

*Trading Relationships in the Over-the-Counter Market for
Secured Claims: Evidence from Triparty Repos*¹

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The Federal Reserve Board

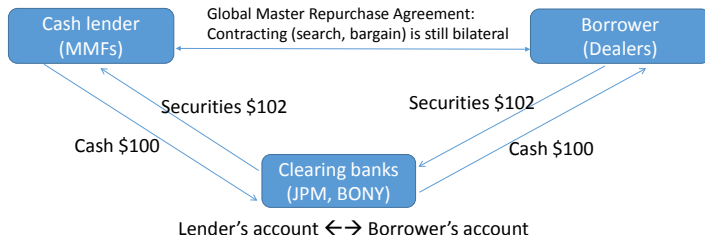
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¹The views expressed are those of the authors and do not necessarily represent those of the Federal Reserve Board or its staff.

Repos 101

Triparty Repos

- Opening Leg ($t=0$)



- Closing leg ($t=M$): reverse with interest payments
- Fed became a regular borrower since Sept 2013: Overnight Reverse Repos

Motivation: Quest for Unveiling OTC Market Trading Mechanism

- ▶ Exploding interests in OTC—huge markets about which we don't know much
- ▶ Lots of progress in studying pricing/liquidity: bonds, ABS, CDS, etc.
- ▶ Nascent literature in understanding the underlining trading mechanism
 - ▶ Theorists focus on implications of search frictions, being search cost or asymmetric information (e.g., Duffie et al., 2005)
 - ▶ One key implication: market participants form trading relationships
 - ▶ Interbank markets: Ashcraft and Duffie (2007), Afonso et al (2014)
 - ▶ MMFs: Chernenko and Sunderam (2014)
 - ▶ Dealer-intermediated fixed-income markets: Di Maggio et al (2015), Hendershott et al (2015), Li and Schurhoff (2014)

Is There A Role for Relationships in the TPR Market?

- ▶ No
 - ▶ Participants of the TPR Market are mostly sophisticated, large financial institutions: lower search costs
 - ▶ Repos are secured, mitigating information risk (Mills and Reed, 2008; Petersen and Rajan, 1994; Ongena and Smith, 2000)
 - ▶ Counterparty credit risk doesn't seem to matter (Hu, Pan, and Wang, 2015)
- ▶ Yes
 - ▶ Collateral security may be elusive (Antinolfi et al., 2015)
 - ▶ The identity of counterparty does seem important (Copeland et al. 2014)
 - ▶ Information on liquidity shocks can be asymmetric, even if credit risk doesn't matter
- ▶ It is an important quantitative issue
 - ▶ At \$1.5 trillion, the TPR market is a major funding source for securities dealers
 - ▶ Support market liquidity of Treasuries and other collateral
 - ▶ Platform for implementing new monetary policy

Main Findings

- ▶ TPR participants form stable, concentrated relationships
 - ▶ Both MMFs and dealers interact with multiple counterparties
 - ▶ But choose to allocate volumes on far fewer ones
 - ▶ Top counterparties are stable over time
- ▶ Relationships affect terms of trade: stronger relationships increase trade amount but reduce bargaining power on rates
- ▶ Relationships help buffer liquidity shocks
 - ▶ RRP effects: Negative supply shocks reduce funding to dealers, but less so to dealers with whom funds have stronger relationship (at higher rates)
 - ▶ Treasury auctions: Positive demand shocks lead higher borrowing by dealers, more so from funds with whom dealers have stronger relationships (at lower rates)

Data and Sampling

- ▶ Data:
 - ▶ Information on intraday repo transactions on a given weekday
 - ▶ Combine other data, such as MMFs holding at month-ends
- ▶ Sampling:
 - ▶ Exclude quarter-ends; include overnight Treasury repos only
 - ▶ Keep top 15 dealers and top 40 fund families for each rolling “month”
- ▶ Methodology:
 - ▶ Analysis is at the parent dealer and sub-fund family level (RRP-eligible or not)
 - ▶ Analyze outcomes among all potential trading pairs

A Data Sample

Date	ultimate_investor	parent dealer	volume	rate
8-Jan-13	Investor 1 - Eligible	Dealer 1	0.3	0.105
8-Jan-13	Investor 1 - Eligible	Dealer 2	0.005	0.1
8-Jan-13	Investor 1 - Eligible	Dealer 3	0.515	0.1
8-Jan-13	Investor 1 - Eligible	Dealer 4	0.357	0.101
8-Jan-13	Investor 1 - Eligible	Dealer 5	0.3	0.1
8-Jan-13	Investor 1 - Eligible	Dealer 6	0.365	0.1
8-Jan-13	Investor 1 - Eligible	Dealer 7	1.125	0.098
8-Jan-13	Investor 1 - Eligible	Dealer 8	0.0505	0.13
8-Jan-13	Investor 1 - Eligible	Dealer 9	0.12	0.07
8-Jan-13	Investor 1 - Eligible	Dealer 10	0	.
8-Jan-13	Investor 1 - Eligible	Dealer 11	0	.
8-Jan-13	Investor 1 - Eligible	Dealer 12	0	.
8-Jan-13	Investor 1 - Eligible	Dealer 13	0	.
8-Jan-13	Investor 1 - Eligible	Dealer 14	0	.
8-Jan-13	Investor 1 - Eligible	Dealer 15	0.65	0.07
8-Jan-13	Investor 1 - Ineligible	Dealer 1	0.45	0.11
8-Jan-13	Investor 1 - Ineligible	Dealer 2	0.1265	0.1
8-Jan-13	Investor 1 - Ineligible	Dealer 3	0	.
8-Jan-13	Investor 1 - Ineligible	Dealer 4	0	.
8-Jan-13	Investor 1 - Ineligible	Dealer 5	0	.
8-Jan-13	Investor 1 - Ineligible	Dealer 6	0	.
8-Jan-13	Investor 1 - Ineligible	Dealer 7	0.032	0.1
8-Jan-13	Investor 1 - Ineligible	Dealer 8	0.1	0.1
8-Jan-13	Investor 1 - Ineligible	Dealer 9	0	.
8-Jan-13	Investor 1 - Ineligible	Dealer 10	0	.
8-Jan-13	Investor 1 - Ineligible	Dealer 11	0	.
8-Jan-13	Investor 1 - Ineligible	Dealer 12	0	.
8-Jan-13	Investor 1 - Ineligible	Dealer 13	0	.
8-Jan-13	Investor 1 - Ineligible	Dealer 14	0	.
8-Jan-13	Investor 1 - Ineligible	Dealer 15	0	.
8-Jan-13	Investor 2 - Ineligible	Dealer 1	0	.
8-Jan-13	Investor 2 - Ineligible	Dealer 2	0.1	0.1
8-Jan-13	Investor 2 - Ineligible	Dealer 3	1.1	0.11

Key Variables of Interest

- Size variables

$$IV_{i,t} = \sum_{s=t-c}^{t-1} \sum_{d=1}^{N_d} V_{i,d,s}; \quad DV_{d,t} = \sum_{s=t-c}^{t-1} \sum_{i=1}^{N_f} V_{i,d,s}$$

- Relationship strength variables

$$RS_{i,d,t}^i = \frac{\sum_{s=t-c}^{t-1} V_{i,d,s}}{IV_{i,t}}; \quad RS_{i,d,t}^d = \frac{\sum_{s=t-c}^{t-1} V_{i,d,s}}{DV_{d,t}}$$

Sample statistics

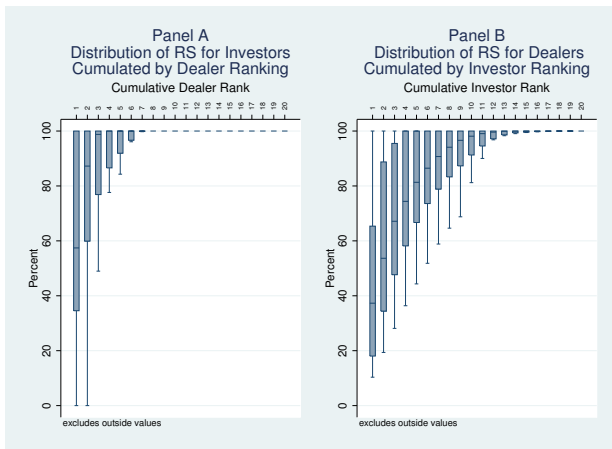
Variable	Mean	Median	Std. Dev.
	(1)	(2)	(3)
Trade Volume (bln)	0.44	0.23	0.63
IV (bln)	15.50	8.98	17.65
Rank 1	44.41	44.80	23.33
Rank 40	0.25	0.22	0.16
DV (bln)	27.19	23.46	16.95
Rank 1	53.34	58.32	11.90
Rank 15	2.54	1.93	2.18
TPR rate (bps)	6.88	5.21	4.99
<i>N</i>	23389		

Relationship Statistics

Var.	Var.=0	Var. > 0		
	Percent (1)	Mean (2)	Median (3)	St. Dev (4)
RS MMF	74.03	0.26	0.14	0.29
Rank 1	50.94	0.14	0.08	0.21
Rank 40	89.33	0.63	0.57	0.34
RS Dealer	76.49	0.07	0.04	0.12
Rank 1	57.48	0.04	0.03	0.04
Rank 15	93.93	0.28	0.20	0.24

- ▶ Actual trades are a relatively small percentage of potentials
- ▶ Relationships are relatively broad, positively related to size
- ▶ Smaller players tend to have more concentrated relationships

Relationships Are Stable



- ▶ Counterparts form several relationships
- ▶ But allocate the bulk of volumes to certain ones, stable over time

The Effects of Relationships on Trading: Model

Basic model

$$Y_{i,d,t} = f \left(IV_{i,t}, DV_{d,t}; RS_{i,d,t}^i, RS_{i,d,t}^d; \text{Fixed effects} \right) + \epsilon_{i,d,t},$$

- ▶ $Y_{i,d,t}$ is a placeholder for (i) the Probability of trade (ii) the Volume of a trade and (iii) the Rate of a trade at time t
- ▶ IV and DV are control variables for size
- ▶ RS^i and RS^d are the past relationship strength variables
- ▶ “Fixed effects” are fixed effects for the MMF family, the dealer and time

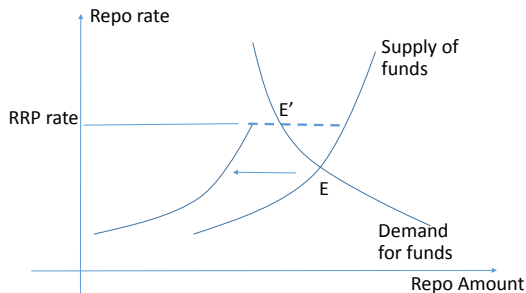
The Effects of Relationships on Trading: Regressions

lhs	Pr(trade) (1)	Volume (2)	Rate (3)
RS MMF	5.330*** (0.000)	0.577*** (0.000)	-0.279*** (0.000)
RS Dealer	13.484*** (0.000)	2.837*** (0.000)	0.114** (0.035)
IV	0.015*** (0.000)	0.007*** (0.000)	-0.001 (0.622)
DV	0.005*** (0.000)	0.008*** (0.000)	-0.003** (0.012)
\bar{R}^2		0.595	0.978
N	88,375	20,397	20,397

- ▶ Stronger relationships lead to greater probability of trade and larger volumes
- ▶ Stronger relationships reduce bargaining power over rate
- ▶ The probability of trade increases in both investor and dealer sizes

ON RRP as A Quasi-Experiment of Supply Shocks

RRPs' as Supply Shocks to Private Repos



The impact of Fed's ON RRP on TPR trading: Model

The Model

$$Y_{i,d,t} = f \left(\text{RRP}; IV_{i,t}, DV_{d,t}; RS_{i,d,t}^i, RS_{i,d,t}^d; \text{Fixed effects} \right) + \epsilon_{i,d,t}$$

- ▶ “RRP” includes treatment effects:
 - ▶ *Eligible* \times *After*
 - ▶ *Eligible* \times *After* \times RS_{MMF}

The Role of Relationships in Absorbing Supply Shocks: Triple-Diff

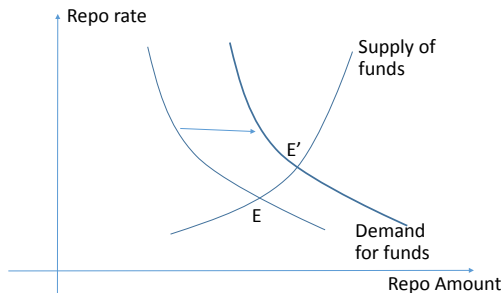
Indp. Var.	Pr(trade) (1)	Volume (2)	Rate (3)

Eligible	0.172*** (0.000)	-0.001 (0.891)	-0.039 (0.703)
After	-0.105 (0.416)	-0.277*** (0.000)	-15.947*** (0.000)
Eligible × After	-0.375*** (0.000)	-0.107*** (0.000)	0.099*** (0.000)
Eligible × RS MMF	-3.987*** (0.000)	-0.319*** (0.000)	0.154 (0.113)
After × RS MMF	-3.785*** (0.000)	-0.174*** (0.000)	-0.123*** (0.001)
Eligible × After × RS MMF	3.617*** (0.000)	0.388*** (0.000)	0.431*** (0.002)
<i>N</i>	88,452	20,380	20,380

- ▶ Eligible MMFs with stronger relationships with dealers were less likely to shift to the Fed
- ▶ These MMFs were remunerated with higher rates

Treasury Auctions as A Quasi-Experiment of Demand Shocks

Treasury Auctions as Demand Shocks to Private Repos



The Role of Relationships in Buffering Demand Shocks: Model

The Model

$$Y_{i,d,t} = f \left(\text{Tr. auction}; IV_{i,t}, DV_{d,t}; RS_{i,d,t}^i, RS_{i,d,t}^d; \text{Fixed effects} \right) + \epsilon_{i,d,t},$$

- ▶ “Tr. Auction” includes interaction between Tr. Auction shock and RS_{Dealer} and their relevant terms
- ▶ Tr. Auction shock is the residual from regressing Tr. Auction allocated vol. on FE for maturity and types of securities and lagged volumes

The Role of Relationships in Buffering Demand Shocks: Regressions

lhs	Pr(trade)	Volume	Rate
IV	0.011*** (0.000)	0.008*** (0.000)	0.001*** (0.000)
DV	0.001** (0.034)	0.016*** (0.000)	-0.007 (0.283)
RS MMF	6.779*** (0.000)	0.593*** (0.000)	-0.282*** (0.000)
RS Dealer	27.543*** (0.000)	9.718*** (0.000)	-0.143* (0.051)
Tr. auction	-0.028 (0.187)	0.047*** (0.003)	2.715*** (0.000)
Tr. auction × RS Dealer	0.710** (0.015)	0.037 (0.095)	-0.189*** (0.001)
\overline{R}^2		0.715	0.977
N	84,965	23,538	23,538

- ▶ Positive shocks in Treasury Auction issuance lead to larger TPR volumes and rates
- ▶ Stronger relationships help dealers fund more at lower rates

Conclusions

- ▶ Relationships play an important role in the TPR market, despite that the traded claims are secured and the participants are large, sophisticated institutions, suggesting that search frictions are still important factors
- ▶ Further analysis and data are needed to study how relationships are formed
- ▶ More studies to fully understand the unintended consequences of new monetary policy tools