

Understanding Collateral Re-use in the U.S. Financial System

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Financial market intermediaries such as broker-dealers circulate financial securities as collateral through various contracts. The use of securities as collateral allows dealers to perform certain functions that improve market efficiency. For example, dealers use collateral to raise funds through secured financing transactions (SFTs) or to satisfy margin requirements for derivatives positions. Most contracts allow dealers to re-use collateral—to use collateral that is sourced from another counterparty to be returned at a later date. For example, dealers re-use collateral to finance their secured lending or to source and deliver securities that may be in high demand. Re-use enhances the benefits of collateral use, increasing the collateral's underlying market liquidity and allowing dealers to more efficiently distribute securities, resulting in lower issuance costs.

However, collateral circulation is not costless. The use and re-use of collateral can create “collateral chains” where one security is used in multiple transactions. These chains lead to greater interconnectedness and increased uncertainty as to who holds the collateral, potentially amplifying fragility in times of market stress.

The trade-offs associated with collateral re-use have garnered increased attention from regulators.¹ Despite its importance, there are relatively few measures of collateral re-use for the U.S. financial system.² Using confidential supervisory data (CSI), we measure the amount of collateral re-use in the U.S. at the individual dealer level, with a particular focus on U.S.

¹ For example, see FSB (2017)

² For example, Singh (2011) uses SEC filings to estimate market wide collateral re-use of large international broker-dealers, but these estimates rely on strong assumptions regarding dealers' counterparties and their investment strategies.

Treasuries. The data shows that most collateral received is eventually re-used, indicating a high degree of collateral circulation. Focusing on U.S. Treasuries, we plot the total amount of incoming and outgoing collateral, specify the contracts through which financial institutions conduct such activity, and construct an index to measure the degree of collateral re-use.

In this paper, we put forth three possible drivers for dealers' high level of U.S. Treasury re-use: 1) intermediation of cash through SFTs, 2) intermediation of specific Treasury securities that may be in high demand, and 3) "stripping" and distribution of the safe asset benefits of U.S. Treasuries. Importantly, this last driver highlights that U.S. Treasury re-use does not create new safe assets, but rather allocates safety efficiently throughout the financial system.

I. Using Regulatory Data to Measure Re-use

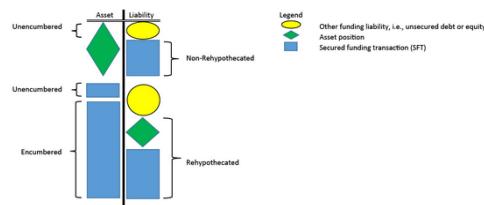
Quantifying collateral re-use has traditionally been a challenging endeavor that relied upon important assumptions due to limited data. Using novel regulatory data collected by the Federal Reserve, we measure the level of re-use of individual institutions—specifically large dealers associated with bank and intermediate holding companies. The data—described in Infante, Press, and Strauss (2018)—allows us to identify SFTs where collateral is received or delivered, the type of contract employed, the type of securities exchanged, and whether incoming collateral is encumbered or outgoing collateral is rehypothecated.³ Our sample consists of a subset of primary dealers, which are at the core of many financial markets and are therefore representative of the financial system. They are especially representative of U.S. Treasury security flows because primary dealers are trading counterparties of the Federal Reserve Bank of New York,

³ Incoming collateral is defined as encumbered if it is simultaneously used in a collateral outflow transaction or the firm is legally, contractually, or operationally restricted from recirculating it. Outgoing collateral is defined as rehypothecated if it was sourced through an incoming SFT. In this paper, "re-use" and "rehypothecation" are used interchangeably.

which requires them to participate in Treasury auctions. Because the majority of banks' securities activity is conducted by their dealer subsidiaries, the analysis at the bank holding company gives similar results. For these reasons, we believe dealer-level measures of collateral re-use are the most relevant.

II. Incoming and Outgoing Volumes and Contracts

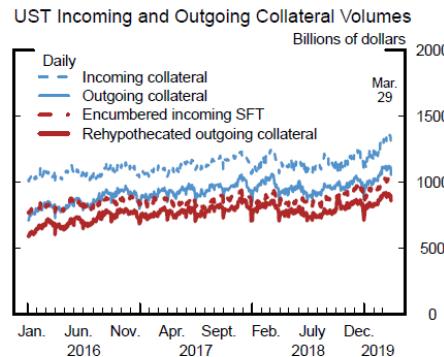
In order to understand the economic impact of these activities it is useful to map how collateral re-use affects a dealer's balance sheet (Figure 1). Dealers can broadly source or distribute collateral through two types of transactions: outright purchases and sales (green diamonds) and SFTs (blue rectangles). On the asset side, incoming collateral can be unencumbered, meaning the collateral is still available for re-use, or encumbered, meaning the collateral has already been re-used or it is restricted from re-use. Unencumbered assets are financed by unsecured debt or equity (yellow ovals). On the liability side, outgoing collateral can be non-rehypothecated, meaning the collateral is owned by the dealer, or rehypothecated, meaning the collateral came from an incoming SFT. Figure 1 illustrates how sourcing and distributing large quantities of collateral can significantly increase the size of a dealer's balance sheet.



Infante, Press, and Strauss (2018) show that the majority of collateral that flows in to a dealer subsequently flows out. The difference between incoming collateral and outgoing collateral is relatively small suggesting that the vast majority of incoming securities are financed through either short positions or SFTs. The authors also show that the amount of encumbered collateral

is only slightly higher than the amount of rehypothecated collateral, indicating that a small fraction of incoming collateral sourced through SFTs is restricted from re-use.

Figure 2 shows a similar analysis focusing on U.S. Treasuries. Roughly 85 percent of incoming Treasuries are later used in outgoing transactions.⁴ Infante, Press, and Strauss (2018) show that the most prevalent contracts used for encumbered and rehypothecated U.S. Treasury collateral are repurchase agreements (repos), underscoring the importance of repo for U.S. Treasury intermediation.⁵ This importance is likely driven, in part, by the limited restrictions on dealers to re-use repo collateral, the high degree of leverage that can be taken through repos, and the seniority of repos in bankruptcy.



III. Quantifying Collateral Re-use

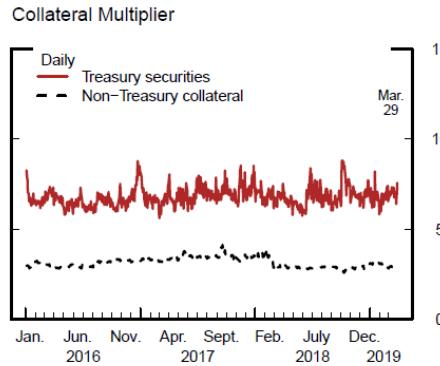
To further understand the level and dynamics of collateral circulation we develop a measure to quantify the degree of collateral re-use. Our measure, called the collateral multiplier, is calculated at the firm level and averaged across the firms in our sample.⁶ Since primary dealers

⁴ The total amounts of U.S. inflows and outflows differ from those reported in Infante, Press, and Strauss (2018) because in this paper we exclude internal trades.

⁵ Contracts include reverse repos, collateral swaps, securities borrowing, and margin loans for encumbered transactions and repo, firm shorts, collateral swaps, customer shorts, and securities lending for rehypothecated transactions. Details can be found in Infante, Press, Strauss (2018).

⁶ Fuhrer, Guggenheim, and Schumacher (2016) propose a similar market-level measure for the Swiss franc repo market.

lie at the core of collateral circulation, averages of our firm-level measures are valid proxies for estimating re-use at the system-wide level. The collateral multiplier is the ratio of the amount of outgoing collateral to the amount of collateral that is outright owned but financed through SFTs. Infante, Press, and Strauss (2018) illustrate how collateral re-use, as measured by the collateral multiplier, has a multiplication effect similar to the money multiplier. The collateral multiplier (money multiplier) measures SFTs (deposits) as a multiple of the total amount of collateral (reserves) owned. Figure 3 plots the collateral multiplier for U.S. Treasuries and all other collateral classes. The measure shows that primary dealers create seven times as many private liabilities backed by Treasury securities as they own, and it is significantly higher for Treasuries than for all other collateral classes. The collateral multiplier can be interpreted as a proxy for the length of the “collateral chain,” where one specific security is used for multiple transactions.⁷ Under this interpretation, the data suggest that dealers use one U.S. Treasury security between six to seven times, and this level of circulation is significantly higher than for all other collateral classes.



IV. Drivers Behind Collateral Re-use of U.S. Treasuries

⁷ Alternatively, a high collateral multiplier may be the consequence of dealers holding very few securities relative to the total amount of repo intermediation.

A natural question is why the collateral multiplier is much higher for U.S. Treasuries than other collateral classes. We posit three possible economic drivers: the intermediation of cash through SFTs, the efficient redistribution of U.S. Treasuries that are in high demand (for example, for on-the-run Treasuries), and the stripping and distribution of U.S. Treasuries' safe asset status.

The first driver is the intermediation of cash from initial cash lenders to end borrowers. These intermediation chains arise because of informational or regulatory restrictions that limit direct interaction between cash borrowers and lenders. Highly creditworthy intermediaries overcome these restrictions by standing between borrowers and lenders, intermediating cash and collateral from one counterparty to another.⁸ For this driver, conditional on the collateral class, the specific collateral is not important, as its role is merely to protect the cash lender (and intermediary) from the default of the cash borrower.⁹ However, given the irrelevance of the specific security, it is difficult to see why this driver would result in a collateral chain longer than one or two intermediaries, suggesting the high multiplier is the result of dealers' high degree of repo intermediation relative to their actual position.

The second driver is related to the specific security itself. Dealers rely heavily on SFTs to source and distribute specific collateral from one counterparty to the next. SFTs are useful because they allow dealers to intermediate securities without taking ownership.¹⁰ From this perspective, one security can circulate through various dealers, as demand for the security propagates from the

⁸ Infante (2019a) studies this type of intermediation to reconcile the differences observed between different U.S. repo markets during the financial crisis. Gottardi, Monnet, and Maurin (2019) micro found the presence of an intermediary in the context of repo.

⁹ Although, Infante and Vardoulakis (2019) study the risks borne by collateral providers who stand to lose their collateral in case of a dealer default. These risks can trigger a run on the asset side of a dealer's balance sheet.

¹⁰ Huh and Infante (2019) study the important role repos play in bond market intermediation and, consequently, their underlying liquidity.

initial security owner, through the interdealer network, to the final investor seeking to source that specific security.

The final driver is the stripping and distribution of U.S. Treasuries' safe asset benefits. Krishnamurthy and Vissing-Jorgensen (2012) provide evidence that both long- and short-term U.S. Treasuries have a significantly lower yield because of their safe asset status.¹¹ This literature highlights that investors value long- and short-term safety differently.¹² By delivering U.S. Treasuries through SFTs, intermediaries convert long-term safety into short-term safety or distribute long-term safety for the duration of the SFT. This suggests that the safe asset status of repo backed by Treasuries stems from the safe asset status of the collateral itself, consistent with Infante (2019b). From this perspective, differences in SFT maturity may be able to account for the high degree of collateral re-use, as each rehypothecated SFT sources and delivers the U.S. Treasury's safety for the duration of each contract.

The data shows that, overall, the majority of Treasury collateral is rehypothecated using overnight repos, while the rest of the volume is spread out fairly evenly across contracts with a maturity ranging from a few days to over a month. However, dealers' encumbered incoming SFTs have longer maturities than their rehypothecated outgoing SFTs, indicating that dealers source Treasury collateral through longer-term contracts and distribute them through shorter-term contracts. This activity can be interpreted as traditional maturity transformation, but in the context of U.S. Treasury repo it can also be seen as dealers buying long-term safe asset positions while simultaneously selling them over the short-term.

¹¹ van Binsberg et. al (2018) estimate this premium for different maturities.

¹² Greenwood, Hansen, Stein also recognize the difference between long- and short-term safety.

Importantly, it is unlikely that an elevated collateral multiplier for safe assets implies dealers are “creating” new safe assets. For illustrative purposes, imagine two dealers simultaneously entered into multiple overnight repos and reverse repos between each other, using and re-using one single safe asset as collateral. It would seem incorrect to think that multiple safe assets were created. In effect, only the final safe asset holder would have the option to meaningfully re-use it by, say, posting it as collateral for a derivatives position. We prefer the interpretation that safe asset re-use allows for the efficient distribution of its benefits.

V. Concluding Remarks

In this paper we use CSI data to document the high degree of collateral re-use in the U.S. financial system. This activity enhances market liquidity and reduces issuance costs, but also has the potential to undermine financial stability in times of market stress. We put forth a measure of collateral re-use and posit potential drivers behind this activity.

Understanding the fundamental drivers behind collateral re-use is an important area of future research. These insights will provide a better foundation to address the broader question: What are the economic benefits and financial stability consequences of collateral re-use?

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