

Understanding Collateral Re-use in the US 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—that is, 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, especially when collateral is scarce. It increases the collateral’s underlying market liquidity and allows dealers to more efficiently distribute securities, resulting in lower issuance costs in the primary market.

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 US financial system.² Using confidential supervisory data (CSI), we measure the amount of collateral re-use in the United States at the individual dealer level, with a particular focus on US Treasuries. The data show that most collateral received is eventually re-used, indicating a high degree of collateral circulation. Focusing on US 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 US Treasury re-use: (i) intermediation of cash through SFTs, (ii) intermediation of specific Treasury securities that may be in high demand, and (iii) “stripping” and distribution of the safe asset benefits of US Treasuries. Importantly, this last driver highlights that US 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

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¹ For example, see Financial Stability Board (2017).

² For example, Singh (2011) uses US Securities and Exchange Commission 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.

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 therefore representative of the financial system. They are especially representative of US Treasury security flows because primary dealers are trading counterparties of the Federal Reserve Bank of New York, 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 level 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 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) shows that on aggregate the majority of collateral that flows into a dealer subsequently flows out. The

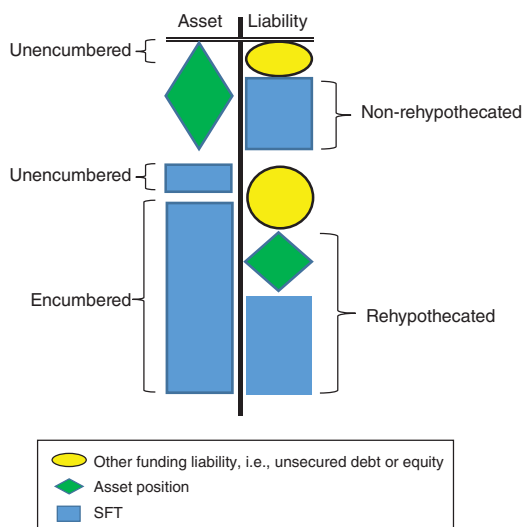


FIGURE 1. GRAPHICAL REPRESENTATION OF COLLATERAL INFLOWS AND OUTFLOWS ON A REPRESENTATIVE DEALER'S BALANCE SHEET

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 US Treasuries. Roughly 85 percent of incoming Treasuries are later used in outgoing transactions.⁴ Infante, Press, and Strauss (2018) shows that the most prevalent contracts used for encumbered and rehypothecated US Treasury collateral are repos (repurchase agreements), underscoring the importance of repos for US Treasury intermediation.⁵ This importance is

⁴The total amounts of US Treasury inflows and outflows differ from those reported in Infante, Press, and Strauss (2018) because in this paper we exclude internal trades within the bank holding company.

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

³Incoming 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.

UST incoming and outgoing collateral volumes

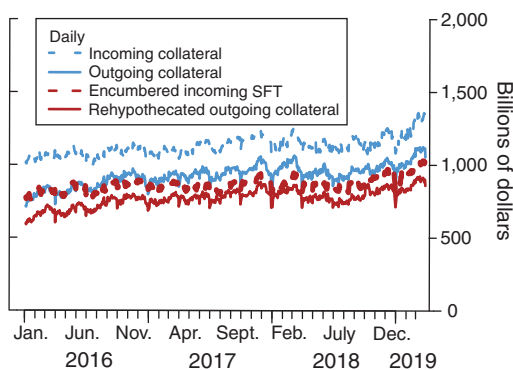


FIGURE 2. TOTAL AMOUNT OF INCOMING, OUTGOING, ENCUMBERED, AND REHYPOTHECATED US TREASURIES FOR THE DEALERS IN OUR SAMPLE

Notes: Internal transactions with affiliates and parent and unsettled transactions are excluded. Daily data from January 1, 2016, to March 29, 2019.

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 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. In terms of Figure 1, the collateral multiplier is the sum of rehypothesized and non-rehypothesized collateral over the amount of non-rehypothesized collateral, which is a proxy for the total amount of collateral owned. Infante, Press, and Strauss (2018) illustrates how collateral re-use, as measured by the collateral

Collateral multiplier

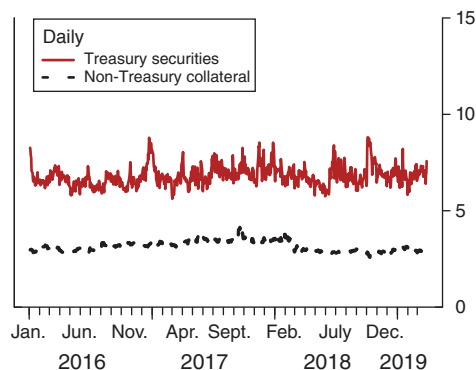


FIGURE 3. CROSS-SECTIONAL AVERAGE COLLATERAL MULTIPLIER ACROSS ALL DEALERS IN OUR SAMPLE

Notes: Firm-level collateral multipliers are defined as total outgoing collateral over non-rehypothesized collateral. Daily data from January 1, 2016, to March 29, 2019.

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 US 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 US Treasury security between six and seven times, and this level of circulation is significantly higher than for all other collateral classes.

IV. Drivers behind Collateral Re-use of US Treasuries

A natural question is why the collateral multiplier is much higher for US Treasuries than other collateral classes. We posit three possible economic drivers: the intermediation of cash

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

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

through SFTs, the efficient redistribution of US Treasuries that are in high demand (for example, for on-the-run Treasuries), and the “stripping” and distribution of US 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 initial security owner, through the interdealer network, to the final investor seeking to source that specific security. If this were the primary driver, we would expect a higher collateral multiplier for collateral classes with higher search frictions.

The final driver is the “stripping” and distribution of US Treasuries’ safe asset benefits.

Krishnamurthy and Vissing-Jorgensen (2012) provides evidence that both long- and short-term US 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 US Treasuries through SFTs, intermediaries may 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 repos 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 US Treasury’s safety for the duration of each contract.

The data show 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 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 US Treasury repos it can also be seen as dealers buying long-term safe asset positions while simultaneously selling them over the short term.

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 reusing one single safe asset as collateral. It would seem incorrect to think that these transactions created multiple safe assets. 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.

⁸Infante (2019a) studies this type of intermediation to reconcile the differences observed between different US repo markets during the financial crisis. Gottardi, Maurin, and Monnet (2019) shows how the presence of an intermediary may endogenously arise in the context of repos.

⁹Although, Infante and Vardoulakis (2019) studies 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.

¹⁰Huh and Infante (2017) studies the important role repos play in bond market intermediation and, consequently, the market’s underlying liquidity.

¹¹van Binsbergen, Diamond, and Grotteria (2019) estimates this premium for different maturities.

¹²Greenwood, Hanson, and Stein (2015) also recognizes the difference between long- and short-term safety.

V. Concluding Remarks

In this paper we use CSI data to document the high degree of collateral re-use in the US 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 three 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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