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Repo Intermediation and Central Clearing: An Analysis of Sponsored Repo

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FEDERAL RESERVE BANK of NEW YORK

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Abstract

This paper evaluates the salient forces behind a dealer-intermediary's decision to move a bilateral repo transaction with a customer into central clearing. We provide evidence that dealers turn to sponsored repo on occasions when balance sheet space is scarce, such as when there is a large issuance of Treasury coupon securities and end-of-month dates. We also find that sponsored repo spreads tend to be affected by a range of factors, with the three largest drivers being money market fund assets, a proxy for hedge fund demand for repo funding, and end-of-month dates.

JEL classification: G12, G23
Key words: repo, sponsored services, central clearing, money markets

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To view the authors' disclosure statements, visit
https://www.newyorkfed.org/research/staff_reports/sr1140.html.

Through the past decade, the Treasury market has experienced several episodes during which market functioning has been severely disrupted, most notably the dash-for-cash in March 2020 due to the Covid-19 pandemic. These disruptions have highlighted the important role of intermediaries and raised questions on identifying the drivers of spreads charged by these firms. Although significant work has been done considering these issues for the more well-known markets for Treasury securities, little work has been done on a key and unusual segment of the Treasury repo market, sponsored repo, where dealer-to-customer trades are centrally cleared. Although currently a relatively small portion of the overall repo market, the Securities and Exchange Commission's (SEC) recently instituted rule amendments to central clearing are expected to greatly expand the size of sponsored repo, increasing its importance.

This paper evaluates the salient forces behind a dealer-intermediary's decision to move a bilateral repo transaction with a customer into central clearing. This is done by studying what are the main drivers of volumes and spreads of sponsored repo using detailed trade-level data. We begin by explaining the institutional arrangements of sponsored repo and how it differs from the other, more well-studied, segments. We then detail how sponsored repo provides a potentially important benefit to dealers by allowing them to net their customer trades with other centrally cleared trades on a balance sheet basis. We also describe how margins in sponsored repo are computed and argue that this process is likely to impose higher capital costs on dealers relative to repos that are not centrally cleared. From a dealer's perspective, sponsored repo therefore provides a key tradeoff between two of the main costs of intermediation in the repo market: lower balance sheet costs and higher capital costs. Finally, we lay out the potential costs and benefits for dealers' customers from central clearing through sponsored repo.

We then turn to quantifying the main drivers of repo volumes and pricing, with a focus on which of the relative advantages of sponsored repo are the main forces driving the decision to move repo transactions into sponsored repo. We use the confidential data provided by the U.S. Department of the Treasury's Office of Financial Research (OFR) centrally cleared repo collection. We begin by documenting several facts about sponsored repo, including the evolution of volumes and rates over time. Importantly, we show that money market funds (MMF) are the largest customer type investing cash against Treasuries in sponsored repo, whereas hedge funds are the dominant customer type delivering Treasury securities against cash.

To better understand the drivers of sponsored repo volumes and rates, we use a regression

approach. The estimated coefficients imply that sponsored repo volumes increase with Treasury coupon issuance, in line with results in the literature which show that issuance drives repo volumes generally. The coefficients also show that sponsored repo volumes increase on end-of-month dates, when dealers' balance sheet costs are typically high. Further, there is evidence of market participants increasing sponsored repo activity in response to a decline in cash available in money markets, such as when corporate tax payments are made to the Treasury. These last two results both suggest that dealers see sponsored repo as a useful tool to accommodate requests for additional repo from customers, a balance sheet intensive activity, by placing these trades in sponsored repo. As such, these results provide evidence that the balance sheet netting benefits to dealers are a main force driving the use of sponsored repo.

Turning to rates, the estimated coefficients imply that the three drivers with the largest economic effect are change in MMF assets, a proxy for hedge fund demand for repo funding, and end-of-month dates. The first driver reflects the dominant role of MMF as cash investors in repo and the second driver captures the behavior of dealers to place their funding-oriented repos with hedge funds into central clearing, to minimize the balance sheet impact of these trades. Finally, the month-end effects documented here are consistent with the results in the literature.

These results link our paper to a long literature on balance sheet costs and dealer intermediation. Here, our work is most related to papers discussing these costs in the context of the Treasury market, such as Duffie (2020), He, Nagel, and Song (2022), and Du, Hebert, and Li (2023). While these papers have highlighted how balance sheet costs of dealer intermediation can distort prices in Treasury markets, in this paper we examine whether balance sheet costs drive repo transactions into sponsored repo, as this service minimizes these regulatory costs to dealers. The regression results in this paper provide evidence that balance sheet costs are important because sponsored repo is relied upon more on when balance sheet costs are high (e.g., end-of-month dates) and when customers demand more repo intermediation (which is balance sheet intensive) from dealers because of declines in sources of funds elsewhere in the money markets.

Furthermore, our results show that one arbitrage trade in particular, the Treasury cash-futures basis trade, is strongly correlated with the sponsored repo rates. This trade has been discussed previously by Fleckenstein and Longstaff (2018), and the role of hedge funds in the

trade is discussed in Schrimpf, Shin, and Sushko (2020), Barth and Kahn (2021), and Kruttli, Monin, Petrasek, and Watugala (2021). Our paper highlights how the intensity with which financial firms execute this arbitrage strategy is a crucial determinant of spreads in sponsored repo.

We also contribute to the literature on the choice of central clearing versus bilateral exchange, for instance Duffie and Zhu (2011), Koeppl, Monnet, and Temzelides (2012), Loon and Zhong (2014), Duffie, Scheicher, and Vuillemey (2015), Bellia, Girardi, Panzica, Pelizzon, and Peltonen (2024), and Vuillemey (2020). Sponsored repo provides a particularly useful lens on this trade-off since it has some of the advantages of central clearing (balance sheet netting) and protects customer trades. However, it does not offer full settlement netting and has the dealer maintain its exposure to the customer from the trade. Our paper therefore highlights that even with only a portion of the usual advantages of central clearing, it may continue to provide substantial benefits over bilateral clearing.

Finally, this paper is a timely investigation of sponsored repo given the SEC's rule amendments which call for increased central clearing in the U.S. Treasury market.[1] Currently, the majority of Treasury repo transactions are not centrally cleared and so these rule changes could have a massive effect on clearing and settlement in the Treasury market. Furthermore, we expect that a significant portion of the Treasury repo transactions between dealers and their customers that will migrate to central clearing will do so through sponsored repo, making a study of this segment and the current drivers of activity particularly important for academics, policy makers, regulators, and market participants.

1 The Economics of Sponsored Repo

We begin this section by defining a repurchase agreement (repo) and its terms of trade, as well as describing the segments in which this financial instrument are traded. We then turn to why central clearing is important in repo and how different types of participants benefit from central clearing. Lastly, we focus on the sponsored repo service, detail how this service works, and describe its main benefits and costs.

[1]The SEC adopted rule changes in December 2023 that will result in all eligible Treasury repo transactions being centrally cleared beginning in June 2026 (i.e., central clearing mandate). See the SEC's final rule at: `https://www.sec.gov/files/rules/final/2023/34-99149.pdf`.

1.1 What is a repo?

A repurchase agreement (a.k.a. repo) is a legal contract entered into by market participants. It documents the sale of securities for cash on a specific date paired with the repurchase of those same securities for a specific price at a future date. The terms of trade for a repo involve: (i) the total amount of the securities to be exchanged as well as the specific securities to be delivered, (ii) the price of the securities on the initial date, and (iii) the price of the securities on the return (or second) date.[2]

Although market participants enter into repo contracts for a variety of reasons, we can group these motivations into two general categories. The first is to source funds, in which case the repo can be viewed as similar to a secured loan.[3] The party delivering the securities on the initial date is seeking to obtain cash, and the securities serve as collateral. In these cases, the difference in the price of the securities across the two negotiated dates of the repo can be converted into a rate of interest on the cash and that rate can be interpreted as the value of cash in the marketplace.[4]

The second general reason that participants enter into repo contracts is to source securities. In this case, the participant delivering cash on the initial date is seeking to acquire specific securities for a set amount of time. As when sourcing cash, the difference in the price of the securities across the two negotiated dates can be converted into an interest rate. In these instances, the rate usually reflects the demand and supply pressures for the security; when a specific security is in sparse supply, for example, the implied interest rate can be negative.[5]

[2]The Internet Appendix for "Repo Over the Financial Crisis" by Copeland and Martin (2024) lays out the terms of trade for repos.

[3]The secured overnight funding rate (SOFR), a common reference rate used by financial instruments, is calculated using repos where the motivation for the trade is understood to be for funding purposes.

[4]The securities posted as collateral in a repo are exempt from the automatic stay imposed by bankruptcy proceedings. See Garbade (2006) and Maclachlan (2014) for a description of the evolution of repo contracts in the U.S. with a focus on their treatment in bankruptcy.

[5]See Duffie (1996) as well as more recent work by D'Amico and Pancost (2020) for details on the use of repo to acquire specific securities.

1.2 An overview of the structure of the U.S. repo markets

In the U.S., repo contracts are executed on an over-the-counter (OTC) basis. Similar to other OTC markets, repo trading can be divided into two parts: dealer-to-dealer and dealer-to-customer. The market microstructure of repo transactions differs depending upon the asset class of the securities exchanged. For this paper we focus on repos involving Treasuries, as the total value of Treasury repo is both quite large and far outstrips the total value of repos involving securities from any other asset class, reflecting the global importance of the Treasury market.

1.2.1 Interdealer Repo: FICC DVP and GCF Repo

The network structure of the interdealer market for Treasury repo is dense, with securities dealers entering into repo contracts with one another and then clearing and settling those trades with a central counterparty, the Fixed Income Clearing Corporation (FICC).[6] Although clearing through FICC is limited to firms that are its members, the set of FICC members is large and inclusive of a wide variety of securities dealers.[7] As a result, we characterize all dealers active in repo as being FICC members, and so centrally clearing their interdealer repo trades.[8]

For trade execution, dealers can, and often do, use electronic platforms run by interdealer brokers (IDB). These platforms provide a number of benefits, including real time pricing and anonymity, as well as transparent and timely clearing services. IDBs confer anonymity to their customers by standing as a principal between the two parties of a repo. Participants post bid and asks prices on the IDB platform anonymously. If a quote is accepted by another party, that execution results in two trades. One trade is between the participant that posted the bid and the IDB and the other trade is between the participant that accepted the bid and the IDB. (In this way, the IDB provides for multilateral netting among all the platform participants.)

[6]FICC is a subsidiary of the Depository Trust & Clearing Corporation (DTCC) and acts as a financial utility. It is currently the only central counterparty for Treasury securities.

[7]The current list of FICC members can be found at `https://www.dtcc.com/client-center/ficc-gov-directories`.

[8]As a direct clearing member of FICC, a securities dealer is obligated to central clear all eligible repo trades. Eligible trades are those where both parties to the trade are direct clearing members of FICC. As discussed in more detail below, there are also indirect clearing members of FICC, and this obligation does not apply to this class of member.

After two dealers execute a Treasury repo, the trade details are submitted to FICC. Upon a successful comparison of the trade details, FICC guarantees the settlement of the repo and novates the trade. Novation is a legal maneuver which results in FICC becoming a counterparty to each of the original parties to the trade. For example, if dealer A and B enter into a repo contract which is novated by FICC, the result is two trades, one between dealer A and FICC and the other between FICC and dealer B.

If dealers A and B execute their trade on a IDB's platform, then, assuming both dealers and the IDB are members of FICC, the two resulting trades are submitted to FICC. Because the IDB's position nets down to zero, after novation the resulting obligations are between dealer A and FICC and between FICC and dealer B.

FICC offers two repo-related services to its members. The first is the FICC Delivery-versus-Payment Service (DVP). The second is the General Collateral Finance Repo Service (GCF Repo™).[9] While there are a number of differences between these two services, two significant ones are that GCF Repo only accepts general collateral repo trades, and a member settles its net position resulting from this service on the tri-party repo settlement platform run by the Bank of New York Mellon.[10] In contrast, repo trades submitted to DVP must specify the exact securities being delivered or received, and a member settles its end of day net position from this service using its own clearing and settlement arrangements.

The DVP Service is the focus of this paper, because it is through this service that FICC offers the Sponsored Repo Service. Agueci et al. (2015) provides a wealth of detail on GCF Repo.

1.2.2 Dealer-to-Customer Repo: Tri-Party and Uncleared Bilateral

The dealer-to-customer segment is comprised of two segments: the tri-party market and the uncleared bilateral space. Tri-party activity is largely composed of large broker-dealers borrowing funds from MMFs and other cash-rich investors. The Bank of New York Mellon, currently the sole tri-party agent for government securities, provides a range of services in this

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

[10] A general collateral repo is one where at trade execution, the parties to the trade agree that any securities within a specific asset class can be delivered at settlement (e.g., all Treasury securities are permissible). By its nature, the economic driver behind a general collateral repo is to obtain cash.

capacity, including custody, valuation, margining, and collateral optimization. That said, the tri-party agent does not novate or net trades and these trades are not centrally cleared.

There is not much data on the uncleared bilateral segment of the repo market, and so less is known about its structure.[11] This segment is largely a market between broker-dealers and their customers, where a dominant portion of activity involves levered customers.[12] In contrast to the interdealer market, the network within the uncleared bilateral space is not considered dense.[13] Dealer-to-customer trades are executed using a number of channels ranging from voice to request-for-quote platforms. Trades in this segment are not centrally cleared, but rather are bilaterally cleared and settled with each participant using their own clearing and settlement arrangements.

1.3 Why do dealers find central clearing valuable?

As described above, interdealer Treasury repo trades are centrally cleared, making FICC's role as a central counterparty (CCP) an important and prominent part of the market. The main benefits of using the CCP are the settlement and balance sheet benefits, as well as the mutualization of risk.

1.3.1 Settlement netting

The benefit of settlement netting is a reduction in the risk of settlement. As part of their market making strategy, dealers often engage in both repos and reverse repos. For example, dealer A may enter into a repo contract with a dealer B to deliver specific U.S. Treasuries against cash and enter into a reverse repo with a dealer C to source those same Treasury securities (against

[11] The OFR has led two pilot data collections on this segment of the market, the results of which are displayed on the website: `https://www.financialresearch.gov/data/collections/pilot-data-collections/`. Further, the OFR will start systemically collect data on this segment shortly; see this website for more information: `https://www.financialresearch.gov/data/collections/non-centrally-cleared-bilateral-repo-data/`.

[12] Hempel et al. (2023b) find that hedge funds are the counterparties for over 75% of repo and 50% of reverse-repo in the non-centrally cleared bilateral market.

[13] The European repo market is also spilt into an interdealer segment and a dealer-to-customer segment. Using data from a relatively new survey focused on repo activity, Eisenschmidt et al. (2024) report that the median customer trades with one dealer.

cash).[14] Without central clearing, dealer A needs to be involved in the settlement of both trades and so is exposed to the inherent risks around these settlements. With central clearing of both trades however, the dealer has zero net position with the CCP; final settlement is achieved by having the securities flow from Dealer C to the CCP to Dealer B; Dealer A is no longer exposed to the settlement risks of those trades.

Given that dealers' trading strategies often involve engaging on both sides of the market, such as making markets for customers, settlement netting can be substantial, and so significantly reduce the settlement obligations of, and the inherent risks to, a dealer. A further benefit of settlement netting is the support it provides for anonymous trading on the IDB platforms. IDBs tend to be thinly capitalized firms which specialize in providing trade execution services to dealers, including anonymity. This anonymity is only guaranteed because the IDB acts as a principal between the two participants on the platform.[15] Given the vast number of repo trades executed on an IDB's platform, the resulting gross settlement obligations, and their accompanying risk, would require an IDB to hold a large amount of capital. Settlement netting substantially reduces this risk.

Settlement risk is further mitigated for IDBs in the repo marketplace, as they and the participants on the IDB platform are members of FICC. As a result, these trades are often communicated to FICC in near real-time, resulting in the FICC guaranteeing the settlement of the trade and novating it, further reducing the IDB's exposure to the inherent settlement risks.[16]

1.3.2 Balance sheet netting

Central clearing also provides balance-sheet netting benefits. These are accounting benefits that result in the net value of repo positions being reported on a dealer's balance sheet, under certain conditions, as opposed to gross positions. This can benefit a dealer because a smaller

[14]From the dealer's perspective, a repo is an obligation to deliver securities against cash and a reverse repo is an obligation to accept securities and deliver cash. Accordingly, repo trades show up as liabilities on the dealer's balance sheet and reverse repo trades show up as assets.

[15]The IDB role is sometimes referred to as a"riskless principal" because there is no market risk associated with standing between the two participants executing a trade. As pointed out in TMPG (2019), however, the IDB is exposed to other kinds of settlement risk.

[16]For repo, discussions with market participants convey that the vast majority, if not all, of participants on the leading IDB platform are FICC members. This is not the case for the cash Treasury market, causing the IDB to hold exposures to participants on their platform. This risk is highlighted and discussed in TMPG (2019). Furthermore, the SEC's December 2023 rule on central clearing in the U.S. Treasury Market highlights this risk.

balance sheet requires a firm to hold less capital. For those dealers that are part of bank holding companies (BHCs), balance sheet netting helps the BHC meet several regulatory targets, such as the supplementary leverage ratio.

A necessary feature to net a repo and reverse repo on a balance sheet basis is for the trades to have the same maturity date and the same counterparty. Because of novation, all the repo trades submitted to FICC by a dealer result in the dealer facing FICC, making netting possible. Hence, returning to the example above of Dealer A entering into a repo with Dealer B and a reverse repo with Dealer C, we see that Dealer A cannot net those trades on a balance sheet basis because the counterparties are not the same. If those trades are centrally cleared however, Dealer A faces FICC as a counterparty for both trades. As a result, central clearing increases the chance these trades can now be netted down on a balance sheet basis (assuming the other conditions of balance sheet netting are satisfied).[17]

1.3.3 Mutualization of risk

A major benefit of central clearing is the transformation of counterparty credit risk. For repos, counterparty credit risk arises because there is a time gap between when a repo is executed and the opening leg settles, as well as a period of time between the settlement of the open and close legs. The usual counterparty credit risk arises because of a counterparty default in the time between the settlement of the open and close legs.[18] If the repo is centrally cleared however, this counterparty credit risk is transformed into an exposure to FICC, which has a different, and typically safer, risk profile.[19]

The safe credit profile of FICC is driven by at least two factors, aside from the aforementioned benefits of multilateral settlement netting. First, FICC follows a uniform, rigorous, and

[17]For a dealer to net a repo and reverse repo trades on a balance sheet basis, the trades need to meet a set of criteria, including having the same counterparty, have the same settlement date for the second leg of the repo (the return to the securities), and use the same account at the clearing entity for cash inflows and outflows of the transaction upon settlement. For precise details, see FIN41, the Financial Accounting Standards Board.

[18]If the dealer is lending cash against securities, such a default means the dealer needs to liquidate the securities in the Treasury market in order to replace its cash. If the dealer is lending securities against cash, then the dealer turns to the Treasury market and uses the cash to purchase the specific securities it lent out. In both cases, the dealer could end up taking a loss.

[19]Menkveld and Vuillemey (2021) provide an overview of the literature on central clearing, including an works on the costs and benefits of loss-mutualization.

transparent set of rules to manage its credit risks. This involves both parties to the trade posting margin to an FICC clearing fund as well as FICC making public a series of steps detailing how it will handle default. Second, by its nature, FICC can monitor the repo market in near real-time and closely track the positions taken by all of its members. This information provides FICC with a market-wide perspective, allowing FICC to observe emerging risks in repo and better protect itself from default.

1.4 How does the sponsored repo service fit into this market structure?

Sponsored DVP Service (sponsored repo) is a FICC product-offering which expands the set of trades which can be centrally cleared, by bringing in dealer-to-customer trades. Under this service offering, the dealer and customer agree to submit their trade to FICC's DVP service for central clearing. Assuming the trade meets the requirements for the Sponsored DVP Service (e.g., current requirements are that repos are of overnight maturity and involve only Treasury securities), FICC will accept the trade for central clearing and novate it, standing between the customer and dealer for purposes of settlement.

This service differs from the previously explained centrally clearing services. Crucially, the aforementioned GCF Repo and FICC DVP services are only available to direct clearing members of FICC which, as indicated in the name, directly interact with FICC. The sponsored repo service differs in that it allows the customers of direct clearing members indirect access to FICC. Direct clearing members who bring on customers become a "sponsoring member" and their customer is referred to as a "sponsored member." The costs and benefits of sponsored repo differ substantially from those offered by GCF Repo and FICC DVP, as detailed below.

Note that in late 2021, FICC introduced a related service, the Sponsored General Collateral Service (sponsored GC). This service clears and settles trades on the tri-party settlement system run by the Bank of New York Mellon.[20] Currently, the volumes of activity cleared in sponsored GC are a fraction of those cleared in sponsored repo, although that may be change given the SEC's mandate around central clearing.[21] There are a number of differences between the two

[20]The official description of this service can be found at this website: `https://www.dtcc.com/clearing-and-settlement-services/ficc-gov/sponsored-membership`.

[21]DTCC publishes aggregate volumes on sponsored services at `https://www.dtcc.com/charts/membership`.

sponsored services, but perhaps the most salient are that sponsored GC utilizes Bank of New York Mellon's tri-party settlement platform, only accommodates general collateral repo, and includes agency MBS repo. Note that in this paper we do not examine sponsored GC activity.

1.5 What are the costs and benefits of the sponsored service to the dealer?

The main benefit to dealers from engaging with sponsored repo is balance-sheet netting. Some trades dealers do with customers are naturally balance sheet netted.[22] For instance, relative value hedge funds often trade one security against another, as is the case in on-the-run/off-the-run trades. In this case the dealer will have both a repo and reverse-repo position with the same customer, and, assuming the maturity dates are the same, on a balance sheet basis these exposures will net as shown in Figure 1.

[insert Figure 1 here]

However, dealers often engage in matched book repo where one side of the trade is with a customer and other side is with another dealer (or perhaps a different customer). For example, a common strategy employed by dealers is to fulfill a customer request for funding by engaging in a reverse repo. The dealer then sources that funding in the interdealer market, by entering into a repo with another dealer. Whereas the inter-dealer repo trade can be centrally cleared, before the introduction of sponsored repo, the reverse repo trade with the customer was not eligible for central clearing. With sponsored repo, however, this trade can now be brought into central clearing and, as a result, the dealer can net the repo and reverse repo trades on its balance sheet as shown in Figure 2. Similarly, borrowing from one sponsored member can be netted against lending to another.

[insert Figure 2 here]

Given the current processes used by FICC to settle sponsored repo trades, there are only

[22] As Hempel et al. (2023b) describes, sets of these repo trades are often offered to clients like hedge funds and referred to as "netted packages."

small settlement netting benefits to the dealer.[23] Further, the dealer does not fully benefit from the mutualization of losses that comes from central clearing. This is because a condition of using sponsored repo is that the dealer guarantees the performance of the customer. As part of this guarantee, the dealer is obligated to post margin with FICC with respect to such sponsored repo trades, though the sponsoring dealer can pass such margin fees (or additional margin) along to the sponsored customers.

All FICC trades are subject to a Value at Risk (VaR) charge in calculating margins. An illustration of this margining process is provided in Figure 3. For a trade between direct clearing members, as illustrated in the top panel, FICC first calculates net positions by each security type (CUSIP) across trades, and uses these net positions to form a portfolio of exposures. Suppose direct clearing member borrows security Y from another member, A, and lends security X to a third member, B. This entails a long exposure to security X, since the member has been promised that X will be returned to them, and similarly a short exposure to security Y. If securities X and Y are identical, these exposures cancel out and there is no margin charge. If they are not identical, FICC then uses a historical model of returns to calculate the 1% value at risk of this combined long/short portfolio. To the extent that security X and Y are correlated, it will reduce the margin relative to each exposure considered independently.[24]

[insert Figure 3 here]

In contrast, for sponsored repo trades, as shown in the bottom panel, instead of calculating net positions across all trades, the portfolio between each sponsoring member and the entity they are sponsoring is treated separately, as if the sponsored member faced FICC directly. Therefore, instead of netting positions in the same CUSIP as is done for trades with direct clearing members, positions are only netted if the long and short repo are with both the same CUSIP and the same counterparty. A trade where the dealer borrows a security from customer A and lends it to customer B therefore leads to two separate exposures to security X and security Y, which are not offset. Margin charges are then calculated on the net portfolio between

[23] Currently, the only settlement netting the dealer gets with sponsored repo is within each customer. For example, from the dealer's perspective, an obligation to deliver a specific security to a customer in sponsored repo will not be netted on a settlement basis against an obligation to accept the same specific security from a counterparty in the interdealer segment of central clearing. Dealer will be involved in the settlement of both transactions.

[24] A floor to the margin charge limits this offset from correlated securities.

the sponsor and each sponsored entity, and the total charge is the sum of all margin charges on each portfolio. Again, this means that two trades no longer are offset by the correlation of the collateral, but instead each creates individual charges.

In practice, this means that the margin charges for the sponsoring member in sponsored trades are much larger, since a position from a (for instance) hedge fund's borrowing cannot be netted (either directly or through offsets in the VaR calculation) against one from intermember lending or from (say) money market fund lending. This provides FICC with extra protection since FICC's clearing fund guarantees the sponsor's side of each trade. But it also makes the trades significantly more expensive for the dealer, especially since many customers such as money market funds are sometimes unwilling to deliver margin to their sponsor, preferring instead to receive margin as they do for tri-party repos. As a result, surveys of dealers have found that margin costs, along with operational and administrative costs, provide the primary limits on sponsored activity by dealers.[25]

1.6 What are the costs and benefits of this service to the customer?

For the customer, a main benefit of sponsored repo is the shift in counterparty risk to FICC. Given FICC's safe counterparty credit risk profile, customers usually value this shift in credit exposure. In addition, customers typically value a diversification in credit risk across their counterparties. Sponsored repo also increases cash borrowing and lending opportunities by increasing the effective set of counterparties available to a customer.

A main cost of participation for customers is the fixed cost of obtaining eligibility to the program from FICC (i.e., becoming a sponsored member). Another cost might be the transformation of a trade with a dealer with which the customer has a relationship, to FICC, an institution which acts more like a financial utility. As a result, it will likely be more difficult (but not impossible) for a dealer and customer to renegotiate the terms of a trade once it has been cleared through sponsored repo. Also, FICC accepts only a standard set of repo contracts for its sponsored repo service (although this could change with time). For example, currently only repo contracts with fixed terms are allowed; optionality on maturity such as puts, calls, and evergreens are not accepted by FICC.

[25] See the December 2023 Senior Credit Officer Opinion Survey on Dealer Financing Terms, available at `https://www.federalreserve.gov/data/scoos/files/scoos_202312.pdf`.

It is not clear what role that margin plays in driving sponsored trades from the customer's point of view. FICC charges a margin to clear sponsored repo transactions, but is silent on how that margin is sourced. As a consequence, which entity (the sponsored member or the sponsoring member) ultimately pays the margin to FICC may differ across both sponsoring members and customers. Conversations with market participants reveal that currently the prevailing case is that the sponsoring member (the dealers) pay the margin to FICC. Moreover, in some trades with money market funds, on top of FICC's margin, dealers may be expected to deliver a two percent haircut to the money market fund to match prevailing practices in tri-party repo.

1.7 What are the costs and benefits of this service to the market?

An increase in the use of sponsored repo benefits the market in two major ways. First, the clearing and settlement services provided by FICC are transparent and rigorously risk managed. In contrast, the same processes used to bilaterally clear and settle dealer-to-customer trades are varied and opaque. As noted in TMPG (2022), a white paper on clearing and settlement published by the Treasury Market Practices Group (TMPG), there is a concern that the wide disparities in clearing and settlement of repo between dealers and customers might reflect differences among market participants in their understanding of the risks involved with settlement. Further, the opaqueness of this segment may obscure some "participants' ability to accurately identify and manage clearing and settlement risks."[26] As a result, the movement of trades into central clearing increases the set of trades which are cleared and settled is a transparent way, lowering the overall risks of settlement.

Second, FICC is better positioned to mitigate fire sales in cases of default. It has a well-documented process to deal with the default of members, which is subject to regulatory oversight. As a result, FICC is well situated to liquidate a defaulting member's position in an orderly way, a process that should minimize fire sales. With more repo trades centrally cleared, the smaller the fire-sale risk faced by the market.

A main cost of increasing the use of sponsored repo is the further concentration of risk at FICC in the repo market. Moreover, increased concentration of the operational aspects of the repo market in FICC could mean that if FICC were not able to open on a particular day there

[26] See the "Potential risks and resiliency issues" summary section starting at the bottom of page 4 of TMPG (2022).

would be no alternative venue for repo trades to be booked and settled.

The margining requirements on sponsors limits the direct counterparty exposure of FICC to a sponsored member. In an extreme case, however, it is possible that the default of a sponsored member spills over and causes the sponsoring member to have difficulties in meeting its obligations, in which case the FICC will have to directly confront the failing of one of its full members.

2 Empirical Description of Sponsored Repo

In this section we introduce the data and describe sponsored repo activity both in the cross-section and over time.

The data we use for our analysis comes from a relative new data source, the OFR Repo data collection. This collection is run by the Office of Financial Research at the U.S. Department of the Treasury and began collecting data in October 2019. The OFR Repo data collection collects daily, transaction-level data from both of FICC's repo-related services.[27] Given this paper's focus on the Sponsored DVP Service, we concentrate on repo transactions cleared by the DVP Service. The sample period is from January 2020 through June 2024.

These data allow us to see a great amount of detail, including the specific securities exchanged, the principal amount, the repo rate, and counterparties involved. FICC DVP's service clears both Treasury securities and agency debentures, however trades involving Treasuries make up more than 99.9 percent of trades in terms of value. To provide a cleaner analysis of the data, we exclude trades involving agency debentures from our empirical analysis.

The detail of trades captured in the data allow us to distinguish among trades based on whether they are between direct clearing members of FICC or between sponsoring members and sponsored members. We classify trades where the sponsored member is borrowing cash as "sponsored borrowing," whereas trades when the sponsored member is lending cash are classified as "sponsored lending." All other trades cleared by the DVP service (i.e. trades between two direct clearing members) are "interdealer" trades.

[27] Information on this data source, including the exact data fields collected and instructions to respondents, can be found on the OFR website: `https://www.financialresearch.gov/data/cleared-repo-data/`. Note that we use the data collected on Schedule 3: specific securities trades.

We further classify these trades by whether they are primarily motivated to source funding or to source securities. Since there is no direct data element in the survey that identifies the motivation for a trade, we classify all trades involving on-the-run through third-off-the-run Treasuries as "securities trades" while all other trades are classified as funding trades.[28] While imperfect, similar classifications have been used in the past by Bowman, Louria, McCormick, and Styczynski (2017) and Hempel and Kahn (2021).[29]

In Table 1, we display the average volumes by segment and trade type over the sample period. On average, sponsored trades made up 29.5% of total transaction volumes, with sponsored lending making up 15.9% of volumes and sponsored borrowing making up the remaining 13.6% (see the Total column). Therefore, on an average day, sponsored repo is more heavily used to centrally clear dealer-to-customer trades where the customer is delivering cash and receiving securities. Further, sponsored repo skews towards funding trades. In particular, the largest segment of sponsored repo is sponsored lending for funding, with an average daily total of $208.5 billion. This is followed by sponsored borrowing for funding, with an average daily total of $166.6 billion. Securities trades account for a smaller share of activity, for both sponsored lending and borrowing, the average daily total is $35.8 and $42.7 billion, respectively.

[insert Table 1 here]

The two main groups of dealers' customers that take advantage of sponsored repo are money market funds and hedge funds (see Table 2). Money market funds, who are looking to invest their cash holdings in short-term secured investments, dominate sponsored lending for funding, accounting for 69.8% of daily activity, whereas hedge funds dominate sponsored borrowing, accounting for 75.9% and 86.0% daily activity for funding and securities trades, respectively. The motivations for hedge funds to enter into sponsored repo vary, usually reflecting the various trading strategies in which they are engaged. For example, relative value

[28] The U.S. Treasury auctions securities with a set number of maturities, such as 5-, 10-, and 30-year maturity. For a given date, the latest-issued securities for each maturity are labelled "on-the-run". A security which was on-the-run but has just been supplanted by a new issuance is labeled "first-off-the-run", and so on. By considering on-the-run through third-off-the-run, we are considering the four latest issuances of Treasuries by each maturity type.

[29] Another approach to differentiating between funding and securities types of trades is to use the repo rate. In the construction of SOFR, for example, the filter used to keep mainly funding trades is to drop all trades in the lower quartile of the rate distribution.

hedge funds often seek to take positions along the Treasury yield curve, by shorting specific Treasuries that they consider are over-valued and going long on specific Treasuries which they believe the market is under-valuing (Dikanarov, McBride, and Spieler, 2017).

[insert Table 2 here]

The dynamics of sponsored repo are illustrated in Figure 4, which plots total sponsored lending and borrowing over the sample period. From 2020, the beginning of the sample period, until 2022, sponsored lending activity was greater than sponsored borrowing, and often by a substantial amount. This pattern changed starting in mid-2022, when both types of sponsored repo became roughly equal in terms of value and both increased at a sharp clip, more than doubling in value by the end of the sample period (mid-2024).

[insert Figure 4 here]

We also consider the dynamics of funding versus securities trades settled using sponsored repo. Funding trades share of total activity by sponsored repo type is illustrated in Figure 5. This share is high throughout the sample period, fluctuating between 70 and 90 percent for both sponsored lending and borrowing. There are somewhat regularly occurring spikes in these shares, especially for sponsored borrowing. Many of these occur around end-of-quarter dates and are likely driven by participants reacting to repo rate disruptions that occur on these dates due to regulatory reporting requirements.[30] These same spikes in activity are also seen in Figure 4.

[insert Figure 5 here]

Finally, we turn to rates, and for ease of comparison focus on trades with overnight maturity. Overnight maturity is by far the dominant maturity type, accounting for 98 and 92 percent of sponsored lending and borrowing trades, respectively, in terms of value. In Figure 6 we plot both average rates for sponsored lending and sponsored borrowing, as well as show the average rate between two direct clearing members of FICC (interdealer) as a point of reference. All

[30] See Munyan (2017) and Anbil and Senyuz (2018) for analysis of the window dressing that occurs on end of quarter dates in the repo market.

rates are illustrated as a spread to the Federal Reverse's interest on reserves balances (IORB) policy rate, because monetary policy did change during the sample period. Indeed, note that the March 2020 Covid-19 shock to Treasury markets is reflected in the data, with sponsored lending and borrowing rates spiking up for both funding and securities types of trades, likely reflecting dealers' unwillingness to enter into matched repo trading during this period of high aggregate uncertainty.

[insert Figure 6 here]

Over the sample period, the average rates of sponsored borrowing, whereby the customer is obtaining cash and delivering securities, are markedly above the inter-dealer rate. This is expected, in that customers are paying a premium on the cash they borrow through sponsored repo compared to the rate dealers pay for funding themselves. This same relationship is expected to hold for sponsored lending, where customers delivering cash against securities receive lower rates on their cash compared to the rate earned by dealer investing cash themselves. In practice, however, we find that the rates of sponsored lending are sometimes below the inter-dealer rate and sometimes roughly equal to it.

Further, these spreads reveal that roughly speaking, sponsored borrowing rates were mostly above IORB until the start of 2021, whereas interdealer and sponsored lending rates were mostly at or below IORB. There is a change in 2021, where all three rates fall below IORB (the spreads are all negative). This decline in rates is likely driven by the Federal Reserve's quantitative easing policy during this time as well as the decline in balances held at the Treasury's general account.[31] Finally, there is another change starting in early 2022 where the gaps between sponsored borrowing, interdealer, and sponsored lending widen, especially for funding trades (see Figure 6a). One likely driver of this change is a notable uptick in repo borrowing by hedge funds in response to the profitability of the cash-futures basis trade.[32]

[31] See Hempel and Kahn (2021) for a more detailed analysis of the drivers of repo rates over this period.

[32] For a more detailed discussion of the intersection of the cash-futures basis trade and repo markets, see Barth and Kahn (2021) and Barth et al. (2023).

3 The Drivers of Sponsored Repo Activity and Rates

We now turn to understanding the drivers behind sponsored repo activity. We begin by describing what are the potential drivers behind sponsored repo activity and then use regression analysis to analyze how these drivers affect quantities and rates.

3.1 Description of sponsored repo drivers

Given the variety of financial firms active in repo as well as the centrality of the Treasury market, there are number of potential drivers behind sponsored repo activity, which we group into five categories. A summary of these drivers and their expected correlations with sponsored repo activity is provided in Table 3. Summary statistics of these variables are provided in Table 4 and, in the appendix, we list their data sources.

The first category is the issuance of Treasury coupon securities. Given that securities dealers and their levered customers tend to fund their purchases of coupon Treasury securities using repo, we expect an issuance of Treasury coupons to increase sponsored borrowing and lending activity.

The second category is money market mutual fund's (MMF) supply of cash into repo, and it includes four measures. The first measure is the issuance of Treasury bills. These securities can be owned outright by MMFs and are usually considered as a potential substitute for repo by MMFs. Therefore, we expect this variable to have a negative association with sponsored lending activity, given MMFs are the main entities lending cash in sponsored repo.

The second measure in the second category is the change in MMF assets under management, with the expectation that higher assets translate into high cash holdings, and so greater cash invested through sponsored lending. The third measure is the total amount of cash placed at the Federal Reserve's overnight reverse repo facility (RRP). This facility allows eligible participants to invest cash with the Federal Reserve (against Treasuries) at an administered interest rate. Although there is a variety of financial institution types eligible to use the RRP, MMF's are by far the largest user type (Hempel, Isley, Kahn, and McCabe, 2023a). The correlation between sponsored repo and ON-RRP activity is ambiguous as the ON-RRP could serve as a substitute for repo activity or as an additional place to invest cash given an unexpected increase in MMF cash holdings.

The fourth measure in this second category is corporate tax payments. As noted in Afonso et al. (2021), corporations typically make tax payments by reducing the amount of cash held at mutual funds. As a result, larger tax payments are associated with temporarily smaller cash holdings at mutual funds, which means there is less cash available to place into repos. Therefore, we expect corporate tax payments to reduce sponsored lending.

[insert Table 3 here]

The third category is SOMA activity and includes the change in SOMA's securities lending activity as well as SOMA net coupon purchases.[33] There is not a clear prediction of the association between either of these measures and sponsored repo activity due to equilibrium effects.

The fourth category is the change in the amount of cash sitting in the Treasury general account (TGA). Increases in the TGA account, all else equal, removes reserves from the financial system and so is this variable likely to be correlated with decreases in sponsored repo activity. That said, dealers could respond to customers increase in demand for repo funding (given the decline in funding elsewhere in the money markets) by placing trades into sponsored repo to minimize balance sheet costs.

The fifth category considers a measure which proxies for the amount of activity associated with the cash-futures basis trade. This trading strategy aims to take advantage of a divergence in pricing in the Treasury futures market and the Treasury cash market and involves hedge funds acquiring funding in the repo market.[34] In practice, dealers often try to reduce the balance sheet costs of funding this trade by using sponsored repo. Therefore, as in Barth, Kahn, and Mann (2023), we expect to find a positive association between measures of basis trade activity and sponsored borrowing. We use the amount which hedge funds are short Treasury futures as a proxy for financial activity associated with this strategy. The measure

[33] Securities dealers typically use the SOMA securities lending facility by delivering Treasuries which are relatively easily obtainable in the marketplace and receiving Treasuries which are in scarce supply. As noted in the SOMA annual for 2023 (p. 17), "To the extent that the SOMA has holdings of specific securities, securities lending can help alleviate periods of scarcity for those securities, such as when individual issues experience high levels of short positioning or elevated settlement fails."

[34] See Schrimpf et al. (2020), Barth and Kahn (2021), Banegas and Monin (2023), Barth, Kahn, and Mann (2023) and Glicoes et al. (2024).

averages \$474 billion in our sample period, with a large amount of variation, as revealed by a standard deviation of \$253 billion.

Finally, we include month-end variables to capture unusual month-end activity in the repo markets. For example, as described in Munyan (2017) and Correa, Du, and Liao (2020), foreign securities dealers often adjust their month-end repo activity in response to regulations. In these periods, balance sheet space becomes scarcer in the aggregate since foreign securities dealers pull back on their gross intermediation activity. Therefore, bringing these dealers' customers into sponsored repo, with its potential to allow for balance sheet netting, may be advantageous on these particular dates.

[insert Table 4 here]

3.2 Regression analysis of sponsored repo quantities

We use the above economic drivers to explain dynamics in sponsored lending and borrowing quantities using regression analysis, focusing on funding and securities trades separately. We consider total daily volumes and given the secular trends in this repo segment, we define the dependent variables to be changes in daily volumes. Letting t denote the date, the empirical specification is:

$$\Delta Y_t = \alpha + X_t^{'}\beta + \Delta Z_t^{'}\Gamma + \eta \mathrm{ME}_t + \varepsilon_t, \tag{1}$$

where we estimate this specification for four different series for ΔY_t. Specifically, we let ΔY_t be the change in daily total value of (i) securities trades within sponsored lending, (ii) funding trades within sponsored lending, (iii) securities trades within sponsored borrowing, and (iv) funding trades within sponsored borrowing. The matrix X_t contains the independent variables which are stocks, such as Treasury issuance and hedge fund short positions in Treasury futures, and the matrix ΔY_t contains the independent variables which are changes in daily values, such as the change in RRP volumes. Finally, ME_t is an indicator variable equal to 1 if the date is at the end of the month and ε_t is an independent and identically distributed error term.

The estimated coefficients from all four regressions are reported in Table 5. In this table, and for all other regression results, robust standard errors are reported, using the sandwich estimator of variance. As expected, Treasury coupon net issuance has a positive and statistically

significant effect on both sponsored lending and borrowing for securities trades (which, by definition, include newly issued securities). The coefficients imply that a $6 billion increase in coupon issuance (the mean amount in the sample period) drives a $576 thousand increase in sponsored lending and a $360 thousand increase in sponsored borrowing.

[insert Table 5 here]

For the drivers associated with MMF activity, we have a range of results. We find that Treasury bill net issuance has the expected negative association with sponsored repo, but none of the estimated coefficients are statistically significant. Similarly, changes in MMF assets have the expected positive association with sponsored repo, but the statistical significance is weak.

Turning to changes in RRP volumes, we find this variable has negative association with changes in sponsored lending for funding trades, implying that MMFs view the RRP and sponsored repo as substitutes. The estimated coefficient implies that a one standard deviation increase in the change in RRP, a $44 billion increase, predicts a $3,388 thousand decrease in sponsored lending for funding purposes. Further, changes in RRP volume have a positive association with changes in sponsored borrowing funding trades. This likely reflects dealers willing to fund levered customers through central clearing when funding elsewhere in the money markets declines (as in the case when MMFs place cash at the RRP).

Finally, corporate tax payments have a positive association with sponsored borrowing. With as the RRP, this dynamic likely reflects the fact that dealers are willing to enter into centrally cleared repos with customers when the cash available in the money markets declines. Unlike the RRP, this effect affects securities and funding trades within sponsored borrowing.

For SOMA activity, we find that SOMA purchases of Treasury coupons have a negative effect on sponsored borrowing volumes. A $2.7 billion increase in these purchases, the mean amount of SOMA net coupon purchases in the sample period, decreases sponsored borrowing of securities trades by $130 thousand and of funding trades by $170 thousand. SOMA securities lending effects sponsored repo through a different channel, it has a negative association with sponsored lending of funding trades, reflecting its use by dealers. Dealers deliver securities to SOMA which are in ample supply (used in funding trades) for those which are scarce (used in securities trades).

Lastly, we consider TGA balances and hedge funds short positions in Treasury futures. For changes in the TGA balance, the estimated coefficients imply that an increase in this account, which reduces the level of total reserves, are associated with a fall in sponsored repo activity across the board. These coefficients, however, are statistically weak or insignificant. Similarly, we find that hedge fund short positions do not have statistically significant effect on changes in sponsored repo volumes.

The month-end indicators have large and statistically significant effects on sponsored repo activity. This seasonality is driven by dealers based in countries outside of the U.S., as they reduce how much repo they enter into so as to reduce their balance sheet at the end of the month, in response to regulations (for example, see Correa, Du, and Liao (2020)). In other repo segments, this seasonality results in a decline in repo activity, but the results for sponsored repo show an *increase* inactivity. This result suggests that dealers, as a group, as moving some of their dealer-to-customer activity into central clearing on month ends, in order to minimize the impact of these trades on their balance sheet.

Overall, we find that sponsored repo volumes move in line with aggregate shocks to repo such as Treasury coupon issuance and SOMA net purchases. Further, there is evidence of market participants increasing sponsored repo activity in response to a decline in overall reserves (for the sponsored borrowing regression, see the coefficients on corporate tax payments and change in RRP). These results along with the estimated positive coefficient for end-of-month dates suggest that the balance sheet netting benefits of sponsored repo is a significant driver of volumes. Further, the sponsored lending results suggest that MMFs see the RRP and sponsored repo as substitutes.

3.3 Regression analysis of sponsored repo rates

This section focuses on sponsored lending and borrowing rates using the same economic drivers described above. We use the same specification detailed in equation 1, except the dependent variable is a rate. We compute value-weighted average daily rates and construct sponsored repo spreads. We analyze spreads rather than levels because spreads better account for market-wide shocks. We focus on the following three spreads: (i) the sponsored borrowing rate minus the interdealer rate, (ii) the interdealer rate minus the sponsored lending rate, and (iii) the sponsored borrowing rate minus the sponsored lending rate. These rate spreads are

computed for funding trades and securities separately, giving us six dependent variables. These dependent variables are displayed in Figure 6, and note that on a given day, it is generally the case that for either funding trades or securities trades, the average sponsored borrowing rate is greater than the average interdealer rate, which in turn is greater than the average sponsored lending rate.

Results from the three rates regressions for funding trades are displayed in Table 6 and those for securities trades are displayed in Table 7. Most results are consistent across both sets of regressions. We find that the coefficient on Treasury coupon net issuance is significant and negative in almost all the rate regressions. The coefficients imply that a $6 billion increase in issuance leads a roughly 0.3 bps decrease in spreads. The estimated coefficient for the regression on the spread between sponsored borrowing and interdealer rates is smaller in magnitude (first column) than the estimated coefficient on the spread between the interdealer rates and sponsored lending (2nd column). This suggests that the greater demands for funding from dealers and hedge funds which are related to Treasury coupon issuance, lead to higher rates for MMFs (the main customer type for funding trades within sponsored lending).

[insert Table 6 and Table 7 here]

Of the four measures related to MMFs, only the change in their overall assets has a statistically significant effect on spreads. For both funding and securities trades, a one standard deviation increase in MMF assets, equal to $33 billion, leads to higher spreads ranging from 0.99 to 2.64 basis points.

For SOMA activity, we find the securities lending activity does not affect spreads, whereas Treasury coupon net purchases have a significant and negative effect on spreads. This could be because these purchases relieve balance-sheet pressure on banks, but it could also be because the period of SOMA purchases around the March 2020 Covid-19 event also coincided with a general decrease in repo market spreads as reserves increased.

Turning to TGA balances, the estimates imply that an increase in these balances, which reduces overall reserves, has a negative effect on spreads for securities trades. The relative magnitude of the estimated coefficients across the various spreads suggest that the narrowing of the spreads is largely due to dealers' customers earning higher rates in sponsored lending

due to a lower total supply of reserves.[35] For funding trades, the effect on spreads is also negative, but at best has weak statistical significance.

Hedge funds short positions in Treasury futures has a positive effect on spreads (with one exception). Focusing on the spread of sponsored borrowing to sponsored lending, the estimated coefficients of 0.007 and 0.008 for securities trades and funding trades, respectively, imply that a one standard deviation increase in this measure, equal to a $253 billion, leads to a 1.77 to 2.02 basis point increase in spreads. This somewhat large economic effect reflects the central role played by repo as a market for hedge funds to gain leverage, especially for those executing the Treasury cash-futures basis trade.

Finally, we find the expected month end effects of a large increase in spreads. For the spread between sponsored borrowing and lending, the estimated increase on month ends is 3 to 4 basis points for funding and securities trades.

Taking all these results together, we find that sponsored repo spreads are affected by a range of factors. The three drivers with the largest economic effect are change in MMF assets, hedge funds short futures position, and end-of-month dates. The first driver reflects the dominant role of MMF as cash investors in repo and the second driver captures the behavior of dealers to place their funding-oriented repos with hedge funds into central clearing, to minimize the balance sheet impact of these trades. Finally, the positive month-end effect on spreads documented here are consistent with the results in the literature documenting a general rise in balance sheet costs for dealers on these particular dates.

4 Conclusion

The Treasury market has experienced several episodes where market functioning has been severely disrupted over the past decade. These events have highlighted the importance of dealer-intermediaries in these markets. Although significant work studying intermediaries has been done for the more well-known Treasury markets, there has been little attention paid to sponsored repo, a rapidly growing segment where dealer-to-customer repos are centrally cleared. This segment is unusual enough that lessons learned about dealer intermediation from

[35] As detailed in Table 2, the total amount of sponsored lending for securities trades is quite small and spread across MMFs, hedge funds, and other customer types.

other Treasury markets may not carry over.

As a result, this paper provides a novel examination of the salient forces behind a dealer-intermediary decision's to clear and settle trades in sponsored repo. We begin by detailing the incentives to both dealers and their customers to use sponsored repo versus bilateral clearing (the previaling standard). In particular, we lay out how from a dealer's perspective, sponsored repo provides a key tradeoff between lowering the balance sheet costs associated with repo intermediation and raising the capital costs of the trade.

We then turn to quantifying the main drivers of repo volumes and pricing, using detailed trade-level data. We provide evidence that sponsored repo volumes increase when dealers' balance sheet space is scarce, such as when there is large issuance of Treasury coupon securities or on end-of-month dates. Furthermore, there is evidence of market participants increasing sponsored repo activity in response to a decline in the amount of cash available in money markets, such as when corporate tax payments are made to the Treasury. This result is consistent with dealers viewing sponsored repo as a useful tool to accomodate customers' demand for additional repo intermediation, a balance sheet intensive activity. We also find that sponsored repo spreads respond to a range of factors, where the three drivers with the largest economic effect are change in MMF assets, a proxy for hedge fund demand for repo funding, and end-of-month dates.

Sponsored repo is likely to grow more important in the years ahead. With the SEC's central clearing mandate for Treasury repo, repo trades between dealers and customers which are not centrally cleared will likely migrate to sponsored repo. Many repo customers are already preparing paperwork for this transition, and others may have already joined in anticipation of the rule. Indeed, between December 2020 and August 2022, FICC's list of sponsored members increased by only 38, whereas between August 2022 and July 2024, it increased by 555 (a little less than 30%). In the next few years, understanding the details of sponsored repo and the tradeoffs it presents relative to other forms of repo will only grow more important as this service grows further.

Table 1: Average Daily Volumes by Segment

	Funding trades		Securities trades		Total	
	($)	(%)	($)	(%)	($)	(%)
Interdealer	836.9	69.1	249.2	76.0	1086.1	70.5
Sponsored lending	208.5	17.2	35.8	10.9	244.3	15.9
Sponsored borrowing	166.6	13.7	42.7	13.0	209.3	13.6
Total	1211.9	100	327.7	100	1539.7	100

Note: Data are average daily transaction volumes in billions of dollars from January 2020 through June 2024. Interdealer is a trade between two direct clearing members of FICC; Sponsored lending occurs when a FICC sponsored member delivers cash against securities to a direct clearing member; Sponsored borrowing occurs when a FICC sponsored member delivers securities against cash to a direct clearing member. Trades are also classified as a securities trade (trades collateralized with on-the-run through 3rd off-the-run Treasuries) or a funding trade (all other trades).
Source: OFR centrally cleared repo data collection.

Table 2: Average Sponsored Volumes by Segment and Sponsored Member Type

	Money market		Hedge funds		Other		Total	
	($)	(%)	($)	(%)	($)	(%)	($)	(%)
Sponsored Lending								
Funding trades	144.9	69.8	22.8	11.0	39.8	19.2	207.5	100
Securities trades	15.9	43.1	13.3	36.1	7.7	20.9	36.9	100
Sponsored Borrowing								
Funding trades	n.a.	n.a.	121.6	75.9	n.a.	n.a.	160.3	100
Securities trades	n.a.	n.a.	38.5	86.0	n.a.	n.a.	44.8	100

Note: Data are average daily transaction volumes in billions of dollars from January 2020 to June 2024. Sponsored lending occurs when a FICC sponsored member delivers cash against securities to a direct clearing member; Sponsored borrowing occurs when a FICC sponsored member delivers securities against cash to a direct clearing member. Trades are classified as a securities trade (trades collateralized with on-the-run through 3rd off the run Treasuries) or a funding trade (all other trades), and participant type. Other includes banks, closed-end funds, exchange traded funds, insurance funds, mutual funds, official sector funds, pension funds, and private funds. $ is billions of dollars and % is percent. n.a. signifies that the cell entry has been suppressed for confidentiality reasons.
Source: OFR centrally cleared repo data collection.

Table 3: Economic Drivers of Sponsored Repo

Independent Variable	Expected Association with Sponsored Repo Volumes
Treasury coupon issuance	Securities dealers and other leverage financial entities typically fund purchases of Treasury coupons with repo. • Positive association with volumes
MMF activity	
i) Bill net issuance	MMFs can purchase Treasury bills, and so newly issued bills are usually a substitute for repo. • Negative association with volumes
ii) Change in MMF assets	If MMF assets grow, then they are likely to invest more cash in repo. • Positive association with volumes
iii) Change in RRP volumes	RRP could be either a substitute or a complement to repo. • No prediction on volumes
iv) Corporate tax payments	Corporate tax payments lower the cash available in the money markets. Repo rates should rise, but change in volume is ambiguous. • No prediction on volumes
SOMA activity	
i) Securities lending ii) Coupon net purchases	Because SOMA activity is strategic, it has an ambiguous effect on volumes. • No prediction on volumes
Treasury account	Increases in the TGA balance mean there are less cash to lend in the money markets. Repo rates should rise, but change in volume is ambiguous.
i) Change in TGA balance	• No prediction on volumes
Cash-futures basis trade	Increases in this financial activity generate demand for repo financing.
i) Hedge funds short Treasury futures position	• Positive association with volumes

Note: This table enumerates and provides intuition behind the economic drivers of repo volumes examined in the regression analysis. MMF is money-market mutual fund, SOMA is System Open Market Account, and TGA is Treasury general account.

Table 4: Summary Statistics of the Independent Variables

Variables	Mean	Std Dev	Median
UST bill net issuance	3	21.53	0
UST coupon net issuance	6.03	22.14	0
Change in SOMA securities lending	-0.01	3.53	0.01
SOMA net coupon purchases	2.65	8.13	0
Change in RRP volume	0.13	44.02	0.02
Change in MMF assets	10.98	33.4	8.81
Corporate tax payments	1.61	6.08	0.16
Change in TGA balances	-0.37	36.74	1.9
Hedge funds short position in futures	474.41	252.8	394.98
Month-end indicator	0.05	0.21	0

Note: All variables are in billions of dollars, except for the month-end indicator. UST is United States Treasury, SOMA is System Open Market Account, RRP is the Federal Reserve's reverse repo facility, MMF is money market fund, and TGA is the Treasury General Account. Std Dev is standard deviation. Statistics are computed over the sample period of January 2020 to June 2024.
Source: OFR centrally cleared repo data collection.

Table 5: Regression of Change in Sponsored Repo Volumes

Dependent variables	Sponsored Lending		Sponsored Borrowing	
	Securities trades	Funding trades	Securities trades	Funding trades
UST Bill net issuance	-13.963	-12.311	-9.808	-2.029
	(15.471)	(24.460)	(20.829)	(20.695)
UST Coupon net issuance	95.823***	-43.375*	59.546**	-34.788
	(19.431)	(25.590)	(27.838)	(36.043)
Change SOMA sec lending	-8.823	-241.302**	44.556	130.005
	(58.590)	(104.374)	(77.209)	(114.139)
SOMA net coupon	-23.199	-0.649	-48.126**	-63.388**
	(21.183)	(54.905)	(22.982)	(32.152)
Change in RRP volume	-7.158	-76.743***	13.196	34.203***
	(8.242)	(15.950)	(10.233)	(12.068)
Change in MMF assets	9.656*	11.975	11.361*	8.827
	(5.413)	(12.418)	(6.201)	(8.588)
Corporate tax payments	34.983	68.798	127.681**	157.967***
	(51.943)	(70.429)	(57.390)	(58.454)
Change in TGA balances	-14.774	-20.923	-30.561*	-21.726
	(12.933)	(16.756)	(18.557)	(17.528)
HF short futures	0.875	-1.117	0.899	0.453
	(0.835)	(1.664)	(1.202)	(1.517)
Month-end indicator	12000***	19000***	20000***	22000***
	(2007)	(2579)	(3026)	(3419)
Constant	-1600***	-169	-1800***	-1100*
	(394)	(736)	(574)	(648)
N	1092	1092	1092	1092
r2	0.374	0.158	0.401	0.282
F statistic	24.572	9.230	17.101	10.001

Note: Sponsored Repo volumes are in thousands of dollars and dependent variables are in billions of dollars. Standard errors are in parenthesis. N is the number of observations and r2 is the R-squared statistic. $^{*}p < 0.1$;$^{**}p < 0.05$;$^{***}p < 0.01$.

Table 6: Regression of Sponsored Repo Funding Rates

Dependent variables	Spon borr minus ID	ID minus spon lend	Spon borr minus spon lend
UST Bill net issuance	0.015	-0.031*	-0.016
	(0.016)	(0.018)	(0.013)
UST Coupon net issuance	-0.008	-0.038***	-0.046***
	(0.010)	(0.013)	(0.012)
Change SOMA sec lending	0.090	-0.026	0.064
	(0.055)	(0.060)	(0.060)
SOMA net coupon	-0.071	-0.222***	-0.293***
	(0.050)	(0.041)	(0.032)
Change in RRP volume	0.001	-0.002	-0.001
	(0.005)	(0.006)	(0.006)
Change in MMF assets	0.066***	0.011	0.077***
	(0.020)	(0.017)	(0.010)
Corporate tax payments	-0.012	0.038	0.027
	(0.023)	(0.034)	(0.032)
Change in TGA balances	0.005	-0.016*	-0.012
	(0.008)	(0.008)	(0.009)
HF short futures	-0.004***	0.012***	0.008***
	(0.001)	(0.001)	(0.001)
Month-end indicator	1.297	2.725*	4.022***
	(1.034)	(1.438)	(1.217)
Constant	10.265***	-0.847	9.418***
	(0.514)	(0.542)	(0.574)
N	1093	1093	1093
r2	0.079	0.194	0.196
F statistic	7.753	46.133	31.098

Note: Repo rates are in basis points and dependent variables are in billions of dollars. Spon borr is sponsored borrowing, Spon lend is sponsored lending, and ID is interdealer. Standard errors are in parenthesis. N is the number of observations and r2 is the R-squared statistic. $^{*}p < 0.1$;$^{**}p < 0.05$;$^{***}p < 0.01$.

Table 7: Regression of Sponsored Repo Securities Rates

Dependent variables	Spon borr minus ID	ID minus spon lend	Spon borr minus spon lend
UST Bill net issuance	-0.000	0.001	0.000
	(0.005)	(0.010)	(0.012)
UST Coupon net issuance	-0.019***	-0.039***	-0.057***
	(0.004)	(0.007)	(0.010)
Change SOMA sec lending	0.010	0.028	0.038
	(0.028)	(0.044)	(0.059)
SOMA net coupon	0.013	-0.267***	-0.255***
	(0.015)	(0.021)	(0.027)
Change in RRP volume	0.004*	-0.008**	-0.004
	(0.002)	(0.004)	(0.005)
Change in MMF assets	0.031***	0.033***	0.065***
	(0.004)	(0.006)	(0.007)
Corporate tax payments	0.018	0.032	0.050
	(0.013)	(0.028)	(0.035)
Change in TGA balances	-0.002	-0.012**	-0.014*
	(0.003)	(0.006)	(0.007)
HF short futures	0.001***	0.006***	0.007***
	(0.000)	(0.001)	(0.001)
Month-end indicator	1.608***	1.461**	3.069***
	(0.500)	(0.700)	(1.013)
Constant	6.745***	3.262***	10.008***
	(0.176)	(0.384)	(0.500)
N	1093	1093	1093
r2	0.193	0.229	0.200
F statistic	16.934	76.156	58.814

Note: Repo rates are in basis points and dependent variables are in billions of dollars. Spon borr is sponsored borrowing, Spon lend is sponsored lending, and ID is interdealer. Standard errors are in parenthesis. N is the number of observations and r2 is the R-squared statistic. $^{*}p < 0.1$;$^{**}p < 0.05$;$^{***}p < 0.01$.

Figure 1: Example of Balance Sheet Netting without Central Clearing

This figure displays a stylized example of balance sheet netting for trades that are not centrally cleared.

Figure 2: Example of Balance Sheet Netting Through FICC Sponsorship

This figure displays a stylized example of balance sheet netting for trades that are centrally cleared through FICC Sponsored Services.

Figure 3: Stylized Example of Margining for FICC inter-member and sponsored repo

This figure displays a stylized example of how FICC computes initial margin for centrally cleared trades between two direct clearing members (interdealer) and also for sponsored repo.

Figure 4: Sponsored Repo over Time

This figure displays total sponsored repo activity by type. Sponsored lending is when the sponsored member is lending cash against securities. Sponsored borrowing is then the sponsored member is borrowing cash against securities.
Source: OFR centrally cleared repo data collection.

Figure 5: Funding Trades Share of Total Sponsored Repo over Time

This figure displays share of sponsored repo activity this is categorized as funding, by type. Sponsored lending is when the sponsored member is lending cash against securities to the sponsoring member. Sponsored borrowing is then the sponsored member is borrowing cash against securities to the sponsoring member. Funding trades are those transactions where the securities exchanged are not on-the-run, or first, second or third off-the-run.
Source: OFR centrally cleared repo data collection.

(a) Funding Trades

(b) Securities Trades

Figure 6: Average Daily Overnight Spreads by Segment

This figure displays average repo rates for overnight trades using Treasury collateral in sponsored lending, sponsored borrowing, and interdealer trades. Rates are shown as spreads to the Federal Reserve's interest on reserves policy rate.

Source: OFR centrally cleared repo data collection.

Appendices

A Summary of data sources

In this section, we list the sources of our data, all of which are publicly available except for repo. See Office of Financial Research Centrally Cleared Repo Data Collection website for information on the repo data, at `https://www.financialresearch.gov/data/collections/cleared-repo-data/`.

1. U.S. Treasury issuance, the amount of reserves held in the Treasury General Account, and corporate tax payments:
   (a) Daily Treasury Statement at `https://fiscaldata.treasury.gov/datasets/daily-treasury-statement/operating-cash-balance`
2. SOMA securities lending, purchases and sales
   (a) `https://www.newyorkfed.org/markets/soma-holdings`
3. Federal Reserve's RRP volume, and IORB series are from The St Louis Federal Reserve's FRED database at `https://fred.stlouisfed.org/`.
   (a) RRP is RRPONTSYD series
   (b) IORB is drawn from both the IOER and IORB series.
4. Money Market Fund total asset holds
   (a) The OFR's Short-term funding monitor, `https://www.financialresearch.gov/short-term-funding-monitor/datasets/mmf/`
5. Hedge funds short position in futures
   (a) The OFR's hedge fund monitor, `https://www.financialresearch.gov/hedge-fund-monitor/`

References

Afonso, Gara, Marco Cipriani, Adam Copeland, Anna Kovner, Gabriele La Spada, and Antoine Martin (2021), "The market events of mid-September 2019." *Economic Policy Review*, 27.

Agueci, Paul, Leyla Alkan, Adam Copeland, Isaac Davis, Antoine Martin, Kate Pingitore, Caroline Prugar, and Tyisha Rivas (2015), "A primer of the GCF Repo Service." *Economic Policy Review*, 21, 1–38.

Anbil, Sriya and Zeynep Senyuz (2018), "The regulatory and monetary policy nexus in the repo market." FEDS Notes, Board of Governors of the Federal Reserve System.

Banegas, Ayelen and Phillip Monin (2023), "Hedge fund treasury exposures, repo, and margining." FEDS Notes, Board of Governors of the Federal Reserve System.

Barth, Daniel and R. Jay Kahn (2021), "Hedge funds and the Treasury cash-futures disconnect." Working Paper 21-01, Office of Financial Research, US Department of the Treasury.

Barth, Daniel, R. Jay Kahn, and Robert Mann (2023), "Recent developments in hedge funds' Treasury futures and repo positions: is the basis trade 'back'?" FEDS Notes, Board of Governors of the Federal Reserve System.

Bellia, Mario, Giulio Girardi, Roberto Panzica, Loriana Pelizzon, and Tuomas Peltonen (2024), "The demand for central clearing: To clear or not to clear, that is the question!" *Journal of Financial Stability*, 72, 1–20.

Bowman, David, Joshua Louria, Matthew McCormick, and Mary-Frances Styczynski (2017), "The cleared bilateral repo market and proposed repo benchmark rates." FEDS notes, Board of Governors of the Federal Reserve System.

Copeland, Adam and Antoine Martin (2024), "Repo over the financial crisis." *Journal of Finance*. Forthcoming.

Correa, Ricardo, Wenxin Du, and Gordon Y. Liao (2020), "U.S. banks and global liquidity." International Finance Discussion Papers 1289, Board of Governors of the Federal Reserve System.

D'Amico, Stephanie and Aaron N. Pancost (2020), "Special repo rates and the cross-section of bond prices: The role of the special collateral risk premium." Working Paper 2018-21, Federal Reserve Bank of Chicago.

Dikanarov, George, Joseph McBride, and Andrew C. Spieler (2017), "Relative value hedge fund strategies." In *Hedge Funds: Structure, Strategies, and Performance* (H. Kent Baker and Greg Filbeck, eds.), chapter 14, Oxford University Press.

Du, Wenxin, Benjamin Hebert, and Wenhao Li (2023), "Intermediary balance sheet constraints and the Treasury yield curve." *Journal of Financial Economics*, 150, 1–19.

Duffie, Darrell (1996), "Special repo rate." *Journal of Finance*, 51, 493–526.

Duffie, Darrell (2020), "Still the world's safe haven? Redesigning the US Treasury market after the Covid-19 crisis." Hutchin Center Working Paper 62, Hutchins Center on Fiscal and Monetary Policy at Brookings.

Duffie, Darrell, Martin Scheicher, and Guillaume Vuillemey (2015), "Central clearing and collateral demand." *Journal of Financial Economics*, 116, 237–256.

Duffie, Darrell and Haoxiang Zhu (2011), "Does a central clearing counterparty reduce counterparty risk?" *Review of Asset Pricing Studies*, 1, 74–95.

Eisenschmidt, Jens, Yiming Ma, and Anthony Lee Zhang (2024), "Monetary policy transmission in segmented markets." *Journal of Financial Economics*, 151, 1–19.

Fleckenstein, M. and F. A. Longstaff (2018), "Shadow funding costs: Measuring the cost of balance sheet constraints." Working Papers 24224, NBER.

Garbade, Kenneth (2006), "The evolution of repo contracting conventions in the 1980s." *Economic Policy Review*, 12.

Glicoes, Jonathan, Benjamin Iorio, Phillip Monin, and Lubomir Petrasek (2024), "Quantifying treasury cash-futures basis trades." FEDS Notes, Board of Governors of the Federal Reserve System.

He, Z., S. Nagel, and Z. Song (2022), "Treasury inconvenience yields during the Covid-19 crisis." *Journal of Financial Economics*, 143, 57–79.

Hempel, Samuel, Calvin Isley, R. Jay Kahn, and Patrick E. McCabe (2023a), "Money market fund repo and the ON RRP facility." FEDS notes, Board of Governors of the Federal Reserve System.

Hempel, Samuel and R. Jay Kahn (2021), "Negative rates in bilateral repo markets." Brief Series 21-03, Office of Financial Research, US Department of the Treasury.

Hempel, Samuel, R Jay Kahn, Mark Paddrik, and Robert Mann (2023b), "Why Is So Much Repo Not Centrally Cleared?" Brief Series 23-01, Office of Financial Research, US Department of the Treasury.

Koeppl, Thorsten, Cyril Monnet, and Ted Temzelides (2012), "Optimal clearing arrangements for financial trades." *Journal of Financial Economics*, 103, 189–203.

Kruttli, Mathias S., Phillip J. Monin, Lubomir Petrasek, and Sumudu W. Watugala (2021), "Hedge fund treasury trading and funding fragility: Evidence from the Covid-19 crisis." Finance and Economics Discussion Series 2021-038, Board of Governors of the Federal Reserve System.

Loon, Yee Cheng and Zhaodong Ken Zhong (2014), "The impact of central clearing on counterparty risk, liquidity, and trading: Evidence from the credit default swap market." *Journal of Financial Economics*, 112, 91–115.

Maclachlan, Fiona (2014), "Repurchase agreements and the law: how legislative changes fueled the housing bubble." *Journal of Economic Issues*, 48, 515–522.

Menkveld, Albert J. and Guillaume Vuillemey (2021), "The economics of central clearing." *Annual Review of Financial Economics*, 13, 153–178.

Munyan, Benjamin (2017), "Regulatory arbitrage in repo markets." Working Paper 15-22, Office of Financial Research.

Schrimpf, A., H. S. Shin, and V. Sushko (2020), "Leverage and margin spirals in fixed income markets during the Covid-19 crisis." *BIS Bulletins*, 2.

TMPG (2019), "White paper on clearing and settlement in the secondary market for U.S. Treasury securities." Technical report, Treasury Market Practices Group, URL `https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/CS_FinalPaper_071119.pdf`.

TMPG (2022), "White paper on clearing and settlement in the market for U.S. Treasury secured financing transactions." Technical report, Treasury Market Practices Group, URL `https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/CS_SFT_2022.pdf`.

Vuillemey, Guillaume (2020), "The value of central clearing." *The Journal of Finance*, 75, 1775–2321.