Consultative White Paper

Non-Centrally Cleared Bilateral Repo and Indirect Clearing in the U.S. Treasury Market: Focus on Margining Practices

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Executive summary

The U.S. Treasury repurchase agreement market (repo market) is critical for the functioning of the financial system. This market has evolved substantially since 2000, with the increased use of advanced technology and central clearing services, as well as the introduction of new regulations. These structural changes have implications for the clearing and settlement of Treasury repo and the risks inherent in these post-trade processes. Indeed, there is concern that market participants may not have a common understanding of these risks, particularly during contingent events when there might be disruptions to overall Treasury market functioning. Recent stress events in the Treasury market, such as the repo rate spikes in September 2019 and the Treasury market dysfunction in March 2020, demonstrate the importance of proper risk management in the Treasury repo market.

In light of these vulnerabilities, the Treasury Market Practices Group (TMPG) has completed two complementary studies on the clearing and settlement risks of Treasury securities. The first focused on the secondary cash market for Treasury securities and the second on Treasury secured financing transactions, which includes both repo and securities lending agreements. The second study highlighted that the repo segment composed of non-centrally cleared bilateral repo (NCCBR) presents risks given that its clearing and settlement processes are bespoke and opaque. These features make it especially difficult for market participants to accurately identify, measure, and manage their risk exposures. Furthermore, the opaqueness could then create an undesirable level of aggregate or systemic risk in the repo market.

This present effort builds upon these past efforts and recommends that market participants address any weaknesses in risk management practices in the Treasury repo market, with a focus on the NCCBR segment and dealer-to-client repo, which are indirectly centrally cleared. A working group, composed of TMPG members and subject matter specialists from TMPG member and non-member firms, was tasked with:

- describing the general risk management practices used in Treasury repo, with a focus on the NCCBR segment and indirect centrally cleared repo,
- identifying potential risk and resiliency issues,
- putting forth best practices recommendations, and
- facilitating a public discussion of these potential risks and best practice recommendations.

This paper is an outcome of this work. It provides a description of the risk management practices used to mitigate counterparty risk exposures in the Treasury repo market. The risk and resiliency issues identified also motivate the proposed updates to the TMPG recommended best practices. The TMPG requests that market participants review this paper and provide comments on this paper as well as on the proposed updates to the best practice recommendations.

The TMPG encourages all market participants to incorporate best practices into their operations in order to promote market integrity and efficiency and to conduct due diligence to evaluate the soundness of current practices, including whether their risk mitigation tools are sufficient for their level of market engagement.

Current risk management practices to mitigate counterparty risk exposure

Despite the high quality of the securities delivered in Treasury repo and the typically short maturity of these agreements, it is recognized that counterparty credit exposures arise from these trades and that this risk should be well managed. These exposures reflect the probability of a counterparty failing in its obligations, as well as the liquidity and market risks of the securities exchanged.

The main tools relied upon to manage this exposure differ across the repo market segments. For centrally cleared repo trades, the central counterparty (CCP) relies in part on a portfolio margining approach that takes into account the set of eligible trades between the CCP and its member when computing a net exposure. This net exposure is a main driver of the amount of margin the CCP collects from the member.

For tri-party repo, a segment where dealer-to-client trades are cleared and settled on a tri-party settlement platform, the negotiation of the haircut is one of the main tools used to manage counterparty credit exposures. In this segment, the agreed-upon haircut, or 1 minus the ratio of the principal amount to the value of the securities exchanged on the initial settlement leg of the repo, is almost always positive, implying that the cash-lending party to the trade is overcollateralized.[1]

In part due to the opaqueness of the NCCBR segment as well as the variety of types of financial firms that are active in this segment, it is difficult to characterize the main tools used by market participants in this segment to manage their counterparty credit exposures. Nevertheless, the use of haircuts in this segment is fairly low. Indeed, from discussions with market participants as well as the data collected from two Office of Financial Research pilot surveys, a majority of NCCBR transactions involving Treasury securities have zero haircuts.[2]

For some of these transactions with zero haircuts, these exposures are managed using other tools. Some market participants report using portfolio margining and/or netting agreements for their NCCBR transactions, whereby the total exposures between two firms are computed across a set of trades. The overall net exposure then generates a margin call between the firms, if necessary.

However, while some market participants may be judiciously using portfolio margining and/or netting agreements, there are likely market participants, perhaps yielding to competitive pressures, who do not charge a haircut or collect margin on these trades. The counterparty credit exposures arising from these trades may be taken as part of doing business in this segment.

[1] A typical tri-party repo transaction is a money market fund lending cash against Treasury securities to a broker-dealer. For this example, a 2 percent haircut implies that for every $1 in Treasury securities that the money market fund receives, it delivers $0.98 in cash.

[2] The Treasury Department's Office of Financial Research publishes information on the 2015 bilateral repo pilot survey and the 2022 bilateral non-centrally cleared bilateral repo data collection pilot at: https://www.financialresearch.gov/data/collections/pilot-data-collections/.

Potential risk and resiliency issues

The TMPG identified the following potential risk and resiliency issues related to the Treasury repo market.

For the NCCBR segment, there is a lack of consistency and transparency in risk management practices.

How the counterparty credit exposures of a repo or a set of repos are evaluated and managed in the NCCBR segment is bespoke and opaque. This can lead to inconsistencies in the application of haircuts and other practices to manage these exposures across market participants. This inconsistency, along with the competitive forces in this segment, could be driving risk management to become a commercially negotiated term in some cases. Such a development is likely to drive market participants away from prudent risk management best practices and could potentially increase contagion risks in aggregate.

For those trading relationships in the NCCBR segment that do not use portfolio margining or enforceable netting agreements, outreach by the TMPG reveals that it is not uncommon for market participants to put aside their own capital when negotiating Treasury repo trades rather than charge a haircut. A risk of this approach is that market participants may not uniformly recognize counterparty credit risks, a point brought up in earlier work by the TMPG on clearing and settlement (TMPG 2019, TMPG 2022). These inconsistencies present not just a risk to the participant itself, but potentially a broader risk to the market. This is because in the NCCBR segment differences in risk assessment are largely opaque to market participants and so can be hard to recognize and properly manage.

Currently, for dealer-to-client repos that are indirectly centrally cleared, the dealer is often fully contributing the initial and variation margin required by the CCP.

In the Treasury repo market, the current sole CCP offers clearing services for dealer-to-client trades, where the dealer is a direct clearing member of the CCP and the client is an indirect clearing member. As part of this offering, the CCP requires an initial and a variation margin to protect itself from the resulting counterparty credit exposures. A common current practice is for the dealer to fully fund these margin calls. Especially given the recent and projected increase in volumes of centrally cleared dealer-to-client repo trades, this practice is likely not sustainable nor is it prudent management of the bilateral counterparty risk exposures between the dealer and client.

This paper proceeds as follows: In Section I, we provide an overview of the repo market and highlight how the NCCBR segment compares and contrasts with the other repo segments. Section II provides a general description of counterparty credit risk management for repos. Section III compares margining practices across the repo segments. Section IV summarizes the risks and resiliency issues around margining practices in the NCCBR segment. Section V discusses how a new data collection covering the NCCBR segment could be used to help mitigate some of the risks in this segment. Section VI concludes.

Section I: NCCBR overview

The U.S. Treasury repurchase agreement market (repo market) is a critical market for the functioning of the financial system. Treasury repos are financial transactions in which one party sells U.S. Treasuries to another party with a promise to repurchase the asset at a specific price at a later date. Effectively, repos work as collateralized loans, in which the Treasury security serves as the collateral.[3] This allows the repo cash borrower to obtain financing, which it can use to buy the security itself or for other purposes, while the repo cash lender is able to earn interest on its cash.

Repos transform a straightforward government security into a valuable piece of collateral that allows market participants to secure funding for their activities, enter into market making activity, and facilitate the implementation of various investment, risk management, and collateral management strategies. Repos also play an essential role in the functioning and efficiency of the financial system, enhancing price discovery and secondary market liquidity in Treasury markets. Also importantly, the Federal Reserve executes monetary policy in the Treasury repo market, making the market's effective functioning essential to policymakers.

The U.S. Treasury repo market currently consists of four main segments: centrally cleared tri-party (FICC GCF Repo™), centrally cleared bilateral (FICC DVP Service), non-centrally cleared tri-party (Bank of New York tri-party), and non-centrally cleared bilateral repo (NCCBR).[4,5] Figure 1 characterizes each segment and describes the extent of data collection coverage. As noted, currently only limited data are available on the NCCBR segment, an information gap that was highlighted in the TMPG's 2023 White Paper on Data Availability and Transparency in the U.S. Treasury Securities Market. The Treasury Department's Office of Financial Research (OFR) has

[3] There are two main types of repo transactions in the U.S. Treasury market: general collateral (GC) repo, where most Treasury securities are accepted as collateral, and specific repo, where the collateral accepted for the repo is specified in advance and is typically trading with scarcity value. For expositional ease, the discussion references GC repo transactions, but risk management of specific repo transactions has parallel considerations.

[4] FICC GCF Repo and FICC DVP Service are the two main central clearing services for Treasury repo offered by the Fixed Income Clearing Corporation (FICC), currently the only central counterparty in the U.S. Treasury market. GCF is general collateral financing, and DVP is delivery-versus-payment. However, this central clearing landscape may evolve in the future as several other CCPs have expressed interest in creating cleared offerings for the Treasury market. Indeed, CME Securities Clearing has filed an application with the SEC to register as a clearing agency to provide central counterparty clearing services in U.S. Treasury securities and transactions in repurchase agreements involving U.S. Treasury securities.

[5] GCF Repo™ (hereinafter, "GCF Repo") is a registered trademark of the Depository Trust and Clearing Corporation or its affiliates in the United States.

launched a permanent data collection in this market, which should help address this data gap for the official sector [6]

Figure 1: The Four Main Segments of the U.S. Repo Market

		Settlement	
		Tri-party	**Bilateral**
Clearing	**Centrally Cleared**	FICC GCF Repo • Centrally cleared by FICC • Settled on BNY's Tri-Party platform • General collateral repo • Transaction-level data collected from FICC by the OFR.	FICC DVP Service • Centrally cleared by FICC • No central custodian • General or specific collateral repo • Transaction-level data collected from FICC by the OFR
	Non-Centrally Cleared	BNY Tri-party • No central counterparty • Settled on BNY's Triparty platform • General collateral repo • Transaction-level data collected from BNY by the Federal Reserve	NCCBR • No central counterparty • No central custodian • General or specific collateral repo • A data collection survey has been launched by the OFR

Note: FICC is the Fixed Income Clearing Corporation, GCF is general collateral financing, DVP is delivery-versus-payment, OFR is the Office of Financial Research at the U.S. Treasury, BNY is Bank of New York, and NCCBR is noncentrally cleared bilateral repo. This figure was taken from Hempel et al. (2023) and edited.

We size these segments from the point of view of the dealers' balance sheet, reflecting the centrality of dealers to Treasury repo. Starting on the asset side, composed of Treasury reverse repo, we calculate that in the first half of 2024, centrally cleared daily Treasury repo outstanding averaged $2.3 trillion, with DVP far outstripping GCF.[7] We estimate that non-centrally cleared activity was in the range of $1.4 to $2.7 trillion, an admittedly wide interval. (In the appendix, Table A1 provides a more detailed breakdown of the sizing of various segments.) This non-centrally cleared reverse repo activity is carried out in large part with hedge fund clients.[8]

Turning to the liability side, overall activity is larger. Centrally cleared daily Treasury repo outstanding averaged $2.5 trillion in the first half of 2024, and we estimate that non-centrally

[6] On May 6, 2024, the Office of Financial Research adopted the final rule for a data collection of non-centrally cleared bilateral transactions in the U.S. repurchase agreement market.

[7] Reverse repo is just the inverse of a repo, where a firm buys a Treasury security with an agreement to sell it back later.

[8] For example, Barth and Kahn (2021) explain how the Treasury cash-futures basis trade, a common arbitrage strategy pursued by hedge funds, results in the hedge fund acquiring repo funding from its dealer. They then document that the increased participation in this arbitrage strategy from 2016 until March 2020 led to dealers providing substantial amounts of repo funding to hedge funds.

cleared activity ranged from $2.5 to $3.4 trillion outstanding, of which tri-party repo makes up $1.7 trillion. Tri-party repo activity is carried out in large part with cash-rich investors, such as money market funds and the cash reinvestment arms of securities lending firms.[9]

Given the current limited availability of data on the NCCBR market and the market's large size, a fuller understanding of risk management practices in this market is warranted. Previous work by the TMPG highlighted the bespoke and opaque risk management practices that are used in the NCCBR market due in part to the lack of central clearing of these transactions.

Furthermore, this is a timely moment to investigate risk management practices in Treasury repo markets due to SEC rule amendments that call for increased central clearing in the U.S. Treasury market. These rule amendments are likely to transform the structure of the Treasury market as they substantially expand the set of repo trades that are required to be centrally cleared. Therefore, these rule amendments will likely result in the sizable migration of non-centrally cleared repo into the cleared repo market.

Nonetheless, it is difficult to accurately predict the amount of repo outstanding that will move into central clearing, in part because NCCBR repos sometimes employ maturity optionality and other features that currently make these trades ineligible for central clearing.[10] As a result, the non-centrally cleared segment of this market will continue to warrant monitoring even after the SEC rule amendments go into effect. Further, as this market transformation occurs, it will be important to track risk management practices across all segments of the Treasury repo market to ensure strong risk management across all repo market sectors.

Section II: Counterparty risk management

In general, counterparty risk management focuses on understanding the risks presented by a counterparty to a transaction and then properly accounting for that exposure. Because repo involves the simultaneous exchange of cash and securities, counterparty credit risk is a function of the market price of the securities exchanged and the liquidity risks inherent in the securities. Despite the high quality of the securities delivered in NCCBR and the typically short maturity of these agreements, risks to the clearance and settlement of these non-centrally cleared trades exist and manifest themselves in a number of ways, a point highlighted in past TMPG white papers.

Risk management begins before trading, when a firm's risk team vets potential counterparties to determine whether the firm is willing to trade with that entity and, if so, what are the limits to the exposure a firm is willing to bear. After this vetting has been successfully completed and a firm enters into a repurchase agreement with a counterparty, counterparty credit exposure arises.

For the firm lending cash (and receiving securities), counterparty credit exposure arises if the market value of the securities declines below the value of the repurchase amount. This is because the proceeds from selling the securities will not cover the cash-lending firm's claim if the counterparty fails to pay the repurchase amount. Further, the liquidity risk of the securities is

[9] For more details, see Copeland, et al. (2012).

[10] For example, repos with open maturity, or no fixed maturity date, are not currently eligible for central clearing at FICC.

important if the cash-lending firm wants to quickly sell the securities. For more illiquid securities, the cash-lending firm will face a larger price discount when trying to quickly liquidate the collateral.

For the firm delivering securities (and receiving cash), counterparty credit exposure arises if the market value of the securities increases above the value of the repurchase amount. This is because the repurchase amount is not enough to cover the cost of replacing the securities if the cash-lending firm fails to return them as agreed. Once again, the liquidity risk of the securities is important if the securities-lending firm wants to quickly replace the securities it has lost.

A haircut can be set to protect one, but not both, of the counterparties to the repo agreement from these counterparty credit exposures. To protect itself against a potential decline in the value of the securities received, the cash-lending firm can negotiate an agreement that the total value of securities delivered in the initial settlement leg exceeds the principal cash amount of the trade by a specific percentage. This overcollateralization, the haircut, is measured as 1 minus the ratio of the cash principal over the value of the securities exchanged on the initial settlement leg. A positive haircut means that the principal cash amount is less than the value of the securities exchanged, and so the cash-lending firm is overcollateralized.

Similarly, the firm delivering securities can negotiate to protect itself against a potential increase in the value of the securities, by negotiating a (negative) haircut, whereby the value of the securities delivered in the initial settlement leg is less than the cash principal amount.

Since the haircut can protect only one of the counterparties to the trade, which counterparty gets to charge the haircut? The decision is usually made at the beginning of the trading relationship when each firm's risk teams are vetting potential counterparties and the legal documentation to facilitate repo trading is being arranged. There is no rule, but as a general guide, often the counterparty lending cash against securities or, alternatively, the counterparty that is deemed to have a safer financial profile, decides whether to charge a haircut and what the appropriate amount is.

In addition to providing protection in times of default, charging a haircut can provide a firm with capital relief, for example, by reducing the risk-weighted assets associated with the activity. Furthermore, the haircut provides the firm with a buffer, which, among other things, gives it time to consider whether an adverse event affecting a counterparty can be quickly rectified or cured without resorting to more drastic measures.

Market participants use a variety of approaches to setting a haircut. It is not uncommon for the parties to a trade to set a static haircut, using a fixed amount of overcollateralization (for example, 2 percent). Alternatively, the parties to a trade can negotiate different haircuts across a package of Treasury repo trades, reflecting the overall counterparty credit exposures that arise from entering into those repos. Further, the calculation of the haircut is sometimes determined through a calculation that reflects the market value-at-risk (VaR) over the period necessary to replace a defaulted trade. Implementing a VaR approach often uses historical price changes to determine potential fluctuations in market value for a security, over a specific period and given a level of statistical significance.

The protection afforded by the haircut can decrease over the life cycle of a repo. For repos with longer maturities, persistent changes to securities prices can offset the protections offered by the

haircut before the maturation of the trade. To address this issue, the two parties to the repo can agree to exchange variation margin over the life cycle of the trade. Such an agreement requires both counterparties to the trade to post margin at a specified frequency equal to the mark-to-market change in the net value of the exposure between the two counterparties, as well as accounting for the accrued interest on the principal amount. Unlike the haircut, variation margin is often a symmetrical regime in that either counterparty may be required to post or return margin, depending on the direction of fluctuations in the value of the securities delivered as part of the repo, as well as the accrued interest. Importantly, the risk teams of the counterparties to a trade also monitor one another and reassess counterparty credit risks given changes to market conditions, positions, and other factors.

When the parties to a trade have credit risk exposures to one another across many transactions or types of transactions, they can manage these risks with portfolio margining and/or a netting agreement. Portfolio margining considers the net exposure between two parties across a range of trades. This can be advantageous as it may lead to a more efficient use of collateral as exposures generated in one trade might be offset by exposures from another trade. Properly calculating netted exposures across different types of trades can be complex and require modeling of how various types of risks are correlated both during periods of calm in the marketplace and during times of stress. During times of stress, when managing counterparty risk is paramount, portfolio margining exposure to correlation risks needs close observation and ongoing assessment.

Finally, haircuts can also help manage counterparty credit exposures by reducing the amount of leverage taken by a counterparty, thus reducing the risk posed to the market as a whole. This is most naturally understood with repos that have been entered into as a source of funding (such as a general collateral repo). Making a counterparty pay a haircut for a funding repo forces that counterparty to use capital to obtain funding. For example, suppose a client wishes to borrow $98 million from a dealer using Treasury repo and the dealer charges a 2 percent haircut. Then the client needs to deliver $100 million in Treasuries to receive the $98 million in funding, where the $2 million difference, the haircut, is sourced from the client's capital. If a participant is charged a haircut across all of its funding repo trades, then that haircut will act as a capital constraint for that participant.

The fact that haircuts limit the amount of leverage that can be obtained is important, since whether or not counterparty leverage is limited in aggregate can have systemic implications. Indeed, the unwinding of large leveraged strategies due to a shock can have spillover effects and amplify illiquidity. Such spillovers can harm other market stakeholders and have contributed to episodes of market dysfunction in the past (IAWG 2021).

Section III: Comparison of margining practices across repo segments

We now turn to comparing the use of both haircuts and variation margins across segments of the repo market. We begin with centrally cleared repo trades, then discuss non-centrally cleared repo settled on the tri-party settlement platform, and finally, we describe margining practices in NCCBR.

Central clearing

A financial utility offering to be a central counterparty for Treasury repo trading offers several services to its members. A fundamental feature of these central clearing services is that a CCP guarantees the performance of the trade and novates the trade, becoming the counterparty to each of the original parties of the trade.[11] These actions create counterparty credit risk for the CCP, which is managed in part through portfolio margining. In aggregate, the credit risk faced by the CCP is materially smaller than the aggregate credit risk if these trades were bilaterally settled due to multilateral netting, which compresses settlement obligations. So CCPs reduce aggregate settlement risk.

Currently, there is only one central counterparty in the Treasury repo market. For the two main repo central clearing services for direct clearing members (general collateral financing (GCF) Repo and Delivery-versus-Payment (DVP) services), the FICC does not charge a haircut on each repo transaction. Rather, the FICC considers its exposure to each member given that member's portfolio of trades and calculates a margin call intended to capture market and liquidity risk within each member's portfolio. On a regular trading day, the FICC makes margin calls twice a day, and its rules allow for more frequent calls if needed.

The FICC also offers central clearing between direct clearing members and their clients through its Sponsored Services products.[12] For these trades, the direct clearing member serves as a sponsor to the client, which means that the direct clearing member (the sponsoring member) retains the counterparty credit risk to the client (the sponsored member). This is implemented by the CCP through the collection of margin on these trades, where the margin helps protect the CCP against the failure of the sponsored member from performing on its obligations from the cleared trade.

The FICC does not specify whether the sponsoring or sponsored member of the trade being centrally cleared needs to fund the margin. In practice, TMPG's outreach to firms active in sponsored repo reveals that it is currently commonplace for the sponsoring member to be the source of this margin owed to the CCP. Especially with a projected increase in volumes of centrally cleared dealer-to-client repo, this practice is likely not sustainable. Furthermore, this practice may also not be prudent given the bilateral counterparty credit exposures that arise between the dealer and client as a result of the dealer's sponsorship of the client to the FICC.[13]

It is possible this practice may change as the FICC implements the ability for customer margin segregation as required by the SEC's recent rule changes.[14] Further, customer margin segregation,

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[11] A CCP guarantees settlement of repos that are eligible for central clearing and where the trade details have been confirmed. Details of the services provided by a CCP are provided in the TMPG's white paper on the clearing and settlement of secured financing transactions, published in November 2022.

[12] The FICC has also proposed additional access models to comply with the SEC's central clearing rule. In the majority of this white paper, we focus on the currently available clearing access models.

[13] This bilateral counterparty credit exposure arises whether the centrally cleared dealer-to-client transaction is a done-with or done-away trade. This is because in both cases the dealer is guaranteeing the performance of the client to the central counterparty.

[14] The FICC and CME currently have a cross-margining arrangement to provide cross margining across Treasuries and interest rate futures for clearing member accounts. The potential exists for a similar

in general, protects customers against risk of default of their clearing intermediary and facilitates porting of their cleared trades in the case of an intermediary default.

Tri-party repo

The tri-party settlement platform is set up to clear and settle general collateral repo trades. By and large, trades involve a buy-side firm, such as a money market fund, lending cash against securities to a broker-dealer. These trades are negotiated bilaterally between the two parties to the trade: the tri-party agent is not a principal to the trade but rather handles the back-office details of the trade.

The vast majority of the trades cleared and settled on the tri-party settlement platform include a positive haircut. This haircut limits the amount of leverage that broker-dealers can acquire in this segment of the market. Statistics on the distribution of haircuts charged on tri-party repo trades are reported on the Tri-Party/GCF data visualization web page; the median haircut on repos involving Treasuries is 2 percent, from 2011 onward.[15]

These repos are also subject to variation margin, as the tri-party agent marks-to-market the securities delivered into the trade at least once a day. For non-maturing trades, if the mark-to-market calculation results in the securities no longer meeting the agreed-upon margin, then the party that originally delivered the securities faces a margin call. Similarly, if these calculations result in the implied margin of a trade being higher than the agreed-upon amount, the party that originally delivered the securities could pull some of the securities out of the trade and use them elsewhere. Variation margin is calculated on a daily basis for each individual trade, as opposed to on a portfolio basis.

Non-centrally cleared bilateral repo (NCCBR)

Finally, we turn to NCCBR, a segment of the repo market for which there is limited data. The TMPG white paper (November 2022) highlighted that the clearing and settlement processes in this segment are bespoke and opaque, making it difficult to draw generalizations. However, the OFR pilot bilateral repo data collection projects in 2015 and 2022 provide a representative snapshot on the distribution of haircuts charged in this segment.[16]

In both of the pilots, the data reveal that broker-dealers both charged and paid haircuts (Baklanova, et al. 2017; Hempel, et al. 2023). The implication is that with some types of clients, broker-dealers often paid a haircut, much like is observed in the tri-party repo segment. For other types of clients, the broker-dealer charged the haircut. These differences reflect the intermediary role that broker-dealers play in repo markets where they engage with a variety of clients with a range of counterparty credit risk profiles.

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agreement to be established for client accounts once client margin segregation is available, which could give sponsored members an incentive to be the source of the margin call to the FICC.

[15] Another publicly available haircut schedule is published by the Federal Reserve's Discount Window at https://www.frbdiscountwindow.org/pages/collateral/collateral_valuation .

[16] For details of these two pilot projects, see https://www.financialresearch.gov/data/collections/bilateral-repo-pilot/ .

A salient feature from both pilots, however, is that a large majority of Treasury repo transactions in this segment had zero haircuts, in sharp contrast to what is observed in tri-party repo. The implication of this result for counterparty credit exposures is not straightforward.

For some of these trades with zero haircuts, the management of counterparty credit exposures could be happening away from the settlement of the repo. As noted by TMPG members, Hempel et al. (2023) and Banegas and Monin (2023), in the NCCBR segment, market participants sometimes use portfolio margining and/or netting agreements to manage counterparty credit exposures. This results in margin being collected separately from the settlement of the repo, where the amount of margin collected is determined by a measure of the net exposure across a range of trades.[17]

For other trades with zero haircuts, however, there are likely market participants who are not collecting margin. Rather, these market participants, perhaps yielding to competitive pressures, absorb the counterparty credit exposure arising from these trades as part of the cost of doing business in this segment.

Section IV: Risk and resiliency issues

A vulnerability with current counterparty credit risk management practices in the NCCBR segment is a lack of consistency across market participants. How the risks of NCCBR trades between two parties are evaluated and managed are both bespoke and opaque, which can lead to inconsistencies in risk management practices across market participants. There is concern that this inconsistency, along with the competitive forces in this segment, is driving risk management to become a commercially negotiated term. Such a development is likely to drive market participants away from risk management best practices and could potentially increase contagion risks in aggregate.

For those trading relationships that do not use portfolio margining or netting agreements, outreach by the TMPG reveals that it is not uncommon for market participants to put aside their own capital when negotiating Treasury repo trades rather than charge a haircut. These outcomes reflect in part the competitive dynamics of the sector, as mentioned above. A risk of this approach is that market participants may not uniformly recognize counterparty credit risks, a point brought up in earlier work by the TMPG on clearing and settlement (TMPG 2019, TMPG 2022). These inconsistencies are not just a risk to the market participant itself, but potentially a broader risk to the market. This is because in the NCCBR segment, differences in risk assessment are largely opaque to market participants, and so can be hard to recognize and properly manage.

The risks discussed above contribute to a risk and resiliency issue around the recognition and risk management of market leverage provided in the NCCBR segment. As detailed in Section II, for repos used to source funding, having the cash provider collect margin (either as a haircut or on a portfolio basis) provides a constraint on the amount of leverage provided to a market participant. This is particularly relevant for market participants that source funds in NCCBR from multiple counterparties. If cash lenders provide funding without charging haircuts or otherwise collecting

[17] The netting of exposures is not limited to repo trades but can include exposures from other financial instruments such as Treasury futures or interest rate derivatives.

margin (perhaps due to competitive pressures), then the cash-borrowing firm could receive significant leverage overall, unbeknownst to any of the individual counterparties. Not being able to recognize this leverage leaves each counterparty unable to prudently manage its counterparty credit exposure.

This risk and resiliency issue also applies to current practices around repos cleared in Sponsored Services, where it is often the case that the sponsoring member fully funds the margin charged by the FICC. For trades where the sponsoring member is lending cash to the sponsored member, this practice can result in the sponsored member borrowing cash (against collateral) without being charged a haircut.

Leverage that is not fully recognized, and so managed, can lead to a build-up in market risk. Shocks that might otherwise be absorbed by collateral posted as margin might result in a levered participant having to rapidly unwind its position, an event that could then cause a fire sale.[18]

Section V: Impact of the new NCCBR collection by the OFR

The OFR has launched a daily data collection surveying the NCCBR segment. These data will be confidential, and analysis of these data will bring much needed insight into this segment to regulators and policymakers, including a better understanding of the magnitude of the bilateral and systemic risks inherent in this repo segment.

This collection also provides an opportunity for more transparency to be provided to market participants. One potential use of these data would be for the OFR to publish aggregate statistics on the quantity of repo by collateral type, the distribution of haircuts by collateral type, and other features of repo that could provide valuable insights into this opaque segment, much like what is already produced for the tri-party repo segment (see the TPR/GCF interactive website) and the centrally cleared repo segment (see the OFR short-term funding monitor). These statistics could help market participants more accurately measure the risks inherent in these trades and improve risk management associated with them going forward.

Section VI: Conclusion

This white paper builds upon past TMPG work focused on the clearing and settlement risks of Treasury securities. This paper focuses on counterparty credit risk management of Treasury repo trades, with a focus on the NCCBR segment and dealer-to-client repo that are indirectly centrally cleared. After documenting the range of counterparty credit risk management practices used by market participants, the white paper highlights two potential risk and resiliency issues. First, in the NCCBR segment, there is a lack of consistency and transparency in counterparty credit risk management practices. Second, for those dealer-to-client repos that are indirectly centrally cleared, the dealer is often fully contributing the initial and variation margin required by the CCP.

[18] Fire-sale risk has long been recognized in the tri-party repo segment, given the large positions in that segment and the understanding that the market participants providing funding have strong incentives to quickly liquidate collateral. See the 2010 NY Federal Reserve White Paper "Tri-Party Repo Infrastructure Reform" at https://www.newyorkfed.org/medialibrary/media/banking/nyfrb_triparty_whitepaper.pdf.

This practice is likely not sustainable nor is it prudent management of the bilateral counterparty risk exposure between the dealer and the client. As a result, the TMPG is putting out for comment proposed best practices on repo risk management.

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Appendix 1: Table of Dealer Activity in the Treasury Repo Market by Segment

In this appendix we present a table of estimates of the amount of repo outstanding for each segment of the market (over the first half of 2024), from the perspective of dealers' balance sheets. The estimates are derived from public data sources, and the details of how these numbers are calculated are described below.

Table A1: Dealer Activity in the Treasury Repo Market by Segment

$ billions outstanding (2024 H1)

	Assets (Reverse repo)	Liabilities (Repo)
Interdealer		
Centrally cleared		
DVP[1]	1,770	1,700
GCF (tri-party)	150	150
Non-centrally cleared		
Bilateral	~0	~0
Dealer-to-client		
Centrally cleared		
Sponsored GC (tri-party)[2]	~0	160
Sponsored DVP[1]	380	450
Non-centrally cleared		
Tri-party[3]	~0	1,540
Bilateral[4]	[1,370, 2,740]	[930, 1,860]

Source: Office of Financial Research, FRBNY, DTCC

[1] Includes agency debt.

[2] Includes agency debt and agency mortgage-backed securities.

[3] Excludes transactions with the Federal Reserve.

[4] Estimate based on non-centrally cleared activity reported by primary dealers (FR2004C). Minimum values are reported values for primary dealers. Maximum values assume primary dealers account for the same share of the non-centrally cleared bilateral segment as the non-centrally cleared tri-party segment.

Methods Used

Centrally cleared DVP: From the OFR's U.S. Repo Markets Data Release, use the *DVP Service Outstanding Volume: Total* time series and compute the average over the first half of 2024. From this average, subtract out the amount outstanding for Sponsored DVP, as the *DVP Service Outstanding Volume* series includes Sponsored DVP.

Centrally cleared GCF: From the OFR's U.S. Repo Markets Data Release, use the *GCF Repo Service Outstanding Volume: U.S. Treasury Securities Total* series, and compute the average over the first half of 2024.

Sponsored GC: From the DTCC sponsored membership volumes site, download *GC_Total_Amount* series and compute the average over the first half of 2024. These values are transaction numbers and so are a lower bound on the total value of outstanding activity. Given that a majority of Sponsored GC has overnight maturity, this lower bound should be close to the total amount outstanding.

Sponsored DVP: From the DTCC sponsored membership volumes site, download *Total_Repo_Amount*, *Total_Reverse_Repo_Amount* and *GC_Total_Amount*. We assume that dealers use Sponsored GC to only borrow cash. Therefore, Sponsored DVP repo is equal to Total_Repo_Amount and Sponsored DVP reverse repo is equal to Total_Reverse_Repo minus GC_Total_Amount. These values are transaction numbers and so are a lower bound on the total value of outstanding activity. Given that a majority of Sponsored DVP has overnight maturity, this lower bound should be close to the total amount outstanding.

Tri-party: From the Federal Reserve Bank of New York's interactive tri-party repo site download the total value of Treasury tri-party repo volume outstanding. From the Federal Reserve Bank of New York's site download Reverse Repo Operations (RRP) and Standing Repo Facility (SRF) outstanding repo activity for the corresponding dates. (The SRF activity is insignificant over the first half of 2024.) We then calculate the difference between the tri-party repo Treasury volume outstanding and the outstanding amount at the Federal Reserve's facilities, and average over the first half of 2024.

Bilateral: From the NY Federal Reserve's FR2004C, download the financing activity for all primary dealers. We use the uncleared bilateral repo and reverse repo outstanding for Treasury securities as the minimum values in the table. For the maximum values, we assume that primary dealers' share of uncleared bilateral is the same as their share of tri-party repo. We compute the primary dealer's share of tri-party repo using the FR2004C data and use that fraction to arrive at an estimate of total bilateral repo and reverse repo. The primary dealer's share of tri-party repo is computed using the FR2004C tri-party Treasury repo numbers and the total tri-party number in the table. For the first half of 2024, we find that primary dealers account for, roughly, half of total tri-party Treasury repo activity. So we multiply the FR2004C uncleared bilateral repo and reverse repo minimum values by 2 to arrive at the maximum numbers in the table.

We have assumed that all bilateral non-centrally cleared repo activity falls into the dealer-to-client category. With higher quality data on this segment, a more accurate view could be obtained about the share of this segment that is dealer-to-client versus interdealer.

Appendix 2: TMPG NCCBR Working Group Members

TMPG Member and Non-Member Firms

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Debbie Cunningham	Federated Hermes, *Working Group Co-Chair*
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Brett Davis	BlackRock
Brian Disken	DTCC
Keith Donohue	Bank of New York
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Glossary of Terms

CCP	Central Counterparty
DVP	Delivery-Versus-Payment
FICC	Fixed Income Clearing Corporation
GC	General Collateral
GCF	General Collateral Financing
NCCBR	Non-Centrally Cleared Bilateral Repo
OFR	Office of Financial Research, U.S. Department of Treasury
Repo	Repurchase agreement
SEC	Securities and Exchange Commission
TMPG	Treasury Market Practices Group
TPR	Tri-party Repo