

Repo and FX Swap: A Tale of Two Markets

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Introduction

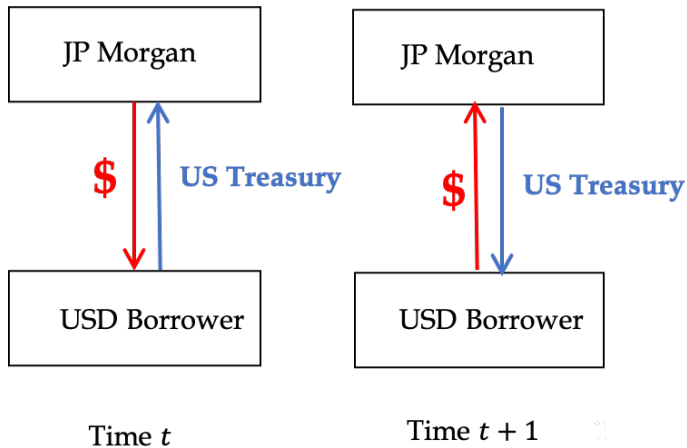
- ▶ Repo and FX swaps are two most important short-term funding markets for U.S. dollar liquidity.
- ▶ The two markets share many similarities, but are also distinct along important dimensions.
- ▶ Dealers/banks play a central role in both markets. The time-varying intermediary balance sheet constraint is key to the pricing of dollar liquidity.
- ▶ Demystify the FX swap market using the MMSR transaction data: Despite the breakdown of CIP, the FX swap market is an overall well-functioning market, and helps fulfill significant dollar liquidity demand during stress days.

Outline of the Talk

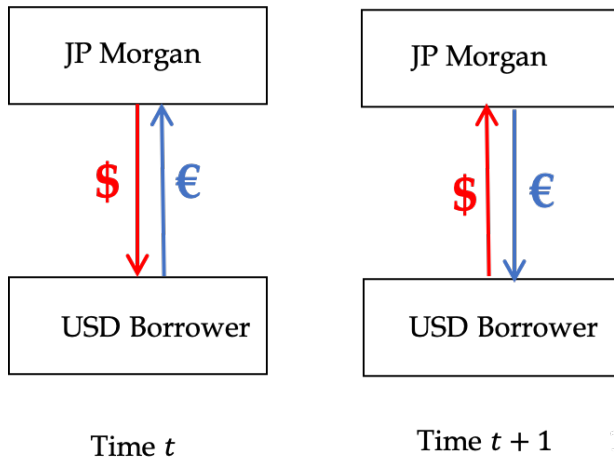
1. Overview of the two markets: similarities and differences
 - ▶ Market structure
 - ▶ Balance sheet implication and regulatory treatments
2. Linkages between the two markets
 - ▶ Funding cost comparison
 - ▶ Quarter-end dynamics
3. Implications for financial stability
 - ▶ Central bank swap line and standing repo facility
 - ▶ Issues during QT

1. Overview of the Two Markets

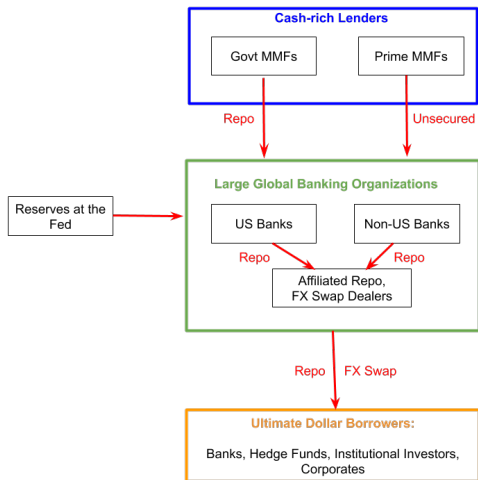
Dollar Funding in the Repo Market



Dollar Funding in the FX Swap Market



Outsized Role Played by Large Banks in Segmented Markets



Source: Du and Schreger (2022)

▶ U.S. Repo Market

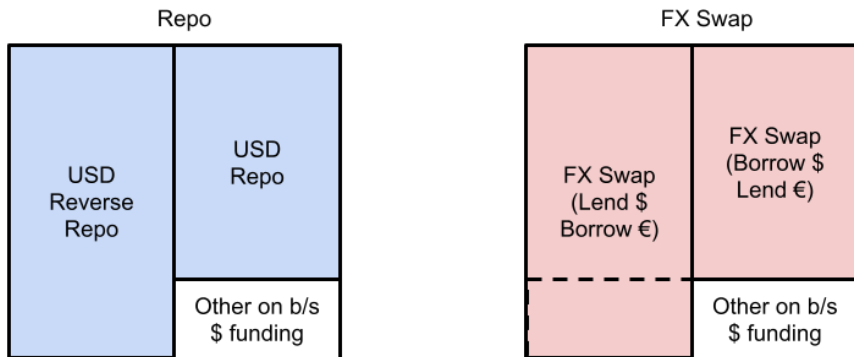
- ▶ Cash lenders: MMFs, corporate treasuries, banks
- ▶ Cash borrowers: banks, hedge funds, (Fed)
- ▶ Term: mostly o/n
- ▶ Size: \$3T private, \$1-2T at Fed.

▶ USD FX Swap Market

- ▶ Cash lenders: banks, central banks, asset managers
- ▶ Cash borrowers: banks, hedgers (e.g. institutional investors, corporates), hedge funds
- ▶ Term: short-term
- ▶ Size: \$93T USD-linked contracts outstanding

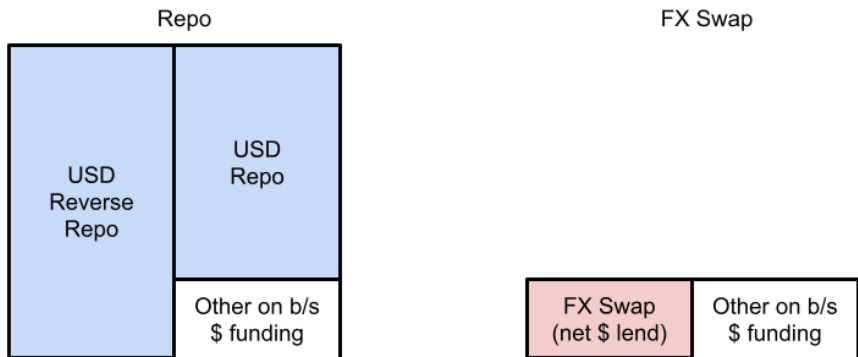
Intermediary Balance Sheet Implications

Figure 1: Total Activities



Intermediary Balance Sheet Implications

Figure 2: On-Balance-Sheet Activities



Balance Sheet Usage and Regulatory Treatments

- ▶ Both types of activities face little risk-based capital charge.
- ▶ Gross USD repo borrowing and lending stay on balance sheets
 - ▶ Exception is “sponsored” repo where the borrowing and lending can be netted, still a small segment of the repo market.
- ▶ Gross FX swap USD borrowing and lending can be netted off (except for margins). Only net FX swap borrowing/lending stay on balance sheets.
 - ▶ CIP arbitrage positions, e.g. borrow \$ in the cash market and lend in the FX swap market, stay on balance sheets.
- ▶ FX swaps activities can potentially worsen G-SIB capital surcharge more than repos.

2. Linkages between the Two Markets

Price Dispersion in the Repo Market

Table 1: Distribution of Repo Rates, basis points (2016-2023)

Triparty	SOFR	p1	p25	p75	p99
175	177	170	175	180	190

Source: FRBNY

- ▶ Large dealers can borrow at the triparty rate, and lend at a spread over the triparty rate up to 15 bps on average.

Dollar Funding Cost in the FX Swap Market

- ▶ It is generally more expensive to fund USD in the EUR-USD swap market than in the U.S. repo market

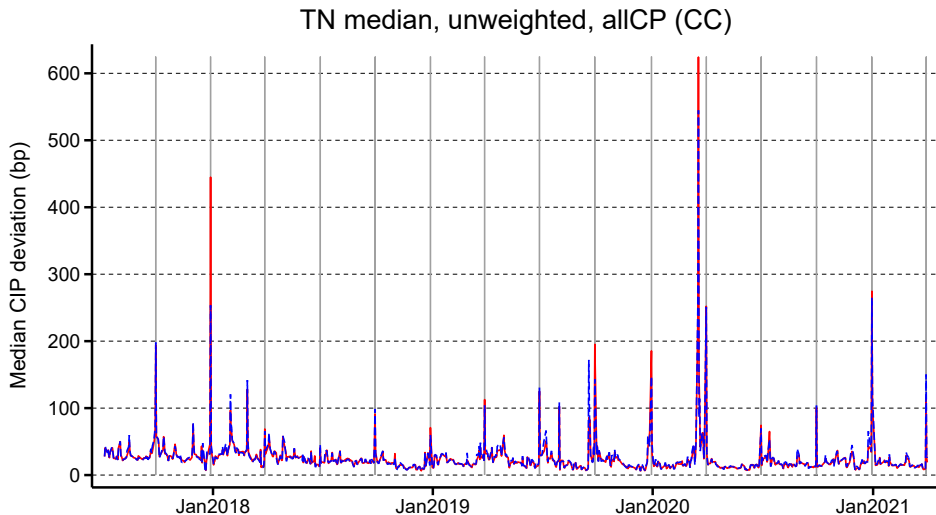
$$x = \underbrace{[y^{\text{€}} - (f - s)]}_{\text{\$ rate in the FX swap market}} - \underbrace{y^{\text{\$}}}_{\text{cash market \$ rate}} > 0$$

- ▶ Du, Strasser and Verdelhan (2023) use EUR-USD FX swaps from the MMSR data (2018-2021)

Table 1: Average daily volume and positions in dollar-euro FX swaps reported by MMSR banks

	(1) Transactions bn	(2) %	(3) Positions bn	(4) %	(5) CIP deviation eq-w	(6) vol-w
Panel A: Overall market						
Total	169.1	100	2171	100	29.8	27.7
MMSR banks on both sides	36.5	22	426	20	29.5	27.5
MMSR banks borrowing USD from non-MMSR	57.2	34	832	38	21.1	26.9
MMSR banks lending USD to non-MMSR	75.4	45	912	42	38.4	28.4

Median MMSR Transaction Rates Match Bloomberg Quotes



Notes: **red** - median transaction rate; **blue** - Bloomberg quote (Du, Strasser and Verdelhan, 2023)

Price Dispersion in the FX Swap Market

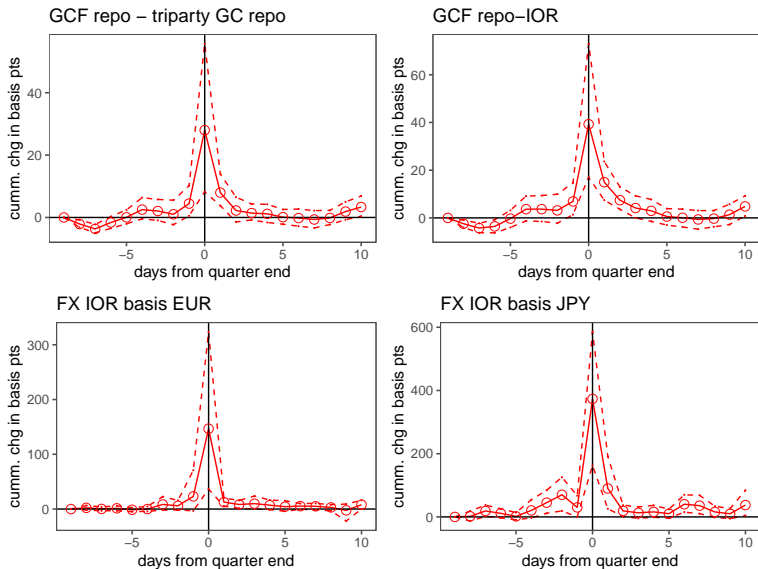
- ▶ Du, Strasser and Verdelhan (2023): Regress borrowing and lending rates on counterparty types using the MMSR transactions (volume-weighted):

$$x_{i,t} = \alpha_t + \sum_c \beta_c \text{Type}_c + \epsilon_{i,t}$$

- ▶ Use MMSR-MMSR trade as the omitted category.
- ▶ Borr (lend) – MMSR banks borrow (lend) USD in the FX swap market.

	TN		1W		1M		3M	
Counterparties	borr	lend	borr	lend	borr	lend	borr	lend
Non-MMSR bank	-0.06	1.16***	-0.37**	-0.13	0.16**	0.22**	-0.13	-0.09
Pension & insur.	-1.25**	+	-***	3.12*	-1.01***	4.36***	2.42	0.15
Oth. non-bank fin.	-2.06***	1.86***	-1.30***	0.13	-0.29***	1.10***	-0.58***	0.25**
Non-financial	-3.82***	4.29***	-8.81***	2.55***	-3.50***	2.47***	-2.60***	0.74***
Government & CB	-1.76***	3.42***	-1.67***	-2.64	-0.60**	1.97***	-0.54**	0.25**
Observations	132,809	132,913	18,112	17,485	31,441	38,606	24,119	28,046
R^2	0.81	0.83	0.97	0.97	0.98	0.97	0.96	0.97

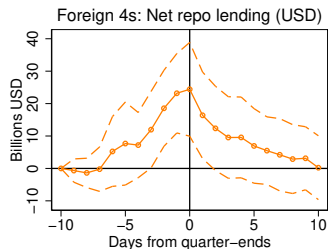
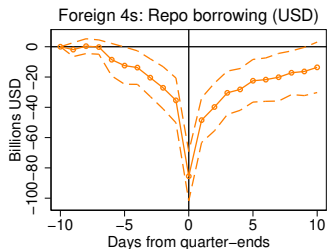
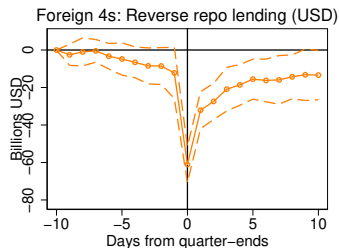
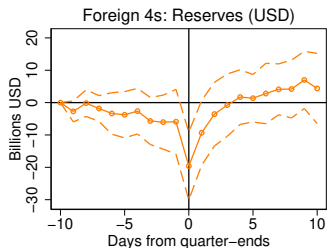
Quarter-End Increases in Repo and FX Swap Spreads



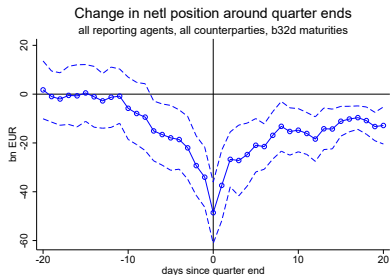
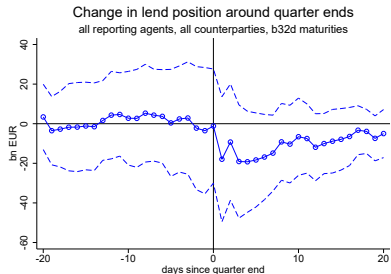
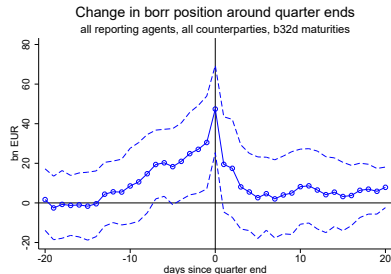
Source: Correa, Du and Liao (2022)

Quarter-end Changes in Repo Activities

- ▶ Correa, Du and Liao (2022): Non-U.S. banks reduce matched-book repo intermediation and drains reserves to make up the difference



Quarter-end Changes in FX Swap Activities



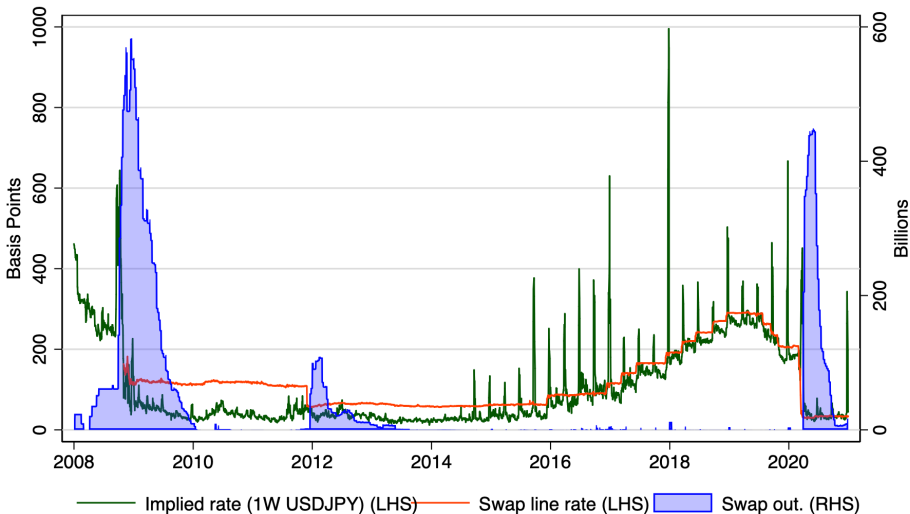
Source: Du, Strasser and Verdelhan, 2023

Summary of Quarter-End Dynamics

- ▶ Quarter-end balance sheet constraints significantly contract matched-book repo intermediation.
- ▶ Euro-area MMSR banks significantly increase their dollar borrowing in the FX swap market, and maintain their dollar lending in the FX swap market.
- ▶ The FX swap market acts an important residual market for MMSR banks to obtain dollar funding on quarter-ends: Overall **higher** FX swap volume incurs the quarter-turn premium!

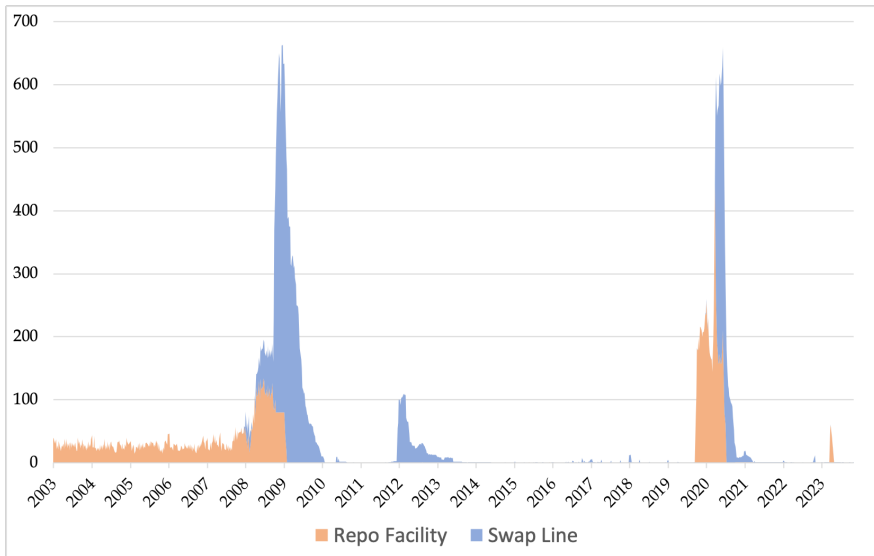
3. Implications for Financial Stability

Central Bank Swap Line



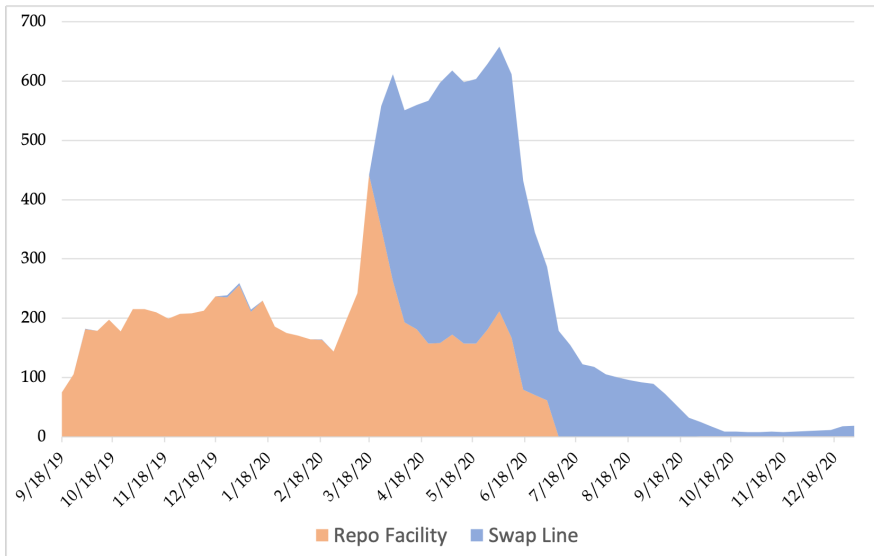
Source: Du and Schreger (2022)

Central Bank Swap Line and Repo Facility, \$B



Source: FRED

Central Bank Swap Line and Repo Facility, \$B (2019-2020)



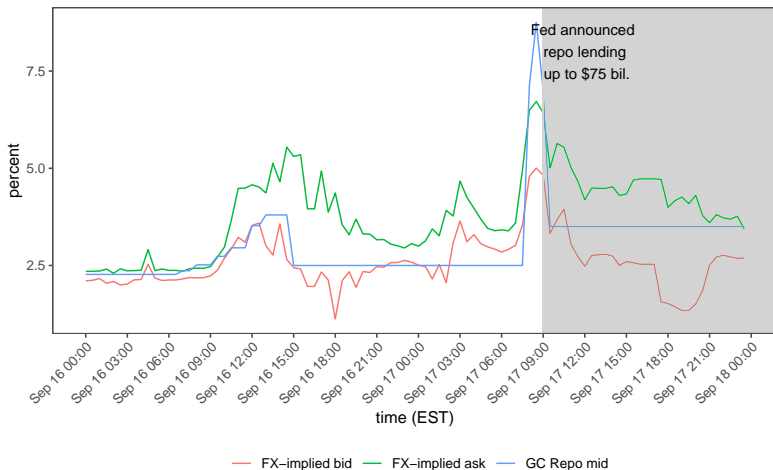
Source: FRED

Implications for Crisis Response

- ▶ Global dollar funding markets are highly segmented. The FX swap market often represents the most challenging segment of the funding market for offshore participants.
- ▶ Hierarchy of money market rates: FX swap implied rate $>$ \$CP/\$CD (\$Libor) $>$ \$OIS $>$ \$Repo/Fed Funds.
- ▶ Bringing the highest rate (FX swap) down helps restore functions in all other short-term funding markets.
- ▶ Central bank liquidity swap is one of the most effective tools for crisis response.

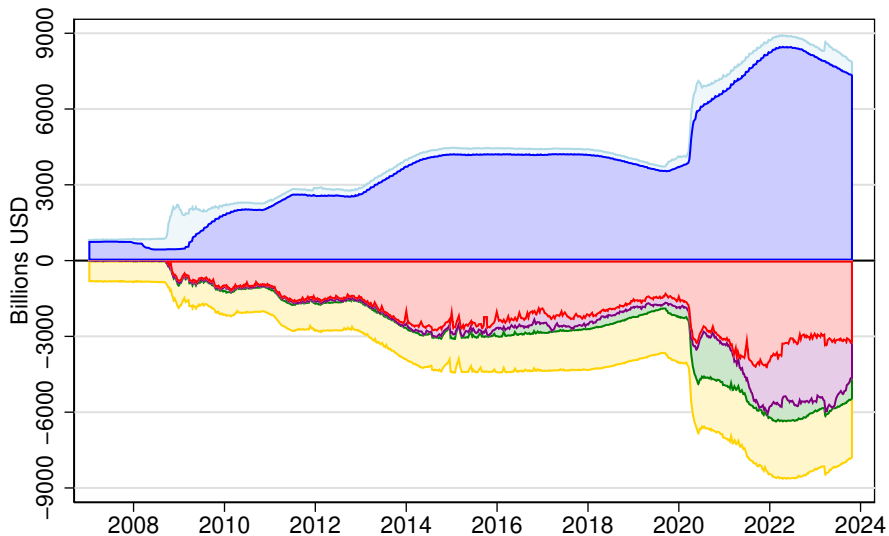
Issues during QT

- ▶ Looking back, following the 2017-2019 QT, total bank reserves declined to \$1.4T on September 16, 2019.



Source: Correa, Du and Liao (2022)

Fed Balance Sheet



Increasing Repo Demand to Finance Treasuries, Tighter Dealer Balance Sheet Constraints

Figure 3: Primary Dealers' Treasury Position

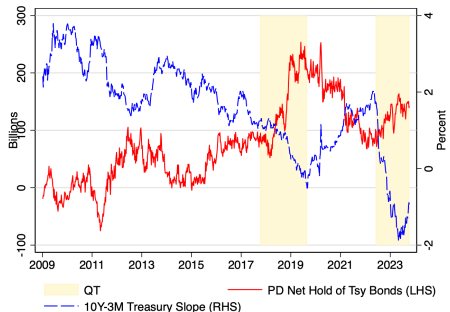
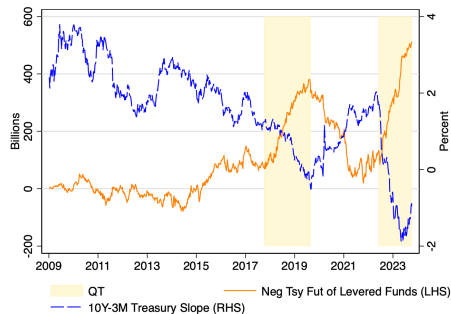
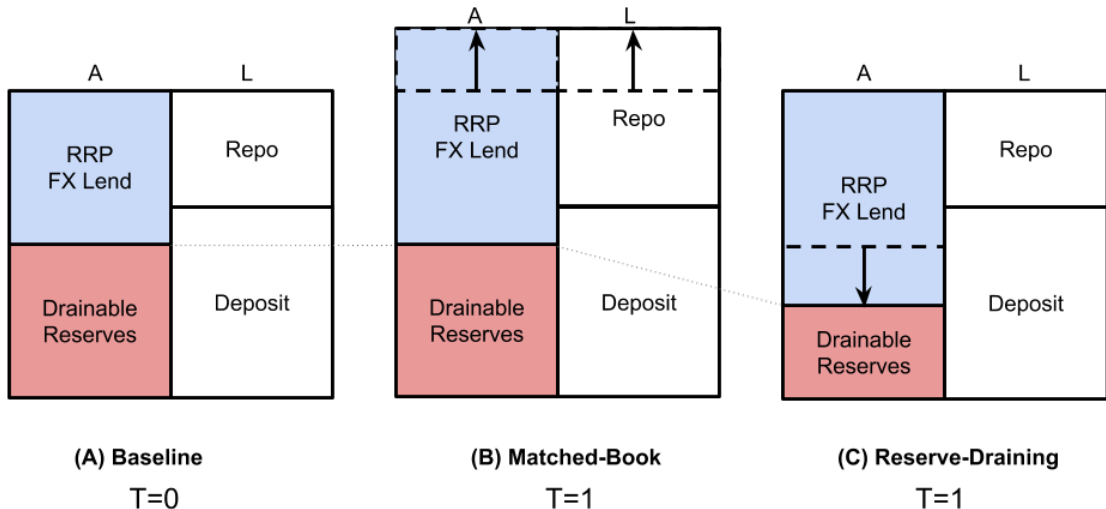


Figure 4: Implied Relative-Value Levered Investors' Treasury Position



Du, Hébert and Li (2023) Updated

Reserves Level is Critical to Maintain Repo/FX Swap Liquidity



(A) Baseline

T=0

(B) Matched-Book

T=1

(C) Reserve-Draining

T=1

Source: Correa, Du and Liao (2022)

Conclusion

- ▶ The dollar funding market is highly global. Repo and FX swap markets are intimately connected. Both markets are crucial to global financial stability.
- ▶ Despite large and persistent CIP deviations, the FX swap market is functional and serves core functions of providing dollar funding to market who lack ready access to cash market funding, albeit at higher costs.
- ▶ The resilience of the two markets depends on the intermediary balance sheet capacity, ample reserves, and central bank liquidity backstops.