Liquid Assets and Financial Fragility

Toni Ahnert[1] Marco Macchiavelli[2]

[1]ECB & CEPR [2]University of Massachusetts

ECB Money Markets Conference 2022

The views expressed are solely those of the authors and do not necessarily reflect those of the European Central Bank, the Bank of Canada, or the Federal Reserve System.

Motivation

- **Money market funds (MMFs)** issue shares redeemable on demand and invest in short-term debt
  - Govt MMFs invest in **liquid** govt debt and repos backed by govt debt
  - Prime MMFs can additionally invest in **illiquid** short-term private debt (CP, CDs)
- **As a results,** Prime MMFs are subject to runs (2008, 2020)
- Can **financial stability** be improved by providing **liquid assets** to Prime MMFs?

Motivation

- **Money market funds (MMFs)** issue shares redeemable on demand and invest in short-term debt
  - Govt MMFs invest in **liquid** govt debt and repos backed by govt debt
  - Prime MMFs can additionally invest in **illiquid** short-term private debt (CP, CDs)
- **As a results,** Prime MMFs are subject to runs (2008, 2020)
- Can **financial stability** be improved by providing **liquid assets** to Prime MMFs?

Motivation

- Providing **liquid assets** could affect **financial stability**:
  1. reduce **run risk** of MMFs
     - liquid assets have no cost of liquidation
     - used to accommodate redemptions
  2. by stabilizing their flows, Prime MMFs can continue lending to private borrowers (CP, CDs)
     - hence reducing the **run risk** of private borrowers

- This Paper: study these issues both theoretically and empirically

Preview of Results

1. *Global-game model of mutual fund runs*
   - provision of liquid assets dampens strategic complementarity (in redemption decisions), hence reducing run risk
   - with less redemptions, funds with access to liquid assets can lend more to private borrowers (illiquid assets)

2. *Empirically test model's implications*
   - quasi-random assignment of MMFs to treatment (access to liquid assets) and control $\Rightarrow$ initial phase of Overnight Reverse Repo facility (ONRRP)
   - exogenous stress event triggers outflows from MMFs: 2013 U.S. debt limit
   - evidence that provision of liquid assets indeed reduces financial fragility

Preview of Results

1. *Global-game model of mutual fund runs*
   - provision of liquid assets dampens strategic complementarity (in redemption decisions), hence reducing run risk
   - with less redemptions, funds with access to liquid assets can lend more to private borrowers (illiquid assets)

2. *Empirically test model's implications*
   - quasi-random assignment of MMFs to treatment (access to liquid assets) and control $\Rightarrow$ initial phase of Overnight Reverse Repo facility (ONRRP)
   - exogenous stress event triggers outflows from MMFs: 2013 U.S. debt limit
   - evidence that provision of liquid assets indeed reduces financial fragility

Model

- A global games model of investor redemptions
  - investors receive a noisy private signal about (money) fund performance and decide whether to redeem their shares
  - building on Chen, Goldstein, Jiang 2010 JFE
- Novel aspect: asset heterogeneity
  - funds hold a portfolio of risky and liquid assets
  - risky assets = lending to corporate borrowers (high liquidation cost)
  - liquid assets = ONRRP and Treasuries
  - zero liquidation cost for ONRRP (treated group)
  - positive liquidation cost for Treasuries in the debt limit episode

Mechanism

- Redemptions can impose costs on non-redeeming investors
  - costs may arise from transactions or market illiquidity
  - not fully borne by redeeming investors: a negative externality
  - strategic complementarity (when some risky assets are liquidated)
  - Note: 2013 episode is before the 2016 money fund reform
- liquid assets can also lead to strategic substitutability
  - for few redemptions, investors prefer not to redeem
  - liquid assets imply that redemptions do not create much costs
  - Intuition: because of the equity-like stake, non-redeeming investors have to share the proceeds with fewer other investors in the future
- We use the methods of Goldstein and Pauzner 2005 JF to derive a unique equilibrium

Testable implications

- (1) Money funds with access to a liquid asset are less fragile.
  - Treated funds experience smaller outflows in response to at-risk exposures during the debt limit episode.
- (2) Money funds with access to a liquid asset liquidate less in expectation.
  - Treated funds maintain more of their lending to risky borrowers during the debt limit episode.
- (A third result on investor sophistication increasing money fund fragility is derived and tested in the paper.)

ONRRP facility

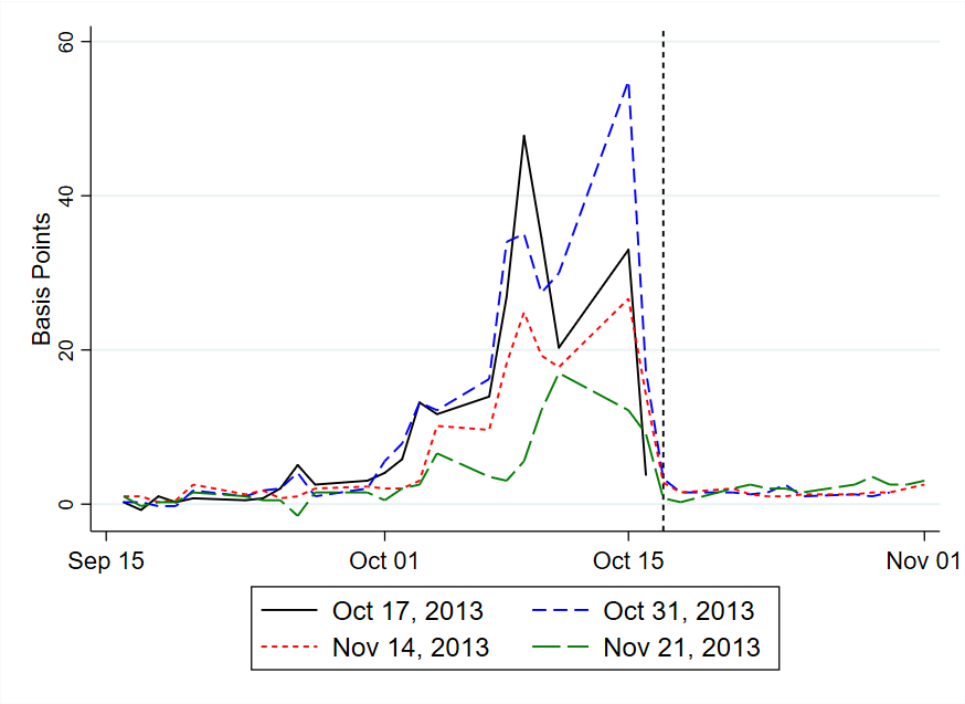
Federal Reserve introduced Overnight Reverse Repo (ONRRP) facility to improve control on short-term rates. Counterparties can invest cash at the ONRRP and earn the administered rate.

- Aug/Oct 2010: first ONRRP test operations
- Sep 2010: MMF eligibility (AUM $\geq$ \$10 bn)
- Feb 2011: MMF eligibility **(AUM $\geq$ \$5 bn)**
- Sep 2012: **ONRRP application deadline**
- Jul 2013 FOMC establishes daily ONRRP operations
- Sep 23, 2013: daily ONRRP operations begin
- Nov 2014: **new ONRRP application available**

Control group

Some MMFs did not satisfy eligibility criteria by Sep 2012 but do so in 2013. These MMFs are **technically eligible** in 2013 but are not treated since they missed the last application deadline.

2013 U.S. Debt Limit



- May 17-20: debt limit is reached, extraordinary measures until Aug 2
- Aug 2: extraordinary measures extended through Oct 11
- Sep 25: extraordinary measures will be exhausted by Oct 17
- Oct 1: government shutdown; markets doubt a timely resolution
- Oct 16: legislation suspends the debt limit

$\Rightarrow$ Treasuries with payments btw Oct 17 and Nov 22 are at risk

Liquid assets and MMF run risk

- flows, yields, liquidity metrics from iMoneyNet (weekly)
- exposures to Treasuries from N-MFP (month-ends)
- Treasuries' payment dates from MSPD

Hypothesis 1: ONRRP reduces sensitivity of outflows to risky Treasury exposures (AtRisk). ($\beta_3 < 0$, $\beta_4 > 0$)

$$\begin{aligned} Flow_{i,t} =& \beta_1 AtRisk_{i,t-1} + \beta_2 Treat \cdot AtRisk_{i,t-1} + \beta_3 Crisis \cdot AtRisk_{i,t-1} + \\ &+ \beta_4 Crisis \cdot Treat \cdot AtRisk_{i,t-1} + \gamma X_{i,t-1} + \mu_t + \mu_i + \varepsilon_{i,t} \end{aligned}$$

- Flow = $\%\Delta$ AUM
- AtRisk: share of assets in Treasuries with payments btw Oct 17 & Nov 22
- Controls ($X_{i,t-1}$): log(AUM), gross yields, WAM, Treasury share
- Treatment Group: ONRRP MMFs with AUM btw \$5 bn and \$8 bn
- Control Group: non-ONRRP MMFs with AUM btw \$5 bn and \$8 bn

Liquid assets and MMF run risk

Hypothesis 1: ONRRP reduces sensitivity of outflows to risky Treasury exposures (AtRisk). ($\beta_3 < 0$, $\beta_4 > 0$)

	Sample 1		Sample 2		Sample 3	
AUM window:	[5,10]		[4,8]		[5,8]	
Dep. var.:	Flows		Flows		Flows	
Crisis · AtRisk	-3.074***	-1.317*	-2.286***	-1.724**	-3.142***	-1.603**
	(0.290)	(0.669)	(0.518)	(0.773)	(0.351)	(0.733)
Crisis · Treat · AtRisk	3.091***	1.620**	2.269***	2.035***	3.043***	1.821**
	(0.321)	(0.627)	(0.469)	(0.689)	(0.356)	(0.650)
N	331	331	302	302	246	246
Week, Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes

Liquid assets and Lending Behavior

Hypothesis 2: ONRRP allows funds to continue lending to riskier borrowers (PrimeRisk). ($\beta_3 < 0$, $\beta_4 > 0$)

$$PrimeRisk_{i,t} = \beta_1 AtRisk_{i,t-1} + \beta_2 Treat \cdot AtRisk_{i,t-1} + \beta_3 Crisis \cdot AtRisk_{i,t-1} + \\ + \beta_4 Crisis \cdot Treat \cdot AtRisk_{i,t-1} + \gamma X_{i,t-1} + \mu_t + \mu_i + \varepsilon_{i,t}$$

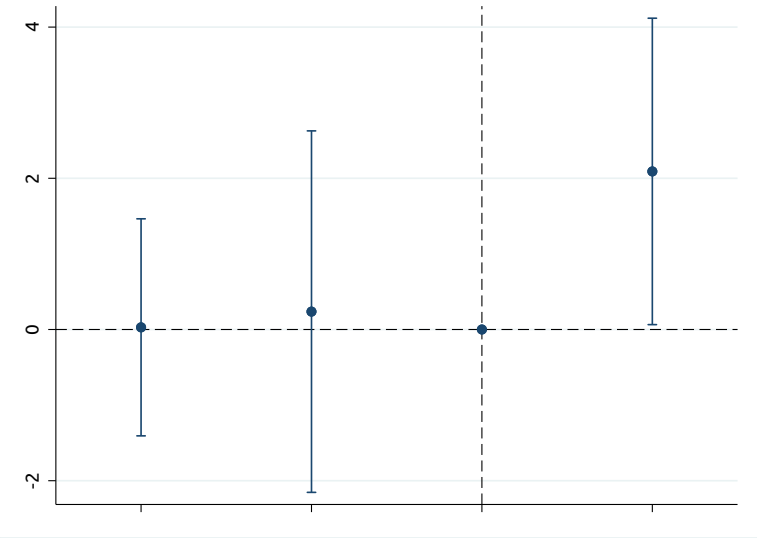
- PrimeRisk: share of assets in A2/P2 CP, foreign CDs, ABCP

	Sample 1		Sample 2		Sample 3	
AUM window:	[5,10]		[4,8]		[5,8]	
Dep. var.:	PrimeRisk		PrimeRisk		PrimeRisk	
Crisis · AtRisk	-4.932***	-5.228***	-1.471	-1.275	-5.158***	-6.266***
	(0.338)	(0.850)	(0.990)	(1.066)	(0.378)	(0.721)
Crisis · Treat · AtRisk	5.170***	5.408***	1.637*	1.519*	5.154***	6.172***
	(0.187)	(0.678)	(0.830)	(0.770)	(0.217)	(0.525)
N	331	331	302	302	246	246
Week, Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes

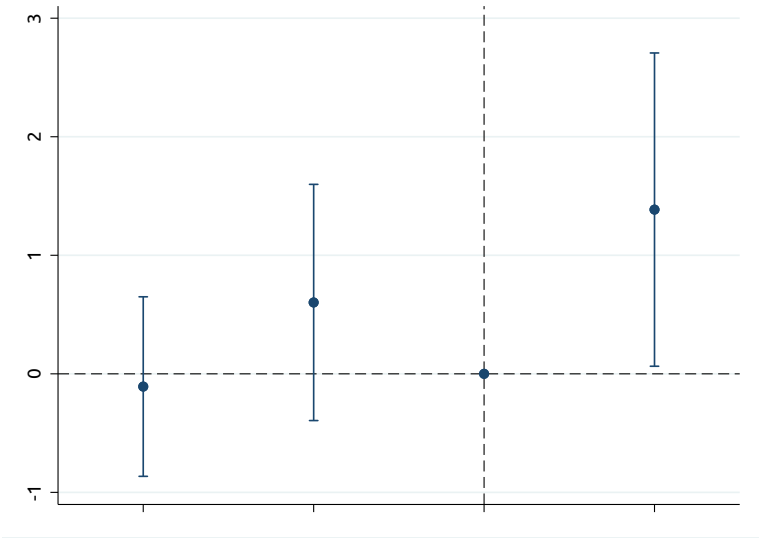
Robustness Tests

Our results are not driven by

- skilled managers avoiding ex-post risky Treasuries
- treated group being less risk-sensitive than control group
- imprimatur effect (stamp of approval without access to ONRRP)
- pre-existing trends



Flows



PrimeRisk

Conclusion

The provision of **liquid assets** by the Federal Reserve delivers two **financial stability benefits**

- lower sensitivity of outflows to risky exposures
- ability to keep funding less liquid (ex-ante riskier) assets

Concerns that the provision of liquid assets leads to disintermediation in times of stress seem to be unfounded.

Additional Material

Prime Funds

	Pre-crisis (Jul 1 – Sep 30)					Crisis (Oct 1 – Oct 16)				
	Obs.	Mean	St.Dev.	p(25)	p(75)	Obs.	Mean	St.Dev.	p(25)	p(75)
Flows	2046	0.05	4.40	-0.95	0.89	462	-0.21	3.96	-1.13	0.85
Yield	2045	18.78	5.28	16	23	462	18.60	5.22	15	22
Mat7d	2025	42.09	16.68	33	47	458	41.40	15.62	33	46
AtRisk	2037	0.87	1.65	0	1.34	462	1.79	5.08	0	2
PrimeRisk	2046	25.07	15.20	13	36	462	24.62	14.62	15	35