Granular Investors and International Bond Prices: Scarcity Induced Safety

Ester Faia
Goethe University, CEPR

Juliana Salomao
University of Minnesota, NBER

Alexia Ventula Veghazy
European Central Bank

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Research Question

- International bond prices determine asset safety and affect firms' funding conditions
- Role of **granular (large and with skewed portfolios)** investors with heterogenous clientele mandates in affecting bonds' safety and currency pricing
- Most of the international bond market is intermediated by large investors such as mutual fund and insurance funds

Key novelty of the paper

- Leverage on *unique confidential* highly disaggregated detaset of corporate bonds matched with prices, bond and firm characteristics

- Estimate UIP, CIP, rebalance elasticities in an *experimental setting* focusing on corporate bonds eligible for ECB QE continuously enacted (a large shock on market clearing), focusing on euro area investors (arguably subject to same country factors)

Supply Scarcity induced by QE makes euro desired)safe), eroding dollar convenience yield

Our identification strategy

- **Facts**: neat segmentation of OFI, liking dollar foreign firm securities, and ICPF, liking euro domestic firm securities

- **First stage**: estimate for the same securities (corporate bonds. rating, maturity) issued by the same firm (purge for supply determinants) but in different currencies, hedged and unhedged
- *Sub-stage*:Exploit portfolio weights (unique feature of our data) rebalance to measure the rebalance

- **Second stage**: Correlation between estimated investor demand and stock of asset purchases

- A model with **heterogenous investors** preferences and time-varying risk-attitudes to microfound *deviations* in returns differentials and *endogenous portfolio rebelance* in response to asset purchases

Results and Channels

- Estimates of euro-dollar investor *residual*: declines over the sample period: supply drain of ECB QE against rising demand of euro securities by ICPF engineer an excess demand. Scarcity or local supply channel

- Investor rebalance in response to CIP deviations toward securities whose valuation is expected to rise and duration risk is expected to decline (momentum behaviour)

- UIP and CIP deviations significantly correlate with stock of asset purchases, more so for long maturity bonds and ICPF

Literature review

- **OFI preference for dollar** Hau and Rey (various works)
- **Heterogenous investor preferences** Gourinchas, Govillot and Rey 2017. **Home bias.**: French and Poterba 1991; we find that only for ICPF
- **Scarcity channel**: Caballero, Gourinchas and Farhi 2016
- **CIP deviations, Erosion of dollar yield**: Du and Schreger 2019, 2021, Caramichael, Liao and Gopinath 2021
- **Investor Elasticities and Base**: Gabarix and Koijen 2019, Koijen and Yogo 2019, 2020, Coppola 2021

Break Down by Investor

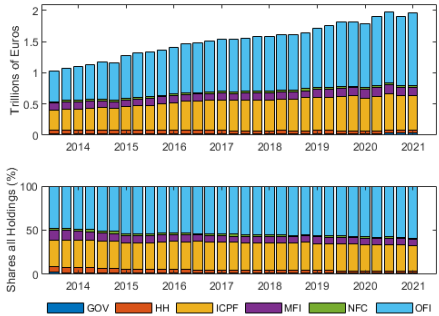


Figure: By investors' type

ICPF and OFI intermediate most of the bond market: granular

Break down by currency

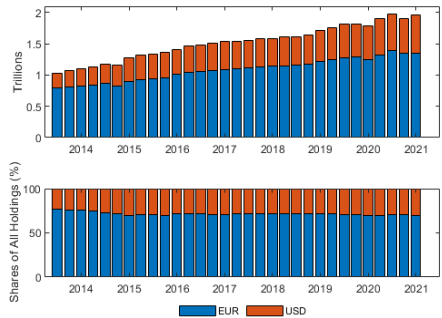


Figure: Euro versus Dollars

Euro prevails: no dollar dominance

Break down by currency, Mutual funds

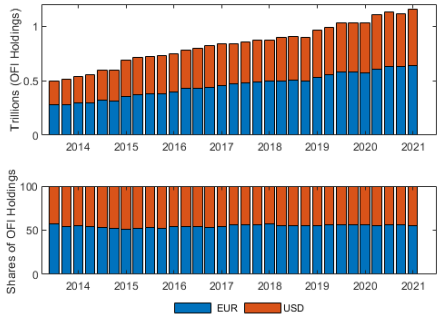


Figure: OFIs

Mutual funds like dollar: Hau and Rey AER 2008, Maggiori et al. JPE 2019, they have only mutual funds

Break down by currency, Insurance funds

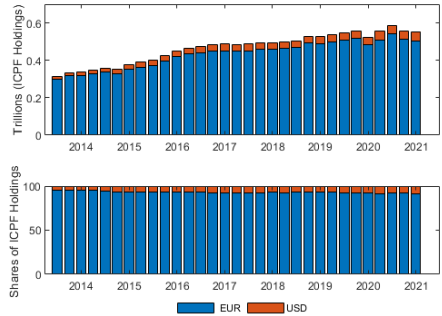


Figure: ICPFs

Insurance funds like euros: Koijen and Yogo AER 2020, but focus on Treasuries

Break down by issuers and investors

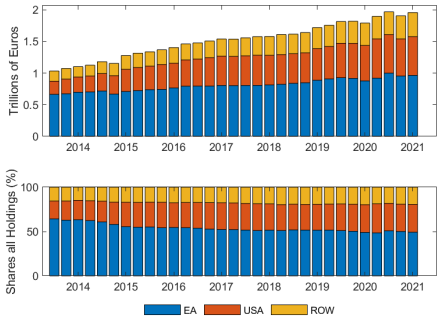


Figure: Euro area issuers

No home bias in assets: French and Poterba 1995. Familiarity vanish due to specialized intermediation services

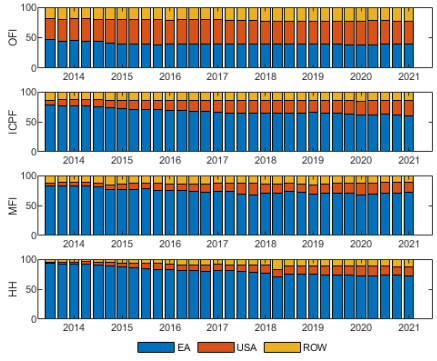


Figure: U.S. issuers

But home bias differ per type of investor

Break down by issuers, currency and investor

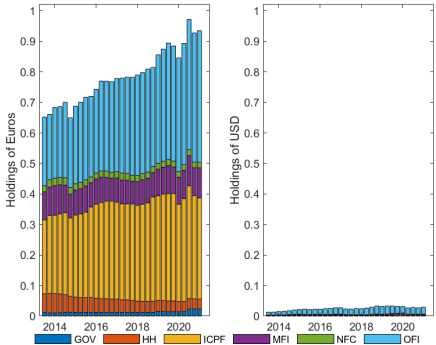


Figure: Euro area issuers

Euro area issuers usually go along with euro-denomination: clientele effect

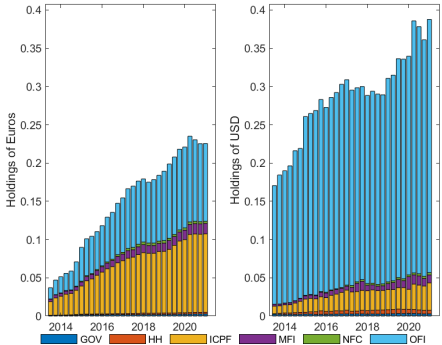


Figure: U.S. issuers

Foreign issuers usually go along with dollars: clientele effect

Break down by issuers, currency and OFI-ICPF

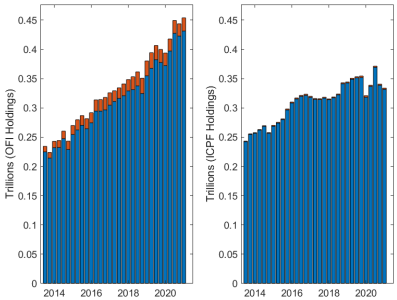


Figure: Euro area issuers

Insurance prefer both euro-denominated and euro area issuers

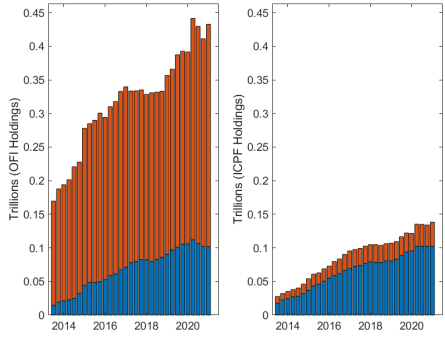


Figure: U.S. issuers

Mutual funds prefer dollar-denominated of foreign firms

Identification Strategy: First Stage

- Neat segmentation of investors
- **Pillar 1, same security**: control for firms' fixed effects and for bonds' characteristics (we match with ratings and maturity)
- **Pillar 2, investors from same country**: subject to same shocks
- **Pillar 3, large supply shocks**: Asset purchase of corporate bonds

$$y_{i,t} = \alpha_t \mathcal{I}_{EUR,i} + \beta_{f,t} + \gamma_{m,t} + \delta_{r,t} \tag{1}$$

Variants to First Stage

- Estimated un-hedged and hedged (Du and Schregge JF 2020)

$$y_{i,t} = \begin{cases} y_{i,t} & if\ euro \\ (1-y_{i,t})(\frac{E(S_{t+n})}{S_t})^{1/n} - 1 & if\ dollar\ \&\ unhedged \\ (1-y_{i,t})(\frac{F_{t+n}}{S_t})^{1/n} - 1 & if\ dollar\ \&\ hedged \end{cases} \tag{2}$$

- Weighted and unweighted (Curcuru et al. QJE 2008)

$$\overline{y}_c = \sum_{j=1}^{N} w_{j,t-1}^c y_{j,t}^c \tag{3}$$

- **Interact with investor type and eligible assets**:

$$y_{i,t} = \mathcal{S}_{type} + \alpha_t(\mathcal{I}_{EUR,i} + \mathcal{S}_{type}) + \beta_{f,t} + \gamma_{m,t} + \delta_{r,t} \tag{4}$$

Second Stage

- **Correlated estimated investor residual to stock of purchases**:

$$\hat{\alpha}_{i,t} = \kappa + \gamma QE - Stocks_t + \epsilon_t \tag{5}$$

- In all cases bootstrapped errors for generate regressors

Baseline Results

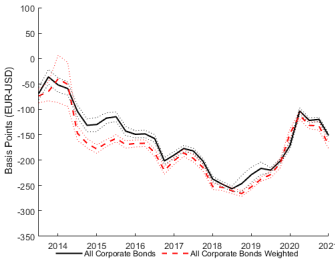


Figure: Raw differential

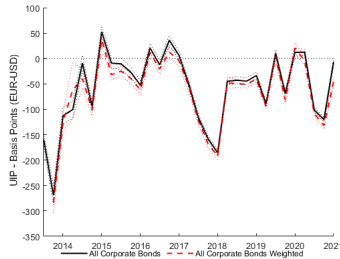


Figure: Unhedged(UIP)

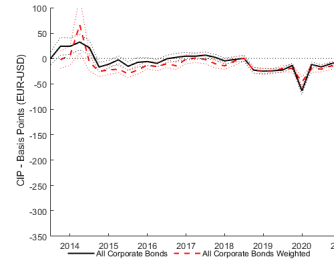
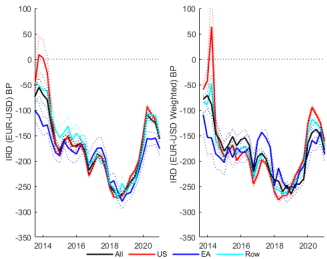


Figure: Hedged(CIP)

Weighted declines by more; sizable CIP deviations

Interacted by Issuers



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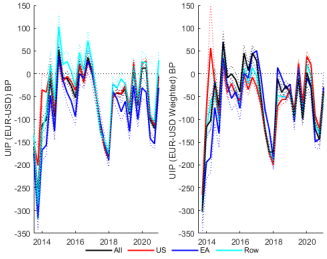

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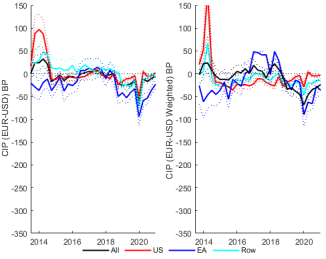


Figure: Hedged(CIP)

Decline for all issuers

US Issuer: OFI versus ICPF

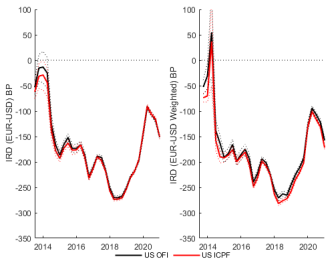


FIGURE: Raw-US

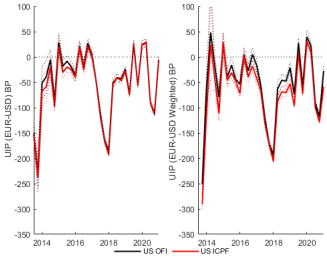


FIGURE: Unhedged(UIP)-US

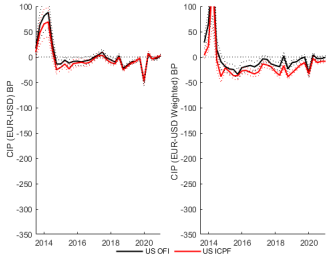


FIGURE: Hedged(CIP)-US

Decline is larger for ICPF

Long Maturity

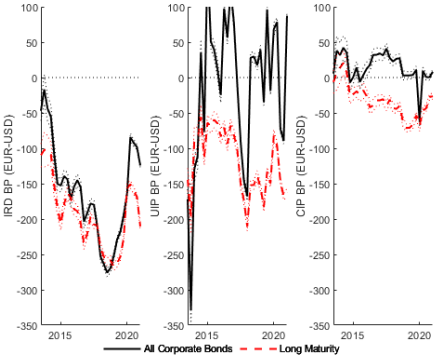


Figure: Long maturity - unweighted

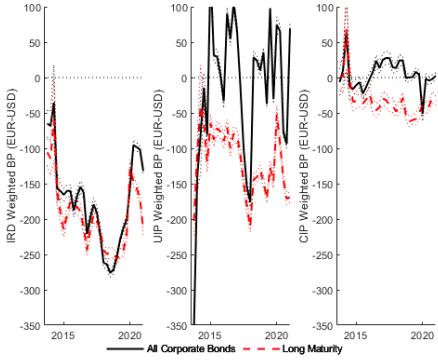


Figure: Long maturity - weighted

Decline is larger for long maturity bonds

Investor residual and APP

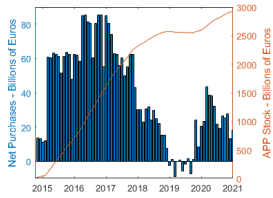
Is EA unconventional monetary policy affecting the estimated price differentials?

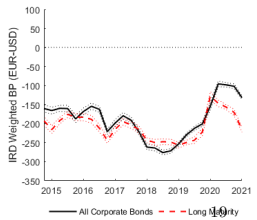
ECB's APP:

- Started mid-2014 with total purchases of 3419 bn EUR (2015-2022)
- Elegible corporates (CSPP): EUR bonds issued by EA firms

Results and channels:

- Yield differential shape mirrors build up in APP stock
- Scarcity channel: supply drained by CSPP against large demand for EUR securities by ICPF affecting bond valuations





Investor Residual and QE Stocks

Table: Second Stage: Regressing weighted investor differential, α, estimated from the first stage on the (net) stock of asset purchased.

	UIP All	UIP Long	UIP ICPF	CIP All	CIP Long	CIP ICPF
Stock	-0.00018*	-0.00027***	-0.000213***	-0.00001	-0.00004**	-0.00001
	(0.00010)	(0.00006)	(0.00007)	(0.00002)	(0.00002)	(0.00002)
R-squared	0.086	0.375	0.125	0.011	0.167	0.001

Model

- Portfolio optimization by institutional investors on behalf of clientele choose bonds to maximize $\sum_{t=0}^{\infty} \beta E_t[U(C_t)]$, subject to their clientele budget constraint:

$$P_t C_t + B_{h,t} + e_t B_{f,t} = (1 + i_t) B_{h,t-1} + e_t (1 + i_t^*) B_{f,t-1} + Y_t$$

  First order conditions

$$U_{c,t} = (1 + i_t) \beta E_t (U_{c,t+1}) \tag{6}$$

$$U_{c,t} = (1 + i_t^*) e_t B_{f,t} \beta E_t (U_{c,t+1} \frac{e_{t+1}}{e_t}) \tag{7}$$

- Foreign country symmetric

Model-based UIP

$$E_t(\hat{u}^*_{c_{t+1}} + \hat{p}^*_t + \hat{e}_t - \hat{u}^*_{c_t} - \hat{p}^*_{t+1} - \hat{e}_{t+1}) = E_t(\hat{u}_{c_{t+1}} + \hat{p}_t - \hat{u}_{c_t} - \hat{p}_{t+1}) \tag{8}$$

Upon defining the real exchange rate as $S_t = \frac{e_t P^*_t}{P_t}$,:

$$E_t(\hat{m}^f_{t,t+1} - \hat{m}^h_{t,t+1}) = E_t(\hat{s}_{t+1} - \hat{s}_t) \tag{9}$$

Note that, if SDFs are lognormal we can define equation (9) as

$$E_t(\hat{s}_{t+1} - \hat{s}_t) = \hat{r}_t - \hat{r}^*_t + \frac{1}{2}[Var(\hat{m}^h_{t,t+1}) - Var(\hat{m}^f_{t,t+1})] \tag{10}$$

Portfolio Rebalancing and Asset Purchases

$$\omega_{h,t}^{euro} = \frac{MV_{h,t+1}(\mathcal{S}_t - AP_t) - \sum_{j \neq euro} \omega_{h,t}^{j} W_t^j + \sum_j \omega_{h,t}^{j,*} W_t^{j,*}}{W_t^{euro}} \tag{11}$$

where $\omega_{h,t}^{euro}$ is the portfolio share of bonds issued by euro area firms and held by euro investors resident in the euro area.
Optimal portfolio shares read as follows:

$$\omega_h = \frac{\mathcal{S}}{2} - \frac{1}{2} V_{xx}^{-1} V_{xD} \tag{12}$$

Conclusions

- Role of institutional investors for international bond prices
- Erosion of dollar convenience yield and rise of euro safety
- Exploit scarcity of specific securities from asset purchase program