Dash for Dollars

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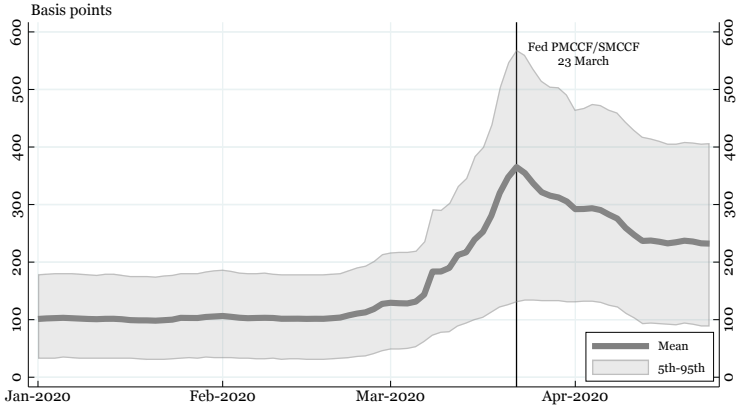
*The views expressed in this paper are those of the authors and do not necessarily represent the views of the Bank of England or its committees, or SPX Capital.

Covid-19 and the global increase in corporate bond spreads



NOTE. Global average of investment grade corporate bond spreads (option-adjusted) weighted by bonds face value, together with 5th and 95th percentile of the full distribution. Source: ICE BoA ML.

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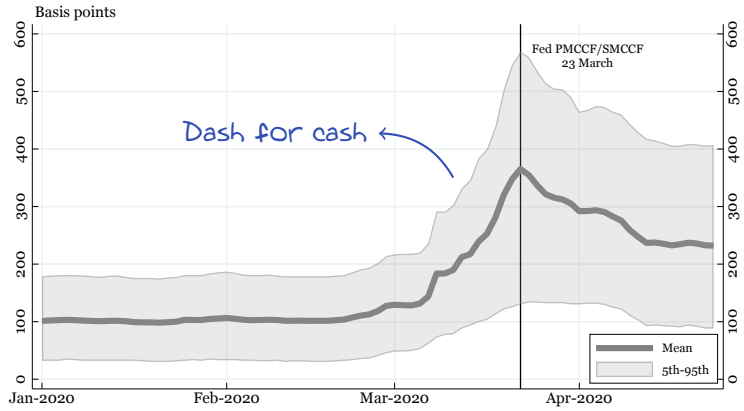

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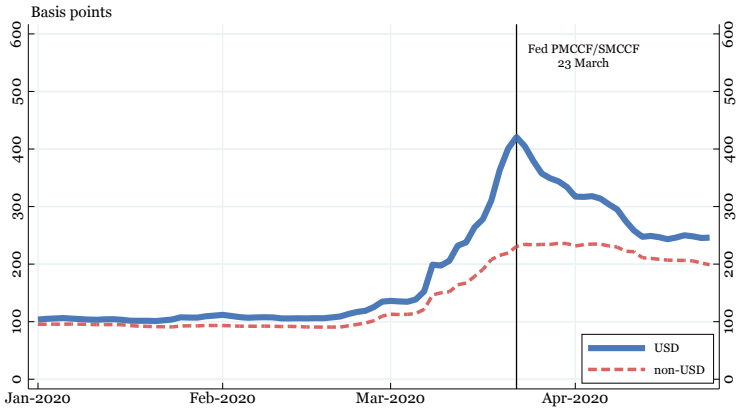
An overlooked dimension: Bonds' currency of denomination



NOTE. Average of investment grade corporate bond spreads (option-adjusted) weighted by bond face value across USD-denominated and non-USD-denominated bonds (blue and red line, respectively). Source: ICE BoA ML.

Heterogeneity by currency

What we do, what we find

- **What we do** Use cross-section of bonds to discipline interpretation of dash for cash episode
  - Was investors' sell off more severe for dollar bonds? If so, why?
  - What does the evidence tell us about the dominant role of the dollar?

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- **What we find**
  - *Dash for dollars:* Greater selling pressure, price declines, and liquidity deterioration in dollar bonds
  - *Mechanism:* Dollar liquidity needs by non-US institutions with large dollar exposures and FX hedges

Menu du jour

- Data
- Dash for dollars
- Mechanism

Data

Data sources

- **ICE BofAML**: daily spread on investment grade corporate bonds globally
  - $+14,000$ bonds, $+2,900$ firms, 60 countries
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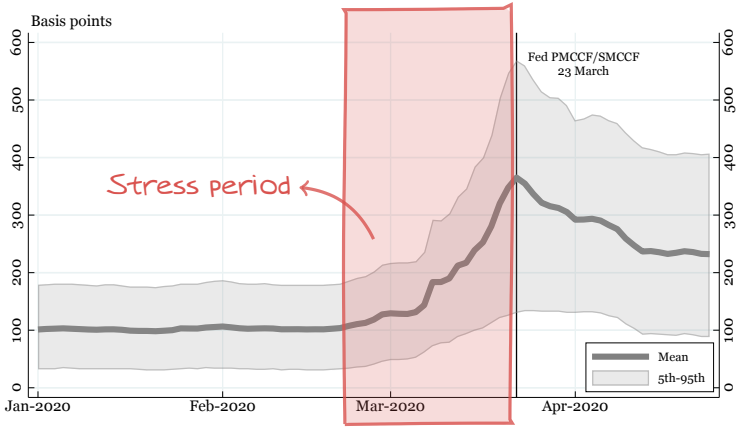
- **Solvency II (PRA)**: Quarterly data on asset and derivative holdings for universe of UK insurers
  - 83 insurers with a total asset size of around £2tn in 2019 Q4

Sample period



The Dash for Dollars

The dash for dollars: Spreads

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- Within-firm specification

$$\Delta s_{b,t} = \alpha + \alpha_{i,t} + \alpha_w \cdot \beta_1 USD_b + \Gamma X_b + \varepsilon_{b,t}$$

  - $\Delta s_{b,t}$ is the daily change in the spread of bond b issued by firm i over the period Feb 28 - Mar 20
  - $\alpha_{i,t}$ is a firm-by-day fixed effect
  - USD_b is an indicator variable that flags USD-denominated bonds
  - X_b are bond-level controls (size, initial spread level, coupon, amortization, maturity)
  - α_w is a week fixed effect → Captures the evolution of β_1 over time (on average, by week)

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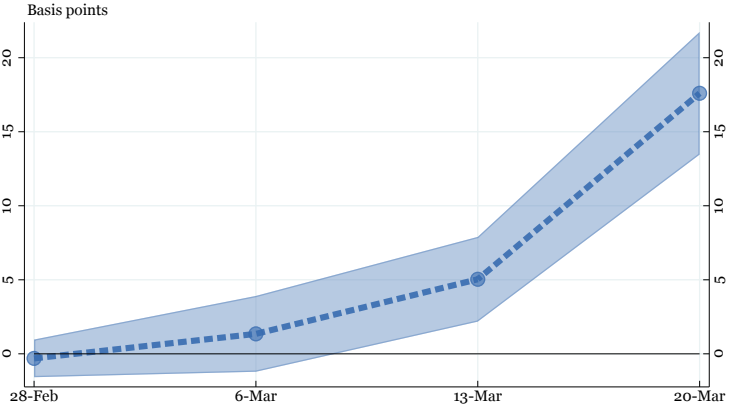
- $\alpha_w \beta_1$: Average spread increase for USD bonds vs. non-USD bonds of firm i in week w

The dash for dollars: Spreads



NOTE. The figure shows weekly estimates of the differential increase in spreads of dollar-denominated bonds vis-a-vis non-dollar bonds using, using the following specification: $\Delta s_{b,t} = \alpha + \alpha_{i,t} + \alpha_w \times \beta_1 USD_b + \Gamma X_b + \varepsilon_{b,t}$, where α_w is a week fixed effect. The shaded areas display 99 percent confidence intervals based on robust standard errors clustered on the firm level.

The dash for dollars: Quantities

- **Question** Did dollar bonds see higher selling pressure?

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$$Vol_{b,j,t} = \alpha + \alpha_{i,j,t} + \alpha_w \cdot \beta_1 USD_b + \Gamma X_{b,t} + \varepsilon_{b,j,t}$$

  - $Vol_{b,j,t}$ is investor j's daily trading volume of bond b, issued by firm i
  - $\alpha_{i,j,t}$ is a firm-by-investor-by-day fixed effect
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- $\alpha_w \beta_1$: Average net trading volume of investor j in USD vs. non-USD bonds of firm i in week w

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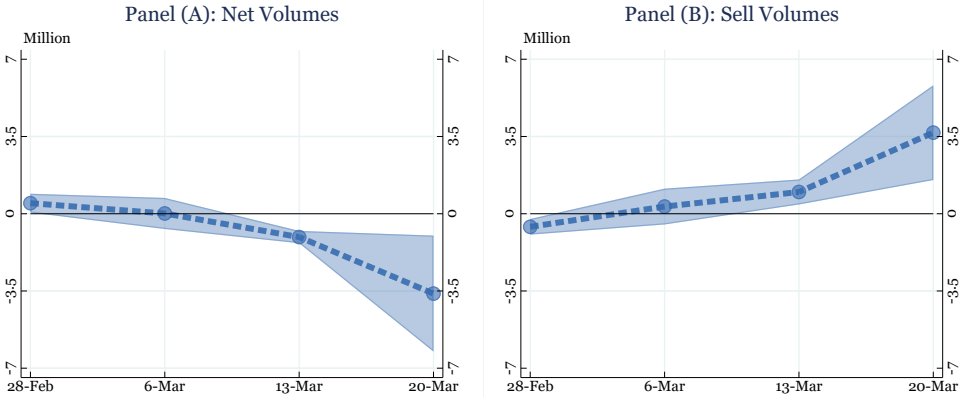

NOTE. Panel A shows weekly estimates of the difference in investors' net trading volumes between dollar bonds and non-dollar bonds, using the following specification: $NetVol_{b,j,t} = \alpha + \alpha_{i,j,t} + \alpha_w \times \beta_1 USD_b + \Gamma X_{b,t} + \varepsilon_{b,j,t}$. Panel B plots estimates of the same specification but using sell volumes $SellVol_{b,j,t}$ as a dependent variable. The trading volumes are measured on the investor-bond-day level. The shaded areas display 99 percent confidence intervals based on robust standard errors clustered on the firm level.

The dash for dollars: Quantities

	(1)	(2)	(3)	(4)	(5)	(6)
	Net Volumes		Buy Volumes		Sell Volumes	
US dollar	-0.53***	-0.25***	-0.03	0.06	0.50***	0.31***
	(0.07)	(0.04)	(0.10)	(0.06)	(0.05)	(0.06)
US dollar × ICPF	-1.34***	-1.64***	0.84	0.75	2.18***	2.39***
	(0.09)	(0.14)	(0.73)	(0.85)	(0.71)	(0.76)
US dollar × Hedge Fund		-0.60***		-0.10		0.50***
		(0.16)		(0.19)		(0.08)
US dollar × Asset Manager		0.36		-0.16		-0.52
		(0.46)		(0.10)		(0.54)
Observations	1444	1444	1444	1444	1444	1444
R squared	0.770	0.770	0.810	0.810	0.752	0.752
# Investors	195	195	195	195	195	195
Firm × Day × Investor FE	yes	yes	yes	yes	yes	yes

NOTE. Net volumes (in millions) are measured on the investor-day-bond level in the period between February 28th and March 20th. Buy (Sell) volume is equal to net volume if the given investor is a net buyer (seller) of investment grade bond *b* on day *t*, and zero otherwise. The indicator variable "ICPF" captures insurers and pension funds, "Asset Manager" captures asset managers and mutual funds, and "Hedge Fund" captures hedge funds and principal trading firms. The non-interacted dollar variable accounts for all other investor groups, such as banks, other financial institutions, and non-financial entities. Robust standard errors clustered at the firm level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant, control variables and fixed effects not reported.

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$$\textit{Trade Cost}_{b,t} = \alpha + \alpha_{i,t} + \alpha_w \cdot \beta_1 USD_b + \Gamma X_{b,t} + \varepsilon_{b,t}$$

  - $\textit{Trade Cost}_{b,t}$ is effective half spread of bond b issued by firm i
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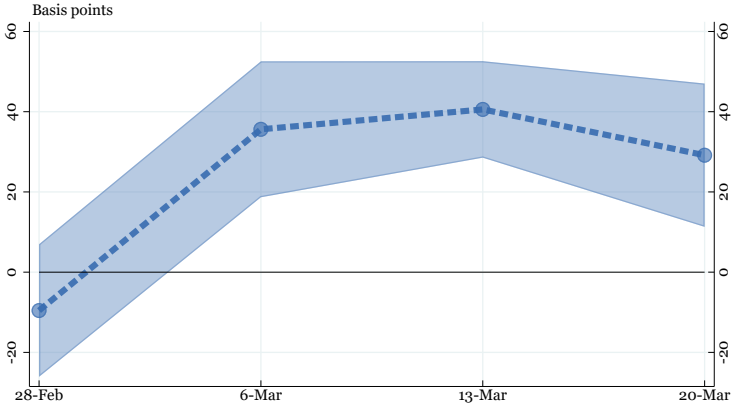

NOTE. The figure shows the weekly estimates of the difference in trade costs between dollar bonds and non-dollar bonds, using the following specification: $TradeCost_{b,t} = \alpha + \alpha_{i,t} + \alpha_w \times \beta_1 USD_b + \Gamma X_{b,t} + \epsilon_{b,t}$. The trade costs are measured on the bond-day level and defined as the difference between the trade price and the weighted bid/ask midpoint. The shaded areas display 99 percent confidence intervals based on robust standard errors clustered on the firm level.

Strengthening the evidence & Identification challenges

- Single firm specifications Go
- Include financials Go
- Include high yield bonds Go
- Drop callable bonds Go
- Geographic heterogeneity Go
- Currency-maturity interaction Go
- Central bank actions Go
- Results by currency Go
- Drop local currency bonds Go

- Issuers' maturity structure Go
- Bond staleness Go
- Transaction-based spread Go
- Spreads vs yields Go
- Other crisis periods Go
- Post-Fed intervention Go
- Alternative liquidity Go
- Alternative samples Go
- Investor domicile Go

Inspecting the Mechanism

What drives the dash for dollars?

- **Hypothesis** Dash for dollars linked to US dollar ‘dominance’

Widespread USD denomination of financial assets and liabilities

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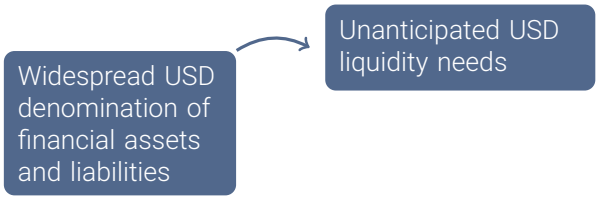

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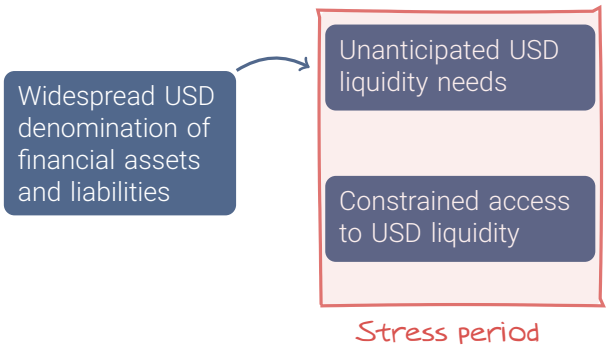

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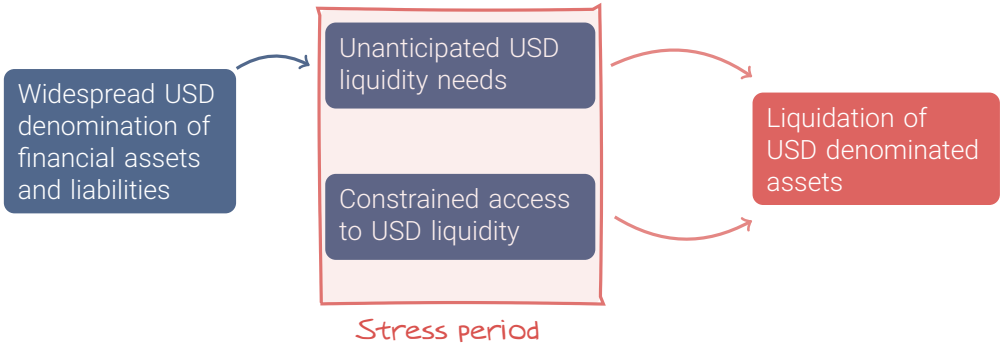

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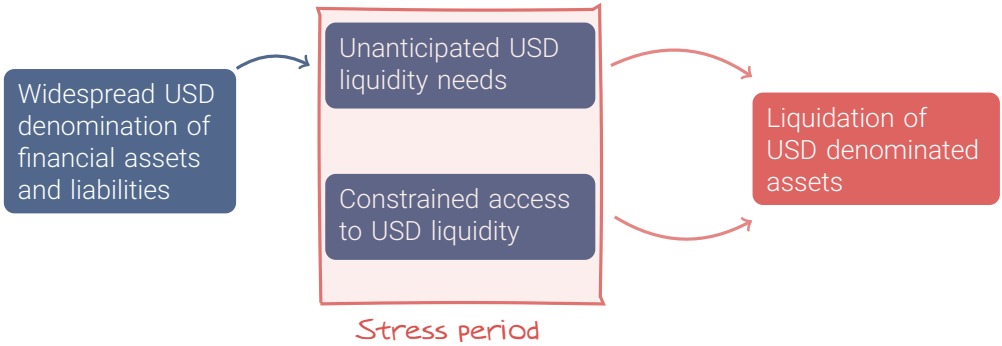

- Vulnerabilities especially pronounced for non-US NBFIs with large dollar holdings and FX hedges

  BIS (2020); Du and Huber (2023)

A leading example: The UK insurance sector

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  - [3] Can measure heterogeneous exposure to USD liquidity needs (via data on derivative holdings)
- External validity
  - Many non-US institutions with large dollar exposures and FX hedges [Kubitza et al., 2024]
  - Non-US investors hold about one-third of USD corporate bonds globally [Du and Huber, 2023]

The role of dollar liquidity needs

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$$Sell\ Vol_{b,j,t} = \alpha + \alpha_b + \alpha_j + \alpha_{i,t} + \beta_1 \left(USD_b \times DollarShare_j\right) + \varepsilon_{b,j,t}$$

  - $DollarShare_j$ share of dollar-denominated derivative contracts of investor j at the end of 2019:Q4
  - $\alpha_{i,t}$ is a firm-by-day fixed effect
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- β_1: sell volumes of USD vs. non-USD bonds of firm i for insurer j with high $DollarShare_j$

The role of dollar liquidity needs

	(1)	(2)	(3)	(4)
US dollar × Dollar share	8.89***	12.93***		
	(1.12)	(4.05)		
US dollar × High share			3.17***	4.61***
			(0.40)	(1.44)
Observations	368	243	368	243
R squared	0.517	0.675	0.517	0.675
# Investors	29	25	29	25
Investor FE	yes	yes	yes	yes
Bond FE	yes	yes	yes	yes
Day FE	yes	no	yes	no
Firm × Day FE	no	yes	no	yes

NOTE. Sell volumes (in millions) are measured on the investor-day-bond level for the period between February 28th and March 20th. *DollarShare* measures the share of dollar-denominated derivative contracts of investor *j* at the end of Q4 2019. To facilitate the interpretation of the coefficients, we transform the variable by subtracting the cross-sectional average, before dividing it by the standard deviation. To calculate *HighShare*, in Columns (3) and (4), we divide the sample of investors into below-average and above-average holders of USD derivative contracts, using the sample median as the cut-off point. Robust standard errors clustered at the firm-day level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant and fixed effects not reported

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- Investors face two options, with associated costs

Option 1: Sell non-dollar bonds

- Non-dollar bond liquidation costs
- Spot market transaction costs
- Rollover hedging costs

Option 2: Sell dollar bonds

- Dollar bond liquidation costs

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Option 2: Sell dollar bonds

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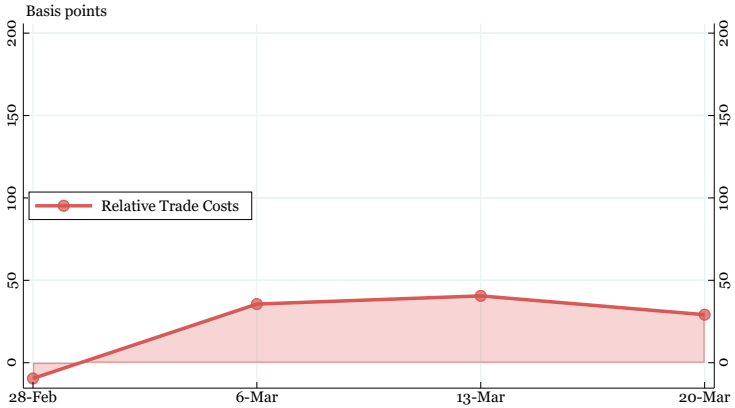
- **Approach** Compare liquidation costs (effective half spread) with hedging cost (CIP premium)

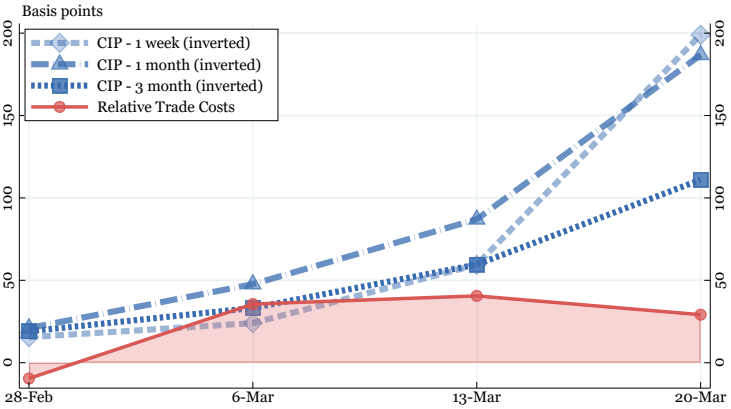
Relative dollar trade costs vs. CIP premium



NOTE. The red line and shaded area plots the weekly estimates of the difference in trade costs between dollar bonds and non-dollar bonds. The blue dashed lines plot CIP deviations (defined as the difference between the dollar borrowing rate less the synthetic dollar borrowing rate, here inverted) at different maturities (namely 1 week, 1 month, and 3 months). The CIP deviations are computed as a weekly average for the euro and the pound sterling against the US dollar.

Details

Relative dollar trade costs vs. CIP premium



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Details

Debunking alternative interpretations

- Expectations of dollar depreciation Go
- Portfolio rebalancing Go
- Heterogeneous default risk for local-currency vs. foreign-currency bonds Go
- Dealer constraints Go
- Fundamental information vs. Liquidity pressures Go

Conclusion

Conclusion

- Dollar bonds experienced significantly greater selling pressure, price declines, and liquidity deterioration compared to non-dollar bonds
  - Partly driven by institutions' urgent need for dollar liquidity
  - We use the UK insurance sector as a case study to demonstrate the mechanism
- Dash for cash was effectively a dash for dollars → Another facet of dollar hegemony
- **Implications** Scope for policy intervention (central bank swap lines, FIMA,...)

Appendix

A1: Literature & Data

References I

Avdjiev, S., E. Eren, and P. McGuire (2020): "Dollar funding costs during the Covid-19 crisis through the lens of the FX swap market," *BIS Bulletin 1*.

Bahaj, S. and R. Reis (2020): "Swap Lines," *CEPR Covid Economics*, 2, 1–12.

BIS (2020): *US dollar funding: an international perspective*, Bank for International Settlements.

Caramichael, J., G. Gopinath, and G. Liao (2021): "US Dollar Currency Premium in Corporate Bonds," *IMF Working Paper No. 2021/185*.

Cesa-Bianchi, A., F. Eguren-Martin, and A. Ferrero (2022): "Dollar shortages and central bank swap lines," Unpublished manuscript.

Du, W. and A. W. Huber (2023): "Dollar Asset Holding and Hedging Around the Globe," *Unpublished Working Paper*.

Eren, E., A. Schrimpf, and V. Sushko (2020): "US dollar funding markets during the Covid-19 crisis - the money market fund turmoil," BIS Bulletin 14, Bank for International Settlements.

Ferrara, G., P. Mueller, G. Viswanath-Natraj, and J. Wang (2022): "Central bank swap lines: micro-level evidence," *Bank of England Staff Working Paper No. 977*.

Gilchrist, S., B. Wei, V. Z. Yue, and E. Zakrajšek (2020): "The Fed Takes on Corporate Credit Risk: An Analysis of the Efficacy of the SMCCF," NBER Working Papers 27809, National Bureau of Economic Research, Inc.

Gopinath, G. and J. C. Stein (2020): "Banking, Trade, and the Making of a Dominant Currency," *The Quarterly Journal of Economics*, 136, 783–830.

Gourinchas, P., H. Rey, and N. Govillot (2017): "Exorbitant Privilege and Exorbitant Duty," Unpublished Working Paper.

Gourinchas, P.-O. (2021): "The Dollar Hegemon? Evidence and Implications for Policymakers," in *THE ASIAN MONETARY POLICY FORUM Insights for Central Banking*, ed. by S. J. Davis, E. S. Robinson, and B. Yeung, World Scientific Publishing Co. Pte. Ltd., World Scientific Book Chapters, chap. 7, 264–300.

Gourinchas, P.-O., H. Rey, and M. Sauzet (2019): "The International Monetary and Financial System," *Annual Review of Economics*, 11, 859–893.

Haddad, V., A. Moreira, and T. Muir (2021): "When Selling Becomes Viral: Disruptions in Debt Markets in the COVID-19 Crisis and the Fed's Response," *The Review of Financial Studies*, 34, 5309–5351.

References II

He, Z., S. Nagel, and Z. Song (2022): "Treasury inconvenience yields during the COVID-19 crisis," *Journal of Financial Economics*, 143, 57–79.

Kargar, M., B. Lester, D. Lindsay, S. Liu, P.-O. Weill, and D. Zuniga (2021): "Corporate Bond Liquidity during the COVID-19 Crisis," *The Review of Financial Studies*, 34, 5352–5401.

Liao, G. Y. (2020): "Credit migration and covered interest rate parity," *Journal of Financial Economics*, 138, 504–525.

Ma, Y., K. Xiao, and Y. Zeng (2022): "Mutual Fund Liquidity Transformation and Reverse Flight to Liquidity," *The Review of Financial Studies*, 35, 4674–4711.

Maggiori, M., B. Neiman, and J. Schreger (2019): "The Rise of the Dollar and Fall of the Euro as International Currencies," *AEA Papers and Proceedings*, 109, 521–526.

——— (2020): "International Currencies and Capital Allocation," *Journal of Political Economy*, 128, 2019–2066.

Literature & Contribution

- **Special role of the US dollar** → Novel 'conditional' evidence from corporate bond markets

  [Gourinchas, Rey, and Sauzet (2019); Gopinath and Stein (2020); Gourinchas, Rey, and Govillot (2017); Gourinchas (2021); Maggiori, Neiman, and Schreger (2020); Maggiori, Neiman, and Schreger (2019)]

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- **Dash for cash** → Uncover role currency of denomination

  [Haddad, Moreira, and Muir (2021), Gilchrist, Wei, Yue, and Zakrajšek (2020), Kargar, Lester, Lindsay, Liu, Weill, and Zuniga (2021); Ma, Xiao, and Zeng (2022); He, Nagel, and Song (2022)]

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- **Dollar shortages** → Novel cross-sectional identification in corporate bond markets

  [Eren et al. (2020), Avdjiev et al. (2020); Bahaj and Reis (2020); Liao (2020); Caramichael, Gopinath, and Liao (2021); Ferrara et al. (2022), Cesa-Bianchi, Eguren-Martin, and Ferrero (2022)]

A regulatory transaction-level data set

- MiFID II transaction database (FCA)
  - All secondary market trades in corporate bonds by counterparties regulated in the UK
- Time period: Jan 2018 - May 2020, $\sim$ 2.1M trades in 7.4K corporate bonds
  - Focus on non-financial bonds and non-interdealer trades
- For each trade: price, quantity, counterparties, direction, time-stamp, trading venue, etc.

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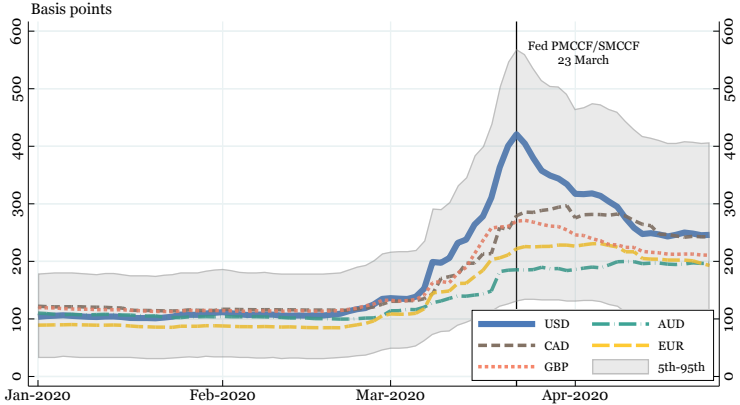
- For each trade: price, quantity, counterparties, direction, time-stamp, trading venue, etc.
- Additional data
  - Info on bond characteristics (issuer, rating, etc.) from S&P Capital IQ
  - Supervisory data on derivative holdings of UK insurers subject to the Solvency II Directive

An overlooked dimension of heterogeneity: The US dollar



NOTE. Average of investment grade corporate bond spreads (option-adjusted) weighted by bond face value across currencies. The shaded area reports the 5th and 95th percentiles of bond spreads across the full distribution. Source: ICE BoA ML.

Back

A2:Additional Results: Spreads

Empirical Approach: Within-firm regressions

Cross-sectional estimates

- Cross-sectional specification

$$\Delta s_b = \alpha + \alpha_i + \beta_1 USD_b + \Gamma X_b + \varepsilon_b$$

  - Δs_b is the change in the spread of bond *b* issued by firm *i* between Feb 28 and Mar 20
  - α_i is a firm fixed effect
  - USD_b is an indicator variable that flags USD-denominated bonds
  - X_b are bond-level controls (size, initial spread level, coupon, amortization, maturity)

Empirical Approach: Within-firm regressions

Cross-sectional estimates

- Cross-sectional specification

$$\Delta s_b = \alpha + \alpha_i + \beta_1 USD_b + \Gamma X_b + \varepsilon_b$$

  - Δs_b is the change in the spread of bond b issued by firm i between Feb 28 and Mar 20
  - α_i is a firm fixed effect
  - USD_b is an indicator variable that flags USD-denominated bonds
  - X_b are bond-level controls (size, initial spread level, coupon, amortization, maturity)

- $\beta_1 \rightarrow$ Overall spread increase for USD bonds relative to non-USD bonds

Larger increase for US dollar bond spreads

Cross-sectional estimates

- Specification: $\Delta s_b = \alpha + \alpha_i + \beta_1 USD_b + \Gamma X_b + \varepsilon_b$

	(1)	(2)
US dollar (β_1)	120.41***	7.84***
	(7.68)	(2.56)
Observations	2927	50685
R squared	0.649	0.356
Number of Firms	221	225
Firm FE	yes	no
Firm × Day FE	no	yes

NOTE. The dependent variable in Column (1) is the total change in bond spreads between February 28th and March 20th, while Column (2) uses the daily spread increase during this period. Robust standard errors clustered at the firm (Column 1) and firm-day level (Column 2) are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients corresponding to the constant, fixed effects, level of credit spread at the beginning of the sample, coupon type dummies, amortization type dummies, bond face value, and maturity not reported.

Empirical Approach: Within-firm regressions

Panel estimates

- Panel specification

$$\Delta s_{b,t} = \alpha + \alpha_{i,t} + \beta_1 USD_b + \Gamma X_b + \varepsilon_{b,t}$$

  - $\Delta s_{b,t}$ is the daily change in the spread of bond b issued by firm i over the period Feb 28 - Mar 20
  - $\alpha_{i,t}$ is a firm-by-day fixed effect
  - USD_b is an indicator variable that flags USD-denominated bonds
  - X_b are bond-level controls (size, initial spread level, coupon, amortization, maturity)

Empirical Approach: Within-firm regressions

Panel estimates

- Panel specification

$$\Delta s_{b,t} = \alpha + \alpha_{i,t} + \beta_1 USD_b + \Gamma X_b + \varepsilon_{b,t}$$

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  - X_b are bond-level controls (size, initial spread level, coupon, amortization, maturity)

- $\beta_1 \rightarrow$ Daily spread increase for USD bonds relative to non-USD bonds

Larger increase for US dollar bond spreads

Panel estimates

- Specification: $\Delta s_{bt,i} = \alpha + \alpha_{it} + \beta_1 USD_{b,i} + \Gamma X_{b,i} + \varepsilon_{bt,i}$

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US dollar (β_1)	120.41***	7.84***
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Observations	2927	50685
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Dash for dollars during the Global Financial Crisis

- **Question** Is the dash for dollars common to other crisis episodes?
- Back in 2008 Dollar was nearly as dominant as today [Maggiori et al. (2019)]
  → Should observe similar dynamics to Covid episode
- Collect data from ICE Global Corporate Index
  - $+3,600$ bonds for 847 firms (similar stats to baseline)
  - Change in spreads from June 16 to December 8th (all-time peak)
- Then estimate the relative response of dollar-denominated corporate bond spreads

Dash for dollars during the Global Financial Crisis

	(1)	(2)
	Δs_b	
US dollar (β_1)	168.25***	149.71***
	(12.84)	(8.76)
Observations	1146	1144
R squared	0.142	0.751
Number of Firms	119	119
Firm FE	no	yes

NOTE. Results from specification $\Delta s_b = \alpha + \alpha_i + \beta_1 USD_b + \Gamma X_b + \varepsilon_b$. The dependent variable is the change in credit spreads between 8th December and 16th June 2008. Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients corresponding to the constant, fixed effects, maturity, and bond face value not reported.

Back

Firm-specific panel regression

- Firm fixed effects control for *average* unobserved firm characteristics
  - Firm fundamentals, sectoral differences, etc.
- Important for controlling for firm heterogeneity, but might not be enough
- Can the within-firm identification be tightened?

Firm-specific panel regression

- Specification: $\Delta s_{b,t} = \alpha + \beta_1 USD_{b,t} + \Gamma X_b + \varepsilon_{b,t}$

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta s_{b,t}$					
	British Pet.	AT&T	Toyota	Walmart	Vodafone	Mc Donald's
US dollar (β_1)	8.26**	11.32***	5.55**	4.12**	7.66*	9.60***
	(3.99)	(1.53)	(2.63)	(2.04)	(4.41)	(3.29)
Observations	630	1582	595	612	595	647
R squared	0.035	0.031	0.023	0.003	0.067	0.031
Number of Bonds	38	96	37	36	35	39

NOTE. The dependent variable is the daily change in bond spreads between February 28th and March 20th. The independent variable is an indicator variable for dollar-denominated bonds. Robust standard errors clustered on the firm level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients corresponding to the constant, fixed effects, and controls (i.e., level of credit spread at the beginning of the sample, maturity, coupon type indicator variables, amortization type indicator variables, and bond face value) not reported.

Geographical heterogeneity

- Results could be driven by heterogeneity across geographic subsets of firms (e.g. US firms vs. EA firms)

- What can we do?
  - Split sample by nationality of issuer

Geographical heterogeneity

- Specification: $\Delta s_{b,t} = \alpha + \alpha_{i,t} + \beta_1 USD_b + \Gamma X_{b,i} + \varepsilon_{b,t}$

	(1)	(2)	(3)	(4)	(5)
			$\Delta s_{b,t}$		
	US	non-US	Advanced Ec.	Advanced Ec. excl. US	European Union
US dollar (β_1)	8.74***	6.98***	7.95***	6.63***	6.04***
	(0.74)	(0.65)	(0.51)	(0.66)	(0.83)
Observations	28565	22119	47946	19380	9753
R squared	0.338	0.395	0.334	0.317	0.227
Number of Firms	108	121	206	102	45
Firm x Day FE	yes	yes	yes	yes	yes

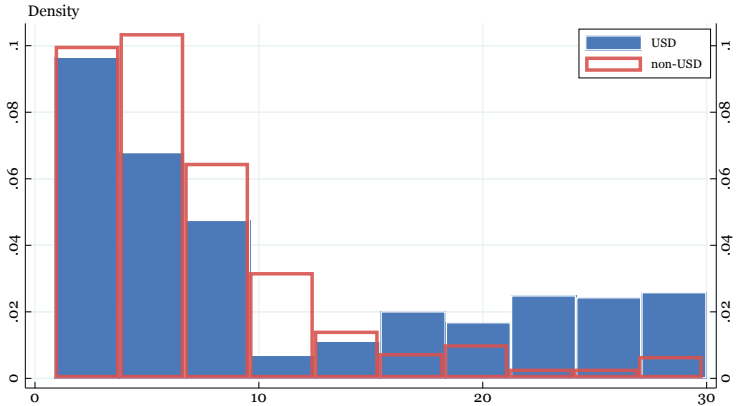
NOTE. The dependent variable is the daily change in bond spreads between February 28th and March 20th. The independent variable is an indicator variable for dollar-denominated bonds. Robust standard errors clustered on the firm level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant, fixed effects, and controls (i.e., level of credit spread at the beginning of the sample, maturity, coupon type indicator variables, amortization type indicator variables, and bond face value) not reported.

The Interaction between currency and maturity

- **Question** How do currency and maturity dimensions interact?
- Existing evidence based on US bonds in USD
  - Shorter-term bonds experienced larger falls in prices during Covid crisis
- Estimate role of maturity in dollar and non-dollar sample

Bond maturity by currency

- Dollar bonds have higher maturity on average



NOTE. Distribution of bond maturity for dollar-denominated and non-dollar denominated bonds in our sample. Average and median maturity is 11 and 7 years for dollar bonds; and 7 and 6 years for non-dollar bonds.

The interaction between currency and maturity

- Specification: $\Delta s_{b,t} = \alpha + \alpha_{i,t} + \beta_1 USD_b + \beta_2 Matu_{b,t} + \beta_3 \left(USD_b \cdot Matu_{b,t}\right) + \Gamma X_b + \varepsilon_{b,t}$

	(1)	(2)	(3)	(4)
		$\Delta s_{b,t}$		
US dollar (β_1)	7.54***		7.84***	10.44***
	(0.51)		(0.50)	(0.77)
Maturity (β_2)		0.04	-0.11**	0.19**
		(0.05)	(0.05)	(0.08)
US dollar × Maturity (β_3)				-0.34***
				(0.05)
Observations	50685	50685	50685	50685
R squared	0.355	0.350	0.356	0.356
Number of Firms	225	225	225	225
Firm x Day FE	yes	yes	yes	yes

NOTE. The dependent variable is the daily change in bond spreads between February 28th and March 20th. The independent variables are an indicator variable for dollar-denominated bonds and a variable capturing the time-to-maturity of a given bond, as well as an interaction term of these variables. Robust standard errors clustered on the firm level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant, fixed effects, and controls (i.e. level of credit spread at the beginning of the sample, maturity, coupon type indicator

Maturity buckets

	(1)	(2)	(3)	(4)	(5)
			$\Delta s_{b,t}$		
	0-3 years	3-5 years	5-10 years	10-15 years	15+ years
US dollar (β_1)	11.66***	11.21***	7.30***	7.46***	4.95***
	(1.12)	(1.47)	(0.54)	(1.96)	(0.68)
Observations	10034	8008	15046	2286	11469
R squared	0.523	0.469	0.498	0.791	0.592
Number of Firms	225	225	225	225	225
Firm × Day FE	yes	yes	yes	yes	yes

NOTE. The dependent variable is the daily change in spread of a bond in a given maturity bucket between February 28th and March 20th. The independent variable is an indicator variable for dollar-denominated bonds. Robust standard errors clustered on the firm level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant, fixed effects, and controls (i.e., level of credit spread at the beginning of the sample, maturity, coupon type indicator variables, amortization type indicator variables, and bond face value) not reported.

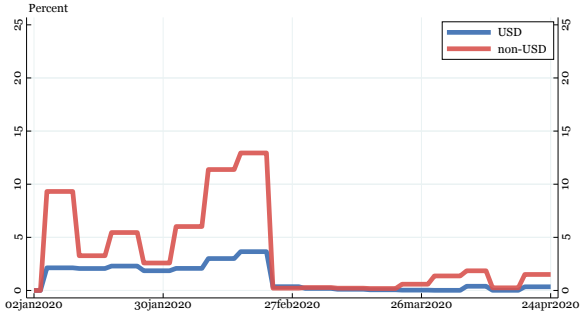
Controlling for issuer's maturity structure

	(1)	(2)	(3)	(4)
		$\Delta s_{b,t}$		
US dollar (β_1)	7.84***		7.77***	11.28***
	(0.50)		(0.48)	(0.69)
Proportion due prior (β_2)		-4.41**	-2.41	1.13
		(1.74)	(1.76)	(1.79)
US dollar × Proportion due prior (β_3)				-8.60***
				(0.93)
Observations	50685	50685	50685	50685
R squared	0.356	0.350	0.356	0.356
Number of Firms	225	225	225	225
Firm × Day FE	yes	yes	yes	yes

NOTE. The dependent variable is the daily change in bond spreads between February 28th and March 20th. The independent variable is an indicator variable for dollar-denominated bonds. *Proportion due prior* measures the proportion of an issuer's face value of debt due prior to a given bond. Robust standard errors clustered on the firm level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant

Bond staleness

- Pattern of spreads raises concerns of non-USD staleness Heterogeneity by currency
- It is not USD bond spreads increasing more, it is non-USD bond spreads not increasing at all
- But measures of staleness suggest that non-USD bonds are, if anything, more stale
- Figure shows share of bonds with no change in a given week



Back

Higher spreads and lower prices for dollar bonds in micro data

- $\Delta s_{b,t} = \alpha + \alpha_{i,t} + \beta_1 USD_b + \Gamma X_b + \varepsilon_{b,t}$ | $\Delta p_{b,t} = \alpha + \alpha_{i,t} + \beta_1 USD_b + \Gamma X_b + \varepsilon_{b,t}$

	(1)	(2)
	$\Delta s_{b,t}$	$\Delta p_{b,t}$
US dollar (β_1)	16.37***	-57.04*
	(3.37)	(28.47)
Observations	877	877
R squared	0.651	0.442
Firm × Day FE	yes	yes

NOTE. This table provides estimates for our baseline regression using spreads and prices of bonds that are traded in the sterling corporate bond market. In the first column, we use changes in spread, which are measured on the bond-day level (in bps). In the second column, we focus on changes in transaction prices, which are measured on the bond-day level and defined as the logarithmic change in the trade-weighted average price compared to the previous trading day (in bps). We focus on the Covid-19 period between February 28th and March 20th 2020. Robust standard errors clustered on the firm level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corre-

Spreads vs Yields

- US lowered policy rate earlier and more aggressively than other countries, mechanically leading to the increase in USD bond spreads
- Can check the relative response of yields (as opposed to spreads)

	(1)	(2)
	$\Delta s_{b,t}$	$\Delta y_{b,t}$
US dollar (β_1)	7.84***	3.60***
	(0.50)	(0.51)
Observations	50685	50685
R squared	0.356	0.369
Number of Firms	225	225
Firm x Day FE	yes	yes

NOTE. The dependent variable is the daily change in bond spreads (Column 1) or yields (Column 2) between February 28th and March 20th. The independent variable is an indicator variable for dollar-denominated bonds. Robust standard errors

The way down

- On March 23rd, Fed announced purchase programs of corporate bonds in primary and secondary markets (PMCCF and SMCCF)
  - This coincides with peak in aggregate IG corporate spread widening
  - Is there any heterogeneity on 'the way down'?

- We re-estimate our baseline specification for spread changes after this announcement
  - Baseline: 5-day window after PMCCF/SMCCF announcement
  - Caveat: large number of Fed actions in the period of analysis

Larger fall for US dollar bond spreads

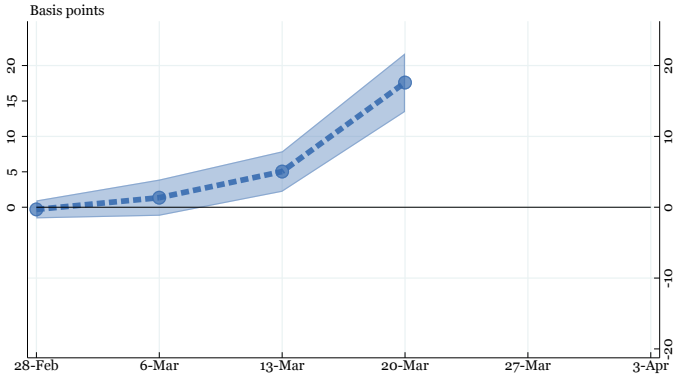
- Specification: $\Delta s_{bt,i} = \alpha + \alpha_{it} + \beta_1 USD_{b,i} + \Gamma X_{b,i} + \varepsilon_{bt,i}$

	(1)	(2)
	$\Delta s_{b,t}$	
US dollar (β_1)	-8.57***	-9.09***
	(0.81)	(0.90)
Observations	34406	33926
R^2	0.315	0.318
Number of Firms	286	286
Firm x Day FE	yes	yes

NOTE. The dependent variable is the daily change in bond spreads in the five trading days following the PMCCF/SMCCF announcement. The independent variable is an indicator variable for dollar-denominated bonds. Robust standard errors clustered on the firm level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients corresponding to the constant, fixed effects, and controls (i.e., level of credit spread at the beginning of the sample, maturity, coupon type indicator variables, amortization type indicator variables, and bond face value) not reported.

The evolution of the dash for dollars over time: The way up

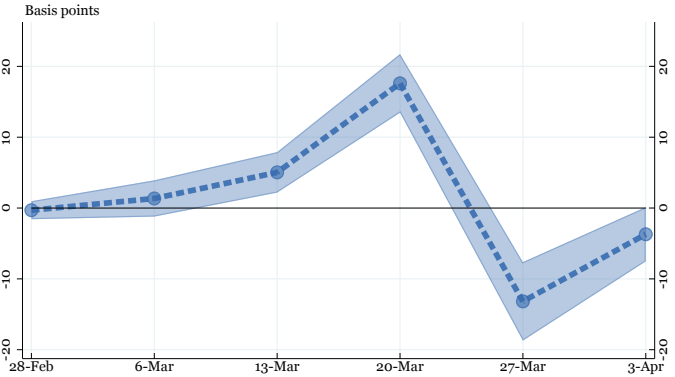
- Specification: $\Delta s_{b,t} = \alpha + \alpha_{i,t} + \alpha_w \cdot \beta_1 USD_b + \Gamma X_b + \varepsilon_{b,t}$



NOTE. Time-varying (weekly) estimates of the differential spread increase for dollar-denominated bonds vis-a-vis non-dollar bonds in the specification with firm-by-day fixed effects (β_1). Shaded area show 90% confidence intervals based on robust standard errors clustered at the firm-day level.

The evolution of the dash for dollars over time: The way down

- Specification: $\Delta s_{b,t} = \alpha + \alpha_{i,t} + \alpha_w \cdot \beta_1 USD_b + \Gamma X_b + \varepsilon_{b,t}$



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Back

Adding high yield bonds to the sample

	(1)	(2)	(3)
		$\Delta s_{b,t}$	
	Baseline (IG only)	All bonds	High Yield Only
US dollar (β_1)	7.84***	7.69***	6.43***
	(0.50)	(0.48)	(1.43)
Observations	50685	55029	4344
R squared	0.356	0.406	0.584
Number of Firms	225	282	57
Firm x Day FE	yes	yes	yes

NOTE. The dependent variable is the daily change in bond spreads between February 28th and March 20th. The independent variable is an indicator variable for dollar-denominated bonds. Robust standard errors clustered on the firm level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant, fixed effects, and controls (i.e., level of credit spread at the beginning of the sample, maturity, coupon type indicator variables, amortization type indicator variables, and bond face value) not reported.

Excluding callable bonds

	(1)	(2)
US dollar (β_1)	90.00***	7.81**
	(16.19)	(3.05)
Observations	395	7077
R squared	0.806	0.430
Firm FE	yes	no
Firm × Day FE	no	yes

NOTE. The dependent variable in Column (1) is the total change in bond spreads between February 28th and March 20th, while Column (2) uses the daily spread increase during this period. Robust standard errors clustered at the firm (Column 1) and firm-day level (Column 2) are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant, fixed effects, level of credit spread at the beginning of the sample, coupon type dummies, amortization type dummies, bond face value, and maturity not reported.

Back

Including financial bonds

	(1)	(2)
US dollar (β_1)	126.37***	8.11***
	(6.04)	(2.64)
Observations	3953	68167
R squared	0.649	0.350
Firm FE	yes	no
Firm × Day FE	no	yes

NOTE. The dependent variable in Column (1) is the total change in bond spreads between February 28th and March 20th, while Column (2) uses the daily spread increase during this period. Robust standard errors clustered at the firm (Column 1) and firm-day level (Column 2) are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant, fixed effects, level of credit spread at the beginning of the sample, coupon type dummies, amortization type dummies, bond face value, and maturity not reported.

Back

A3:Additional Results: Volumes

Higher sell volumes in dollar bonds

- Specification: $Vol_{b,j,t} = \alpha + \alpha_{i,j,t} + \beta_1 USD_b + \Gamma X_{b,t} + \varepsilon_{b,j,t}$

	(1)	(2)	(3)	(4)	(5)	(6)
	Net Volumes		Buy Volumes		Sell Volumes	
US dollar (β_1)	-0.90***	-0.54***	-0.04	-0.03	0.86***	0.51***
	(0.21)	(0.05)	(0.08)	(0.11)	(0.23)	(0.06)
Observations	7323	1444	7323	1444	7323	1444
R squared	0.390	0.770	0.573	0.810	0.234	0.752
Firm FE	yes	no	yes	no	yes	no
Day FE	yes	no	yes	no	yes	no
Investor FE	yes	no	yes	no	yes	no
Firm × Day × Investor FE	no	yes	no	yes	no	yes

NOTE. Net volumes (in millions) are measured on the investor-day-bond level in the period between February 28th and March 20th. Buy (Sell) volume is equal to net volume if the given investor is a net buyer (seller) of investment grade bond *b* on day *t*, and zero otherwise. Robust standard errors clustered at the firm level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients corresponding to the constant, control variables and fixed effects not reported.

Results on prices | Results by investor type

Higher sell volumes in dollar bonds

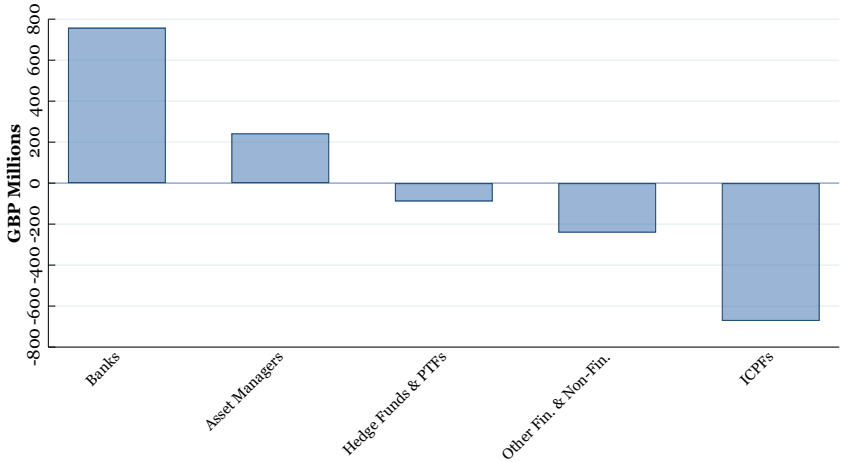
- Specification: $Vol_{b,j,t} = \alpha + \alpha_{i,j,t} + \beta_1 USD_b + \Gamma X_{b,t} + \varepsilon_{b,j,t}$

	(1)	(2)	(3)	(4)	(5)	(6)
	Net Volumes		Buy Volumes		Sell Volumes	
US dollar (β_1)	-0.90***	-0.54***	-0.04	-0.03	0.86***	0.51***
	(0.21)	(0.05)	(0.08)	(0.11)	(0.23)	(0.06)
Observations	7323	1444	7323	1444	7323	1444
R squared	0.390	0.770	0.573	0.810	0.234	0.752
Firm FE	yes	no	yes	no	yes	no
Day FE	yes	no	yes	no	yes	no
Investor FE	yes	no	yes	no	yes	no
Firm × Day × Investor FE	no	yes	no	yes	no	yes

NOTE. Net volumes (in millions) are measured on the investor-day-bond level in the period between February 28th and March 20th. Buy (Sell) volume is equal to net volume if the given investor is a net buyer (seller) of investment grade bond *b* on day *t*, and zero otherwise. Robust standard errors clustered at the firm level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant, control variables and fixed effects not reported.

Results on prices | Results by investor type

Net trading volumes by investor type (unconditional)



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A3:Additional Results: Liquidity

Larger trade costs in dollar bonds

- $\textit{Trade Cost}_{b,t} = \alpha + \alpha_{i,t} + \beta_1 USD_b + \Gamma X_{b,t} + \varepsilon_{b,t}$

	(1)	(2)
	Trade Costs	
US dollar (β_1)	16.89***	18.41***
	(3.38)	(1.87)
Observations	502	327
R squared	0.290	0.439
Firm FE	yes	no
Day FE	yes	no
Firm x Day FE	no	yes

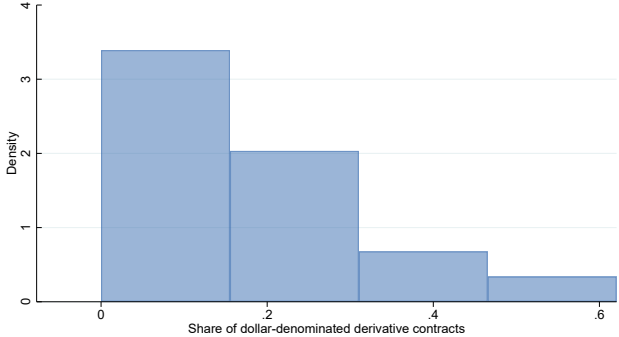
NOTE. The trade costs are measured on the bond-day level and defined as the difference between the trade price and the bid/ask midpoint. We focus on the Covid-19 crisis period between February 28th and March 20th 2020. Robust standard errors clustered on the firm level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant, control variables and fixed effects not reported.

Amihud results

A5:Additional Results: Mechanism

Dollar Share

- **Dollar Share** Insurer *j*'s share of dollar-denominated derivative contracts at the end of Q4 2019
- On average, around 20% of an insurer's derivative portfolio is denominated in dollars



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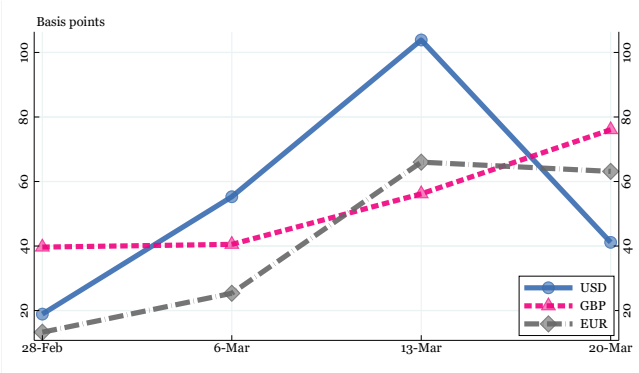
Effective bid-ask spread levels: dash for dollars

- **Effective bid-ask spreads** Twice the difference between trade price and bond's bid/ask midpoint
  - Midpoint defined as dealers' volume-weighted sales price plus dealers' volume-weighted purchase price, divided by two
  - Midpoint serves as proxy for the bond's fundamental value



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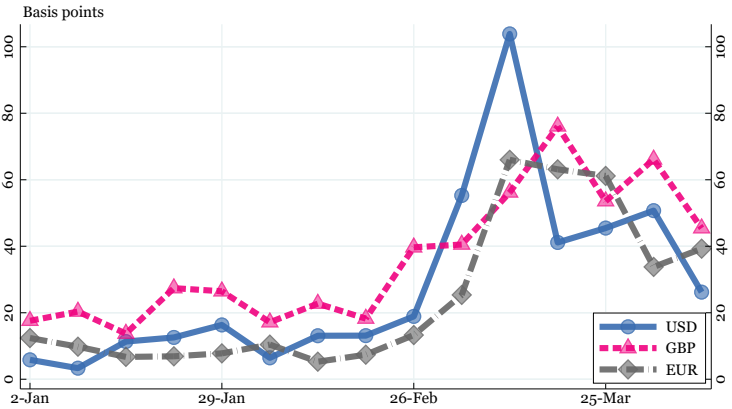
Evolution of effective bid-ask spread levels: Full sample



NOTE. Unconditional effective bid-ask spreads (defined as twice the difference between the trade price and the bid/ask midpoint) by currency.

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Effective cost of liquidation

- **Effective cost of liquidation** Effective half spread to measure the cost of liquidation
  - Effective half spread is defined as the difference between trade price and bond's bid/ask midpoint

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CIP deviations and effective cost of liquidation

- **CIP deviations** Difference between the local dollar borrowing rate less the synthetic dollar borrowing rate
  - Local dollar borrowing rate is the US interest rate
  - Synthetic dollar borrowing rate is the foreign interest rate, multiplied with quotient of forward rate divided by spot rate
  - We use daily spot, forward and OIS benchmark rates for 1 week, 1 month and 3 month maturities for EUR & GBP vs. USD from Bloomberg

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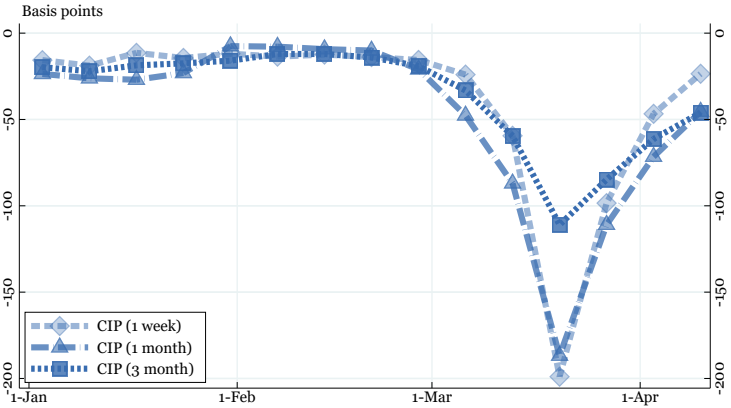
CIP deviations



NOTE. Difference between the local dollar borrowing rate less the synthetic dollar borrowing rate. The local dollar borrowing rate is the US interest rate. The synthetic dollar borrowing rate is the foreign interest rate, multiplied with quotient of forward rate divided by spot rate. Daily spot, forward and OIS benchmark rates for 1 week, 1 month and 3 month maturities for EUR and GBP vs. USD. Source: Bloomberg.

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Expectations of dollar depreciation

- **Intuition**
  - Assume mean reversion in FX dynamics to a stable equilibrium
  - Decision to sell dollar assets driven by subsequent expected dollar depreciation

- **Approach** Compare strength of dollar appreciation and spread widening across currencies
  - Example: the weaker the appreciation, the smaller the dollar spread widening

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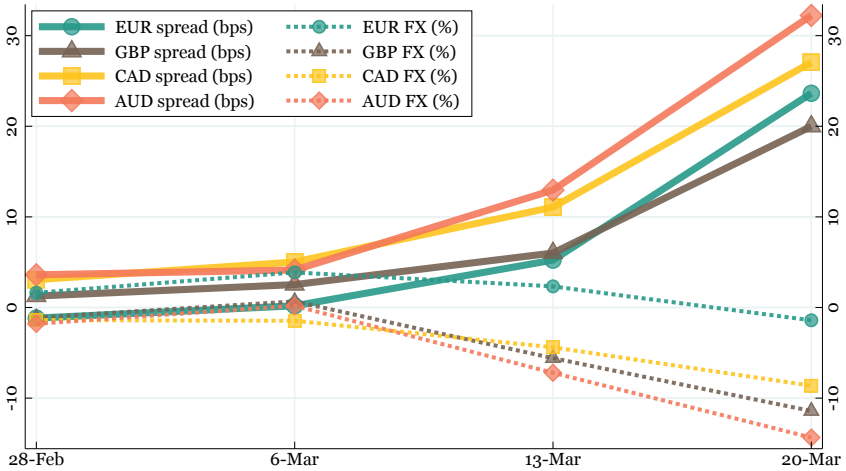
Expectations of dollar depreciation



NOTE. The solid lines show the corporate bond spread differentials between dollar bonds and bonds denominated in other currencies, as estimated from the following specification: $\Delta s_{bt,i} = \alpha + \alpha_{it} + \alpha_w \cdot \alpha_c \cdot \beta_1 USD_{b,i} + \Gamma X_{b,i} + \varepsilon_{bt,i}$, where α_c is a currency indicator variable. The dashed lines show the cumulative FX changes against the US dollar (negative values represent a US dollar appreciation). Source: ICE Bank of America Merrill Lynch and Bloomberg.

Heterogeneous default risk for local- vs. foreign-currency bonds

- **Intuition**
  - Assume that default risk is higher for foreign currency bonds than for local-currency bonds
  - Increase in dollar spreads driven by compensation for risk

- **Approach** Compare dollar spread of non-US firms with other foreign-currency spreads
  - Baseline specification using data for non-US firms excluding local currency bonds
  - Example: Compare dollar vs. pound sterling bonds for euro area firms

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Heterogeneous default risk for local- vs. foreign-currency bonds

- Specification: $\Delta s_{b,t} = \alpha + \alpha_{i,t} + \beta_1 USD_b + \Gamma X_b + \varepsilon_{b,t}$

	(1)	(2)
	Baseline	Excl. Local Currency Bonds
US dollar (β_1)	10.54***	10.02***
	(0.76)	(1.21)
US dollar × Maturity (β_3)	-0.34***	-0.35***
	(0.05)	(0.09)
Observations	57350	18105
R squared	0.366	0.430
Number of Firms	283	178
Firm x Day FE	yes	yes

NOTE. Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients corresponding to the constant, fixed effects, level of credit spread at the beginning of the sample, maturity, coupon type dummies, amortization type dummies, bond face value, and maturity not reported.

Portfolio rebalancing

- **Intuition**
  - Assume that investors target a constant share of dollar assets over total assets
  - Dollar appreciation and fall in asset prices induce them to rebalance
  - Decision to sell/buy dollar assets driven by mechanical rebalancing

- **Rebuttal**
  1. Dollar spread tightening on the way down indicates rapid reversal of the dash for dollars (inconsistent with portfolio rebalancing)
  2. No significant sell-offs of euro-denominated bonds (vs. other non-USD bonds), despite the euro's sharp appreciation against sterling during Covid

Portfolio rebalancing

- Specification: $Vol_{b,j,t} = \alpha + \alpha_{i,j,t} + \beta_1 EUR_b + \Gamma X_{b,t} + \varepsilon_{b,j,t}$

	(1)	(2)	(3)	(4)	(5)	(6)
	Net Volumes		Buy Volumes		Sell Volumes	
Euro bond (β_1)	-0.20	-0.10	-0.16	0.15	0.04	0.25
	(0.15)	(0.19)	(0.13)	(0.19)	(0.07)	(0.19)
Observations	6354	1055	6354	1055	6354	1055
R squared	0.162	0.502	0.182	0.439	0.171	0.525
Firm FE	yes	no	yes	no	yes	no
Day FE	yes	no	yes	no	yes	no
Investor FE	yes	no	yes	no	yes	no
Firm×Day×Investor FE	no	yes	no	yes	no	yes

NOTE. Net volumes (in millions) are measured on the investor-day-bond level in the period between February 28th and March 20th. Buy (Sell) volume is equal to net volume if the given investor is a net buyer (seller) of investment grade bond *b* on day *t*, and zero otherwise. Robust standard errors clustered at the firm level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients corresponding to the constant, control variables and fixed effects not reported.

Dealer constraints

- Dealers that intermediate USD-denominated corporate bonds are also likely to be intermediaries of US Treasuries
- It is therefore possible that dealer capacity for intermediating USD-denominated assets was stretched in general
- This could account for the observed rise in USD spreads and the deterioration of liquidity in USD bonds
- Address by adding dealer-day fixed effects

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Dealer constraints

	(1)	(2)	(3)
	Net Volumes	Buy Volumes	Sell Volumes
US dollar (β_1)	-0.86***	-0.26	0.60**
	(0.28)	(0.16)	(0.28)
Observations	4153	4153	4153
R squared	0.304	0.371	0.336
Firm FE	yes	yes	yes
Investor FE	yes	yes	yes
Dealer × Day FE	yes	yes	yes

NOTE. Net volumes (in millions) are measured on the investor-dealer-day-bond level in the period between February 28th and March 20th. Buy (Sell) volume is equal to net volume if the given investor is a net buyer (seller) from a given dealer of investment grade bond *b* on day *t*, and zero otherwise. Robust standard errors clustered at the firm level are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Coefficients corresponding to the constant, control variables and fixed effects not reported.

ICPF: Fundamental information vs. Liquidity pressures

- Are ICPFs trades based on fundamental information, rather than due to liquidity pressures?
- If so, we should see a longer-term underperformance of the bonds that were sold by these investors
- To mitigate these concerns, we run our baseline spread specification for longer horizons of spread changes

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ICPF: Fundamental information vs. Liquidity pressures

$$\Delta s^{Dollar}_{b,t+k} = \alpha + \alpha_i + \alpha_t + \beta_1 OrderFlow_{b,t} + \Gamma X_{b,t} + \varepsilon_{b,t+k} \quad (1)$$

	(1)	(2)	(3)	(4)
	$\Delta s_{b,t}$	$\Delta s_{b,t+5}$	$\Delta s_{b,t+10}$	$\Delta s_{b,t+20}$
ICPF Order Flow	-7.25**	-2.37	2.44	6.53
	(2.36)	(4.92)	(7.65)	(7.76)
Observations	85	85	85	85
R squared	0.628	0.630	0.788	0.891
Firm FE	yes	yes	yes	yes
Day FE	yes	yes	yes	yes

NOTE. ICPF order flow is measured on the bond-day level and defined as the ICPFs' daily net volume in the given bond, divided by the bond's total daily trading volume across all investor types. To facilitate the interpretation of the coefficients, we transform the variable by subtracting the cross-sectional average, before dividing it by the standard deviation. The dependent variable is the bond's spread change (in bps) from day t-1 to day t+k. Robust standard errors clustered on the firm level are reported in parentheses. *** $p<0.01$, **