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Benefits and Risks of Central Clearing in the Repo Market

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Recent regulatory changes have raised the cost of activity in the repurchase agreement (repo) market for bank-affiliated dealers. Many transactions between dealers are centrally cleared. Expanding the use of central clearing to transactions between dealers and nondealers could reduce costs and improve market access for market participants. But what are the trade-offs? Data from the Office of Financial Research's interagency bilateral repo data collection pilot indicate that dealers could reduce their risk exposures if repo transactions by nondealer clients were centrally cleared. But the potential risks that central counterparties themselves face from larger exposures would also increase.

A repo is the sale of a security with a commitment to buy it back later at a set price. Dealers obtain trillions of dollars in funding from repo markets on a daily basis.[2] Repo markets were under stress during the 2007-09 financial crisis. Regulations introduced after the crisis have made banks and the repo market more resilient. In some cases, they also negatively affected liquidity and reduced market access by increasing the cost of dealer activity.[3]

One way to reduce costs in the repo market is to expand the use of central counterparties (CCPs). In central clearing, CCPs assume the credit risk of bilateral transactions by becoming buyers to all sellers and sellers to all buyers. In the United States, mainly dealer-to-dealer repo transactions are cleared and netted through CCPs. Netting entails offsetting the purchases and sales of similar securities between two or more trading parties. CCPs for dealer-to-nondealer repos may be attractive to dealers if netting results in smaller balance sheets and cost savings. On the other hand, central clearing would concentrate risk in CCPs themselves.

This brief quantifies the potential direct economic benefits to market participants and increased risks to CCPs of moving bilateral repo transactions between U.S. dealers and their nondealer clients to CCPs. The brief analyzes data from the bilateral repo data collection pilot that the Office of Financial Research conducted in 2015 with the Federal Reserve, with input from the Securities and Exchange Commission.[4] Analysis shows that using CCPs offers economic incentives to repo dealers by reducing their risk exposures. That benefit must be weighed against the cost of additional funds those dealers would have to contribute to cushion CCPs from the increased risks.

The U.S. Repo Market Today

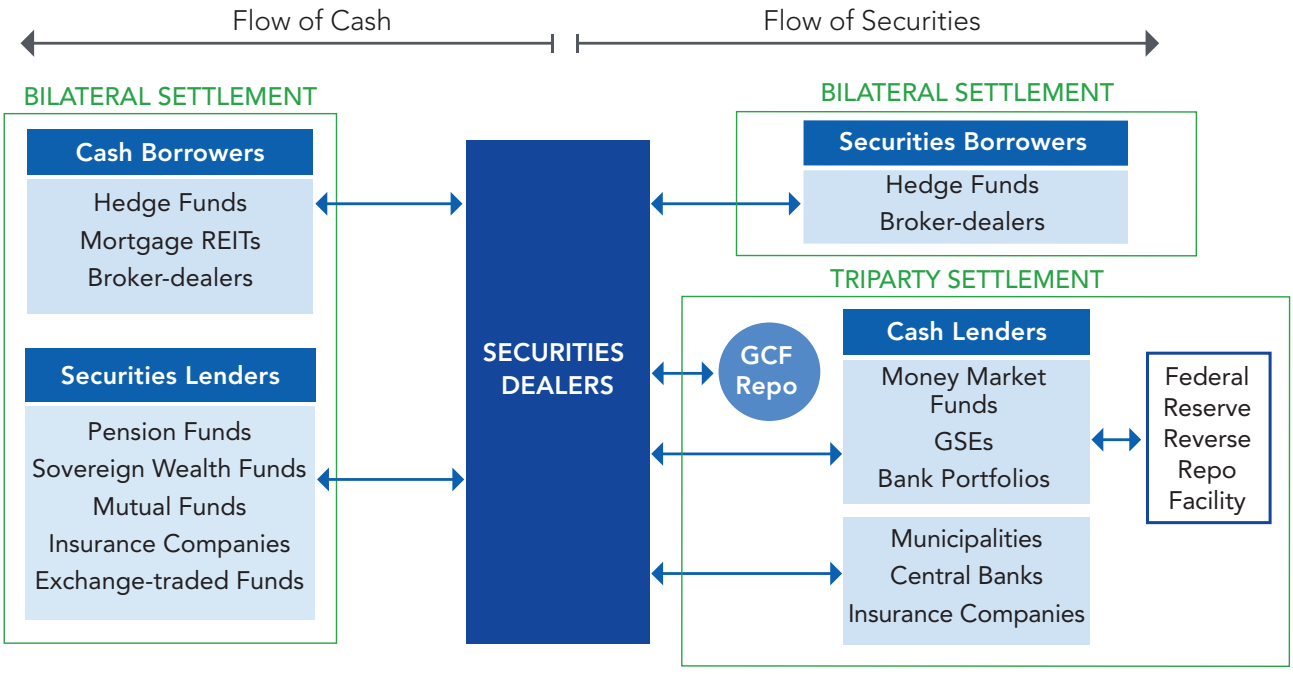
The U.S. repo market can be separated into two segments based on differences in settlement: *triparty* and *bilateral*. In triparty repos, a clearing bank provides clearing and settlement services. Those services include collateral valuation, margining (the process for calculating sufficiency of collateral), and collateral management services to ensure the terms of the repo contracts are met. Triparty clearing banks are not CCPs because they do not assume the credit risk of repo counterparties and do not become the buyer to the seller or the seller to the buyer.

In bilateral repos, the cash provider is responsible for the valuation and margining of the collateral pledged by the borrower. Because bilateral repo trades are easier to customize, they are often used for securities that are hard to find in the market. According to recent estimates, about half of U.S. repo market volume is settled bilaterally.[5]

Key repo market participants are shown in **Figure 1**. Securities dealers are central to the flow of cash and collateral through the financial system. In a repo trade, a party promises to deliver securities as collateral and receives cash. In a reverse repo trade, a party promises to deliver cash as collateral and receives securities. These trades create risk exposures for securities dealers to various market participants.

Transactions with U.S. government securities collateral between dealers are now centrally cleared by the Fixed Income Clearing Corporation (FICC) through its General Collateral Financing (GCF) Repo Service. However, the GCF Repo segment is currently only a small part of the overall U.S. repo market.[6] As of Jan. 11, 2017, the total net cash amount borrowed through GCF Repo was $147.8 billion, less than 4 percent of estimated total dealer repo liabilities of $3.5 trillion.[7]

Figure 1. Key Repo Market Participants



Note: REITs are Real Estate Investment Trusts, GSEs are Government-Sponsored Enterprises, and GCF is General Collateral Financing Repo Service.

Source: Authors' analysis

Central Clearing for Nondealer Repos

Expanding access to repo CCPs would involve centrally clearing bilateral transactions between dealers, who are members of CCPs, and their clients (nondealers), who are not members. If CCPs centrally cleared and guaranteed trades, netting could result in lower credit exposures for dealers. Bank-affiliated dealers would potentially realize savings by reducing assets and corresponding liabilities on their balance sheets.

Financial stability might also be enhanced. In the event of a default, netting of trading positions in the CCP would reduce the size of the positions that would need to be transferred, reducing the potential risk of fire sales. The CCP would also seek to transfer the transactions of the defaulter to another member, to avoid a forced liquidation of collateral.

However, these benefits would come at a cost. If a repo CCP were expanded to process repo transactions involving nondealers, the exposures of the CCP would increase. The CCP would need additional funding in the form of margin and contributions to the guarantee fund to ensure that the CCP could withstand potential losses from defaults. These additional funding contributions would come from participants in the CCP.

New data used to estimate trade-offs

The trade-offs for clearing transactions between dealers and their nondealer clients through a CCP can be estimated using the bilateral repo data collection pilot.[8] In this dataset, dealers affiliated with nine bank holding companies voluntarily provided snapshots of their trading books on three reporting days in 2015: January 12, February 10, and March 10. (One of the nine was excluded from the analysis because its data lacked some essential elements.)

The snapshots contained details about all outstanding U.S.-dollar-denominated bilateral repo and securities lending contracts collateralized by cash at the end of the reporting days. The data about each transaction included the cash principal amount, the interest rate on the cash, the maturity of the repo, the value and type of securities delivered, the haircut (the discount on the value of an asset pledged as collateral) applied to those securities, and the counterparty to the transaction.[9] Dealers also flagged transactions settled by FICC.

The analysis looked only at trades executed under bilateral repo agreements with open or overnight maturities. Only trades backed by collateral types currently accepted by the GCF Repo Service were considered.[10] The analysis excluded securities lending transactions and term trades that were longer than overnight. It also excluded intracompany transactions. Expanding the analysis would require improvements to the data and the information available for each transaction.

Costs and benefits of a repo CCP for nondealer repos

The first step in the analysis considered the reduction in bilateral exposures that could be achieved through bilateral netting (see **Figure 2**). The blue bars reflect dealers' gross bilateral assets and liabilities, or risk exposures, by collateral type. The orange bars reflect dealers' potential risk exposures after netting. The figure assumes that all repo and reverse repo transactions are netted for every pair of counterparties, including dealer-to-dealer transactions. The resulting amounts, for each reporting dealer, are summed to calculate net repo and reverse repo exposures. For U.S. Treasuries, the exposure reduction would be 58 percent in reverse repos and 63 percent for repos.

The portions of the repo market attributable to dealer-to-dealer trades and dealer-to-nondealer trades are not known. The Office of Financial Research is working to close this key data gap. In the dataset analyzed for this brief, dealer-to-dealer transactions accounted for about 36 percent of the total trade volume, while dealer-to-nondealer trades accounted for the balance of 64 percent.

The detailed composition of collateral in dealers' reverse repos and dealers' client types are shown in **Figure 3**. The figure shows that the dealers' largest clients are other dealers. Nondealers such as hedge funds, other financial firms, and depository institutions also receive funding from dealers. All clients borrow mostly using U.S. Treasuries collateral.

Figure 2. Dealer Exposures by Collateral Type (averaged across three reporting days, $ billions)

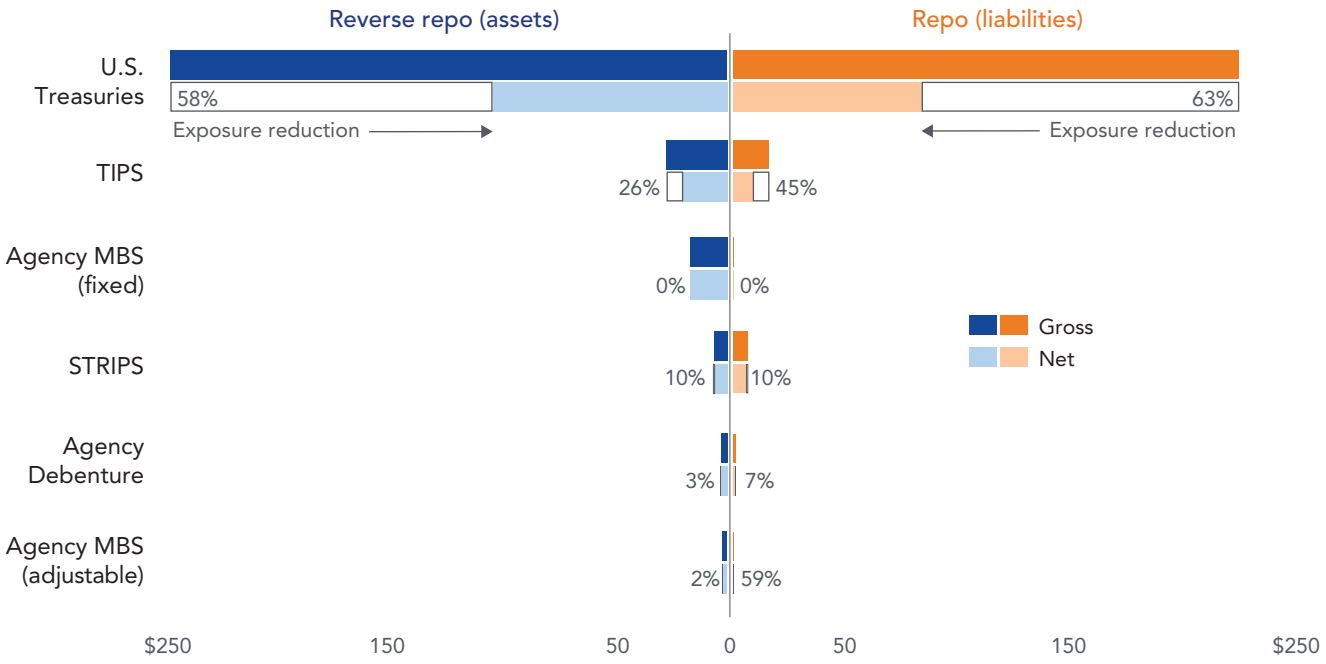
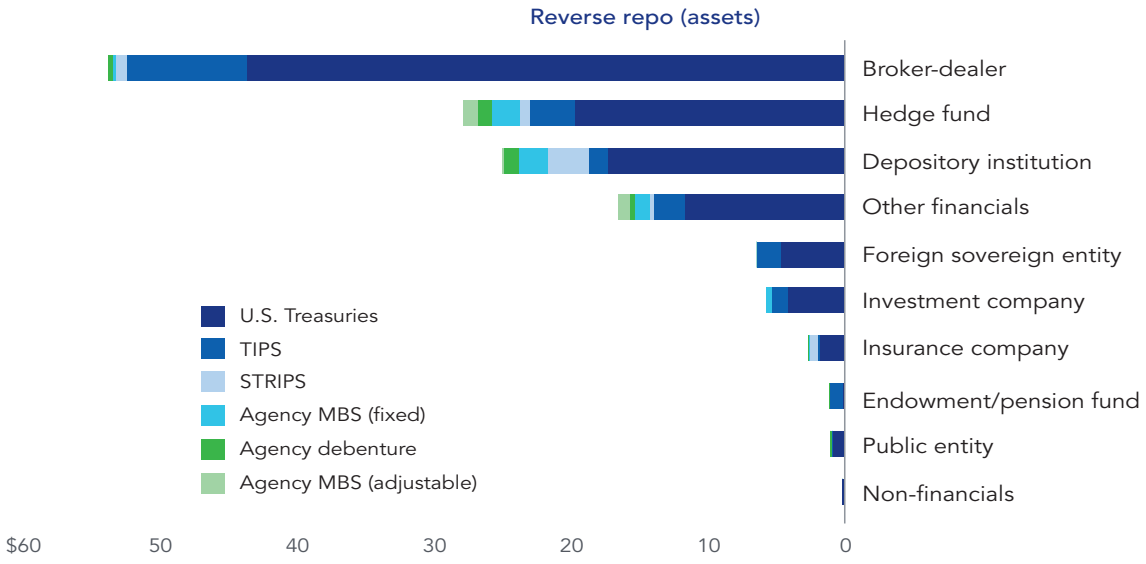


Figure 3. Dealers' Net Reverse Repo (Dealer Asset) Exposures by Client Types and Asset Class (averaged across three reporting days, $ billions)



Note for Figures 2-6: The figures show several types of collateral accepted by the GCF Repo Service: U.S. Treasuries; U.S. Treasury inflation-protected securities (TIPS); fixed-rate mortgage-backed securities (MBS) issued by Fannie Mae, Ginnie Mae, and Freddie Mac, called agency MBS; U.S. Treasury securities known as STRIPS (Separate Trading of Registered Interest and Principal of Securities); non-MBS debt securities issued by government agencies such as Fannie Mae, Ginnie Mae, and Freddie Mac, called debentures; and adjustable-rate agency MBS issued by Fannie Mae, Ginnie Mae, and Freddie Mac.

Sources: Bilateral repo data collection pilot, authors' analysis

FICC currently nets only transactions between member dealers using the same type of collateral. The analysis uses the bilateral repo pilot dataset to quantify the costs and benefits of expanding clearing and netting through CCPs to include nondealers. In this model, dealers would clear and guarantee transactions with the CCP on behalf of their clients.

The analysis splits the dataset into three parts: dealer-to-dealer trades, dealer-to-nondealer trades, and dealer-to-all trades. The exposures of all reporting dealers incurred in dealer-to-dealer trading netted by asset class are shown in **Figure 4**. The exposures among reporting dealers and their nondealer clients and the exposures that would occur if a CCP netted the transactions are shown in **Figure 5**. The combined

Figure 4. Dealer-to-Dealer Exposures by Asset Class (averaged across three reporting days, $ billions)

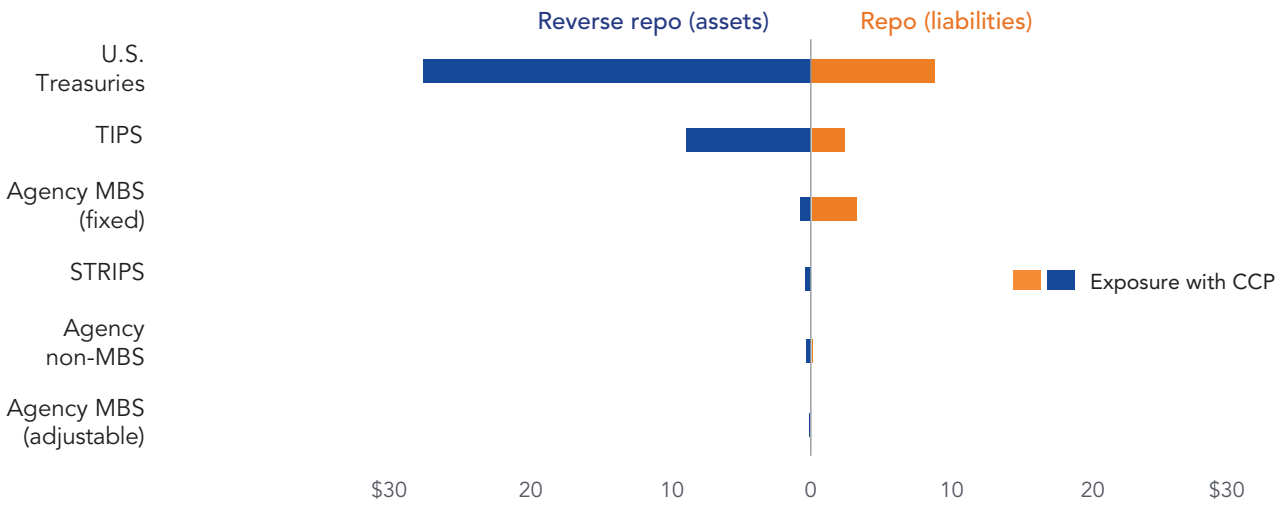
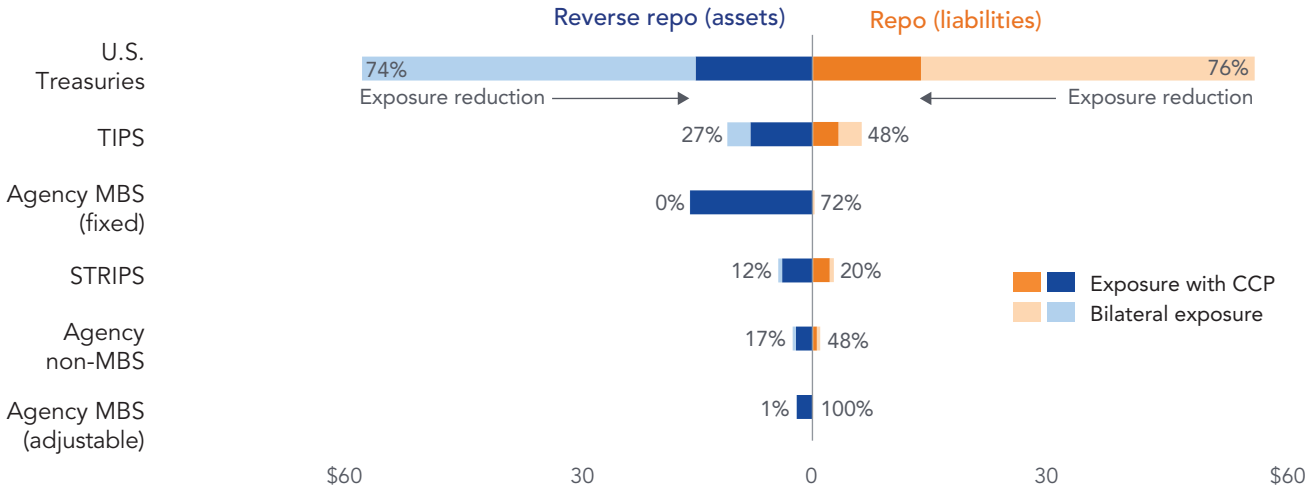
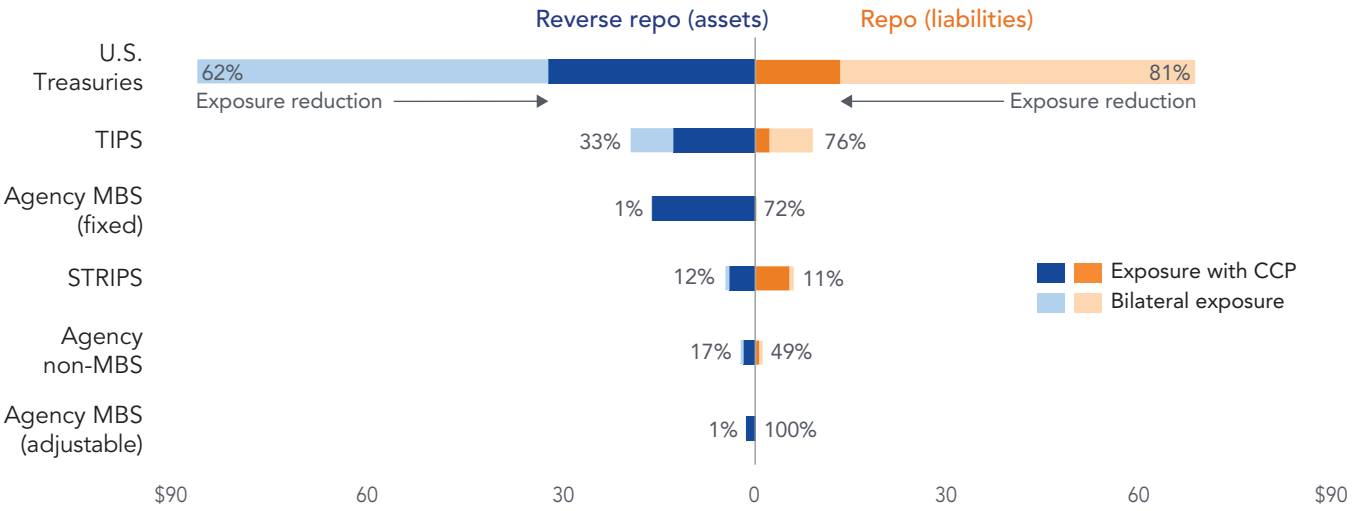


Figure 5. Dealer-to-Nondealer Exposures by Asset Class (averaged across three reporting days, $ billions)



Sources: Bilateral repo data collection pilot, authors' analysis

Figure 6. All Dealer Exposures by Asset Class (averaged across three reporting days, $ billions)



Sources: Bilateral repo data collection pilot, authors' analysis

dealer-to-all exposures under the current GCF Repo design, and for the expanded case in which a CCP cleared and netted dealer-to-nondealer transactions, are shown in **Figure 6**.

The analysis focuses on the case of a CCP that clears only transactions backed by U.S. Treasuries. U.S. Treasury securities are the most common type of repo collateral and an important market for investors globally. The analysis assumes that the dealers participating in the bilateral repo collection pilot are clearing members and that all transactions would be cleared by a CCP.

The difference in netting is particularly large for U.S. Treasuries (see **Figure 6**). Dealer liabilities to all clients over all collateral classes in the bilateral repo market totaled $66.5 billion in net exposures. If all these transactions were conducted through a CCP, the net exposures across all reporting dealers would decline to $12.8 billion. The reduction in net exposures for dealers would be $53.7 billion, or 81 percent. Lower exposures would reduce the amount of capital bank-affiliated dealers would need to hold.

But expanded central clearing has costs. In the analysis for this brief, these costs are estimated by calculating the exposures that a CCP would face under stress. The stress assumptions are based on the Principles for Financial Market Infrastructures.[11]

The principles recommend calculating margins based on stress scenarios. The stress scenarios used in this analysis are the 99th percentile, 99.5th percentile, and 99.7th percentile of historical price changes for five-day intervals over the previous five years.[12] For these scenarios, we calculated the increases in the CCP's risk exposures to each clearing member.

The total change in exposures under stress is calculated by adding the changes for all clearing members. Stressed exposures are calculated and netted on individual securities to capture the interest rate risk exposures for each security. The resulting net interest rate risk exposures, the changes in exposures at different levels of stress, and the concentration of the changes are shown in **Figure 7**. The concentration is measured by the "Cover 2" standard, which reflects a CCP's exposure to the two clearing members to which it has the largest exposures. Considering all counterparties, CCP exposures would increase by up to 75 percent, while concentration would remain relatively stable.

A CCP's exposures to its two largest clearing members would account for $700 million of the $1.6 billion loss to the CCP in the event of a 99th percentile shift in stressed exposures. The figure also shows that expanding clearing to all counterparties would increase stressed exposures by as much as 75 percent from their

Figure 7. CCP Exposures Under Stress Scenarios – U.S. Treasuries only ($ billions)

CCP Margin Requirement	Only Dealers	All Transactions	Increase in exposure
CCP's Current Net Interest Rate Risk Exposures	68.1	111.5	64%
Change - 99.0% shift	1.0	1.6	60%
Cover 2	*0.4*	*0.7*	
Change - 99.5% shift	1.1	1.9	73%
Cover 2	*0.5*	*0.8*	
Change - 99.7% shift	1.2	2.1	75%
Cover 2	*0.6*	*0.9*	

Note: Cover 2 reflects the CCP's exposure to the two clearing members to which it has the largest exposures.
Sources: Bilateral repo data collection pilot, Bloomberg L.P., authors' analysis

current level, from $1.2 billion to $2.1 billion, in a 99.7th percentile shift. Those larger exposures represent concentrated risks for CCPs.

Conclusion

This brief estimates that extending U.S. Treasuries repo CCP services to nondealer counterparties would result in a reduction of up to 81 percent of risk exposures for dealers. This decline exceeds the 63 percent reduction from bilateral netting alone. This potential reduction of exposures provides an economic incentive for repo market participants to use a repo CCP for dealer-to-nondealer transactions. At the same time, expanding access to a repo CCP for nondealers increases the risk exposure for the CCP by as much as 75 percent. Whether the potential benefits outweigh the costs depends on the cost of bilateral repo activity relative to the cost of raising additional funds to guarantee centrally cleared transactions.

Several caveats apply to our analysis. We focus narrowly on direct economic benefits to market participants and increased exposures to the CCP. We do not consider other potential benefits, such as the increased transparency associated with transactions executed through central counterparties. Our findings are based on data collected from a limited number of dealers in a data collection pilot in 2015. The dollar volume of transactions and the composition of market participants are unlikely to remain the same as they were during the pilot study. Still, the existence of continued industry interest in expanding CCP services to a broader range of market participants suggests that strong economic incentives remain.

Endnotes

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[2] See Viktoria Baklanova, Adam Copeland, and Rebecca McCaughrin, "Reference Guide to U.S. Repo and Securities Lending Markets," OFR Working Paper no. 15-17, Sept. 9, 2015 (available at www.financialresearch.gov/working-papers/files/OFRwp-2015-17_Reference-Guide-to-U.S.-Repo-and-Securities-Lending-Markets.pdf, accessed Feb. 23, 2017).

[3] See Meraj Allahrakha, Jill Cetina, and Benjamin Munyan, "Do Higher Capital Standards Always Reduce Bank Risk? The Impact of the Basel Leverage Ratio on the U.S. Triparty Repo Market," OFR Working Paper no. 16-11, Nov. 10, 2016 (available at www.financialresearch.gov/working-papers/files/OFRwp-2016-11_Higher-Capital-Standards.pdf, accessed Feb. 27, 2017). This paper shows that broker-dealers decreased their repo borrowing after the introduction of the supplementary leverage ratio. That result suggests that the supplementary leverage ratio may act as the binding capital requirement for some large U.S. banks.

[4] See OFR, "Bilateral Repo Data Collection Pilot Project," online content (available at financialresearch.gov/data/repo-data-project/, accessed Feb. 23, 2017).

[5] See Viktoria Baklanova, Cecilia Caglio, Marco Cipriani, and Adam Copeland, "The U.S. Bilateral Repo Market: Lessons from a New Survey," OFR Brief no. 16-01, Jan. 13, 2016 (available at www.financialresearch.gov/briefs/files/OFRbr-2016-01_US-Bilateral-Repo-Market-Lessons-from-Survey.pdf, accessed Feb. 23, 2017).

[6] FICC handles transaction processing for fixed income securities, including repos backed by government securities collateral between dealers in the United States. See "Fixed Income Clearing Corporation (FICC)," online content (available at www.dtcc.com/about/businesses-and-subsidiaries/ficc.aspx, accessed Feb. 23, 2017). FICC offers two types of clearing services to its members, who are mainly dealers, for repos backed by U.S. Treasury and government agency securities: Delivery-versus-payment bilateral repo and the General Collateral Financing (GCF) Repo Service. Both services provide netting for FICC members. FICC also offers a service that allows well-capitalized clearing members to sponsor their eligible clients such as registered investment companies that are also qualified institutional buyers. Sponsored membership offers eligible clients the ability to lend cash via FICC-cleared delivery-versus-payment repo throughout the day. FICC acts as a central counterparty in GCF Repo and serves as the legal counterparty to each side of the repo transaction for settlement purposes. FICC also acts as a CCP for certain delivery-versus-payment bilateral repo trades. Netting of trades between FICC members reduces dealer exposures and makes trading less expensive. The GCF Repo segment is currently only a small part of the overall U.S. repo market.

[7] See Federal Reserve Bank of New York, "Tri-party Repo Statistical Data. FICC GCF Repo (November)," online content (available at www.newyorkfed.org/data-and-statistics/data-visualization/tri-party-repo/index.html#interactive/tripartygcf, accessed Feb. 23, 2017)

[8] See OFR, "Bilateral Repo Data Collection Pilot Project."

[9] All client types reported by the pilot participants were grouped in the following 10 categories: broker-dealers, including pilot participants themselves; hedge funds; depository institutions; investment companies, including mutual funds; other financial firms, including real estate investment trusts; public entities, including local governments and municipal entities; foreign entities, including sovereign wealth funds; insurance companies; nonfinancial firms; and endowments and pension funds.

[10] The GCF Repo Service currently accepts the following types of collateral: (1) U.S. Treasuries, U.S. Treasury inflation-protected securities (TIPS) and Separate Trading of Registered Interest and Principal of Securities (STRIPS); (2) fixed- and adjustable-rate mortgage-backed securities (MBS) issued by Fannie Mae, Ginnie Mae, and Freddie Mac; and (3) non-MBS debt securities issued by Fannie Mae, Ginnie Mae, and Freddie Mac, referred to as debentures. Equities and corporate bonds are the two largest collateral types excluded from the analysis. These collateral types are not used by the GCF Repo Service.

[11] See Committee on Payment and Settlement Systems and International Organization of Securities Commissions, *Principles for Financial Market Infrastructures*, April 2012 (available at www.bis.org/cpmi/publ/d101a.pdf, accessed Feb. 23, 2017).

[12] See Committee on Payment and Settlement Systems and International Organization of Securities Commissions, 2012.