

Why is so much repo not centrally cleared?

Lessons from a pilot survey of non-centrally cleared repo data

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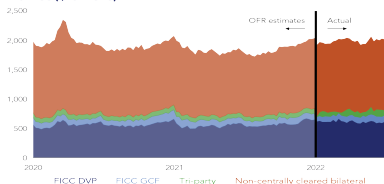
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Non-centrally cleared bilateral repo is large.

Primary Dealer Reverse Repo Outstanding by Venue (\$ billions)

Figure 1. Primary Dealer Reverse Repo Outstanding by Market (\$ billions)



Note: Non-centrally cleared bilateral reverse repo is calculated as a residual using Primary Dealer aggregates less Fixed Income Clearing Corporation GCF and DVP reverse repo by primary dealers and estimated Tri-party reverse repo.

Sources: FRBNY Primary Dealer Statistics, OFR Cleared Repo Collection, Office of Financial Research

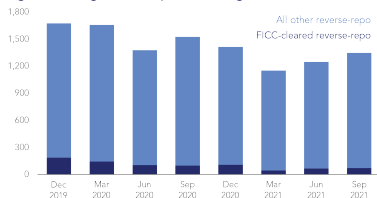
- ▶ 60% of primary dealer reverse repo, 37% of primary dealer repo (Infante et al (2022), Hempel et al (2022)).
- ▶ Over \$2 trillion in gross outstanding, largest segment for PD exposure.
- ▶ Major source of hedge fund borrowing since only 8% goes through FICC.

But little information on why NCCBR is so large, given benefits to central clearing.

- ▶ Especially important given proposals to expand repo central clearing.

Hedge Fund Repo Borrowing by Venue (\$ billions)

Figure 3. Hedge Fund Repo Borrowing (\$ billions)



Note: FICC-cleared repo is total outstanding DVP for qualifying hedge funds.

Sources: Private Fund Statistics, OFR Cleared Repo Collection, Office of Financial Research

This paper

Rely on OFR pilot collection of transaction-level NCCBR data to show why NCCBR is so popular.

- ▶ All outstanding trades for 9 dealers over three days in June 2022.
- ▶ Data comes from the first day of the pilot collection.

Three primary advantages to NCCBR from outreach:

1. Accessing central clearing may be costly for some customers.
2. Customer central clearing is mostly in overnight, Treasury transactions.
3. NCCBR allows greater flexibility in haircuts and margining.

Use pilot data and data from centrally cleared and tri-party repo to investigate each of these explanations.

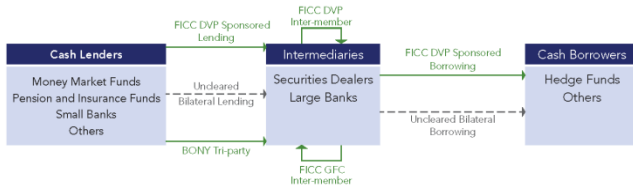
Findings:

1. Majority of trades in NCCBR are with hedge funds. Many of these are FICC sponsored members.
 2. Most trades in Fedwire eligible collateral. However, NCCBR trades often longer-tenor.
 3. **Over 70% of NCCBR Treasury volumes occur at zero haircut.**
 - ▶ *Likely a major driver of NCCBR volumes.*
 - ▶ Participants attribute the majority of these volumes to “netted packages,” which match repo and reverse-repo.
 - ▶ We find some evidence consistent with this, and discuss consequence of moving these netted packages to higher haircuts.
- ▶ Additionally, we examine rates in NCCBR and assess netting benefits of moving NCCBR trades to FICC.

Background on U.S. repo market segments

Differentiated by clearing and presence of a tri-party custodian.

	Tri-party	Bilateral
Centrally cleared	<p>FICC GCF OFR cleared repo collection Fedwire-eligible securities. General collateral. Large financial institutions. Blind-brokered. Transparent screens.</p>	<p>FICC DVP OFR cleared repo collection Non-MBS Fedwire-eligible securities. Specific collateral. Large financial institutions and sponsored members. Blind-brokered inter-member with transparent screens. However, sponsored market not blind-brokered.</p>
Non-centrally cleared	<p>BONY tri-party FRB tri-party collection All securities. General collateral. Dealers borrowing from MMFs and banks.</p>	<p>NCCBR Pilot collection All securities. Specific collateral. Dealers trading with a variety of (mostly levered) counterparties. Voice, chat and RFQ trades.</p>



Pilot construction

The OFR received data from nine voluntary pilot participants.

- ▶ Mix of primary dealers, non-primary dealers, bank-affiliated, non-bank affiliated, foreign and domestic firms.
- ▶ Fields were negotiated with pilot participants to reflect existing practices in data management.
 - ▶ **Include:** start and end dates, rates, haircuts, securities identifier, value and quantity, start and close leg amounts, optionality, trading platform, trade timestamps, counterparty internal identifier as well as names and LEI (where possible).

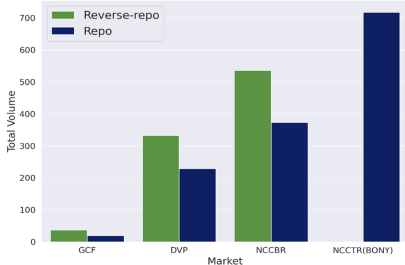
Data was collected for three days in June 2022.

- ▶ **June 15**, June 22, June 30.
- ▶ Collected all participant repo and reverse repo that settled in the U.S. and had no tri-party custodian or central counterparty.

To assemble our full dataset we then match these 9 dealers to their accounts in tri-party and FICC.

Pilot captured \$909 billion in gross NCCBR

Outstanding Volume for Pilot Participants by Segment (\$ billions)



- ▶ Confirms NCCBR largest segment by gross pilot participant exposure.
- ▶ Pilot captured \$373B in NCCB repo and \$536B in NCCB reverse repo.
- ▶ Pilot dealers make up roughly 17% of tri-party volumes, 22% of FICC DVP volumes, 21% of FICC GCF volumes.

NCCBR features a diverse set of counterparties

Counterparty Type	Percent of Outstanding Volume		
	Reverse Repo	Repo	Total
Hedge Fund	54.8	76.6	62.7
Broker-Dealer	6.8	6.6	6.5
Bank	8.8	2.5	6.7
Other	29.6	14.4	24.1

Note: Not all pilot participants submitted counterparty data, does not include inter-affiliate trades.

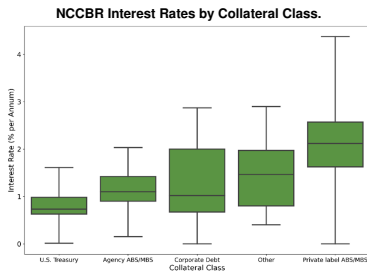
Subset of participants provided data to identify counterparty types.

- ▶ Hedge funds make up the largest share of borrowing and lending.
 - ▶ By volume primarily large, relative value and macro hedge funds.
- ▶ Other counterparties include pension funds, sovereign wealth funds, REITs, public sector entities.
- ▶ Substantial portion of volumes are with sponsored members of FICC.
 - ▶ Suggests lack of access not a primary driver of these volumes.

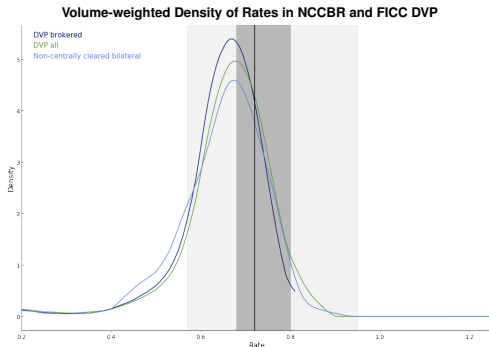
Collateral is more diverse than in cleared markets

Collateral	Reverse Repo			Repo		
	Volume (\$ B)	Haircut (%)	Rate (%)	Volume (\$ B)	Haircut (%)	Rate (%)
U.S. Treasuries	453.3	0.1	0.89	349.6	0.1	0.71
U.S. Agencies	48.8	5.3	1.17	7.9	3.7	1.02
Private MBS/ABS	14.8	26.6	2.32	—	—	—
Corporate Debt	8.5	9.6	1.76	7.7	-0.2	0.61
Other	10.7	13.0	1.60	6.3	5.6	1.19

- ▶ However, Treasury securities make up the largest share of total volumes.
 - ▶ 93% of repo, 84% of reverse repo.
- ▶ Fedwire-eligible securities make up 96% of repo, 94% of reverse repo.
- ▶ Rates generally increase with risk of collateral, but substantial variation.



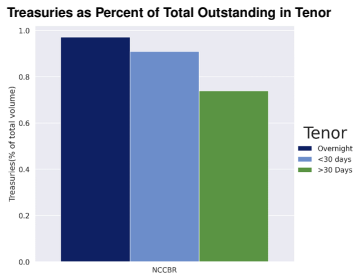
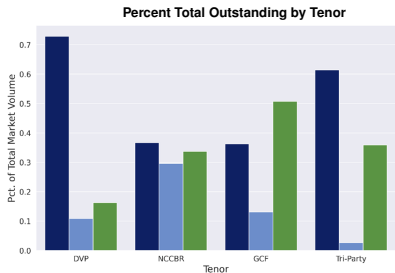
Looking at overnight Treasury repo provides a comparison to FICC DVP



Note: Light shaded area denotes percentiles 1-99 of BGCR distribution,
dark shaded area denotes percentiles 25-75, line denotes median.

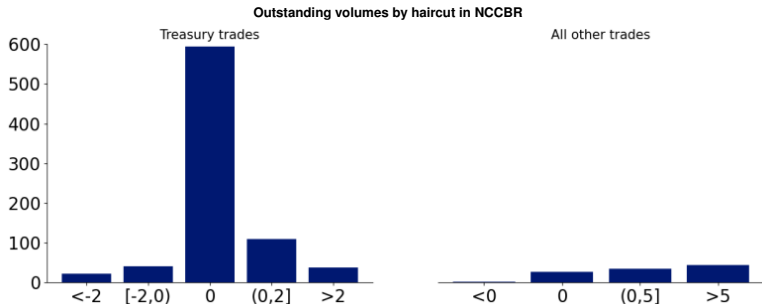
- ▶ **Distribution of rates is broadly similar to FICC DVP.**
- ▶ However, fatter tails than in FICC DVP trades.
- ▶ Some density below 0.5%, likely reflects large specials on June 15 due to Treasury reopening.
 - ▶ However, correlation of rates by CUSIP in FICC DVP and NCCBR is low.

Longer tenor trades more popular in NCCBR than cleared bilateral.



- ▶ Overnight trades make up less than 40% of total NCCBR pilot.
 - ▶ Closest alternative for most customers, sponsored DVP, almost all overnight.
- ▶ Non-Treasury trades make up relatively more of longer-tenor trades.

Haircuts are very different in NCCBR than in other segments.



- ▶ Within asset class, haircuts for repo generally \leq for reverse repo.
 - ▶ For Treasury repo with customers, haircuts ≤ 0 , for reverse repo ≥ 0 .
- ▶ **Zero haircut trades make up 74% of gross Treasury repo.**
 - ▶ Participants attribute much of these zero haircuts to “netted packages.”
 - ▶ These packages match repo and reverse-repo, constitute an asset swap.
 - ▶ *Note that this is likely neither new nor unique to the U.S.*
- ▶ In contrast, FICC charges minimum margins at the portfolio level.

We can't identify netted packages, but we can estimate their extent

$$\text{Netted} = \sum_i \sum_j \sum_t \min(\text{Repo volume}_{i,j,t}, \text{Reverse repo volume}_{i,j,t})$$

where i is the dealer, j is the counterparty, t is the end date of the repo.

- ▶ Identify counterparties by their internal identifier.

Netted NCCBR Treasury Trades as a Percent of All Treasury Trades by Haircut, Counterparty, Direction

Counterparty	Zero Haircut Trades		All Trades	
	Reverse Repo	Repo	Reverse Repo	Repo
All	42	51	42	55
Hedge funds	69	57	60	68

- ▶ **46% of all zero-haircut trades net, but 62% with hedge funds net.**
 - ▶ Remainder may represent difficulties identifying netting sets, netting against non-repo positions, or net exposures charged zero haircuts.
- ▶ **Table also suggests opportunities for netting through FICC.**
 - ▶ “Natural” netting reduces balance sheet Treasury NCCBR by 48% (\$384 B).
 - ▶ FICC netting could reduce an additional 38% (\$107 B).

Conclusion

Using a unique pilot collection of data from the NCCBR market, we discuss what drives volumes in this opaque segment.

- ▶ Volumes are large, dominated by hedge funds and Treasury trades.
- ▶ We show flexibility in haircuts is likely a prime driver of NCCBR volumes.
 - ▶ Over 70% of NCCBR Treasury repo occurs at zero haircut.
 - ▶ Haircuts generally appear to be customized to the exposure to a customer.
 - ▶ Determinants of these margining decisions need more exploration.
- ▶ A further role is played by the ability to borrow and lend over longer tenors than available to customers in cleared repo.

Our results highlight unique features of this segment that bear monitoring with changes in market structure and fundamentals.

Tradeoffs for zero-haircuts on netted packages

- ▶ Hedge fund buys Treasury A , funded through reverse-repo.
- ▶ Short-sells Treasury B , received through repo of the same size.

Assuming zero haircuts, this profits whenever:

$$\left(\frac{P_{A,t+1}}{P_{A,t}} - \frac{P_{B,t+1}}{P_{B,t}} \right) - (r_A - r_B) > 0$$

Efficiency: ▶ If A and B pay 1 tomorrow with certainty it must be that:

$$y_A - y_B \leq r_A - r_B$$

Resiliency: ▶ In default, dealer has given up B and holds A .

▶ Losses are: $\frac{P_{B,t+1}}{P_{B,t}} - \frac{P_{A,t+1}}{P_{A,t}}$

Tradeoff depends on:

- ▶ Opportunity cost of margin.
- ▶ Value of price efficiency.
- ▶ Likelihood of large moves in relative Treasury prices.

Tradeoffs for zero-haircuts on netted packages

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- ▶ Short-sells Treasury B , received through repo of the same size.

Assuming haircut h , this profits whenever:

$$\left(\frac{P_{A,t+1}}{P_{A,t}} - \frac{P_{B,t+1}}{P_{B,t}} \right) - (r_A - r_B) - (r_E - r_A + r_E - r_B)h > 0$$

Efficiency: ▶ If A and B pay 1 tomorrow with certainty it must be that:

$$y_A - y_B \leq r_A - r_B + h(r_E - r_A) + h(r_E - r_B)$$

Resiliency: ▶ In default, dealer has given up B and holds A , $2h$ in margin.

▶ Losses are: $\frac{P_{B,t+1}}{P_{B,t}} - \frac{P_{A,t+1}}{P_{A,t}} - 2h$

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