# Foreign Institutional Investors, Monetary Policy, and Reaching for Yield[1]

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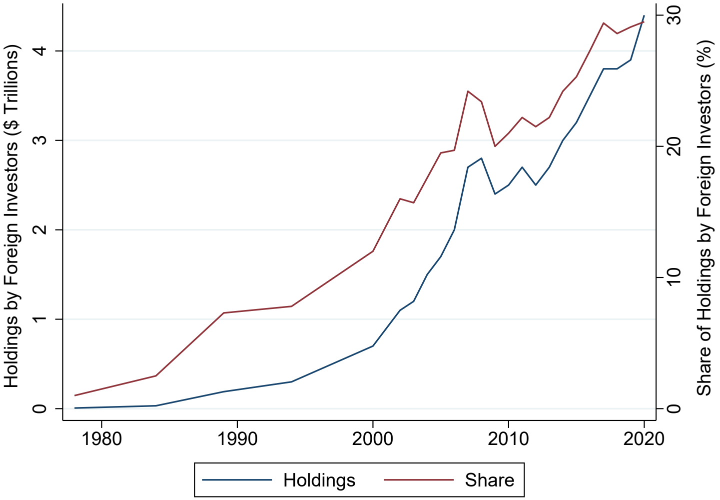
[1] Views expressed here do not necessarily reflect those of BIS or ECB

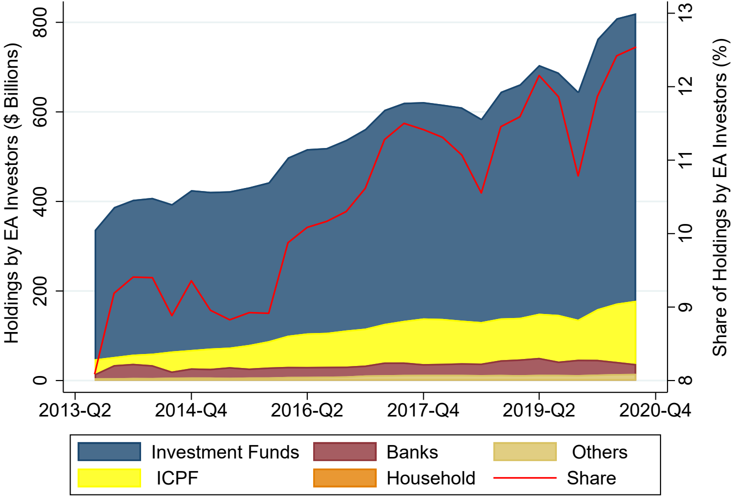
# Share of Foreign Investors in U.S. Corporate Bond Market

95% of these holdings are by private foreign investors



# Euro Area Holdings of U.S. Non-Financial Corporate Bonds

## The increase in bond holdings is driven by insurance companies and pension funds (ICPF), especially through **indirect holdings via investment funds**



# This paper aims to answer some key questions

Q1: How do foreign institutional investors respond to U.S. monetary policy (MP)?

A: Reaching for yield (RFY): Tilt their portfolios towards bonds with higher credit spreads when MP is tightened because of:

1. The need to close their nominal return gap.

2. The need to hedge their FX exposure due to regulatory requirements and internal risk management

# This project aims to answer some key questions (Cont'd)

Q2: What is the impact of such RFY on U.S. credit conditions?

A: Significant increase in corporate bond prices and issuances of BBB-rated bonds

Q3: What are the implications on the transmission mechanism of monetary policy?

A: Potential weakening of monetary transmission

A: Highlights the importance of investor heterogeneity and of the composition of the investor base

# Related Literature

- Global savings/banking glut
  - Bernanke (2005), Caballero et al (2008), and Shin (2011)
- Reaching for yield and monetary policy
  - Becker and Ivashina (2014) & Ozdagli and Wang (2020): Insurance companies in corporate bond market
  - Choi and Kronlund (2017): Mutual funds in corporate bond market
  - MMF: Di Maggio and Kacperczyk (2017)
- Importance of investor heterogeneity
  - Koijen et al (2021): Response to unconventional monetary policy

# Agenda

- Motivation
- FX Hedging Mechanism
- Conceptual Framework
- Empirical Analysis
- Conclusion

# FX Hedging Mechanism

## Case study: German insurer facing return gap

- Solution: Invest in the U.S. long term credit market (Treasury, agency or corporate) ... but have to hedge currency exposure
- Most common: 3-month "3m" currency swaps → **hedging short and investing long**
- Swap rate = (3m \$ rate – 3m € rate) – Cross Currency basis
  - Since 2008 cross currency basis has been persistently negative (Du et al. (2018))

# Hedged Return on Treasuries for Euro Area Investors

## Assuming full FX hedging

- Unhedged Return on Treasuries $= y_{\$} + T^*_{\$}$

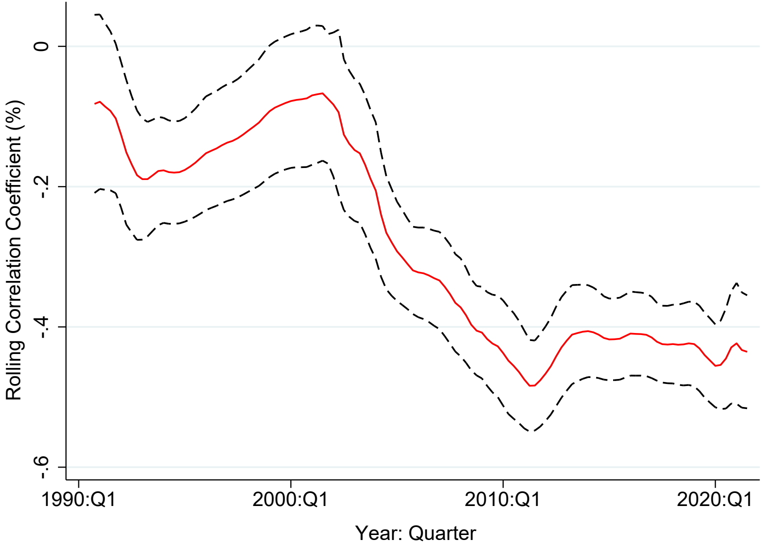
- Cost of Hedging $= y_{\$} - y_e - Z$

- Hedged Return on Treasuries $= T^*_{\$} + \underbrace{y_e}_{\text{Negative}} + \underbrace{Z}_{\text{Negative}}$

- The role of term spread is crucial for euro area investors

# Term Spread and Monetary Policy: $T_\$^* = T_\$ - \rho y_\$$

Hanson and Stein (2015) & Nakamura and Steinsson (2018)

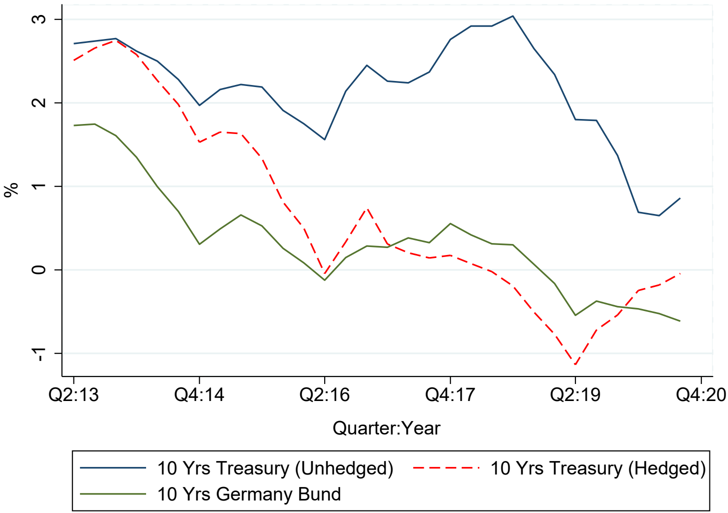


# FX Hedging Mechanism

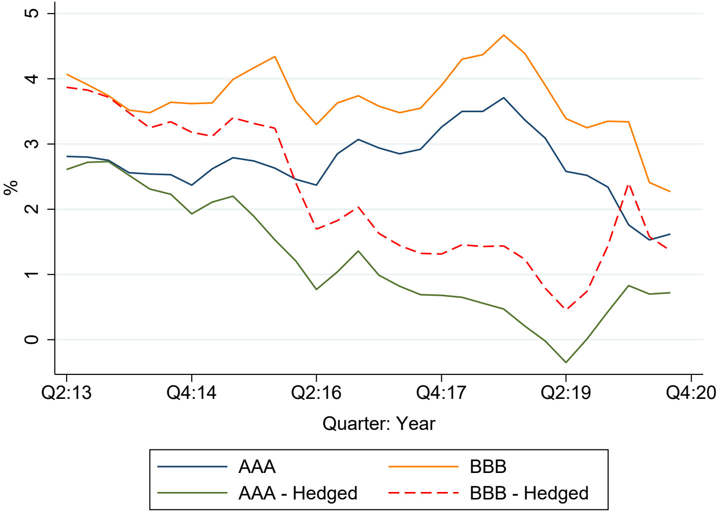
## Substitution of maturity risk with credit risk

- Fed tightening $\rightarrow$ \$ short rate $\uparrow$ $\rightarrow$ \$ Term Spread $\downarrow$ $\rightarrow$ hedged return on safer bonds $\downarrow$ $\rightarrow$ allocation to riskier corporate bonds $\uparrow$
- Unique to foreign private demand

# Treasury Bond Yields for Euro Area Investors



# U.S. Corporate Bond Yields for Euro Area Investors



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# Conceptual Framework

## Euro area "EA" investment opportunity set and hedging decision

1. EA riskless sovereign bond with return: $y_e + T_e$
2. EA corporate bond with return: $y_e + T_e + C_e$ and risk $\sigma_e^2$
3. U.S treasury riskless bond with return: $y_\$ + T_\$^*$
4. U.S corporate bond with return: $y_\$ + T_\$^* +$ C and risk $\sigma_c^2$
5. FX hedge $\phi$ of the U.S bonds, $0 < \phi < 1$
   - Cost of hedging $= H(y_\$, y_e) = y_\$ - y_e - Z$, where $Z < 0$
   - 1 - $\phi$ will be exposed to FX fluctuation with return F and risk $\sigma_f^2$

# Conceptual Framework

## Portfolio optimization problem

$$\min_{w_1, w_2, w_3, w_4} \quad w_2^2 \, \sigma_e^2 \; + \; w_4^2 \, \sigma_\$^2 \; + \; (1-\phi)^2 \, ( \, 1 \; - \; w_1 \; - \; w_2 \, )^2 \, \sigma_f^2$$

$$\text{s.t.} \qquad \textstyle\sum_{i=1}^4 \; w_i \, r_i - \; \phi \, ( \, 1 \; - \; w_1 \; - \; w_2 \, ) \, H \, ( \, y_\$ \, , \; y_e \, ) \; + \; (1-\phi) \, ( \, 1 \; - \; w_1 \; - \; w_2 \, ) \, F \; \geq \; y_L$$

$$\text{s.t.} \qquad \textstyle\sum_{i=1}^4 \; w_i \; = \; 1$$

# Conceptual Framework

## U.S. corporate bond optimal weight

$$w_4^* \;=\; \underbrace{\left(\frac{R_G}{C_\$}\right)}_{\text{Return Target}} \;*\; \underbrace{\frac{\left(\frac{C_\$}{\sigma_\$}\right)^2}{\left(\frac{D}{(1-\phi)\sigma_F}\right)^2 \;+\; \left(\frac{C_e}{\sigma_e}\right)^2 \;+\; \left(\frac{C_\$}{\sigma_\$}\right)^2}}_{\text{Mean-Variance}}$$

- $R_G = y_L$ - $y_e$ - $T_e \quad > 0$
- D $= y_e + T_e - [y_\$ + T_\$ + (1-\phi)F - \phi H(y_\$ - y_e)] > 0$

# Conceptual Framework

## U.S. corporate bond demand and testable predictions

1. Decreasing in $y_\$$ (hedging cost)
2. RFY is increasing in $y_\$$ (hedging cost)

Conditions:

1. $R_G > 0$
2. $D > 0$
3. $\phi > 1 - \rho$
4. $(\frac{C_\$}{\sigma_\$})^2 > [\,(\frac{D}{(1-\phi)\,\sigma_F})^2 + (\frac{C_e}{\sigma_e})^2\,]$

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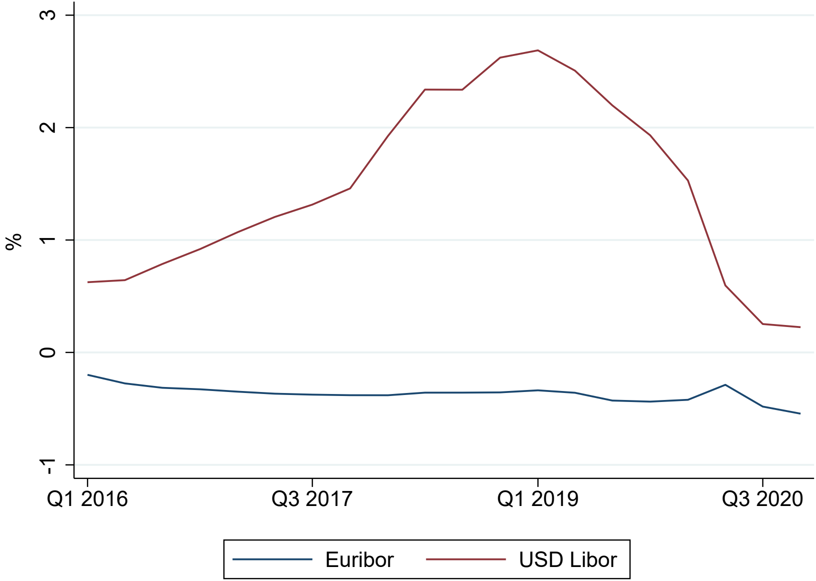
# Data

## Security level holdings

- EA Holdings: ECB Securities Holdings Statistics by Sector
- U.S Holdings: eMAXX database
- Bonds Data: Centralised Securities Database and WRDS
- Nominal Yield Curve: Federal Reserve Board (Gürkaynak, Sack, and Wright (2007))

# Empirical Analysis: Fed's Full Tightening-loosening Cycle

2016:Q1 - 2020:Q4



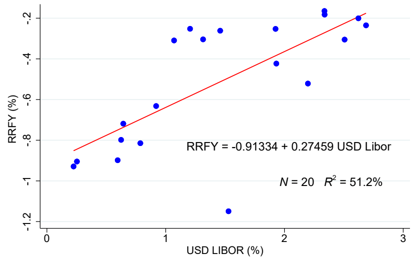
# Within the Corporate Bond Market: Relative RFY Measure

Choi and Kronlund (2017) & Ozdagli and Wang (2020)

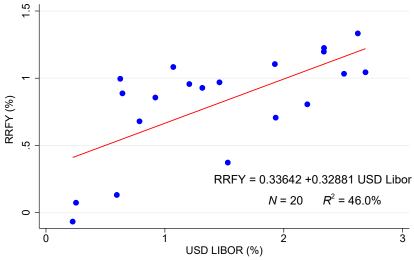
$$RRFY_t = \underbrace{\frac{\sum_i H_{i,t} CS_{i,t}}{\sum_i H_{i,t}}}_{\text{EA investors' U.S. NFC Bond Portfolio}} - \underbrace{\frac{\sum_j V_{j,t} CS_{j,t}}{\sum_j V_{j,t}}}_{\text{All U.S. NFC Bonds Outstanding}}$$

- $CS_{i,t}$: Credit spread of bond i
- $H_{i,t}$ : Amount of bond i held by the EA investors
- $V_{j,t}$: Total amount outstanding of bond j

# Relative RFY and U.S. Monetary Policy




ICPF




Investment Funds

# NFC bond demand systems

## Demand curves for mean-variance investors (Koijen et al. (2021))

$$\log \ (\mathrm{H}_{i,t}(n)) \ =$$

$$\beta_{1,i} \, \mathrm{CS}_t(n) + \beta_{2,i} \, \mathrm{S}_t^{e/\$} + \beta_{3,i} \, \mathrm{CS}_t(n) \cdot \mathrm{S}_t^{e/\$} + \beta_{4,i}^{'} \, \mathrm{X}_t(n) + \epsilon_{i,t}(n)$$

**Controls**:

- Bond characteristics: Maturity and amount outstanding
- Prices: Euribor, term spreads in the U.S. and Germany, euro area corporate credit spreads index
- Lagged log holdings

# Dynamic Panel Modeling with Instrumental Variables

## GMM estimation

1. **LIBOR rates**: Cumulative surprises in the 3-month USD LIBOR and Euribor around FOMC and ECB announcements

2. **Swap rate**: Cumulative difference in surprises between the 3-month USD LIBOR and Euribor around FOMC and ECB announcements

3. **Term spreads**: Cumulative surprises in the 10-years U.S. and German bond yields around FOMC and ECB announcements

4. **Euro area credit spreads index**: ECB non-governmental bonds holdings

# 5. Credit Spread Instrument

Koijen and Yogo (2019) & Bretscher et al. (2020)

$$\hat{CS}_{i,t}(n) = log \left( \sum_{j \neq i} A_{j,t} \frac{1_{j,t}(n)}{1 + \sum_i 1_{j,t}(n)} \right)$$

- Counterfactual credit spread if other investors were to hold an equal-weighted portfolio within their investment universe
- Depends only on the investment universe of other investors and the wealth distribution, which is exogenous
- Exploits variation in the investment universe across investors and in the size of potential investors across assets

# Estimated Demand System 2016-2020

| | ICPF | IF | LIN |
|---|---|---|---|
| Credit Spread X Swap | 0.054*** | 0.088*** | -0.013 |
| | (0.013) | (0.017) | (0.018) |
| Swap | -0.151*** | -0.116*** | -0.003 |
| | (0.027) | (0.033) | (0.028) |
| Credit Spread | -0.033 | -0.159*** | 0.022 |
| | (0.042) | (0.048) | (0.030) |
| N | 85690 | 111971 | 84208 |
| Controls | ✓ | ✓ | ✓ |

# Estimated Demand System 2016-2020

| | ICPF | IF | LIN |
|---|---|---|---|
| Credit Spread X USD LIBOR | 0.064*** | 0.048*** | -0.155*** |
| | (0.012) | (0.013) | (0.023) |
| USD LIBOR | -0.289*** | -0.160** | 0.300*** |
| | (0.062) | (0.065) | (0.043) |
| Credit Spread | -0.035 | -0.032 | 0.094*** |
| | (0.027) | (0.021) | (0.028) |
| N | 85689 | 111972 | 84208 |
| Controls | ✓ | ✓ | ✓ |

# Implications of RFY: NFC Bond Prices

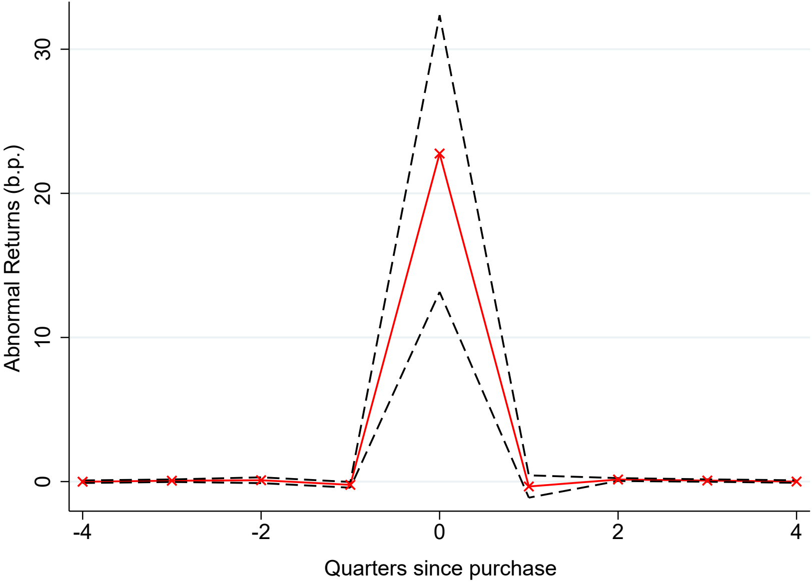
## Monthly abnormal returns

$$Abret_{i,t+h} = \alpha \; EAbuy_{i,t} \; + \; \beta \; EAbuy_{i,t} \cdot y_t^{\$} \; + \; \gamma \, \mathrm{X}_{i,t} \; + \; \epsilon_{i,t}$$

- $EAbuy \in [0, 1]$ & h $\in$ [-4; 4]
- 11 Rating Buckets: AAA, AA, A, BBB, ..., D and NR
- 31 Maturity Buckets: 0, 1, 2, ..., 29, and 30 years
- **Controls**: Coupon rate (and squared), change of the yield on a maturity-matched treasury, issuer and time fixed effects

# Monthly Abnormal Return around EA Purchases

## The interaction term "$\beta$" coefficient



# Implications of RFY: NFC Bond Return

## Significant increase in BBB-rated corporate bond monthly abnormal returns

| | A-rated | BBB | Non-IG |
|---|---|---|---|
| $EAbuy_{i,t} \times y_t^{\$}$ | 0.058 | 0.182*** | 0.087 |
| | (0.047) | (0.057) | (0.222) |
| $N$ | 63518 | 71317 | 22100 |
| Issuers | 843 | 1218 | 834 |

# Implications of RFY: NFC Bond Issuance

## Significant increase in BBB-rated corporate bond issuances

| | A-rated | BBB | Non-IG |
|---|---|---|---|
| $EAbuy_{i,t} \times y_t^{\$}$ | 0.076 | 0.042*** | -0.023 |
| | (0.099) | (0.012) | (0.023) |
| $N$ | 6715 | 5931 | 1402 |
| Issuers | 419 | 557 | 241 |

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# Conclusion

1. Tilting their portfolios towards bonds with higher credit spreads when the MP rate increases. This is driven by:
   - The need to close their nominal return gap
   - The need to hedge their FX exposure
2. Significant increase in corporate bond prices and issuances of BBB-rated issuers
3. Broader implications for the transmission mechanism of MP