

Supply-side interventions and repo rates in the German Bund market

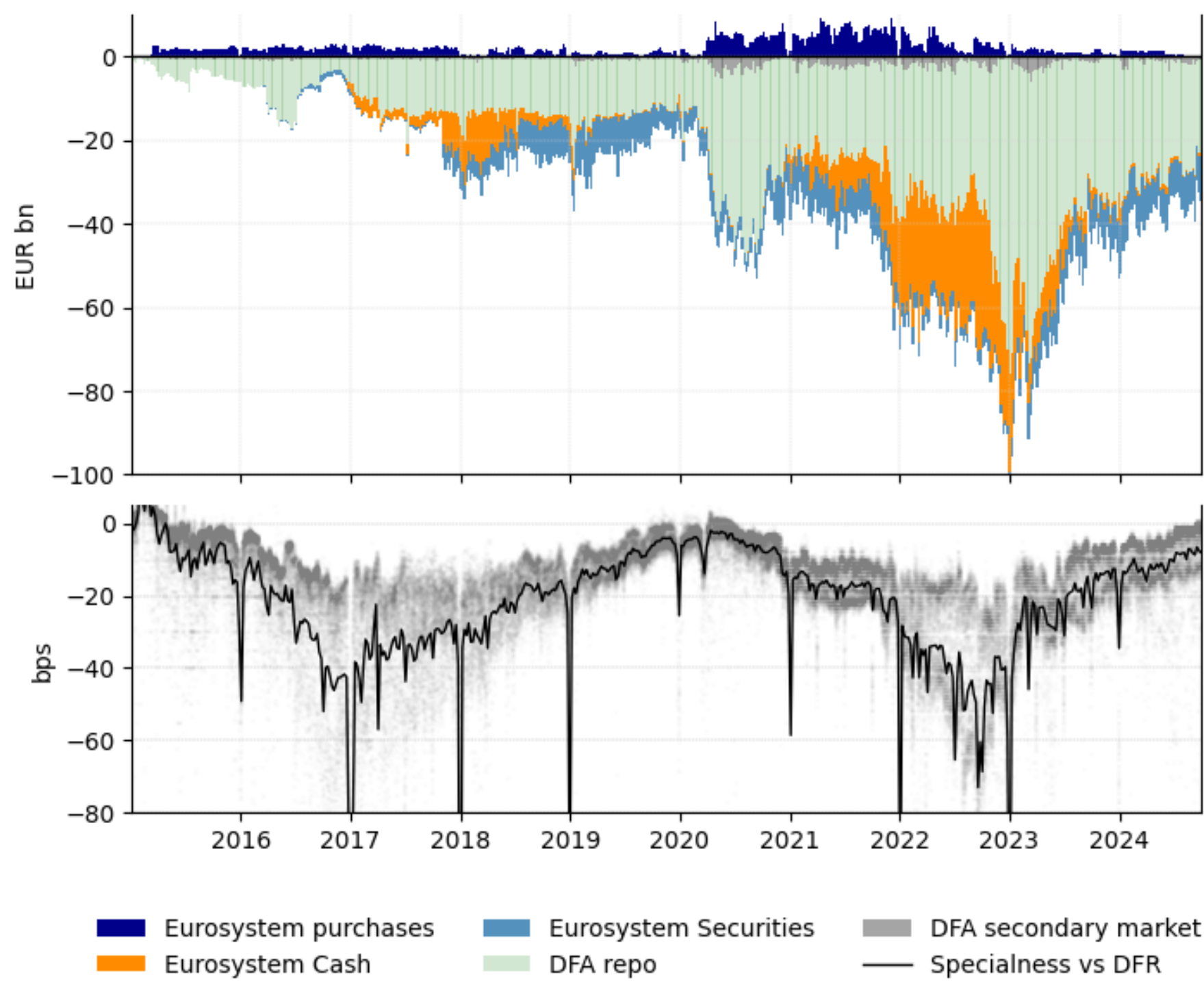
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Motivation

- ▶ Collateral scarcity episodes in German bond market (2016-2017 and 2022)
 - Impaired functioning of repo market, spillovers to cash market
- ▶ Eurosystem's QE substantially reduced free float.
- ▶ Sec lending introduced to alleviate scarcity and DFA became more active in managing supply with secondary market interventions.
- ▶ **Broad question:** supply effects on repo rates
- ▶ **Specific questions:**
Q1: How ES purchases/lending and DFA purchases/sales/repos affect repo rates?
Q2: Why was high scarcity in the Bund market in spite of ample collateral availability?



Data

- ▶ Day-ISIN level data from Jan/2015 to Oct/2024
- ▶ Combines **confidential** market operations of two key Bund market participants:
 - **Eurosystem:**
 - Gross purchases and holdings
 - Securities lending activity
 - **German Debt Management Office:**
 - Secondary cash market activity
 - Repo market activity
- ▶ Commercial/Public data:
 - Repo rates (BrokerTec)
 - Auction data (DFA)
 - Bond characteristics: Coupon, maturity, on-the-run, and CTD status, etc. (Bloomberg)

Methodology: identification

- ▶ **Endogeneity** if ES/DFA operations contemporaneously react to repo rates
- ▶ Identification strategy
 - **For purchases/sales:** lag explanatory variables by one day
 - **For repo:** use an instrument
- ▶ DFA securities lending in the repo market starts at 7:45am
- ▶ IV approach: euro amount of ISIN lent (over total outstanding amount) instrumented with euro amount of ISIN holdings (over total outstanding amount)

$$Y_{i,t} = \beta X_{i,t} + \varepsilon_{i,t}$$

$$\text{Relevance: } \text{cov}(X_{i,t}, Z_{i,t}) \neq 0$$

$$\text{Exogeneity: } \text{cov}(Z_{i,t}, \varepsilon_{i,t}) = 0$$

where

$Y_{i,t}$: change in the repo rate of ISIN i in day t

$X_{i,t}$: amount of ISIN i lent in day t

$Z_{i,t}$: holdings of ISIN i in day t

Methodology: specification

$$\Delta \text{RR}_{i,t,t-1} = \beta_0 + \beta_1 \text{ES purch}_{i,t-1} + \beta_2 \text{DFA purch}_{i,t-1} + \beta_3 \text{DFA sales}_{i,t-1} + \gamma_i + \psi_t + \varepsilon_{i,t},$$

where

$\Delta \text{RR}_{i,t,t-1}$: change in the repo rate of ISIN i in day t

$\text{ES purch}_{i,t}$: Eurosystem purchases of ISIN i in day $t - 1$ (as % of free float)

$\text{DFA purch}_{i,t}$: DFA purchases of ISIN i in day $t - 1$ (as % of free float)

$\text{DFA sales}_{i,t}$: DFA sales of ISIN i in day $t - 1$ (as % of free float)

γ_i : ISIN fixed effects

ψ_t : day fixed effects

$\varepsilon_{i,t}$: error term (clustered at ISIN-level)

$$\text{DFA repo}_{i,t} = \beta_0 + \beta_1 \widehat{\text{DFA holdings}_{i,t}} + \gamma_i + \psi_t + \varepsilon_{i,t}$$

$$\Delta \text{RR}_{i,t,t-1} = \pi_0 + \pi_1 \widehat{\text{DFA repo}_{i,t}} + \gamma_i + \psi_t + u_{i,t}$$

where

$\Delta \text{RR}_{i,t,t-1}$: change in the repo rate of ISIN i in day t

$\text{DFA repo}_{i,t}$: DFA outstanding repo volume of ISIN i in day t

$\widehat{\text{Holdings}_{i,t}}$: DFA holdings of ISIN i in day t

γ_i : ISIN fixed effects

ψ_t : day fixed effects

$\varepsilon_{i,t}, u_{i,t}$: error terms (clustered at ISIN level)

(Q1) Flow effects: Purchases and sales

	Repo Rate Change
ECB Purchases (Lagged)	-0.501*** (0.15)
Bundesbank Purchases (Lagged)	-0.449*** (0.059)
DFA Purchases (Lagged)	-0.111** (0.049)
DFA Sales (Lagged)	0.104*** (0.037)

Control variables	Yes
ISIN and day fixed effects	Yes
Observations	180,466
Adjusted R ²	0.930

Note: *p<0.1; **p<0.05; ***p<0.01

(Q1) Flow effects: Repo operations

	Repo Rate Change
DFA securities lending	0.243** (0.107)

F-test (1st stage)	stat = 4,202.5
Wu-Hausman	stat = 21.2

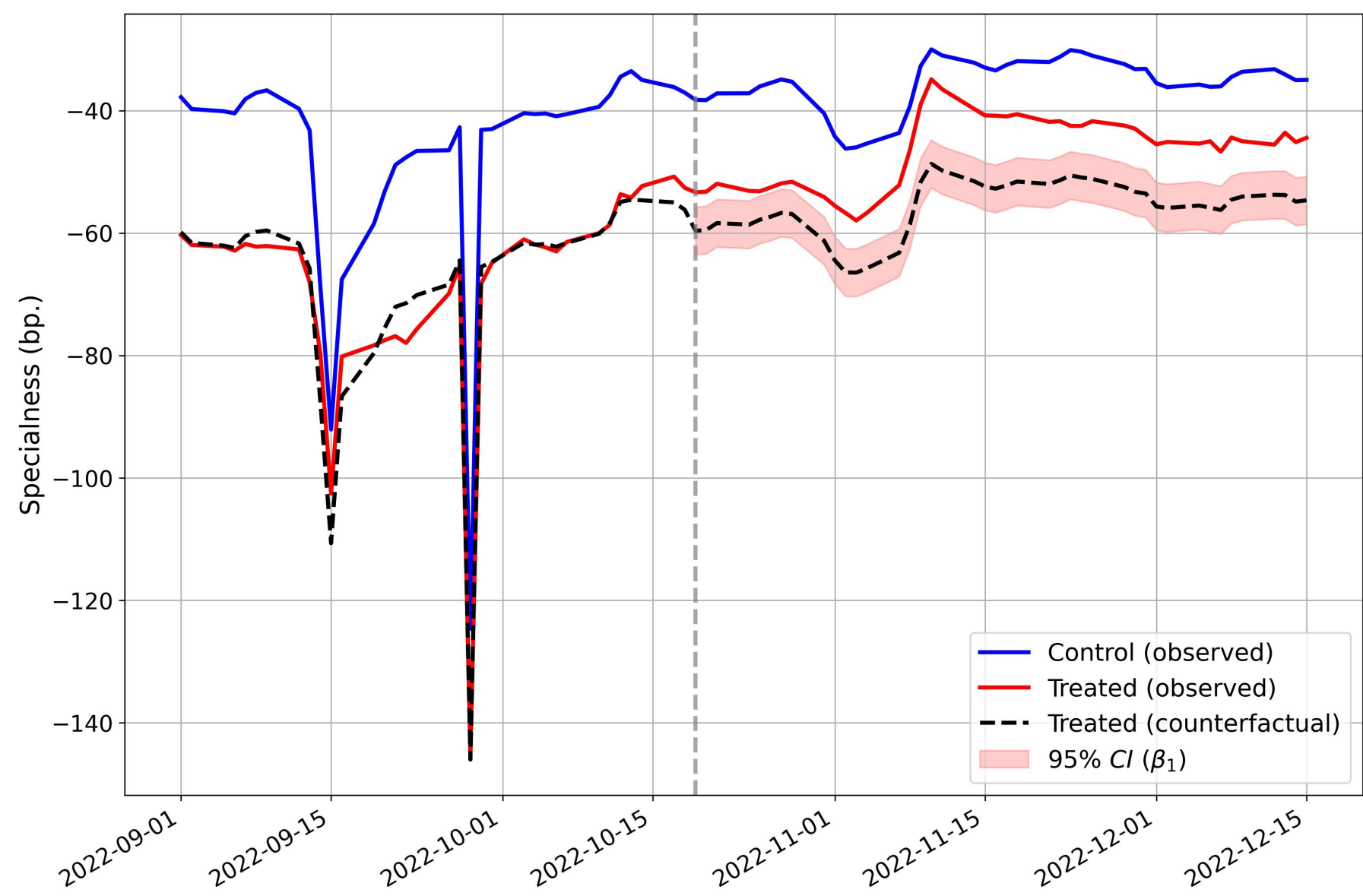
Control variables	Yes
ISIN and fixed effects	Yes
Observations	180,626
Adjusted R ²	0.929

Note: *p<0.1; **p<0.05; ***p<0.01

(Q1) Stock effects

In April 2020 and October 2022 the DFA conducted large-scale bond taps (EUR 132 bn and EUR 54 bn respectively) into their own holdings, with the objective to lend these bonds in the repo market as needed.

These were unexpected operations which we use as quasi-natural experiments to assess their effect on repo rates.



(Q2) Scarcity in spite of ample collateral availability?

- ▶ During the 2016 and 2022 scarcity episodes there were bonds available for borrowing in the balance sheet of the Eurosystem and the DFA. Still, repo rates substantially richened.
- ▶ In the paper we document:
 - **Supply-demand imbalances:** in 2016, supply was effectively being reduced while demand increased. In 2022 supply was ample but demand surged.
 - **Intermediation constraints:** dealers in the repo market can be split into those with relationships with hedge funds and those without them. The former group uses securities lending facilities heavily while the latter group uses them significantly less.

Conclusions

- ▶ We analyze the effect of bond supply shocks on repo rates
- ▶ **ES purchases have a large and significant negative effect on repo rates, the effect of DFA purchases/sales is smaller, reflective their reversible nature.**
- ▶ Using an IV approach, we find that **DFA securities lending in the repo market have a significant positive effect on repo rates**, and thus alleviate scarcity.
- ▶ Using a quasi-natural experiment, we show that stock effects (in terms of supply and demand) can explain the level of repo rates, and in a counterfactual exercise show that **absent DFA interventions specialness would have been higher after 2020.**