

Securities lender of last resort

On the causal effects of central banks' securities lending facilities

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Securities lender of last resort?

- ◆ Quantitative easing makes central banks one of (if not the largest) single owner of government bonds.
- ◆ Concern: Negative side effects on the functioning of the repo market (collateral scarcity) + decreasing market quality for secondary bond markets.
- ◆ Major central banks (Fed, BoE, BOJ, Eurosystem) established securities lending facilities (SLF) as a backstop! → “**securities lender of last resort**”.

The Eurosystem's securities lending arrangements

This paper: Understanding the transmission of policy changes in the securities lending programmes to the repo and secondary bond market.

“The aim of securities lending is to support bond and repo market liquidity without unduly curtailing normal repo market activity.”¹

- ◆ Effects on SLFs' utilization?
- ◆ Effects on market participants' “normal” repo activity?
- ◆ Effects on bond and repo market liquidity?

¹<https://www.ecb.europa.eu/mopo/implement/app/lending/>

Related literature

Only few studies on SLF. These show that higher usage of SLF is associated with:

- ◆ Lower scarcity in the repo market ([Fleming, Hrung, and Keane, 2010](#), [Baltzer, Schlepper, and Speck, 2022](#) [Carrera de Souza and Hudepohl, 2022](#))
- ◆ Lower limits to arbitrage in the treasury market ([Pelizzon, Subrahmanyam, and Tomio, 2022](#))

Challenge: Utilization of securities lending facility is endogenously determined → reverse causality problem!

Our approach:

- ◆ We exploit a pricing change as a natural experiment to estimate causal effects.
- ◆ We use information on major banks' repo activity to track the transmission.

Institutional background

The SLF of the Eurosystem are implemented in a decentralized fashion:

- ◆ Modalities are set by NCBs and reflect differences in domestic market practices
- ◆ Securities lending takes place against either securities or cash collateral
- ◆ Lending activities are subject to individual counterparty and a global limit

However, there is an overarching pricing framework to ensure the backstop character.

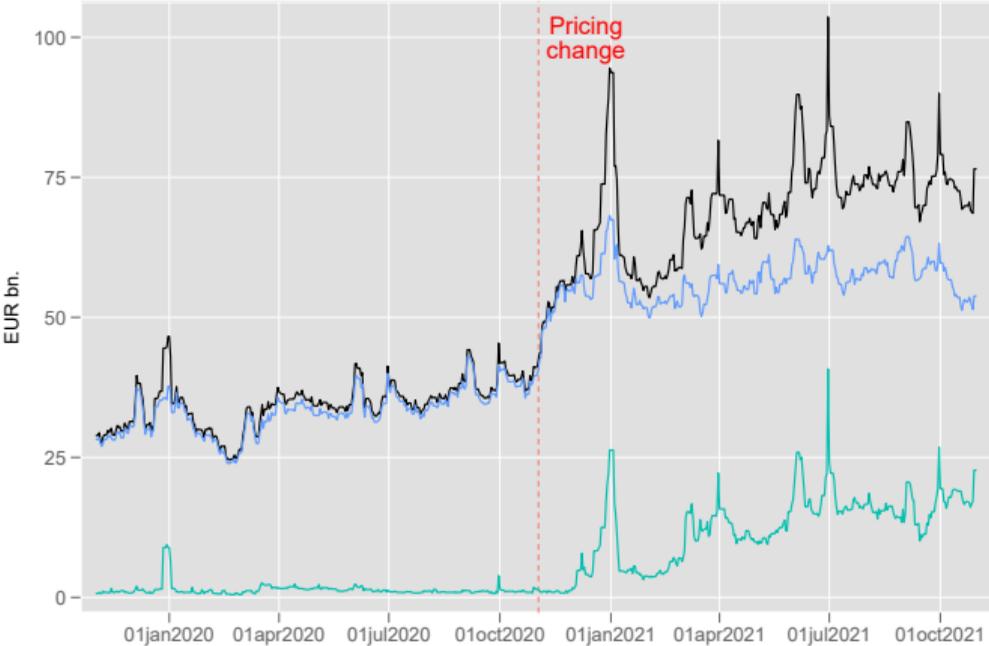
Institutional background: Policy change

Pricing conditions before November 2, 2020 and after (shown in parentheses):

*“[...] The ECB’s securities lending arrangements allow eligible counterparties, at any time, to borrow securities against securities as collateral at a fixed minimum fee of **10 (5) basis points**, or a fee based on prevailing market rates, whichever is higher. The fee is the difference between the repo and reverse repo rates.*

*“[...] The ECB also allows eligible counterparties to borrow securities against cash as collateral at a rate equal to the rate of the deposit facility minus **30 (20) basis points** or the prevailing market repo rate [...], whichever is lower.”*

Eurosystem's public sector securities lending balances



Identification strategy: Diff-in-diff approach

Idea: Securities are heterogeneously affected by the central-bank induced collateral supply shock (bonds with elastic/inelastic supply).

- ◆ Securities held by buy-and-hold investors have inelastic supply because these investors are less likely to make holdings available for lending.
- ◆ Market participants in need of these scarce securities are more likely to borrow them from the SLF after securities lending arrangements have become cheaper.
- ◆ Continuous treatment variable: Share of inelastic investors in each bond (based on detailed ownership data).

SecLending by Counterparty

Hypotheses development

Policy change: Cheaper borrowing conditions at Eurosystem securities lending facilities.

- 1. Usage of securities lending facilities:** Higher usage for securities with inelastic supply.
- 2. Overall repo market activity:**
 - 2.a) Substitution hypothesis:** Crowding out of other market participants → No effect on overall collateral availability.
 - 2.b) Collateral multiplier hypothesis:** Collateral borrowed from central banks is re-used in other collateral transactions → Positive effect on overall collateral availability.
- 3. Effects on the repo and bond market:**
 - 3.a)** No effect on repo market scarcity and bond market liquidity.
 - 3.b)** Improvement of repo market scarcity and bond market liquidity.

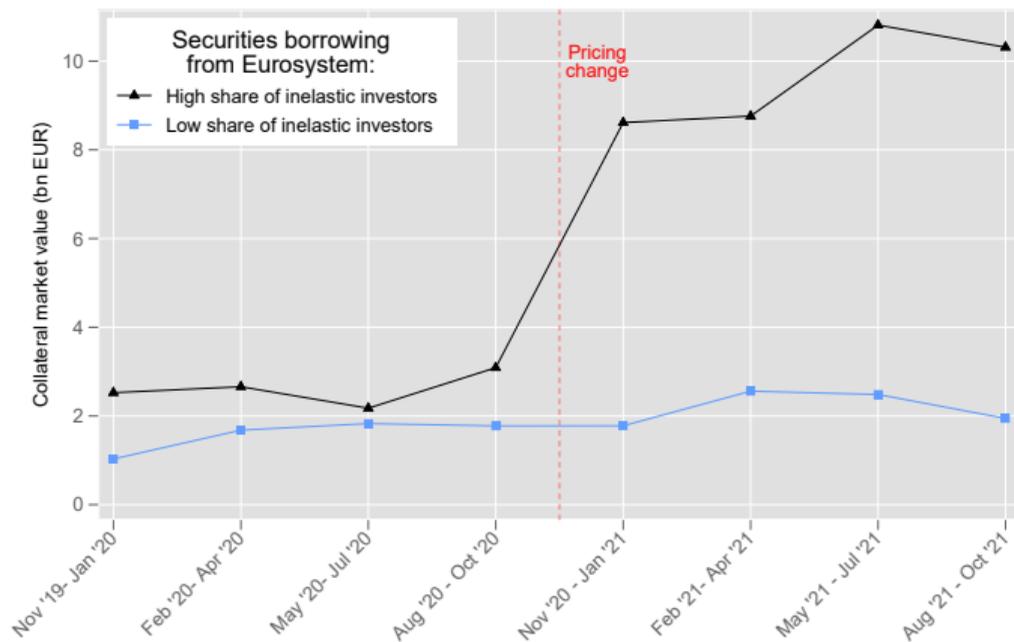
◆ Money Market Statistical Reporting (MMSR) dataset:

- 47 largest euro area banks
- Secured money market transactions (repo transactions)
- Amount of securities borrowed/lent is computed from transaction data.
- Utilization of securities lending facilities and all other repo transactions.

◆ Securities Holding Statistics by sector (SHS-S):

- Investor base of each bond at the sectoral level on a quarterly basis
- *Elastic investors*: monetary financial institutions and investment funds.
- *Inelastic investors*: Households, insurance companies and pension funds, governments and non-financial corporations. (Duffie, 1996; Arrata, Nguyen, Rahmouni-Rousseau, and Vari, 2020; Koijen, Koulischer, Nguyen, and Yogo, 2021).

Diff-in-diff: plain and simple



Dependent variable:	Amount of securities borrowed from Eurosystem Amount outstanding					
	Full sample			Short sample: eight weeks around pricing change		
Post x Inelastic supply	0.51*** (5.28)	0.51*** (5.30)	0.41*** (4.05)	0.38*** (2.59)	0.38*** (2.59)	0.37** (2.55)
Inelastic supply	0.13*** (2.77)	0.14*** (2.79)	-0.21 (-1.39)	0.20** (2.42)	0.20** (2.43)	
Post	0.06*** (5.61)			0.04** (2.13)		
R^2	3.5	3.6	28.8	1.5	1.6	73.3
N	241,825	241,825	241,825	19,712	19,712	19,712
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	Yes	Yes	No	Yes	Yes
Bond fixed effects	No	No	Yes	No	No	Yes

- ◆ Economic effect: 68% increase in SLF utilization relative to the period prior to the pricing change.

Effects across repo characteristics

Panel A:		Collateral type	
	securities	cash	
Post x Inelastic supply	0.21*** (3.35)	0.19*** (3.75)	
R^2 (%)	23.2	13.8	
N	241,825	241,825	

Panel B:		Repo tenor				
	O/N	T/N	S/N	up to one week	above one week	open repo
Post x Inelastic supply	0.01 (1.61)	0.01*** (3.20)	0.01* (1.76)	0.30*** (3.58)	0.07** (2.13)	0.02 (0.63)
R^2 (%)	13.8	4.2	8.4	23.3	29.0	18.4
N	241,825	241,825	241,825	241,825	241,825	241,825

- ◆ Effect present for securities and cash collateral option.
- ◆ Effect concentrated in term repos of one week or longer.

Effects on overall repo market activity I

	Amount borrowed from market	Total amount borrowed	Market share Eurosystem
Post x Inelastic Supply	0.8066 (1.48)	1.1762** (2.06)	0.0349** (1.94)
R ²	90.98	90.87	54.88
Within R ²	3.381	3.497	0.3485
N	19,712	19,712	19,712

- ◆ Evidence consistent with *collateral multiplier hypothesis*
- ◆ Implied collateral multiplier: $1.18/0.37 = 3.19$

Effects on overall repo market activity II

	O/N	T/N	S/N	up to one week	above one week	open repo
Post x Inelastic Supply	0.3497*** (3.33)	-0.0329 (-0.12)	0.1099 (0.62)	0.2370 (1.39)	0.2703 (0.73)	0.0512 (0.40)
R ²	29.11	69.12	52.86	44.36	91.90	80.31
N	19,712	19,712	19,712	19,712	19,712	19,712

- ◆ Market activity mainly increases in O/N segment
- ◆ Certain degree of maturity transformation along the repo chain

Channeling collateral to the system

	All	CCP	Bilateral	All	CCP	Bilateral	All	CCP	Bilateral
Dependent variable:	<u>Amount of securities lent</u> Amount outstanding			<u>Collateral re-use</u> Amount outstanding			<u>Collateral re-use</u> Amount of securities borrowed		
Post x Inelastic Supply	0.9938 (1.08)	1.0015*** (3.21)	-0.0078 (-0.01)	0.5468* (1.73)	0.7452*** (3.10)	-0.1983 (-0.85)	3.3524 (1.07)	7.8521*** (2.90)	-4.4997* (-1.79)
R ²	94.32	88.85	94.22	91.35	86.91	88.55	73.86	64.08	72.09
N	19,712	19,712	19,712	19,672	19,672	19,672	19,507	19,507	19,507

- ◆ Securities are lent and re-used via CCPs.
- ◆ Re-use amount and re-use intensity increase for securities with inelastic supply

Effects on repo scarcity

	O/N	T/N	S/N	O/N	T/N	S/N
Dependent Variable: Specialness spread (in bps)						
	MMSR			BrokerTec		
Post x Inelastic Supply	-6.0367** (-2.54)	-1.1442* (-1.69)	-0.9782* (-1.90)	-7.0848** (-2.58)	-1.8285** (-2.39)	-0.7558 (-1.35)
R ²	42.46	64.32	85.59	36.55	65.23	84.81
N	4,368	10,226	12,863	2,427	7,844	11,297

- ◆ Economic effect: 1 basis point reduction in O/N specialness premium (13% decline relative to the period prior to the pricing change)

Effects on bond market liquidity

	All Bonds	< 10 yrs.	>= 10 yrs.	AAA, AA	A, BBB
Dependent Variable: Relative Bid-Ask Spread (in bps)					
Post x Inelastic Supply	-3.7866*** (-2.97)	-4.6597*** (-3.06)	-2.7955* (-1.72)	-2.8271 (-1.43)	-3.9121 (-1.55)
R ²	75.81	69.44	72.52	74.17	78.65
N	13,111	9,356	3,755	7,338	5,773

- ◆ Economic effect: 0.6 basis point reduction in bid-ask spread (5% decline relative to the period prior to the pricing change)

Conclusion

“The aim of securities lending is to support bond and repo market liquidity without unduly curtailing normal repo market activity.” (Source: ECB)

Insights from pricing change:

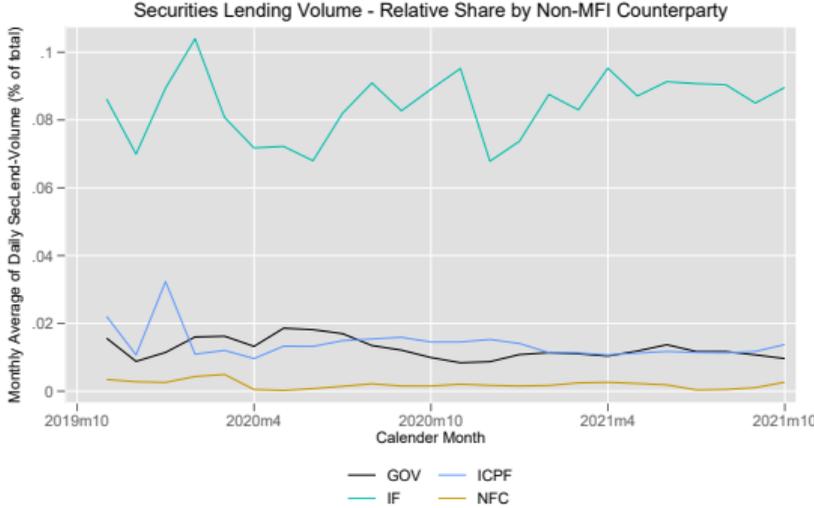
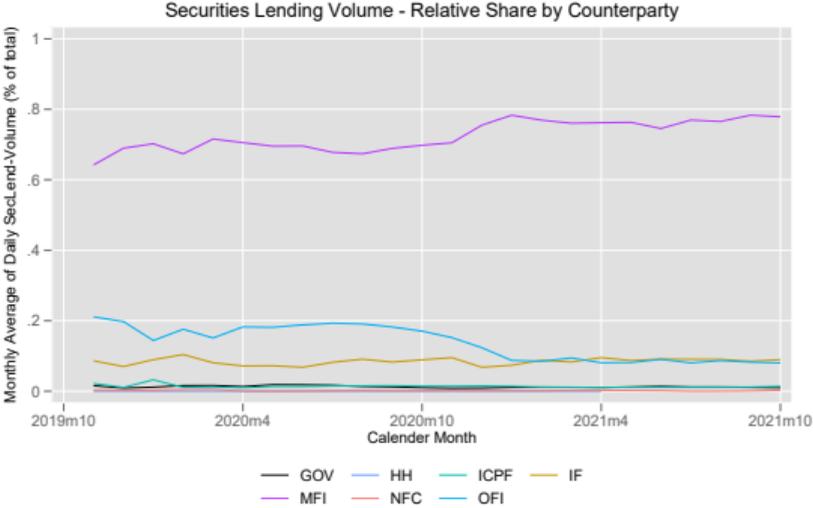
- ◆ Utilization of securities lending facilities surged, in particular for bonds with otherwise inelastic supply to the repo market.
- ◆ No substitution effects! Total securities borrowing and lending increased via the collateral multiplier.
- ◆ Improved pricing conditions alleviate scarcity in the repo market and enhance bond market liquidity.

References I

- William Arrata, Benoît Nguyen, Imène Rahmouni-Rousseau, and Miklos Vari. The scarcity effect of quantitative easing on repo rates: Evidence from the Euro area. *Journal of Financial Economics*, 137(3): 837–856, 2020.
- Markus Baltzer, Kathi Schlepper, and Christian Speck. The eurosystem's asset purchase programmes, securities lending and bund specialness. Bundesbank Discussion Paper, 2022.
- Tomás Carrera de Souza and Tom Hudepohl. The eurosystem's bond market share at an all-time high: What does it mean for repo markets? De Nederlandsche Bank Working Paper, 2022.
- Darrell Duffie. Special repo rates. *The Journal of Finance*, 51(2):493–526, 1996. ISSN 0022-1082.
- Michael J. Fleming, Warren B. Hrung, and Frank M. Keane. Repo market effects of the term securities lending facility. *American Economic Review*, 100(2):591–96, May 2010.
- Ralph SJ Koijen, François Koulischer, Benoît Nguyen, and Motohiro Yogo. Inspecting the mechanism of quantitative easing in the euro area. *Journal of Financial Economics*, 140(1):1–20, 2021.
- Loriana Pelizzon, Marti G Subrahmanyam, and Davide Tomio. Central bank-driven mispricing. 2022.

Additional Slides

Identification strategy: Empirical Validation



Descriptive Statistics

Variable	N	Mean	SD	Percentiles		
				25th	50th	75th
<i><u>Amount of securities borrowed & lent</u></i>						
Dummy: Borrowed from Eurosystem	241,825	0.13				
Amount Borrowed from Eurosystem (in mn EUR)	30,568	117	199		52	
Amount Borrowed from Eurosystem (scaled, in%)	241,825	0.08	0.47		0.00	
Amount Borrowed from Market (in mn EUR)	241,825	1,016	1,294	213	618	1,335
Amount Borrowed from Market (scaled, in%)	241,825	5.83	5.58	2.11	4.24	7.64
<i><u>Repo & Cash Market</u></i>						
Specialness Spread O/N (MMSR, in bps)	89,400	7.24	11.66	0.00	4.00	11.00
Specialness Spread T/N (MMSR, in bps)	197,071	5.89	8.41	0.49	4.50	9.90
Specialness Spread S/N (MMSR, in bps)	238,143	5.85	6.96	1.48	4.86	9.24
<i><u>Explanatory Variables</u></i>						
Inelastic Share (in %)	241,825	32.48	15.36	20.07	30.77	43.21

Treatment effect over time

