Heterogeneous Intermediaries and Bond Characteristics in the Transmission of Monetary Policy

Federic Holm-Hadulla (European Central Bank) and Matteo Leombroni (Boston College)

Motivation

- Unconventional and conventional monetary policy have large effects on bond yields
  - Empirically documented through high-frequency approach [Krishnamurthy-Vissing-Jorgensen 2011; Gagnon-et-al 2011; Gertler Karadi 2015]

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- Segmentation particularly relevant for **corporate bonds** [Kisgen 2006; Chernenko-Sunderam 2012]

- However, limited **empirical** evidence on:
  - Connection between bond market response and investors heterogeneity
  - Role of market segmentations for monetary policy transmission to corporate bonds

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- Empirical test to disentangle the two channels:
  - Compare effects of monetary policy on bonds with similar characteristics but different ownership

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$\rightarrow$ Conclude **risk bearing capacity** in market segments matters for transmission

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Data

Asset Prices

- iBoxx database on single-name corporate bonds
- Daily frequency information on prices, duration, yields, OAS spreads ...

Asset Holdings

- ECB security holdings statistics (SHSS) database
- Security-level portfolio holdings by investor type:
  - Mutual funds, insurance companies and pension funds (ICPF), banks, ...

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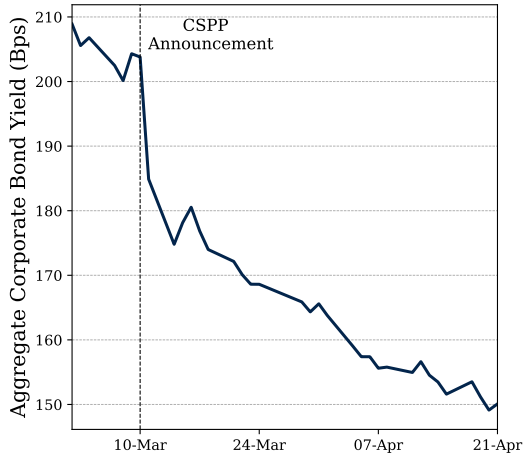

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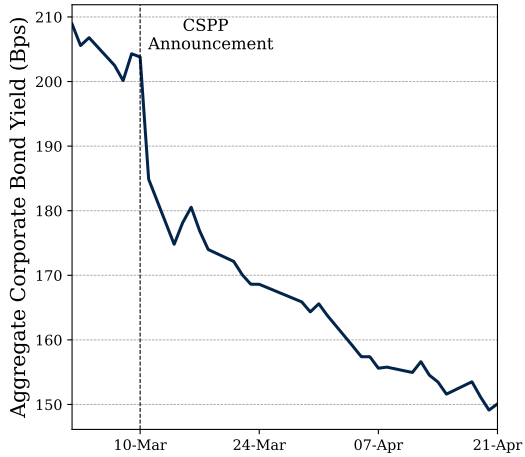
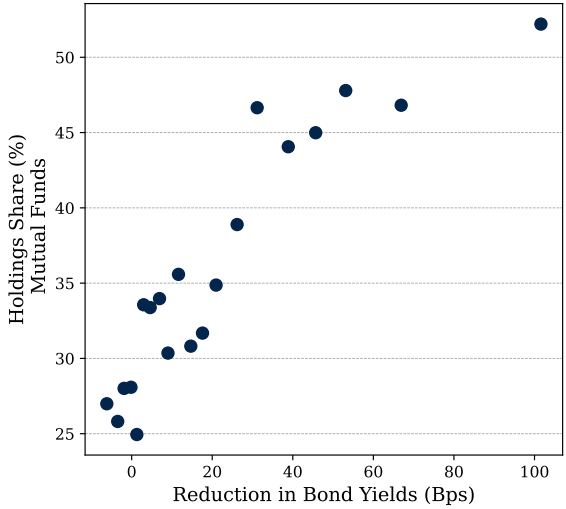
- Significant drop in bond yields following announcements
- Open question: **How bonds held by different intermediaries responded?**



Mutual Fund Holdings and Reduction in Bond Yields

- **Mutual fund shares** (y-axis) and **reduction in bond yields** (x-axis) positively correlated



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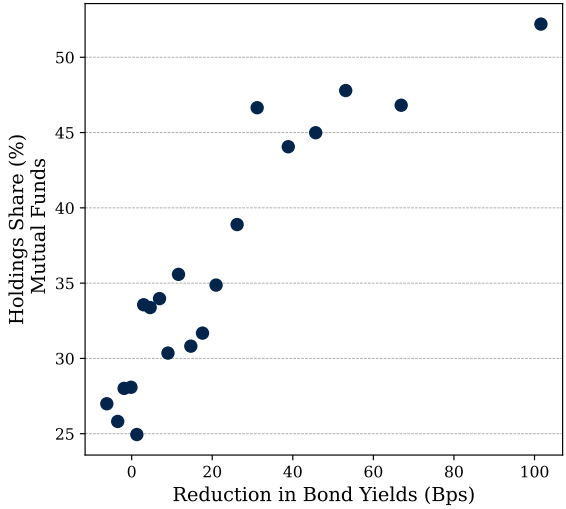

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- Fixed effects can include: Duration, Rating, Country, Callable, Liquidity (bid-ask)
- We use the OAS change in n = 5-days, 10-days, 20-days

Results: The Ownership Effects

	(1) Δys^5	(2) Δys^5	(3) Δys^5	(4) Δys^5	(5) Δys^5	(6) Δys^5	(7) Δys^5	(8) Δys^5
θ_i^{MF}	-55.690***	-46.192***	-50.943***	-40.276***	-49.979***	-31.120***	-20.202**	-11.586**
	(6.16)	(6.95)	(10.69)	(9.17)	(14.11)	(8.75)	(9.79)	(4.48)
Observations	472	466	452	429	399	328	343	435
Adj. R-squared	0.146	0.170	0.231	0.304	0.344	0.570	0.520	0.864
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Duration	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Rating	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Country	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Rating Worst	No	No	No	Yes	Yes	Yes	Yes	Yes
Callable	No	No	No	No	Yes	No	No	No
Liquidity	No	No	No	No	No	Yes	No	No
Sector	No	No	No	No	No	No	Yes	No
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Results at Different Lags are Stable

				Panel (A): 5-days lag				
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				Panel (B): 10-days lag				
θ_i^{MF}	-55.511***	-45.265***	-46.297***	-37.732***	-47.013***	-30.854***	-16.748*	-10.929
	(7.16)	(8.40)	(9.75)	(8.66)	(13.66)	(8.67)	(9.92)	(6.60)
				Panel (C): 20-days lag				
θ_i^{MF}	-56.007***	-39.698***	-41.945***	-33.066***	-38.163***	-29.255***	-14.352	-14.364*
	(7.32)	(8.05)	(8.70)	(9.31)	(12.12)	(7.18)	(10.25)	(8.54)
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Recap

- ↑ mutual fund shares → ↑ sensitivity to central banks' purchases
- Mutual funds hold credit riskier bonds, naturally more sensitive to central bank purchases
- But, controlling for bond characteristics (rating, sector, liquidity) ...

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  → Bonds held by mutual funds are more sensitive to central bank purchases
- We find similar patterns for the **Pandemic Emergency Purchase Programme**
- How do we rationalize these findings?

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Simple Model - Frictionless Equilibrium

- Two period economy (endogenous in **blue**)
- Assets $i = 1, ..N$, in unit supply and returns $R_i \sim N(\mu_i, \sigma_i)$, Risk-free rate R
- Continuum of two investor types (in mass one):
  - $k = M$ for mutual funds
  - $k = O$ for other investors
- Assets A^k, mean-variance preferences (risk-aversion γ_k)
- Choose portfolio share X_i^k

Simple Model - Frictionless Equilibrium

- Portfolio choice depends on γ_k:

$$\boldsymbol{X_{i,k}} = \frac{1}{\gamma_k} \frac{E\left[R_i - R\right]}{\sigma_i^2},$$

- Market Clearing

$$\underbrace{A_M \boldsymbol{X_{i,M}} + A_O \boldsymbol{X_{i,O}}}_{\text{Demand}} = \underbrace{1 - X_i^{CB}}_{\substack{\text{Net} \\ \text{Supply}}}$$

- Central banks' holdings X_i^{CB}

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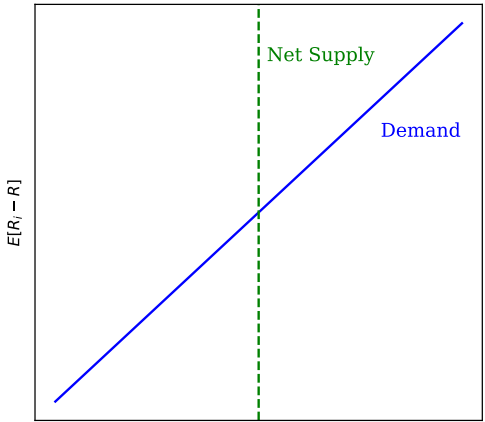

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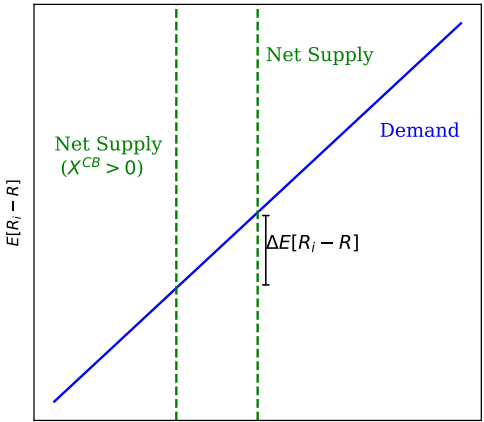

Simple Model - Segmented Equilibrium

- Only subset θ_i^O of O-investors eligible to invest in asset i

- Same portfolio choices if allowed to invest:

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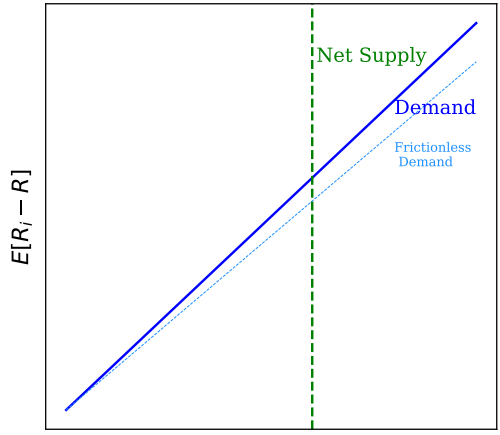

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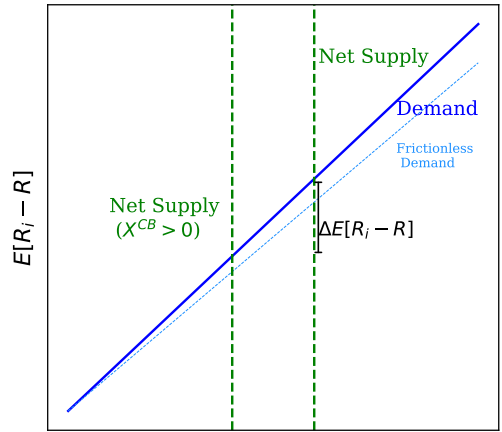
$$\underbrace{A_M \boldsymbol{X_{i,M}} + \theta_i^O A_O \boldsymbol{X_{i,O}}}_{\text{Demand}} = \underbrace{1 - X_i^{CB}}_{\text{Net Supply}}$$



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- Conditioning on risk, bonds held by mutual funds more responsive (**segmentation**)

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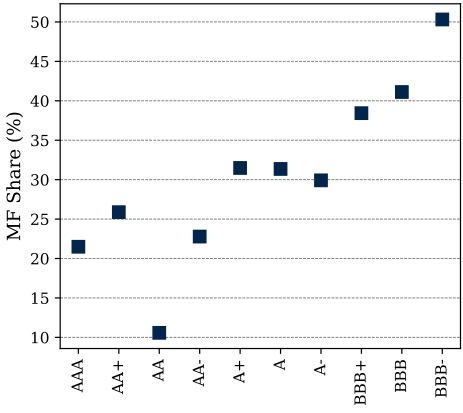
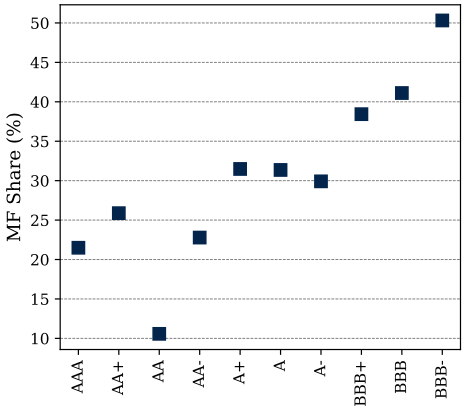
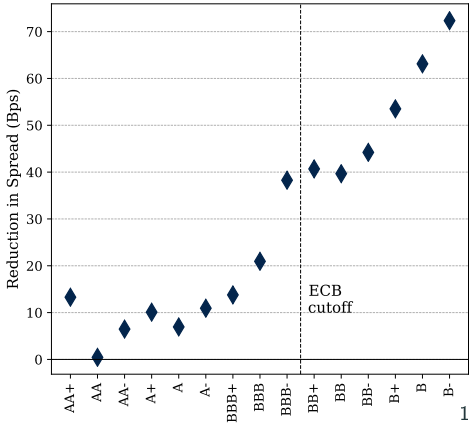
- Mutual funds hold more of lower rated bonds



Mutual Funds Holdings and Effects by Ratings

- Mutual funds hold more of lower rated bonds
- Credit riskier bonds naturally more affected





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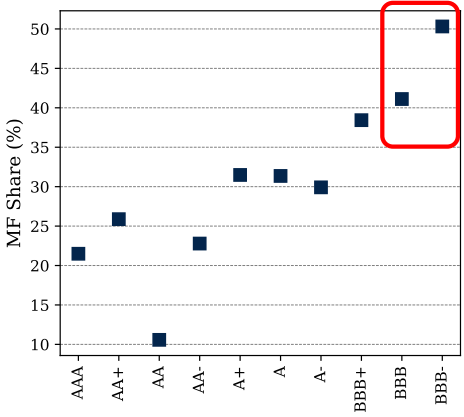
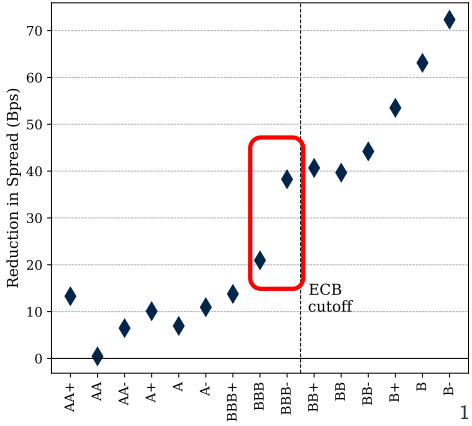
- and especially BBB- bonds



- Credit riskier bonds naturally more affected
- But...Large wedge between BBB and BBB-



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Aggregate Effects

- Conventional monetary policy also affect bond spread
- Regress aggregate spread n-day from announcement:

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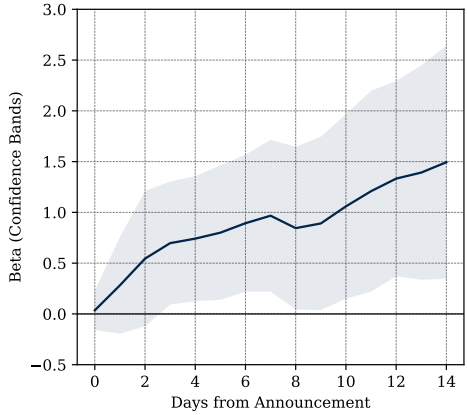

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- Regress individual bond yields on monetary policy and interaction with mutual funds shares:

$$\Delta ys_{i,t}^{n} = \alpha + \beta_{n}^{MP} MP_t + \boldsymbol{\beta_{n}^{MF}} \theta_{MF,i,t} \times MP_t + \text{Interacted Fixed Effects} + \eta_{n}^{MF} \theta_{MF,i,t} + \varepsilon_{i,t}^{n}$$

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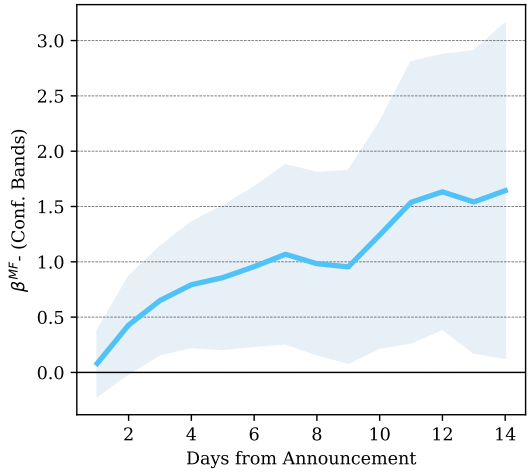
- The marginal effects increases over time
  $\rightarrow$ explain the post-announcement drift



Conclusion

- We study transmission of monetary policy to bonds held by different intermediaries
- Uncover novel patterns on the relationship between bond holdings and price response
- Shows that these are explained by bond **selection** and market **segmentations**
- Risk-bearing capacity in market segments matter for monetary policy transmission
- Transmission stronger for assets excluded from investment mandate of certain intermediaries