dealers themselves mainly use repo contracts to obtain funding.

While neither the size, nor the full set of participants of the securities lending market are known with precision, the vast majority of U.S. securities lending operations are believed to be facilitated by lending agents, primarily custodian banks.²⁸ The share of non-custodial lending agents is growing. For example, in 2013, at least five public pension funds sought securities lending agents outside their custodians.²⁹

2.2.2 Market size

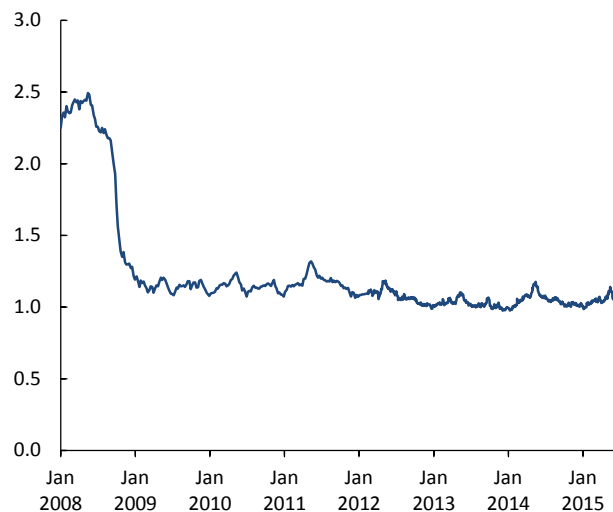
A lack of data standardization and uneven coverage makes it difficult to estimate the total amount of securities lending activity and the respective market shares of beneficial owners and lending agents. According to Markit Group, Ltd., at the end of June 2015, the market value of securities on loan globally stood at around \$1.0 trillion. Securities lending activity has decreased substantially since reaching a peak of the available supply in November 2007. Market participants do not expect lending volumes to return to pre-crisis levels due to changes in the economics of the business. Figure 9 illustrates the historical trend in daily average volumes of securities lending.

²⁸ Oversight and regulation of securities lending activities fall within the purview of many bank regulatory agencies. See OCC's "Comptroller's Handbook, Custody Services," January 2002, at pp. 27-38, and OCC Banking Circular 196, *Securities Lending*, 1985, that adopted the Federal Financial Institutions Examination Council's (FFIEC) supervisory policy on securities lending. The Federal Deposit Insurance Corporation and the National Credit Union Administration also have a responsibility to prescribe rules or regulations restricting transactions involving the loan or borrowing of securities.

²⁹ Rick Baert, "Securities Lending Put on Front Burner Again," *Pensions & Investments*, November 11, 2013, at <http://www.pionline.com/article/20131111/PRINT/311119973/securities-lending-put-on-front-burner-again>.

Figure 9: Securities on Loan (\$ trillions)

The volume of securities on loan has declined since the financial crisis



Sources: Markit Group, Ltd.

Market participants partly attribute the decline in securities loans that occurred in 2007-08 to policymaker efforts to reduce short-selling.³⁰ During the crisis, the Securities and Exchange Commission (SEC) issued several emergency orders that tightened borrowing requirements for shares in the largest financial firms. These efforts were aimed at minimizing the possibility of abusive short-selling and preventing potential sudden and excessive fluctuations in securities prices that could impair markets. In addition, many securities lenders restricted their participation in securities lending activity due to concerns about weak performance and outright losses on cash collateral reinvestment portfolios. The securities lending market remains at a relatively low utilization level. Although the SEC's efforts were limited to loans of equity securities, loans of other types of securities also declined.

³⁰ Statement of Securities and Exchange Commission Concerning Short Selling and Issuer Stock Repurchases, October 1, 2008, at <https://www.sec.gov/news/press/2008/2008-235.htm>.

Figure 10 compares the asset composition of available lendable securities and securities on loan, based on the 13 largest securities lending agents active in 18 markets representing an estimated 80 percent of the global securities lending volume.

Figure 10: Lendable Assets and Securities on Loan (as of Q1 2015, percent of total)

U.S. equity securities account for the largest share of securities available for lending, but U.S. Treasury and agency securities are in greatest demand

Figure 10a: Lendable Assets

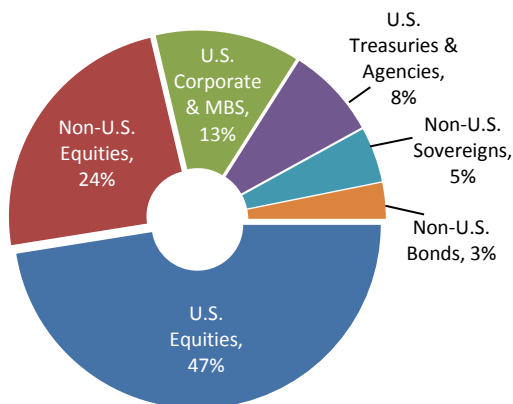
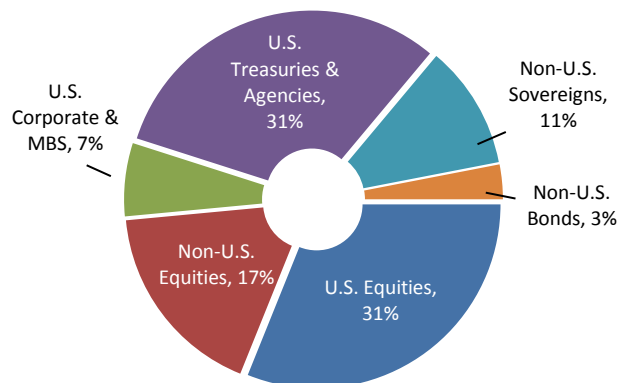


Figure 10b: Securities on Loan

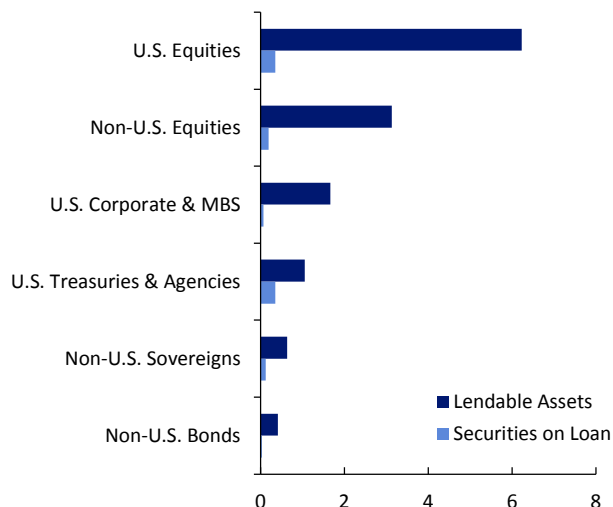


Note: Canadian bonds (government and corporate) are included in “Non-U.S. Bonds”.
Sources: Risk Management Association, OFR analysis

Figure 10a shows that U.S. equity securities account for nearly half of assets available for lending, followed by non-U.S. equities at 24 percent of the total lendable assets. The majority of securities on loan are U.S. Treasuries and agencies and U.S. equities, both at 31 percent. In absolute terms, U.S. equity securities are the most lendable assets among all other asset types, as illustrated by percent of securities on loan relative to the total size of lendable assets (Figure 11).

Figure 11: Lendable Asset vs. Securities on Loan (as of Q1 2015, \$ trillions)

U.S. Treasury and agency securities are in greatest demand from securities borrowers relative to the pool of lendable assets



Note: Canadian bonds (government and corporate) are included in “Non-U.S. Bonds”.
Sources: Risk Management Association, OFR analysis

2.2.3 Main participants and their motivations

2.2.3.1 Securities lenders - beneficial owners

Securities lenders, referred to as “beneficial owners,” are typically large institutional investors managing an unlevered or low-levered portfolio of securities. Lenders include mutual funds, central banks, sovereign wealth funds, pension funds, endowments, and insurance companies. As a low-margin business, the lending portfolio needs to be of a sufficient size to make a securities lending program economic. A relatively static portfolio with low securities turnover is more attractive to securities borrowers because it minimizes recalls of loaned securities. A security may be recalled when its beneficial owner would like to sell it or exercise its voting rights.

The size of lendable assets by types of beneficial owners is not precisely known. Anecdotally, the participation of pension funds and insurance companies has declined substantially since the financial crisis. The last report issued by the National Association of the

Insurance Commissioners (NAIC) stated that as of the end of 2011, the U.S. insurance industry had approximately \$53 billion loaned under securities lending agreements. That was down about 14 percent from the end of 2008, when insurance companies recorded \$61.5 billion of securities on loan.³¹ The decline may be partly attributed to 2010 changes in valuation rules and disclosure requirements of securities lending activities by insurance companies. During the crisis, public pension funds and private retirement plans generated negative headlines when they filed multiple class actions against major agent lenders over losses in their securities lending programs.³²

Lenders engage in securities lending to enhance the yield on their investment portfolios. Historically, securities lending activity has been an ancillary business for lenders and their agents. However, beneficial owners of large, static, unleveraged portfolios, mainly pension funds, increasingly cite securities lending as an important income-enhancing strategy. The incremental income not only provides fund investors with additional returns on their long-term savings, but also helps defined-benefit pension plans to lower deficits ([Pozsar, 2014](#)). That said, we note the diversity of motivation and regulation among beneficial owners. For example, securities lending is a relatively minor strategy for most U.S. registered funds, which are restricted by SEC rules to lending no more than one-third of their total assets. SEC Chairwoman Mary Jo White stated that “securities lending is done by approximately a quarter of funds.”³³

2.2.3.2 Securities lending intermediaries

Securities lending is usually facilitated by a third party. There are two types of intermediaries: agent and principal. Agent intermediaries include custodian banks and other third parties, such as asset managers or specialized consultants. Although market share data are not available, anecdotal evidence suggests that custodian banks have historically facilitated the

³¹ NAIC Capital Markets Weekly Special Report, “Securities Lending in the Insurance Industry,” July 8, 2011, at http://www.naic.org/capital_markets_archive/110708.htm.

³² See *Haygood Phelps Walmsley Willis & Swanson, L.L.P. v. State Street Corporation, et al.*, Civil Action No. 09-10533 (alleging that the 401(k) and pension plans suffered financial losses as a result of the State Street’s securities lending practices). See also *Diebold v. Northern Trust Investments, N.A., et al.*, Civil Action No. 1:09-cv-01934 (alleging that Northern Trust breached fiduciary duties owed to its clients when it engaged in securities lending).

³³ See Mary Jo White, “Enhancing Risk Monitoring and Regulatory Safeguards for the Asset Management Industry,” speech at The New York Times Dealbook Opportunities for Tomorrow Conference, New York, N.Y., December 11, 2014, at <http://www.sec.gov/News/Speech/Detail/Speech/137054367722>.

majority of securities lending activities. As an agent, the custodian provides safekeeping for securities owned by its customers, as well as reporting, valuation, and other administrative services related to the securities held. In addition, the custodian may offer various programs to assist customers with enhancing the return on their securities. For example, custodian banks may engage in securities lending activities, including acting as principal when lending securities from its own account, acting as an “undisclosed principal” when offering customers’ securities, or acting as an agent, fiduciary, or finder. In these examples, the role of the bank extends beyond the pure operational aspect. Further, historically, U.S. custodian banks have often indemnified their securities lending clients against losses, including all financial loss, from a borrower default, or from collateral default, although indemnification practices vary and may be tailored to meet specific client needs (see Section 3.2.1).

Recent advances in technology and operational efficiency have made it possible to separate securities lending services from custody services. This development gave rise to specialist third-party agency lenders, who have established themselves as an alternative to custodial banks. For example, BlackRock, Inc., the world’s largest investment manager by assets, acts as securities lending agent on behalf of its clients, which are mostly affiliated investment companies. For its eligible investment companies, BlackRock serves as an affiliated lending agent.³⁴ Another example is eSecLending, which offers an alternative approach to securities lending based on a competitive blind auction to determine the optimal lending strategy for its clients. The auction process is intended to improve price transparency for borrowers who pay for access to lendable assets.

The net revenues from securities lending operations are shared between the securities owner and its lending agent. According to market sources, lending agents typically retain 30 percent of the net revenues and 70 percent is allocated to the beneficial owners of the securities.

³⁴ According to its public filings, iShares Trust, the largest family of exchange-traded funds, engages BlackRock Institutional Trust Company, N.A., an affiliate of BlackRock Fund Advisors, its investment manager, to run its securities lending operations. See iShare ETF prospectuses, available at <http://www.ishares.com/us/library/financial-legal-tax>. U.S. registered funds can only use affiliated lending agents with SEC approval, either under a no-action letter or an exemption. This approval includes additional conditions to protect fund shareholders. See <http://www.sec.gov/divisions/investment/securities-lending-open-closed-end-investment-companies.htm>.

Securities lending revenues as a percent of total revenues for the largest U.S. custody banks are shown in Figure 12.

Figure 12: Securities Lending Revenue

Securities lending activities represent a small part of custody banks' total revenues

	Securities Lending Revenues (\$ millions)			Total Revenues (\$ millions)			Assets Under Custody (\$ billions)			SL Revenues as % of Total Revenues		
	Q1 2015	2014	2013	Q1 2015	2014	2013	Q1 2015	2014	2013	Q1 2015	2014	2013
BNY Mellon	\$43	\$158	\$155	\$3,851	\$15,692	\$15,048	\$28,500	\$28,500	\$27,600	1.1%	1%	1.0%
State Street	\$101	\$437	\$359	\$2,605	\$10,295	\$9,884	\$28,491	\$28,188	\$27,427	3.9%	4%	3.6%
Citigroup	ND	ND	ND	\$19,736	\$76,882	\$76,419	\$16,000	\$16,200	\$14,300	ND	ND	ND
JPMorgan	ND	ND	ND	\$24,066	\$94,205	\$96,606	\$20,561	\$20,549	\$20,485	ND	ND	ND
Northern Trust	\$22	\$97	\$98	\$1,141	\$4,361	\$4,122	\$6,091	\$5,969	\$5,576	1.9%	2%	2.4%

Sources: Banks' Form 10-Q filings, OFR analysis

Convenience and profit generation are important motivations for securities lenders to maintain a presence in the lending market. If a lending portfolio comprises securities that are widely available in the market, the lending fee is likely to be low, reducing the securities lender's incentive to participate in the market. Also, in a low interest rate environment, when the cash collateral reinvestment rate is low, there is less incentive to lend securities against cash collateral. This has been the case during the post-crisis low interest rate environment, when the share of securities lent against cash collateral within the overall securities lending portfolio declined. Beneficial owners were disincentivized by low yields, which did not provide enough return to offset the risks associated with cash collateral reinvestment.

In addition to agent intermediaries, the market practice recognizes principal intermediaries, who are prime brokers, securities dealers, and specialist intermediaries. The role of the principal intermediary is to provide credit transformation for lending clients who are not willing to assume exposure to certain types of borrowers. In this case, a prime broker assumes credit exposure to the borrower. In short, agent intermediaries aggregate supply on lendable assets, while principal intermediaries aggregate demand for lendable assets.

2.2.3.3 Securities borrowers

The primary securities borrowers are securities dealers, who borrow for their market-making activities or on behalf of their clients. Available data do not identify the ultimate securities borrowers when dealers borrow on behalf of their clients. Anecdotally, though, hedge funds rank among the largest securities borrowers and access the pool of lendable securities mainly through their prime brokers.

Dealers, which often act as market-makers, borrow securities to settle buy orders from customers. A lack of securities to borrow may result in less liquid markets with wider bid-ask spreads. Execution of many trading strategies relies on the ability of the trader to borrow securities. For example, traders often borrow securities to establish a short position in one security that has been taken to hedge a long position in another security.

Lending of equity securities also plays an important role in proxy voting. For example, to assemble a large voting position, hedge funds or other activist investors may borrow shares immediately prior to a scheduled vote and repay the shares immediately afterward. This practice – often referred to as empty voting – has raised important corporate governance issues (see Hu and Black 2006). As such, institutional investors who normally make their securities available for lending often restrict the supply or call back their loaned shares ahead of voting record dates (see Aggarwal, Saffi, and Sturgess 2012), forgoing their lending revenues.

2.2.3.4 Federal Reserve

The Federal Reserve operates in the securities lending marketplace, offering primary dealers access to the Federal Reserve's stock of U.S. Treasury and agency securities. Essentially, the Federal Reserve conducts a daily auction in which primary dealers can bid for securities held in the Federal Reserve's System Open Market Account (SOMA) portfolio. The Federal Reserve does not accept cash collateral, but rather requires dealers to pledge Treasury bills, notes, bonds and inflation-indexed securities as collateral. Each day, the Federal Reserve's securities lending activities average around \$14 billion in U.S. Treasury securities and just under \$1 billion in

agency securities ([FRBNY, 2014](#)). The purpose of this program is to help promote smooth trading and clearing of Treasury and agency securities.³⁵

Under the Dodd-Frank Act, the Federal Reserve provides transaction-level data on its securities lending trades. Trade-level data are available from July 21, 2010 onwards, with a two-year lag.

2.2.4 Key attributes

Relevant attributes of a securities loan include (i) counterparty, (ii) securities on loan, (iii) tenor of the loan, (iv) collateral type, (v) collateral haircut, (vi) lending fee (for any loan collateralized by securities), or rebate rate to be paid to the lender if collateral is provided in cash. The types of securities available for lending include U.S. Treasury and agency securities, sovereign and corporate bonds denominated in various currencies, and equity securities. Agent lenders provide potential borrowers with the inventory of securities available for lending on a daily basis.

Securities loans may be either for a specific term or open-ended with no fixed maturity date. It is typical market practice for securities loans to be open-ended, allowing the security on loan to be called on demand by the beneficial owner. The open recall feature of a securities loan is driven by the assumption that participation in securities lending should not impact the investment strategy of the lender. For example, registered funds are subject to specific requirements under SEC no-action letters regarding the ability to recall securities: they must be able to terminate the loan at any time and recall the loaned securities within the ordinary settlement time.³⁶ Generally, these restrictions include express limits on lending; termination and recall rights; requirements for collateralization, daily mark to market valuation, and cash

³⁵ For more details about the Federal Reserve's activities in these markets, see the annual reports published by the Federal Reserve at http://www.newyorkfed.org/markets/annual_reports.html as well as Fleming and Garbade (2007) and references listed therein. See also <http://www.newyorkfed.org/markets/securitieslending.html>.

³⁶ For a summary of other SEC conditions to which U.S.-registered funds are subject when they engage in securities lending, see https://www.ici.org/viewpoints/view_14_sec_lending_01.

collateral reinvestments; board oversight of the securities lending arrangement; and restrictions on the use of affiliated lending agents, as noted above.

Securities on loan may also be recalled if the owner wishes to cast a proxy vote. For example, a registered fund must recall a loaned security in time to vote proxies, if the asset manager has knowledge that shareholders will be asked to vote on a material change. While securities are on loan, normal interest and dividends still accrue to the beneficial owner. However, the voting rights of equity securities can be used by the securities borrower. This practice is accepted internationally and, therefore, corporate governance events have a significant impact on loans of equity securities.

Two major collateral types are commonly used to back securities lending transactions: cash and securities. While it is the beneficial owner who makes a decision regarding the type of collateral accepted and how the collateral is managed, the choice is often driven by prevailing market practice. Except for the Federal Reserve's securities lending operations, cash collateral is the standard U.S. practice although U.S. government securities are also accepted by many lenders. Market participants attribute the prevalence of cash collateral in the United States to a number of factors. First, deep and broad U.S. money markets provide lenders many options to invest cash collateral in low-risk instruments. Second, in the higher interest rate environment, the yield earned on the cash reinvestment enhances the overall value of the securities lending program for both the securities lender and the lending agent, who also receives compensation for managing cash collateral. Third, securities lending transactions collateralized by cash are seamlessly integrated with the repo market, where cash can be immediately reinvested to finance another security.

Normally, the beneficial owner provides guidelines on which counterparties can borrow its securities, the type of collateral it accepts, and, in case of cash collateral, cash management policy. In the event of a counterparty default, the lender has the right to liquidate the collateral and use the proceeds from the sale to repurchase the loaned securities in the open market. In doing so, the lender is exposed to market risk that the value of securities on loan may increase and the proceeds from collateral liquidation may be insufficient. Haircuts are designed to protect

the lender against this risk. To ensure sufficient collateral for any given loan, both securities on loan and collateral are marked-to-market daily with any margin calls also made on a daily basis. Haircuts are a function of the collateral quality, counterparty risk, and the term of the transaction. Generally, haircuts or margins in securities lending transactions are consistent with those assigned in repo transactions.

Another important dimension of securities lending transactions is the relationship between lending fees and reinvestment income ([Keane, 2013](#)). The relative size of the lending fee and reinvestment income in a securities lending transaction depends on the nature of the securities loaned. If the securities are special, meaning the security being loaned has an intrinsic value in the collateral market and the transaction is motivated mainly by the borrower's desire for a specific security, lending fees dominate and reinvestment income tends to be limited. On the other hand, if the securities loaned are trading with little intrinsic value, reinvestment income dominates and the lending fees tend to be relatively small.

2.2.5 Legal arrangements

Securities lending is a global business and legal arrangements vary among jurisdictions. According to international practice, the lender of the loaned securities passes the legal title of the loaned securities to the borrower for the duration of the loan. The lender regains the title at the end of the loan when the securities are returned. Although the lender temporarily gives up legal ownership, the economic benefit of any corporate actions, such as a stock split or income payments connected with the loaned security, are retained by the lender. Any income or dividends are passed through from the securities borrower to the lender. However, in the case of equity securities, the lender loses any voting rights associated with the security during the term of the loan.

In the United States, a Master Securities Loan Agreement (MSLA) is normally used to set out the legal rights and obligations of the parties in securities lending transactions. In line with the prevailing U.S. market practice, securities lending authorization agreements typically indemnify lending clients from any deficiencies in the collateral in the event of a borrower

default. Although indemnification protects the beneficial owner, it may give rise to incremental credit risk borne by the agent lender (see Section 3.2.1). Indemnification on the securities loan does not cover losses associated with cash collateral management (see Section 3.2.2). Anecdotally, some agent lenders indemnify their lending clients against principal losses on cash collateral reinvested in the repo market.

3 Vulnerabilities

3.1 Repo market

Vulnerabilities in the repo and short-term wholesale funding markets have been cited by policymakers and regulators as a potential source of systemic stress. Weaknesses were especially underscored during the 2007-09 financial crisis, when over-dependence on wholesale funding contributed to the collapse of Bear Stearns Companies, Inc., Lehman Brothers Holdings Inc., and Britain's Northern Rock. The Financial Stability Oversight Council (FSOC) has highlighted various risks associated with the repo market, and recommended measures to improve the structure of the triparty repo market and limit potential spillovers from repo-related asset fire sales.³⁷ U.S. policymakers have reiterated these concerns. Federal Reserve Board Governor Daniel Tarullo has stressed that “(d)esigning and implementing a policy response in light of the vulnerabilities of short-term wholesale funding markets that were revealed in the 2007-09 crisis is an integral part of post-crisis reform.”³⁸ At the global level, the Financial Stability Board has

³⁷ See FSOC annual reports for 2011, 2012, 2013, 2014, 2015.

³⁸ See <http://www.federalreserve.gov/newsevents/speech/tarullo20141120a%20.htm>. Other Federal Reserve officials have expressed similar concerns about the risks of wholesale funding. See Federal Reserve Bank of New York President William Dudley's remarks at the Risk of Wholesale Funding workshop on August 13, 2014 hosted by the Federal Reserve Bank of New York. See also the speech by Federal Reserve Bank of Boston President Eric Rosengren at the Global Banking Standards and Regulatory and Supervisory Priorities in the Americas on November 5, 2014 organized by the Association of Supervisors of Banks of the Americas, the Basel Committee on Banking Supervision, and the Financial Stability Institute.

also recommended policies to mitigate potential systemic risks stemming from repo and securities lending activity.³⁹

3.1.1 Regulatory efforts targeting leverage and liquidity risk

We consider regulatory efforts impacting the repo market from the standpoint of three broad aspects – those related to (i) leverage and liquidity risk incurred by securities dealers; (ii) the market infrastructure; and (iii) the risk of asset fire sales.

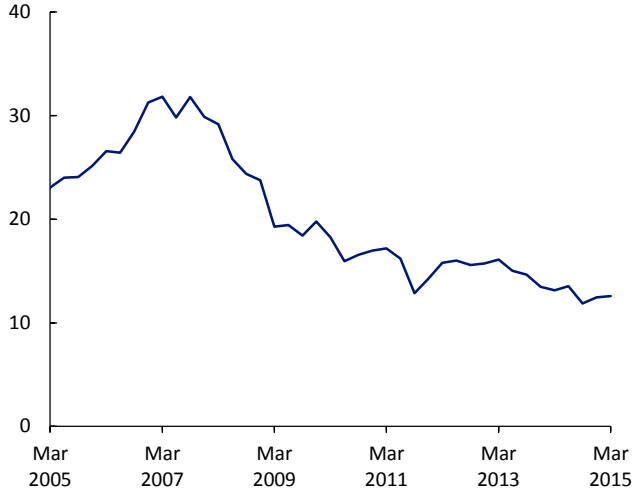
More stringent regulatory requirements were introduced after the crisis to incentivize financial institutions to reduce their leverage and dependence on short-term wholesale funding. We highlight a few of these efforts:

- In spring 2011, the Federal Deposit Insurance Corporation (FDIC) expanded the deposit insurance assessment base from deposits to account for all of a bank’s liabilities, including repo liabilities. This change made it more expensive for FDIC-insured banks to borrow in the repo market.
- Revised capital and leverage requirements had a similar motivation. Sections 165 and 166 of the Dodd-Frank Act’s enhanced prudential standards for U.S. bank holding companies incentivized the dealer subsidiaries of bank holding companies to extend the term of their liabilities. The Basel III banking rules’ liquidity coverage ratio makes it more costly for bank holding companies and their subsidiaries to obtain short-term repo funding for low quality collateral.
- The enhanced supplemental leverage ratio, which is binding on several large U.S. banks, includes leverage incurred through repo borrowings.
- Another Basel III rule, the net stable funding ratio, once adopted, is intended to encourage banks and their affiliates to extend the duration of their liabilities, in an effort to reduce dependence on short-term wholesale funding sources.

³⁹ See Financial Stability Board, “Strengthening Oversight and Regulation of Shadow Banking: Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos,” August 29, 2013, http://www.financialstabilityboard.org/wp-content/uploads/r_130829b.pdf?page_moved=1.

These efforts, combined with changes in firms' risk management practices, have had an impact on repo activity. Dealers' reliance on repo financing peaked in 2007 at 32 percent of total liabilities, and has since steadily declined, as illustrated in Figure 13. At the end of the first quarter of 2015, the share of dealer net repo liabilities stood at 13 percent of total liabilities.

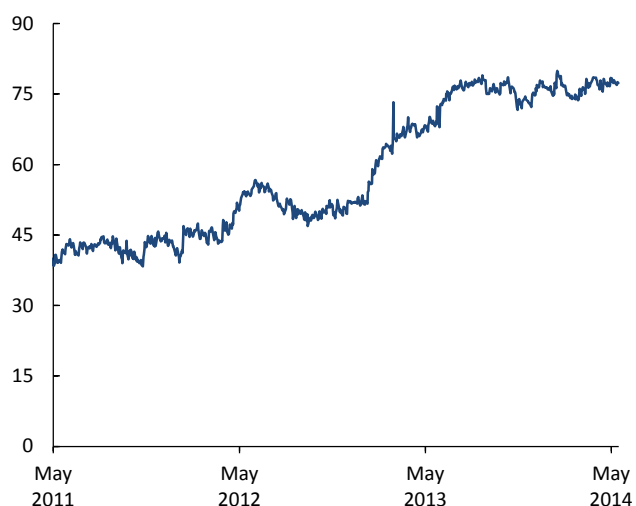
Figure 13: Security Broker-Dealer Net Repo Liabilities as Percent of Total Liabilities



Sources: Financial Accounts of the United States, Haver Analytics, OFR analysis

Dealers have also extended the tenor and staggered the maturity of their repo funding. While a substantial amount of repo is still financed overnight, there has been a lengthening in the maturity of repo funding, particularly for lower-quality collateral (see Figure 14).

Figure 14: Weighted Average Maturity of Triparty Repo Trades Collateralized by Risk Assets (days)



Note: Risk assets are securities which are not backed by the full faith and credit of the U.S. government, such as corporate bonds and equities.

Source: Federal Reserve Bank of New York

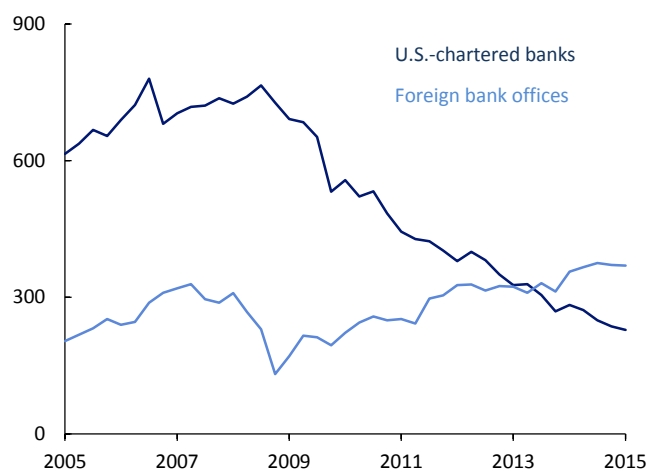
Concentration risks have also eased. Dealers have generally diversified their funding sources and reduced the size of their client-financing operations. For example, in December 2014, the top three dealers accounted for around 30 percent of the average daily volume in non-traditional triparty repo, down from nearly 50 percent in May 2010, when the Federal Reserve started publishing these statistics.⁴⁰ Increased diversification is expected to reduce the adverse effects of absorbing a potential dealer default.

Although U.S. securities dealers and U.S.-chartered banks have significantly reduced their dependence, repo is still a significant source of financing for U.S.-based foreign bank offices. Their heavy reliance on wholesale funding is partly due to differences in regulation and the fact that foreign banks have a limited base of U.S. retail deposits. Indeed, since the first quarter of 2008, repo and fed funds liabilities of foreign bank offices in the U.S. have increased by over 20 percent, bringing their reliance on this type of funding to 18 percent of total liabilities as of the end of 2014 (see Figure 15). To address this anomaly, starting in mid-2016 the Federal Reserve's Regulation YY will require any foreign bank with \$50 billion or more in U.S. non-

⁴⁰ See http://www.newyorkfed.org/banking/tpr_infr_reform_data.html.

branch/agency assets to place all its U.S. subsidiaries within a U.S. intermediate holding company. The intermediate holding company will be subject to the same enhanced prudential standards as U.S. banks, including U.S. Basel III rules, capital planning, Dodd-Frank Act stress testing, liquidity, and risk management requirements.

Figure 15: Fed Funds and Repo Liabilities of U.S.-Chartered Banks and U.S.-based Foreign Bank Offices (NSA, \$ billions)



Note: NSA is Not Seasonally Adjusted.

Sources: Financial Accounts of the United States, Haver Analytics, OFR analysis

3.1.2 Repo market infrastructure

A second source of vulnerability is from weaknesses in the repo market’s institutional infrastructure.⁴¹ Weaknesses in the policies, procedures, and systems supporting the triparty repo market were exposed during the financial crisis as the financial condition of dealers deteriorated and collateral valuations became uncertain. A major infrastructure concern was that the settlement of triparty repo contracts heavily relied on two major clearing banks responsible for extending intraday credit to securities dealers ([FRBNY, 2010](#)). Large intraday credit exposures have subjected clearing banks to significant risk. The failure of a dealer during the day could

⁴¹ There is a large body of literature detailing the so-called plumbing of how repos are cleared and settled. See, for instance, [FRBNY \(2010\)](#), which describes the triparty repo market mechanics before the triparty reform was initiated in 2010. See also [Agucci, et al. \(2014\)](#) for an in-depth review of the use of GCF Repo transactions by dealers and the clearing and settlement structure of GCF Repos.

have resulted in outsized losses for the clearing bank, if the market value of the collateral provided by the dealer was insufficient to cover the amount owed to the clearing bank.

Since the crisis, substantial progress has been made to change how triparty repo contracts are settled. The Federal Reserve Bank of New York's Triparty Repo Infrastructure Task Force helped to reduce the use of discretionary intraday credit extended by the triparty clearing banks and improve their liquidity and credit risk management practices. Clearing banks have redesigned their settlement practices, ending the daily unwind of cash and collateral for nonmaturing trades and revising the process for settling maturing trades. Market participants also took steps to reduce their demand for intraday credit. As a result, daily settlement is much less dependent on the clearing banks' provision of intraday credit. By the end of 2014, both clearing banks had reduced the extension of intraday credit to an amount less than 10 percent of daily triparty repo volumes, down from 100 percent of daily volumes in 2012.⁴²

3.1.3 Risk of fire sales

Losses from the failure of a large, complex, interconnected firm can be transmitted to the broader market through falling asset prices triggered by an asset fire sale. The events of the 2007-09 financial crisis revealed that cash investors, especially those whose decision-making is tied to corporate governance procedures, do not dynamically adjust haircuts when counterparty credit risk rises, but rather request higher quality collateral or limit their repo investment activities to higher quality counterparties. [Copeland, Martin, and Walker \(2010\)](#) found that during stressful periods cash investors in the triparty repo market “appear to be reluctant or unprepared to take possession of the collateral and prefer to withdraw funding if they think a dealer is not creditworthy.” [Krishnamurthy, Nagel, and Orlov \(2014\)](#) confirmed the relative stability of triparty repo haircuts and found that money market funds stopped accepting certain types of lower quality securities as collateral during the financial crisis. This behavior may be driven by money market funds' advisors desire to avoid trading with counterparties whose creditworthiness deteriorates. Cash investors tend to precipitously cut off funding to securities

⁴² Intraday credit is still extensively used to settle GCF Repo contracts. However, regulators and market participants are exploring ways to reform this settlement process.

dealers in times of stress, increasing the probability of fire sales of the dealer's securities portfolio even if the dealer does not default.

Asset fire sales have the potential to amplify and transmit systemic risk through two possible channels: (i) fire sales of assets when a dealer faces default and sells securities in its inventory preemptively to raise liquidity, and (ii) broader fire sales of assets by repo investors, who liquidate securities held as collateral after a dealer default has occurred (see [Begalle et al., 2013](#)). The first type of fire sale is being addressed, albeit partially, through prudential regulations that encourage individual firms to reduce reliance on short-term repo funding. However, little progress has been made to manage the second type of fire sale risk (post-default asset liquidation), although there are various proposals to mitigate this risk.

Some proposals ([Acharya and Oncu, 2013](#)) favor the use of incentives to maximize the value of assets underpinning the repo collateral. This would require some sort of arrangement (e.g., the creation of a special resolution authority or a consortium of dealers) that would commit to taking possession of the collateral and fund the portfolio of a failed firm and then orderly dispose of the assets once market conditions stabilize.

Other proposals have focused on potential changes to the U.S. bankruptcy code, and involve restricting access of a non-defaulting party to certain types of less-liquid collateral upon counterparty default. As discussed in Section 2.1.5, repos are not subject to the avoidance or automatic stay provisions in the U.S. bankruptcy code and enjoy exemptions commonly referred to as safe harbors. Some legal scholars argue that the presence of safe harbors encourages excessive use of short-term financing, mainly through repo borrowings. During the financial crisis, this over-reliance led to transactions where securities did not retain their value, weakening financial firms and worsening the crisis. [Ayotte and Skeel \(2009\)](#) and [Roe \(2011\)](#) argue that the bankruptcy safe harbor provisions create incentives for creditors to quickly liquidate their collateral, inhibiting an orderly resolution of assets and raising the risk of fire sales. In a further study, [Morrison, Roe, and Sontchi \(2014\)](#) argue that the special treatment of repo contracts during bankruptcy increases the risk of fire sales by allowing counterparties to seize assets of a faltering firm, bypassing the normal bankruptcy process. As a remedy, they propose eliminating

safe harbor provisions for repo contracts backed by non-government securities and instead requiring such contracts to be resolved under the normal bankruptcy process. This proposal is based on the assumption that fire sale risks are greater for lower quality collateral securities.

Even if not protected by the safe harbor provisions, the creditor using nongovernment securities collateral for repo would still have the rights of general secured creditors, which are substantial. In practice, a limited automatic stay is sometimes required by regulatory agencies. The FDIC is permitted a one-day stay on qualified financial contracts in bank receivership cases. Also, qualified financial contracts are subject to a one-day stay when a nonbank financial firm is resolved under the orderly liquidation authority established in the Dodd-Frank Act. Introducing a short, defined automatic stay window could allow for a more orderly closure and netting of qualified financial contracts such as repos.

Adoption of these proposals would likely to result in further decline of the repo market and the money market, in general. For example, money market funds may have to include repo positions in their 5 percent issuer diversification limits, leaving less room to purchase unsecured debt, such as commercial paper or certificates of deposit, from the same issuer. There is also the risk of cross-border regulatory arbitrage. Domestic repo market participants may be incentivized to shift their repo funding overseas, where their collateral would not necessarily be subject to the same resolution-driven delay. However, monitoring of this trend is a challenge due to a lack of transparency of cross-border securities financing activity.

3.2 Securities lending activities

The recent financial crisis highlighted some significant but underappreciated risks in securities lending. When analyzing potential vulnerabilities, it is important to isolate securities lending and collateral management operations. We are not aware of any instances of losses to beneficial owners due to a borrower's failure to return borrowed securities. On the other hand, many beneficial owners suffered substantial losses on their cash collateral reinvestment programs during the financial crisis (see Section 3.2.2). For example, in 2007, a group of public pension plans and hospital investors participating in Wells Fargo & Co.'s securities lending

program suffered outsized losses.⁴³ The collapse of American International Group, Inc. (AIG), which led to more than \$2.6 billion in direct losses related to its securities lending business, is another prominent reminder of potential risks in cash collateral management.⁴⁴

The crisis reinforced the need to reassess risks inherent in securities lending. In the United States, the Dodd-Frank Act's Section 165(e) calls for restrictions on the "interconnectivity" of large financial institutions, which include securities lending operations, and Section 984(b) requires the SEC to promote greater transparency of securities lending activities. At the international level, the Financial Stability Board (FSB) issued a set of policy recommendations on securities lending and repos, aimed at improving transparency, strengthening regulation of securities financing, and improving structural aspects of the securities financing markets.⁴⁵

3.2.1 Indemnification

A standard market practice that has developed over the past several decades has agent lenders provide securities replacement guarantees, or indemnification for borrower default. Although no official data exist, anecdotal evidence suggests that the vast majority of securities lenders require that agents provide borrowers default indemnification. Generally, indemnification is limited to the amount of losses that occur when the collateral value is insufficient to acquire replacement securities if a borrower fails to return a borrowed security.

For example, assume that a securities borrower provides \$102 of collateral to borrow securities currently valued at \$100. If the market value of the securities increases during the life of the loan to \$103 and the borrower fails to return the borrowed securities, the indemnification provider would have to make up the difference between the collateral received (\$102) and the

⁴³ Blue Cross and Blue Shield of Minnesota v. Wells Fargo N.A., D. Minn., Civil No. 11-2529, (DWF/JJG), April 18, 2012, at <http://docs.justia.com/cases/federal/district-courts/minnesota/mndce/0:2011cv02529/122014/94/0.pdf?1334832773>.

⁴⁴ Financial Crisis Inquiry Commission, "The Financial Crisis Inquiry Report," January 2011, at http://fcic-static.law.stanford.edu/cdn_media/fcic-reports/fcic_final_report_full.pdf.

⁴⁵ Financial Stability Board, "Strengthening Oversight and Regulation of Shadow Banking: Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos," August 29, 2013, at http://www.financialstabilityboard.org/publications/r_130829b.pdf.

cost to repurchase the loaned securities in the secondary market (\$103). In this case, the lending agent providing indemnification is liable for \$1. According to our discussions with market participants, lending agents generally do not indemnify against losses that may be incurred due to cash collateral reinvestment, although a number of lending agents provide indemnification of principal invested in repos.

This example shows that indemnification arrangements expose lending agents to contingent claims. However, historically, agent lenders have not sustained significant losses due to indemnification and thus may not explicitly price in this risk as part of their securities lending business.⁴⁶ Post-crisis regulatory changes – the Dodd-Frank Act in the United States and Basel III capital standards globally – require bank-affiliated lending agents to incorporate capital charges, liquidity requirements and counterparty concentration limits to account for risks inherent in securities lending transactions. Since these changes can make securities lending programs more costly to run, one potential outcome could be a migration of securities lending activities away from banks to entities unaffiliated with banks. For example, securities lending programs run by independent agents such as eSecLending could capitalize on this cost advantage unless similar rules are adopted for all entities providing securities lending services. At present, a lack of data about securities lending activities prevents regulators from systematically monitoring a potential migration.

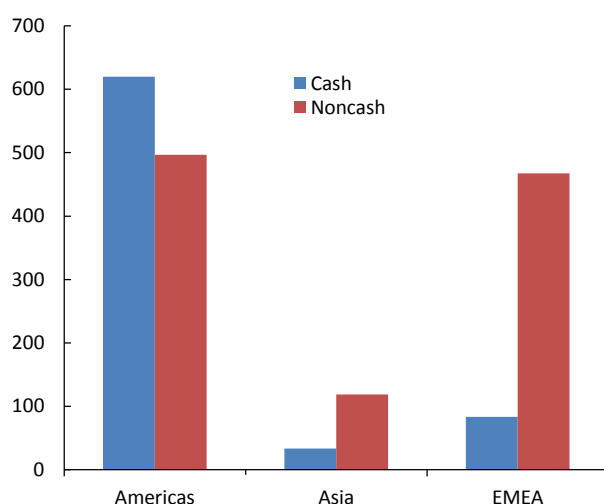
3.2.2 Collateral management

Most U.S. securities lending uses cash collateral, in contrast to practices in other countries. For example, only about 30 percent of loans in Europe, Middle East, and Asia (EMEA) and about 25 percent of loans in Asia are backed by cash collateral (see Figure 16).

⁴⁶ For example, BlackRock said its indemnification agreements have never been triggered during its 30-year history of providing indemnification, see <https://www.blackrock.com/corporate/en-ca/literature/publication/sec-lending-borrower-default-indemnification-may-2014.pdf>.

Figure 16: Securities Lending by Collateral Type (\$ billions)

The majority of securities lending in the Americas is conducted against cash collateral



Source: Markit Group Ltd, June, 2015

Principal losses in cash collateral reinvestment programs during the 2007-09 financial crisis raised significant regulatory concerns. In the case of AIG, firm-wide risk management inefficiencies and misuse of the cash collateral are believed to have played a role in its distress ([Peirce 2014](#)). AIG used its securities lending program as a mechanism to raise cash and to generate leverage. The AIG episode is instructive, as it focused attention on improving cash reinvestment practices, transparency, and disclosure of these activities.

Normally, a lending agent is responsible for investing cash for the term of the loan, although this responsibility is often delegated to an asset management firm. Management of cash collateral introduces certain risks borne by the beneficial owner of securities. A beneficial owner is responsible for establishing cash collateral reinvestment guidelines that meet the portfolio risk tolerance. There might be multiple sources of risk specific to cash collateral reinvestment in pooled vehicles. For example, a pooled vehicle may be at risk of runs in the event of significant redemptions. When securities loans are terminated and cash collateral must be returned to the borrower, the pooled vehicle may need to sell assets in order to raise cash. Unanticipated asset sales could lead to or accelerate declines in the market value of short-term assets, which would

result in losses for lenders. An asset/liability mismatch incurred by securities lenders may range from one day to nearly two months, but the weighted average maturity of cash reinvestment portfolios can also be as long as six months, according to industry surveys conducted by the Risk Management Association.

Risks associated with cash collateral reinvestment may be mitigated if the investment vehicle is invested in high quality, short-dated instruments. For example, money market mutual funds and bank short-term investment funds (STIFs), which are often used to manage cash collateral, are subject to specific limits on the credit quality, maturity, and liquidity of the portfolio assets.⁴⁷ The Risk Management Association's securities lending survey as of March 31, 2015 shows that approximately 12 percent of cash collateral is managed through collective investment vehicles, 8 percent (or \$60 billion) of which is managed by money market mutual funds.

After the 2007-09 financial crisis, many securities lenders have revised their collateral management policies. Revisions were two-fold. First, cash collateral reinvestment practices became more conservative. For example, exposure to private MBS in their cash reinvestment programs is no longer considered appropriate by many securities lenders. Second, securities lenders increasingly accepted high-quality liquid securities, normally government securities, as cash collateral instead of cash. Securities received as collateral in a securities lending transaction are typically not repledged by agent bank lenders and are kept in a segregated custody account.⁴⁸ This practice eliminates the risk of loss from collateral reinvestment.

⁴⁷ Money market mutual funds are regulated under rule 2a-7 under the Investment Company Act, and STIFs regulated under 12 CFR 9.18(b)(4)(iii) are examples of such vehicles. Rule 2a-7, among other conditions, requires money market funds to invest only in high quality, short term instruments, places limits on the maturity of securities in the fund's portfolio, and requires the funds to maintain minimum liquidity requirements. OCC Regulation 9.18(b)(4)(iii), among other things, requires STIFs offered by national banks and federal savings associations to meet certain specific requirements associated with portfolio maturity, and to meet liquidity, portfolio and issuer criteria. State-chartered banks that offer STIFs and other collective funds are not subject to the OCC's regulation.

⁴⁸ Under the Master Securities Loan Agreement (MSLA) governing securities lending transactions, lenders other than broker-dealers may not retransfer collateral. However, restrictions may be different for transactions occurring under non-U.S. MSLAs.

4 Overview of Data Coverage and Gaps

Since the 2007-09 financial crisis, policy makers, academics, and market participants have sought to address the lack of transparency in repo and securities lending markets. In the United States, regulators have improved their collection of data on repo activities since the crisis, although data gaps remain. Globally, the Financial Stability Board recommended that national regulators collect data on repo and securities lending activities. In this section, we describe some of the existing sources of repo and securities lending data . A summary of each dataset is in Figure 17.

Figure 17: Most Frequently Used Securities Financing Data Sources

Data collection	Collecting entities	Reporting entities	Reporting frequency	Main data elements	Data availability
Triparty repo (excluding trades cleared under GCF Repo Service)	FRBNY	Triparty clearing banks	Daily	Market value of collateral financed, counterparty names, collateral types	Not publicly available
				Transaction-level data including counterparties, amount of cash invested, implied interest rate, maturity	Not publicly available
			Monthly	Market value of collateral financed by collateral types, haircuts, dealer concentration	Publicly available
GCF Repo Service	FRBNY	FICC	Daily	Repo and reverse repo positions by counterparty and collateral type	Not publicly available
			Monthly	Market value of collateral financed by collateral types	Publicly available
Federal Reserve's Reverse Repo Facility	FRBNY	NY Federal Reserve Bank	Daily	Demand, utilization, rate, participating entities	Demand, utilization, rate, # of participants; daily
FR2004A	FRBNY	Primary Dealers	Weekly	Positions	Aggregated data becomes publicly available the following business day after reporting
FR2004B			Weekly	Weekly cumulative transactions	
FR2004C			Weekly	Outstanding balances of financing arrangements of government securities dealers using repurchase and reverse repurchase agreements, securities borrowed or lent, collateralized loans, and fails (receive/deliver)	
FR2004SI			Weekly	Positions	
FR2004SD			Daily, special situations	Positions	
FR2004WI			When issued	Closing positions, transactions, and net forward financing commitments	
Financial Accounts of the United States (Z.1)			Federal Reserve Board	Consolidated statistics generated from reports by other regulatory agencies	
Reports of Condition and Income (Call Report) for FDIC-insured banks	Federal Financial Institutions Examination Council	U.S. chartered depository institutions	Quarterly	Netted repo and reverse repo positions, differentiates domestic or foreign transactions, type of collateral valuation used	Publicly available quarterly
Y-9 C	Federal Reserve Board	U.S. chartered bank holding companies	Quarterly	Netted repo and reverse repo positions, differentiates domestic or foreign transactions, type of collateral valuation used	Publicly available quarterly
Risk Management Association Securities Lending Survey	Risk Management Association	Major securities lending agents	Quarterly	Market value of securities available for lending, securities on loan, collateral type, cash collateral reinvestment statistics	Available to members
Survey of securities lending activities	Markit, SunGard	Major participants in securities lending market	Daily	Market value of securities available for lending, securities on loan, selected trading statistics	Commercially available

^a Monthly reports of daily trading activities.

Source: OFR analysis

4.1 Repo market

Data on repo activity are collected using two different approaches. The first is based on a collection of aggregated data for a specific set of market participants, such as primary dealers or commercial banks. These data typically provide a snapshot of repo activities and, therefore, are useful for monitoring developments of the reporting entities. However, the data do not cover the repo market in its entirety. Further, these data tend to be highly aggregated and focused on quantities, and not potentially relevant information on rates, haircuts, or counterparty exposures. The second approach provides detailed data for a specific segment of the repo market covering all participating entities. For instance, regulators collect disaggregated data on triparty repo and GCF Repo activity, including information on rates, haircuts, and counterparties. However, these datasets are missing a substantial amount of repo activity that takes place outside triparty repo. These bilateral repo gaps are shown in Figure 18.

Figure 18: Data Gaps in the Repo Market

Market segment		Data collection	Data elements									
			Frequency	Trade date	Maturity date	Principal amount	Collateral type	Collateral value	Counter party	Haircut	Rate	
Triparty repo	Non-GCF Repo	Triparty clearing banks' reports to FRBNY ^a	Daily	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes ^b	Yes
	GCF Repo Service	Fixed Income Clearing Corp's reports to FRBNY	Daily ^c	Yes	Yes ^d	Yes	Yes	Yes	Yes	No	*	No
	Federal Reserve's Reverse Repo Facility	FRBNY trading data	Daily	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Yes
Bilateral Repo	Primary dealers	FR2004	Weekly	No	No	Yes	Yes	No	No	No	No	No
	Nonprimary dealers	N/A		This market segment is not directly observed from FR2004 or triparty repo collection								

^aFederal Reserve Bank of New York receives transaction-level data and aggregate collateral-pledge data.

^bHaircut data are not provided by the reporting entities, but calculated using the aggregate collateral-pledge data.

^cMonthly reports of daily trading activities.

^dOvernight or a term trade.

* Haircuts are uncommon in these market segments.

Source: OFR analysis

4.1.1 Data collections based on reporting entity type

In this section, we summarize the main datasets collected by regulatory authorities, central bank authorities, and private vendors. While each dataset provides relevant insights, we demonstrate how these data sources collectively fail to provide a comprehensive view of U.S. repo activity.

4.1.1.1 FR 2004 Primary Dealer Data

Primary dealers file weekly reports on how they finance their positions in U.S. government and other securities using Form FR 2004, the Weekly Release of Primary Dealer Transactions.⁴⁹ The Federal Reserve Bank of New York collects data (on a restricted access basis) on the financing of individual dealer positions, and publishes the aggregated data. These reports provide, among other information, aggregated data on the overall volume of repo and securities lending activity conducted by primary dealers. Form FR 2004 was introduced in the early 1960s and so provides a long history of repo and securities lending activity by primary dealers and includes a series of reports (see Figure 19).

Figure 19: Federal Reserve Form FR 2004 Reports

Form	Name	Content
FR 2004A	Weekly Report of Dealer Positions	Weekly data on dealers' outright positions in Treasury and other marketable debt securities
FR 2004B	Weekly Report of Cumulative Dealer Transactions	Cumulative weekly data on the volume of transactions made by dealers in the same instruments for which positions are reported on the FR 2004A
FR 2004C*	Weekly Report of Dealer Financing and Fails	Weekly data on the amounts of dealer financing and fails
FR 2004SI	Weekly Report of Specific Issues	Weekly data on outright, financing, and fails positions in current or on-the-run issues
FR 2004SD	Daily Report of Specific Issues	Daily data collected under certain circumstances
FR 2004WI	Daily Report of Dealer Activity in Treasury Financing	Daily data on positions in to-be-issued Treasury coupon securities, mainly the trading on a when-issued delivery basis

Note: *Form FR 2004C provides information on a dealer's repo and, separately, on securities lending activity. Before April 2013, dealers reported their total repo and reverse repo positions by maturity, where maturity had two categories (overnight and continuing; term). In April 2013, the FR 2004C survey was refined so that dealers

⁴⁹ See <http://www.federalreserve.gov/apps/reportforms/reportdetail.aspx?sOoYJ+5BzDZq2f74T6b1cw==>.

also reported their repo and reverse repo positions by the asset class of the securities held as collateral (e.g., U.S. government, corporate debt, and equities).

Source: OFR analysis

Due in part to its long time-series, Form FR 2004 data are among the most frequently cited sources on securities dealer financing activities and, more specifically, the repo and securities lending components. The data are inputs into the Federal Reserve's Financial Accounts of the United States, which provide information on macro-financial flows and aggregate balance sheets for major sectors of the economy (see Section 4.3).

Nonetheless, Form FR 2004 is insufficient for in-depth monitoring of the repo activity in several respects. In particular, it lacks information on haircuts, rates, and counterparty exposures. Additionally, the dataset double counts trades conducted by primary dealers because the same trade counts as both a repo and a reverse repo by participating primary dealers. The double counting cannot be corrected because the underlying dealer-level data does not include counterparty information. Lastly, the coverage is incomplete since non-primary dealers do not file Form FR 2004. Although nonprimary dealers are not believed to represent a substantial amount of repo activity, this is not known with certainty, and could change over time as regulatory reform measures may prompt a migration of activities from primary dealers to non-primary dealers. This migration cannot be properly tracked due to a lack of consolidated reporting on the repo market.

4.1.1.2 Bank reporting of repo and reverse repo activities

U.S. depository institutions, including national banks, state member banks, and insured nonmember banks are required to file a quarterly Consolidated Report of Condition and Income, often referred to as the call report, which contains information on wholesale funding activities. Call reports are filed with the Federal Financial Institutions Examination Council (FFIEC) by the close of business on the last day of each calendar quarter and are later made available to the public. The specific reporting requirements depend on the size of the bank and whether it has any foreign offices. Banks are required to report their repo and reverse repo activity, and so this dataset is a useful source for analyzing trends in banks' short-term funding strategies.

Bank holding companies are also required to file a consolidated quarterly report FR Y-9C, which collects financial data in the form of a balance sheet, an income statement, and detailed supporting schedules, including a schedule of off-balance-sheet items and regulatory capital. Form Y-9C requires bank holding companies to report repo activities of their subsidiaries consolidated at the bank holding company level. Trades among subsidiaries of the same bank holding company are netted out, providing a clean view of repo activity with counterparties outside the bank holding company. Data elements filed in this report, with certain exceptions, are available to the public.⁵⁰ Separately, a weekly release of Assets and Liabilities of Commercial Banks in the United States, the H.8 report, contains aggregated data on lending and borrowing activities of U.S. banks, including in repo and fed funds markets.

The call report and Form FR Y-9C provide end of quarter snapshots of repo activity with little insight into fast-moving events in financial markets. Further, these data are fairly aggregated — they do not include counterparty information, or differentiate across different types of repo contracts (i.e. bilateral versus triparty repo) and, at best, provide information on average rates over the past quarter. Finally, there are concerns that the quarter-end positions captured in these filings are not representative of a bank’s (or bank holding company’s) position over the quarter.⁵¹

4.1.1.3 Supervisory liquidity monitoring

The Federal Reserve’s liquidity monitoring report, FR 2052, is a non-public collection by the Federal Reserve Bank of New York. Form FR 2052a is a daily survey with detailed questions to measure bank holding companies’ liquidity, including repo and securities lending positions by collateral class and maturity. This survey is aimed at large, complex bank holding companies and is limited to a small set of respondents.⁵² Compared to Form FR 2052a, Form FR 2052b contains less-granular data and is collected less frequently from a larger, but incomplete set of large bank

⁵⁰ See <http://www.federalreserve.gov/apps/reportforms/default.aspx>.

⁵¹ This “window dressing” concern is discussed both in financial media (see “Banks Trim Debt, Obscuring Risks” by Michael Rapoport and Tom McGinty in the *Wall Street Journal*, May 25, 2010) and the academic literature (see [Owens and Wu, 2014](#)).

⁵² For details, see the reporting form at <http://www.federalreserve.gov/apps/reportforms/reportdetail.aspx?sOoYJ+5BzDbpbkRe3/1zdGfyNn/SeV>.

holding companies. In addition to its limited scope, a further disadvantage of this dataset is that triparty and bilateral repo segments are not distinguished. Data on haircuts, rates, or counterparty type are also lacking.

4.1.1.4 Reporting of repo activities by registered investment companies

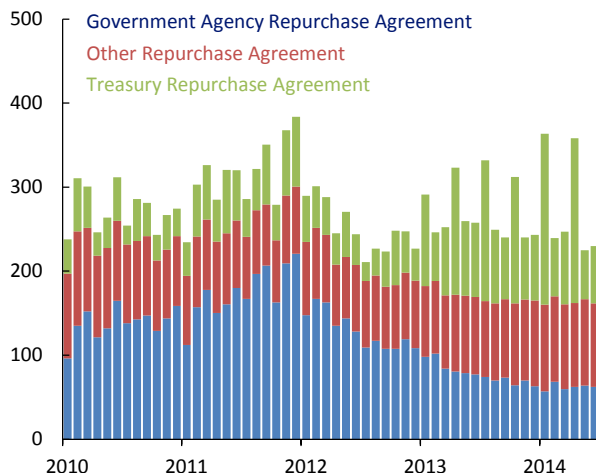
At present, registered funds are required by the SEC to disclose certain information related to their repo investments in Forms N-CSR and N-Q. These disclosures include the name of counterparty, the date of the agreement, the total amount to be received upon repurchase, the repurchase date, and description of securities subject to the repurchase agreements.⁵³ This information is publicly available on the SEC website although it is not machine readable and hard to aggregate at the industry level.

Money market mutual funds are among the largest cash investors in the repo market, and transact mostly through the triparty platform. The SEC's Form N-MFP, filed by money market mutual funds on a monthly basis, provides a high level of detail on the funds' activities, including counterparty, tenors, and allocated collateral securities. This is the most comprehensive regulatory data collection on investment activities in the repo market (see Figure 20), though the series only goes back to November 2010.

⁵³ 17 CFR 210.12-12.

Figure 20: Types of Collateral Accepted by Prime Money Market Funds (\$ billions)

Prime money market funds have reduced investments in government agency repos and increased holdings of nongovernment repos



Sources: SEC Form N-MFP, OFR analysis

Building on its experience with money market mutual funds, the SEC has proposed to modernize and enhance the reporting and disclosure of information by other investment companies and investment advisors.⁵⁴ The new rules and forms would enhance the quality of information available to investors and would allow regulators to more effectively collect data essential for monitoring securities financing markets. Specifically, a proposed new monthly portfolio reporting form, Form N-PORT, if adopted, would require registered funds other than money market funds to provide portfolio-wide and position-level holdings data, including, among other items, information regarding counterparty exposures in repos, reverse repos, and securities lending. Proposed amendments to Form ADV filed by investment advisors would require aggregate information related to assets held and use of borrowings and derivatives in separately managed accounts.⁵⁵ These reporting changes could eventually contribute to

⁵⁴ See the SEC’s proposed rule, “Investment Company Reporting Modernization,” May 20, 2015, at <https://www.sec.gov/rules/proposed/2015/33-9776.pdf>.

⁵⁵ See the SEC’s proposed rule, “Amendments to Form ADV and Investment Advisers Act Rules,” May 20, 2015, at <http://www.sec.gov/rules/proposed/2015/ia-4091.pdf>.

narrowing identified data gaps on financing arrangements by registered investment companies and investment advisors for their separately managed accounts.

4.1.1.5 Reporting of repo activities by insurance companies

At present, insurance companies provide only limited information on repo and reverse repo activities in their regulatory filings. Most reports are focused on quantities invested under repo and reverse repo agreements, but do not identify counterparty exposure or other details related to tenors or pricing. Disclosures regarding repurchase agreements and securities lending can be found in insurance companies' annual statements, footnote 5E. With respect to tenors and haircuts, insurance companies generally follow rules related to repos and reverse repos stipulated by the National Association of Insurance Commissioners (NAIC). Regulations limit the maximum tenor of repos and reverse repos by insurance companies to 12 months. Securities purchased by insurance companies under reverse repo agreements must have a fair value of at least 102 percent of the purchase price paid. The NAIC reviews public filings by insurance companies and provides periodic reports of the industrywide practices. The NAIC research, though, is fairly dated: the latest available report is from end-September 2011 and indicates insurance companies had roughly \$8.6 billion in repos and \$4.4 billion in reverse repos.⁵⁶

4.1.2 Market-specific data collection

4.1.2.1 Triparty repo data

There is a wealth of data available on triparty repo activity. As part of its triparty repo infrastructure reform effects, the Federal Reserve Bank of New York began publishing monthly aggregate statistics of triparty repo activity in May 2010.⁵⁷ These statistics are a snapshot of triparty repo activity, collected on the seventh business day of each month. Included are the total value of collateral posted by asset class and the distribution of haircuts for a given asset class.

The Federal Reserve Bank of New York also collects two more datasets through its supervisory channels. The first dataset is collected daily and includes the quantity and type of

⁵⁶ See http://www.naic.org/capital_markets_archive/120112.htm.

⁵⁷ See http://www.newyorkfed.org/banking/tpr_infr_reform.html

securities posted as collateral for triparty repo contracts as well as the margins for various types of securities. This dataset provides the following level of detail:

- (i) the total value of securities posted in triparty repo by asset class, tenor, and the associated margins for each dealer;
- (ii) the total value of securities an investor accepts as collateral by asset class; and
- (iii) the total amount of cash an investor places with a dealer.

The bank started to collect these data in July 2008. They are not publicly available.

The second set of data is transactions-level triparty repo data collected from the two clearing banks since mid-2012 as part of the clearing process. The minimum reporting parameters include 13 fields that identify counterparties to the contract, value of cash invested with the collateral provider, implied interest rate on the cash, and maturity of the contract.⁵⁸ The data do not include information on the haircut, because this parameter depends on the specific type of security that the collateral provider allocates to a contract during the settlement process at the end of the day.

4.1.2.2 GCF Repo data

Monthly aggregated statistics on GCF Repo transactions are publicly available on the Federal Reserve Bank of New York website.⁵⁹ These data, collected by the Fixed Income Clearing Corporation (FICC), are published by the Federal Reserve Bank of New York and provide a snapshot of GCF Repo activity on the seventh business day of each month. Included are the total gross value of collateral posted by asset class and tenor. In addition, statistics on the net amount settled are provided. Separately, information on the interest rates paid on GCF Repo is available as part of a daily consolidated index published by the Depository Trust and Clearing Corporation (DTCC) based on the three most actively traded GCF-eligible CUSIPS.⁶⁰

⁵⁸ See http://www.newyorkfed.org/tripartyrepo/pdf/Minimum_Parameters_TPR.pdf.

⁵⁹ See http://www.newyorkfed.org/banking/tpr_infr_reform_data.html.

⁶⁰ See <http://www.dtcc.com/charts/dtcc-gcf-repo-index.aspx>.

Since March 2011, the Federal Reserve Bank of New York has collected confidential daily data from FICC on each GCF Repo participant's daily gross repo and reverse repo position by collateral type. These data provide a description of the universe of GCF Repo activity, and can be used to understand the different strategies pursued by dealers in this market (Agucci et al., 2014).

The GCF Repo and triparty repo data discussed in this section cover a large part of U.S. repo activity. Still, a significant amount of repo activity conducted outside the triparty platform is not visible to regulators and policymakers. At best, regulators have measures of aggregate repo activity, which is the summation of triparty repo, GCF Repo, and bilateral repo collected through Form FR 2004. These datasets of aggregate repo activity, however, focus on specific participating entities and on quantities traded, but lack rates, haircuts, and counterparties.

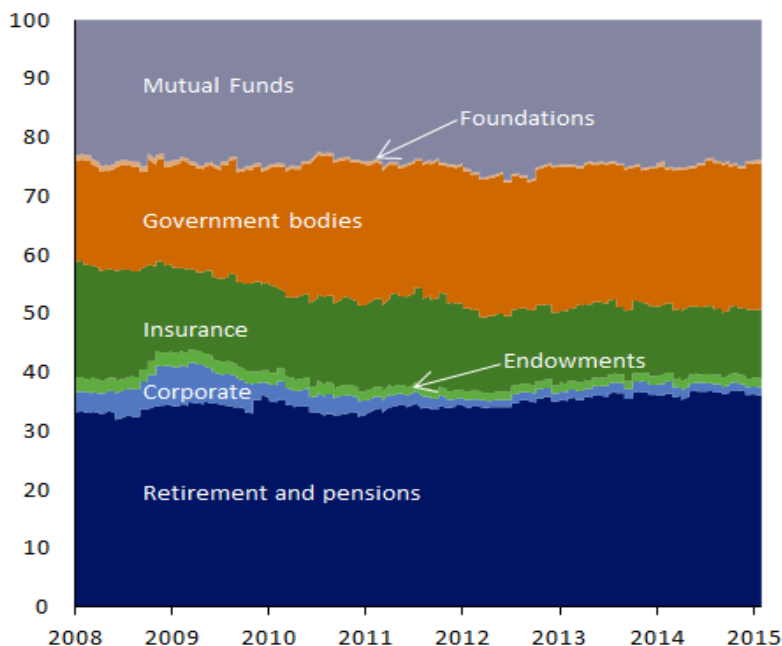
4.2 Securities lending activities

This section gives a brief overview of regulatory filings on securities lending activities conducted by the main types of securities lenders – pension funds, sovereign wealth funds, insurance companies, and investment companies.

4.2.1 Data collections based on reporting entity type

There are significant gaps on securities lending activity conducted by some of the largest participants. For instance, while pension funds are by far the largest securities lenders (see Figure 21), there is little transparency in their activities. Annual reports by employee benefit plan administrators to the Department of Labor filed on Form 5500 and Form 5500-SF do not require detailed information on repo or securities lending activities although individual funds may provide more details. As a result, little information is available about the sector's involvement in these activities. Likewise, little is known about securities lending by sovereign wealth funds, which do not provide regulatory filings and often restrict their agents from disclosing this information.

Figure 21: Securities Lending by Lender Type (percent)



Source: Markit Group, Ltd.

4.2.1.1 Securities lending by registered investment companies

The SEC requires registered investment companies to report certain information regarding their securities lending activities in the financial statements.⁶¹ For example, funds report the total dollar value of securities on loan, recognize the cash collateral received as a fund asset, and recognize a liability that reflects the obligation to return the cash collateral at the conclusion of the loan. In addition, registered funds must disclose the net income from securities loans over the reporting period in the annual and semiannual income statements. However, little information is available about the counterparties to which the funds are exposed.

As noted in Section 4.1.1.4, the SEC has proposed substantial changes to investment company reporting. Specifically, a new Form N-PORT, if adopted, would require information about securities lending, repos, and reverse repos, including the counterparties to which the fund

⁶¹ 17 CFR 210.4-08(b).

is exposed. This information would be useful in assessing individual funds and industrywide exposures to a single counterparty.

Under the proposal, investment companies would have to report Legal Entity Identifiers (LEI) for their counterparties in repos, reverse repos and securities lending. This would more accurately identify counterparties and improve the quality of data overall by enabling elimination of duplicative trades reported by the funds' counterparties. In addition, investment companies would have to provide more information about collateral they receive for lending portfolio securities and how the collateral is being managed. Lastly, using the proposed new Form N-CEN, investment companies would be required to disclose if any borrower of securities defaulted on its obligation to return loaned securities on time and if a securities lending agent or other entity indemnifies the fund against borrower default. The SEC proposal would also require funds' financial statements to include dollar amounts of income and expense associated with securities lending.⁶²

4.2.1.2 Securities lending by insurance companies

Insurance companies represent slightly over 10 percent of global securities lending activities (see Figure 21). The NAIC collects information on securities lending activities and collateral management practices by insurance companies through their public filings. As mentioned in Section 4.1.1.5, public filings by insurance companies provide useful input on quantities, but lack counterparty, tenor, or collateral haircut information. Since 2010, securities lending activities have been subject to more precisely defined valuation rules and disclosure requirements in Schedule DL. The schedule has a detailed listing of reinvested collateral assets, including CUSIP identification numbers, security description, market sector, fair value, book value, and maturity dates. NAIC's Schedule DL is a step forward in offering more transparency about collateral value, but still falls short in providing all data elements needed to analyze counterparty risk, interest rate exposures, and any potential maturity transformation.

⁶² See proposed rule 6-03(m) of Regulation S-X.

4.2.2 Market specific data collections

At present, there is no systematic, targeted data collection of securities lending activity by regulators. Private vendors collect detailed data on securities lending activities from a wide range of market participants. These data collections are voluntary and are thus incomplete. To address this data gap, the Dodd-Frank Act's Section 984(b) directed the SEC to adopt rules to increase the transparency of information available to brokers, dealers, and investors on securities lending activities. The SEC proposal discussed in Sections 4.1.1.4 and 4.2.1.1 is intended, in part, to meet this objective.⁶³

4.2.2.1 Risk Management Association's quarterly securities lending survey

The Risk Management Association (RMA) conducts a quarterly survey of the major securities lending agents, which are mainly global custodian banks. As of the first quarter of 2015, 14 financial institutions provided data, which included elements outlined in Figure 22.

Figure 22: Data Elements in the Risk Management Association's Securities Lending Survey

Content	Currency
Market value of securities available for lending by security type	USD and European currencies
Market value of securities on loan by security type	USD and European currencies
Market value of non-cash collateral by security type	USD and European currencies
Aggregated cash collateral reinvestment data: --reinvestment return, --interest-rate sensitivity, --liquidity, --credit quality, --instrument type	USD and euro-denominated collateral (other currency collateral is converted to USD)

Source: OFR analysis

This is a unique dataset that includes the asset and liability components of a majority of agent lenders on their initial loans to borrowers. The RMA said it covers approximately 80 percent of the total agency lending market, including funds that lend directly or through their

⁶³ See footnote 73 of the SEC proposal, "Investment Company Reporting Modernization," at <http://www.sec.gov/rules/proposed/2015/33-9776.pdf>.

affiliates, although the size of securities lending is not known with precision. The RMA makes the data available to its members and selected regulatory agencies upon request.

4.2.2.2 Private securities financing databases

Private securities lending data vendors, such as Markit and SunGard, provide high frequency information on securities loan trades conducted by various market participants. The data are available daily (and sometimes intraday) and are collected from securities lending and borrowing participants, including asset managers, broker-dealers, custodians, and hedge funds. Data elements include CUSIP identifiers for securities on loan, demand value, quantity, borrowing cost, utilization of available supply, owner domicile, and type of collateral held.

The scope of securities lending data available from private data vendors differs from the RMA quarterly survey. The RMA provides data on initial loans to borrowers. Conversely, Markit and SunGard capture information on the reuse of borrowed securities by securities dealers. Each data vendor covers a different, but overlapping, part of the market. Together, they collectively provide enough information to be used for benchmarking purposes. Historical data for up to at least 10 years are available from the data vendors showing the life cycle of each outstanding and prior loan, including events such as re-ratings, partial returns, and corporate actions. The quality of the securities loan data is generally high, coming directly from the books and records of each lender. The data vendors also employ methodologies to improve data integrity; for example, they eliminate duplicate trades to provide a more accurate estimate of available lending inventories. However, essential information regarding cash collateral reinvestment is a notable data gap in these sources.

The S&P Securities Lending index provides additional insight on the cost of borrowing. The index is designed to measure the average cost to borrow U.S. equities and reflects the average securities lending rate for the underlying stocks in three U.S. equity indexes: the S&P 500, S&P MidCap 400, and S&P SmallCap 600.⁶⁴

⁶⁴ See <http://us.spindices.com/documents/methodologies/methodology-sp-securities-lending.pdf>.

4.3 Financial Accounts of the United States Report

The Federal Reserve's Financial Accounts of the United States report (also known as the Flow of Funds report) measures credit growth and wealth dynamics in the U.S. economy. Among other items, the Financial Accounts includes consolidated quarterly data on short-term lending and borrowing by financial market participants and nonfinancial entities. In addition, the Financial Accounts provide consolidated statistics on repo assets and liabilities by various entity types. These data provide useful historical information about changes in the risk profile of the financial system through short-term lending and borrowing. Previously reported as net liabilities, borrowing and lending in federal funds and repos are now disaggregated and reported separately as assets and liabilities. Certain types of financial firms in the federal funds and repo markets, now disaggregated, were previously reported as a combined data element.

4.4 Data quality, gaps, and overlaps

Data on repo and securities lending activities have improved since the 2007-09 financial crisis. As mentioned, regulators collect granular data on triparty repos and GCF Repo transactions (see Figure 18). However, these data omit bilateral trades that settle outside the triparty repo platform. Also, many of the data elements available to regulators may not be publicly available. Private vendors sell granular data on securities lending that they collect from industry participants. However, these data collections are voluntary and incomplete. They also lack data on counterparties or collateral management that are essential for market monitoring purposes.

[Adrian et al. \(2013\)](#) argued that at least six data elements are required for adequate monitoring and policy analysis of securities financing markets: principal amount, interest rate (or lending rate for securities lending transactions), collateral type, haircut, tenor, and counterparty. Available data sources for the bilateral repo and securities lending segments do not include most of these data elements. For example, counterparty information is not provided in any available sources covering securities lending, making it challenging to track market interconnectedness through this activity.

Much of the available data are not collected in a consistent manner. Various financial regulators require multiple data submissions that may include data elements related to securities financing transactions, but none of the regulators have a comprehensive picture of the entire market. Data inconsistencies arise at different points. For example, depending on accounting standards, repo exposures can be reported on a net or gross basis. Varying frequencies of regulatory filings further reduce data comparability.

The lack of a common data standard for identifying counterparties presents a substantial challenge in monitoring cross-market and cross-border exposures. A global legal entity identifier (LEI), a system for uniquely identifying parties to financial transactions, would substantially improve efficiencies and reduce costs for data collection, cleaning, and aggregation; transaction processing; data management; business operations; compliance monitoring; regulatory reporting; research and analysis; information sharing; and intra- and inter-organization communication.⁶⁵ Wide adoption of the LEI would substantially improve the efficiency of data collections and data accuracy by enabling automated counterparty mapping and the removal of duplicative repo trades. Repo market participants are not currently required to use LEIs in regulatory reporting, although many filing forms recommend LEIs or list them as an option.

5 Conclusion

High-quality data covering repo and securities lending activities are needed for regulators and policymakers to understand and monitor market developments, identify potential risks, and to conduct in-depth analysis of policy options.

A few initiatives are under way to address some of the shortcomings in the existing data. At the international level, in November 2014 the FSB issued a consultative document, “Standards and Processes for Global Securities Financing,” which is aimed at improving transparency of repo and securities lending activities to detect financial stability risks and

⁶⁵ See Office of Financial Research, 2014 Annual Report.

develop policy responses.⁶⁶ The final recommendations are expected to be published in late-2015, and likely followed by a global data collection within a few years.

Domestically, the OFR and the Federal Reserve launched a joint pilot data collection to improve our understanding of bilateral repo and securities lending activities. The pilot identified data elements essential for analyzing risks inherent in repo and securities lending activities. Better data are needed to determine the dependence of individual repo market participants on short-term funding, counterparty credit exposures, and interconnectedness among participants. In addition, data on collateral used are needed to assess collateral quality, diversification, and haircuts. The pilot includes the voluntary participation of selected large firms involved in these activities. This data collection, which will be shared with the SEC, will go a long way toward improving transparency in securities financing markets, but a permanent data collection is needed to fully address the discussed data gaps. Success in these and other future efforts will require adoption of international data standards, extensive collaboration, and improvements in data sharing.

6 Bibliography

Acharya, Viral and T. Sabri Oncu, “A Proposal for the Resolution of Systemically Important Assets and Liabilities: The Case of the Repo Market,” *International Journal of Central Banking*, vol. 9, no. S1, January 2013

Adrian, Tobias, Brian Begalle, Adam Copeland, and Antoine Martin, “Repo and Securities Lending,” Federal Reserve Bank of New York Staff Report no. 529, December 2011, revised February 2013 (available at http://www.newyorkfed.org/research/staff_reports/sr529.pdf, accessed on August 18, 2015).

Aggarwal, Reena, Pedro A. C. Saffi, and Jason Sturgess, “The Role of Institutional Investors in Voting: Evidence from the Securities Lending Market,” Georgetown McDonough School of Business Research Paper no. 2012-07, December 2012.

Agueci, Paul, Leyla Alkan, Adam Copeland, Isaac Davis, Antoine Martin, Kate Pingitore, Caroline Prugar, and Tyisha Rivas “A Primer on the GCF Repo Service,” Federal

⁶⁶ See <http://www.financialstabilityboard.org/wp-content/uploads/Global-SFT-Data-Standards-Consultative-Documents.pdf>.

- Reserve Bank of New York Staff Report no. 671, 2014 (available at http://www.newyorkfed.org/research/staff_reports/sr671.pdf, accessed on August 18, 2015).
- Aguiar, Andrea, Rick Bookstaber, and Thomas Wipf. "A Map of Funding Durability and Risk," Office of Financial Research Working Paper no. 14-03, 2014 (available at http://financialresearch.gov/working-papers/files/OFRwp2014-03_AguiarBookstaberWipf_MapofFundingDurabilityandRisk.pdf, accessed on August 18, 2015)..
- Alkan, Leyla, Vic Chakrian, Adam Copeland, Isaac Davis, and Antoine Martin, "Magnifying the Risk of Fire Sales in the Tri-Party Repo Market," Federal Reserve Bank of New York, Liberty Street Economics blog, July 17, 2013 (available at <http://libertystreeteconomics.newyorkfed.org/2013/07/magnifying-the-risk-of-fire-sales-in-the-tri-party-repo-market.html#.VeS9IrMfhsc>, accessed on August 18, 2015).
- Ayotte, Kenneth M. and David A. Skeel, Jr. "Bankruptcy or Bailouts?" University of Pennsylvania Law School, Faculty Scholarship Paper 259, March 2009 (available at http://scholarship.law.upenn.edu/faculty_scholarship/259, accessed on August 18, 2015).
- Begalle, Brian, Antoine Martin, James McAndrews, and Susan McLaughlin, "The Risk of Fire Sales in the Tri-Party Repo Market," Federal Reserve Bank of New York Staff Report no. 616, May 2013 (available at http://www.newyorkfed.org/research/staff_reports/sr616.pdf, accessed on August 18, 2015).
- Beckhart, Benjamin, James Smith, and William Brown. *The New York Money Market, Vol. IV, External and Internal Relations*. New York: Columbia University Press, 1932.
- Copeland, Adam, Antoine Martin, and Michael Walker, "The Tri-Party Repo Market before the 2010 Reforms," Federal Reserve Bank of New York Staff Report no. 477, November 2010 (available at http://www.newyorkfed.org/research/staff_reports/sr477.pdf, accessed on August 18, 2015).
- Copeland, Adam, Darrell Duffie, Antoine Martin, and Susan McLaughlin, "Key Mechanics of the U.S. Tri-Party Repo Market," FRBNY Economic Policy Review, vol. 18(3) November 2012 (available at <http://www.newyorkfed.org/research/epr/2012/1210cope.pdf>, accessed on August 18, 2015).
- Copeland, Adam, Antoine Martin, and Michael Walker. "Repo Runs: Evidence from the Tri-party Repo Market," Federal Reserve Bank of New York Staff Report no. 506, October 15, 2013; revised August 2014 (available at http://www.newyorkfed.org/research/staff_reports/sr506.pdf, accessed on August 18, 2015).

- Copeland, Adam, Isaac Davis, Eric LeSueur, and Antoine Martin, "Mapping and Sizing the U.S. Repo Market," Federal Reserve Bank of New York Liberty Street Economics blog, June 25, 2012 (available at <http://libertystreeteconomics.newyorkfed.org/2012/06/mapping-and-sizing-the-us-repo-market.html>, accessed on August 18, 2015).
- Copeland, Adam, Isaac Davis, Eric LeSueur, and Antoine Martin, "Lifting the Veil on the U.S. Bilateral Repo Market," Federal Reserve Bank of New York Liberty Street Economics blog, July 9, 2014; corrected December 10, 2014 (available at <http://libertystreeteconomics.newyorkfed.org/2014/07/lifting-the-veil-on-the-us-bilateral-repo-market.html>, accessed on August 18, 2015).
- Duffie, Darrell, "Special Repo Rates," *Journal of Finance*, vol. 51(2), June 1996.
- Federal Reserve Bank of New York. "Domestic Open Market Operations During 2013," Federal Reserve Bank of New York report to the Federal Open Market Committee, April 2014 (available at <http://www.newyorkfed.org/markets/omo/omo2013.pdf>, accessed on August 18, 2015).
- Federal Reserve Bank of New York, "Tri-Party Repo Infrastructure Reform: A White Paper," May 17, 2010 (available at http://www.newyorkfed.org/banking/nyfrb_triparty_whitepaper.pdf, accessed on August 18, 2015).
- Fleming, Michael and Kenneth D. Garbade. "Dealer Behavior in the Specials Market for U.S. Treasury Securities," *Journal of Financial Intermediation*, vol. 16(2), 2007.
- Fleming, Michael J., and Kenneth D. Garbade. "The Repurchase Agreement Refined: GCF Repo," *Current Issues in Economics and Finance*, vol 9, no. 6, Federal Reserve Bank of New York, 2003 (available at http://www.newyorkfed.org/research/current_issues/ci9-6.pdf, accessed on August 18, 2015).
- Frost, Joshua, Lorie Logan, Antoine Martin, Patrick McCabe, Fabio Natalucci, and Julie Remache, "Overnight RRP Operations as a Monetary Policy Tool: Some Design Considerations," Federal Reserve Bank of New York Staff Reports, no. 712, February 2015 (available at <http://www.federalreserve.gov/econresdata/feds/2015/files/2015010pap.pdf>, accessed on August 18, 2015).
- Garbade, Kenneth D. "The Evolution of Repo Contracting Conventions in the 1980s," Federal Reserve Bank of New York Economic Policy Review, May 2006 (available at <http://www.newyorkfed.org/research/epr/06v12n1/0605garb.pdf>, accessed on August 18, 2015).
- Gorton, Gary, and Andrew Metrick. "Securitized Banking and the Run on Repo." *Journal of Financial Economics*, Elsevier, vol. 104(3), 2012.

- Hu, Henry T. C., and Bernard Black, "The New Vote Buying: Empty Voting and Hidden (Morphable) Ownership," *Southern California Law Review*, 79, May 2006 (available at http://www.law.yale.edu/documents/pdf/cbl/Hu_Henry.pdf, accessed on August 18, 2015).
- Keane, Frank. "Securities Loans Collateralized by Cash: Reinvestment Risk, Run Risk, and Incentive Issues," *Federal Reserve Bank of New York Current Issues*, vol. 19(3), 2013 (available at http://www.newyorkfed.org/research/current_issues/ci19-3.pdf, accessed on August 18, 2015).
- Krishnamurthy, Arvind, Stefan Nagel, and Dmitry Orlov, "Sizing Up Repo," *The Journal of Finance*, vol. 69, Issue 6, pages 2381–2417, December 2014.
- Lipson, Paul C., Bradley K. Sabel, and Frank M. Keane. "Securities Lending," *Federal Reserve Bank of New York Staff Report no. 555*, March 2012 (available at http://www.newyorkfed.org/research/staff_reports/sr555.pdf, accessed on August 18, 2015).
- Morrison, Edward R., Mark J. Roe, and Christopher S. Sontchi. "Rolling Back the Repo Safe Harbors," *Business Lawyer*, vol. 69, August 2014 (available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2484565, accessed on August 18, 2015).
- Owens, Edward and Joanna Wu. "Quarter-end Repo Borrowing Dynamics and Bank Risk Opacity," *University of Rochester, Simon Business School Working Paper no. FR 11-15*, April 2014. Peirce, Hester. "Securities Lending and the Untold Story in the Collapse of AIG," *Working Paper no. 14-12*, George Mason University, Mercatus Center, May 2014 (available at http://mercatus.org/sites/default/files/Peirce_SecuritiesLendingAIG_v2.pdf, accessed on August 18, 2015).
- Pozsar, Zoltan. "Institutional Cash Pools and the Triffin Dilemma of the U.S. Banking System," *International Monetary Fund Working Paper WP/11/190*, 2011 (available at <https://www.imf.org/external/pubs/ft/wp/2011/wp11190.pdf>, accessed on August 18, 2015).
- Pozsar, Zoltan. "Shadow Banking: The Money View." *Office of Financial Research Working Paper no. 14-04*, July 2014 (available at http://financialresearch.gov/working-papers/files/OFRwp2014-04_Pozsar_ShadowBankingTheMoneyView.pdf, accessed on August 18, 2015).
- Mark J. Roe. "The Derivatives Market's Payment Priorities as Financial Crisis Accelerator," *63 Stanford Law Review* 539, March 2011 (available at <http://www.stanfordlawreview.org/sites/default/files/articles/Roe-63-Stan-L-Rev-539.pdf>, accessed on August 18, 2015).

Singh, Manmohan and James Aitken, “The (sizable) Role of Rehypothecation in the Shadow Banking System,” International Monetary Fund Working Paper no. WP/10/172, July 2010 (available at <https://www.imf.org/external/pubs/ft/wp/2010/wp10172.pdf>, accessed on August 18, 2015).