Discussion: Comovements in Global Markets and the Role of U.S. Treasury

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Summary

- Daily safety measure η_t^{UST}
  - Negative intraday correlation (ρ) b/w $r^{\text{US equity}}$ (SPX) & $r^{\text{US Treasury}}$ (UST)
  - Five-minute returns, January 2004 to June 2022
- Top-quintile η_t^{UST} days as flight-to-UST episodes
  - $r^{\text{SPX}} \downarrow$, $r^{\text{UST}} \uparrow$, $r^{\text{JPY/USD}} \uparrow$, option-implied $\sigma \uparrow$, & SPX-to-UST flows $\uparrow$
  - η_t^{USD} & η_t^{VIX}, unlike η_t^{UST}, show no flight-to-safety (FTS) pattern
- *Cf.* Baele, Bekaert, Inghelbrecht, and Wei (2020)
  - Identify FTS days in 23 countries using their daily $r^{\text{Stock}}/r^{\text{Bond}}$ with model averaging approach
    - Regime switching model + "threshold" model + "ordinal index" model
  - Negative r^{Stock}, positive r^{Bond}, negative $\rho_{\text{Stock,Bond}}$, & elevated σ_{Stock}

Table 2: During Q5 as FTS

Panel A: Safety Measures

	Q5	Q1	Non-FOMC	FOMC	Diff
η_t^{UST}	0.64***	-0.07***	0.32***	0.03	0.28***
	[201.95]	[-13.03]	[36.74]	[0.83]	[9.89]
# Days	926	926	4509	147	

$r^{SPX} \downarrow$ & $r^{UST} \uparrow$

Panel B: Major Market Return and Implied Volatility

	Return		CAPM α		ΔImp. Vol	
	Q5	Q1	Q5	Q1	Q5	Q1
SPX	-36.20***	13.75***			0.51***	-0.16***
	[-8.04]	[4.76]			[6.48]	[-4.12]
UST	13.60***	-6.05***	5.03***	-7.96***	0.79***	-0.11
	[9.57]	[-3.92]	[4.42]	[-4.92]	[4.68]	[-0.96]
DXY	1.20	2.14	-0.89	3.61**	0.07***	-0.03***
	[0.63]	[1.22]	[-0.49]	[2.06]	[3.75]	[-3.13]
EUR/USD	-1.90	-1.87	-0.22	-3.99**	0.07***	-0.03**
	[-0.82]	[-0.99]	[-0.10]	[-2.06]	[3.42]	[-2.47]
YEN/USD	16.48***	-8.43***	10.27***	-9.76***	0.14***	-0.04***
	[7.07]	[-4.42]	[5.10]	[-5.03]	[4.28]	[-3.04]

Implied $\sigma \uparrow$

$r^{JPY/USD} \uparrow$

Panel C: Major Market Liquidity

	ΔVol		ΔVolume		ΔGamma	
	Q5	Q1	Q5	Q1	Q5	Q1
SPX	1.11***	-0.25**	0.25***	-0.00	-0.08	0.03
	[4.22]	[-2.12]	[7.29]	[-0.12]	[-0.61]	[0.43]
UST	-0.02	0.28***	0.15***	0.12***	-0.00	0.03***
	[-0.21]	[3.64]	[5.22]	[3.97]	[-0.72]	[3.09]

During Q1, UST's liquidity ↑

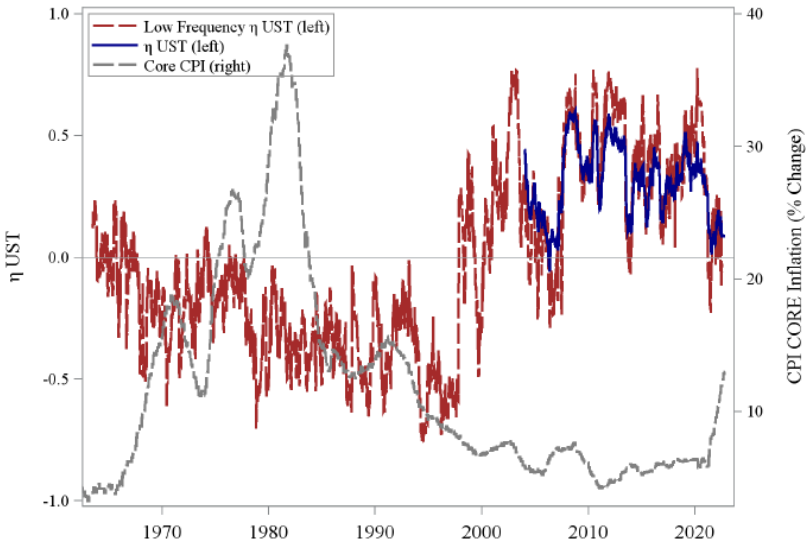
Question: If UST becomes the source of risk in Q1, wouldn't b_{UST}^{Q1} be positive and significant?

Comment 1: Compared to Existing FTS

- This paper
  - "We are mostly related to the recent paper Baele, Bekaert, Inghelbrecht, and Wei (2019), which use the daily returns of international equity and government bonds to infer flight-to-safety episodes based on multiple indicators such as return impact, correlation, and volatility spikes. We differ from their approach by constructing a simple safety measure from the correlation of the U.S. equity and Treasury intraday high-frequency returns, which enables us to identify the flight-to-UST episodes at the *daily* frequency."

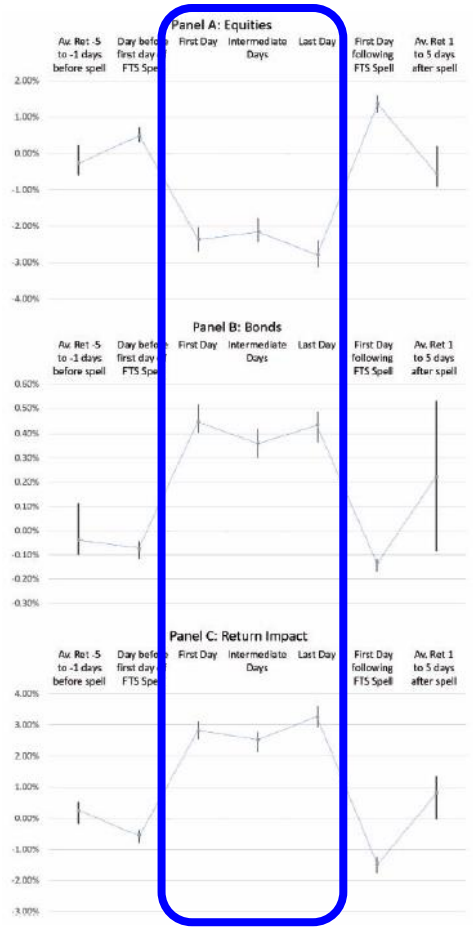
- But Baele *et al.*'s FTS is also *daily* measure
  - Correlation? Comparative advantage? High-frequency advantages?
  - Baele *et al.*: "FTS days comprise less than 2% of the sample …"
  - This paper: "… flight-to-UST episodes as the top 20% η_t^{UST} days …"

Comment 1: Compared to Existing FTS



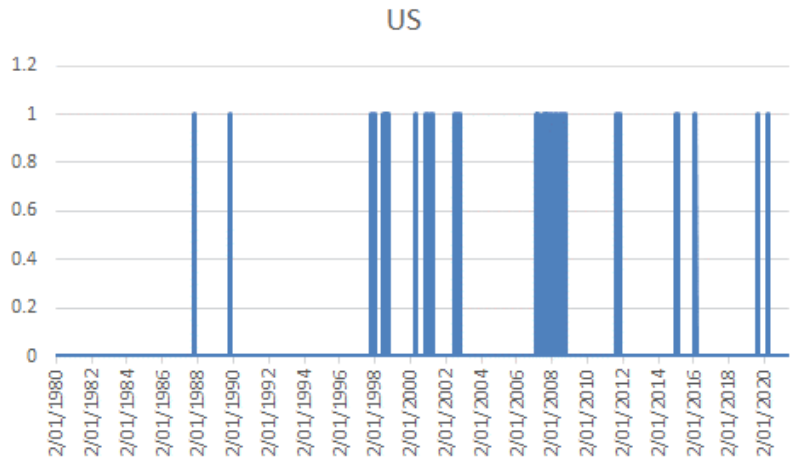
- Section 2.5/Figure 4 are describing/displaying the difference between high- & low-frequency safety measures
- Correlation/overlapping b/w their top-20% η_t^{UST} days?
- "… its construction method limits its ability to capture flight-to-safety at the daily basis."

Comment 1: Compared to Existing FTS



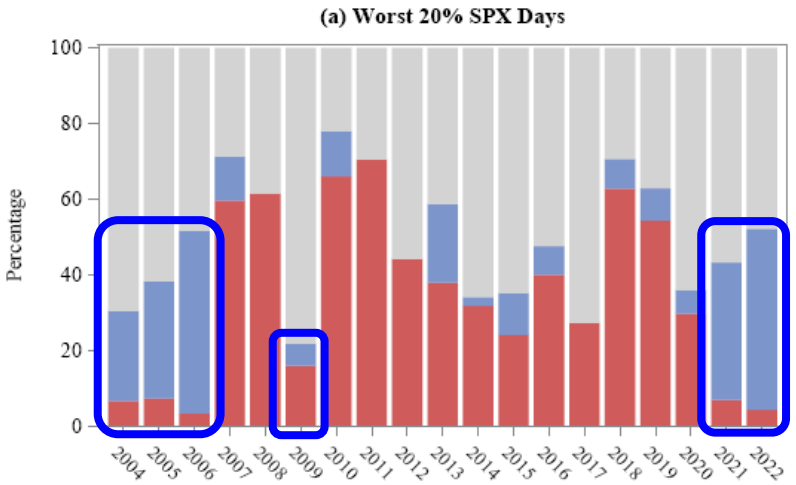
- Table 6/Figure 4 in Baele *et al.* (2020)
- "During the FTS days, equities drop, on average, 2.29% … whereas Treasury bonds increase, on average, 0.43% …"
- "… we note that the 2.79% return impact on the first day of an FTS represents a 2.3 standard deviation move above its daily average of 0.013% …"

Comment 1: Compared to Existing FTS



- Baele *et al.* classify 222/10,794 days as FTS days in the US
- Likewise, how many FTS days in these papers are overlapping?
  - Q5-, D10-, P100-η_t^{UST}
- What if η_t^{USD} or η_t^{VIX}?
- Orthogonal information b/w them would be interesting

Comment 2: Exceptions in Figure 3 (a)



- Top-20% η_t^{UST} days constitute more than 20% of worst-20% SPX days
- 6/19 years are deviating from this pattern and stated as exceptions
- A little more explanations about their difference would be helpful

Comment 3: Comparing η_t^{UST} & η_t^{Others}?

Panel A: Summary Statistics

	Q5	Q1		Q5	Q1
η_t^{USD}	0.45***	-0.30***	η_t^{VIX}	0.91***	0.43***
	[92.72]	[-55.92]		[617.79]	[73.15]
# Days	642	626	# Days	680	826

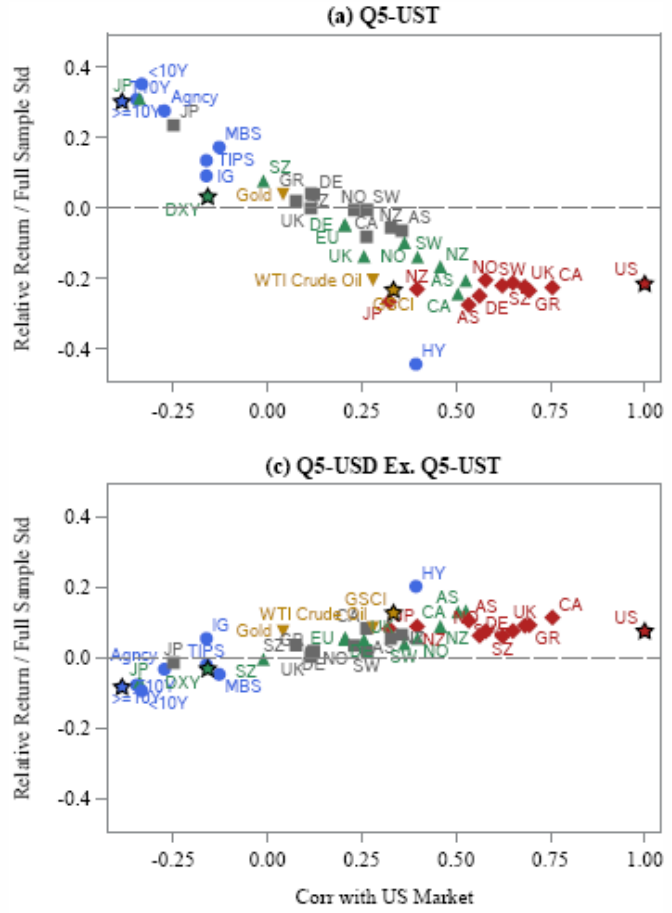
Panel B: Market Performance on Q5 Ex. Q5-UST Days

	Q5-USD			Q5-VIX		
	Return	CAPM α	ΔImp. Vol	Return	CAPM α	ΔImp. Vol
SPX	14.81***		-0.18***	-7.24*		0.05
	[2.98]		[-2.78]	[-1.74]		[0.71]
UST	-2.29	-1.13	-0.30*	-4.38	-2.52	0.17
	[-1.12]	[-0.52]	[-1.71]	[-1.07]	[-1.48]	[1.25]
DXY	-0.97	2.04	-0.05***	3.41**	2.59	0.00
	[-0.45]	[1.07]	[-3.87]	[2.00]	[1.57]	[0.29]
EUR/USD	0.63	-2.21	-0.06***	-4.20**	-4.28**	-0.00
	[0.27]	[-1.00]	[-3.65]	[-2.19]	[-2.25]	[-0.19]
YEN/USD	-4.69**	-3.63	-0.06***	-3.41*	-4.23**	0.01
	[-1.98]	[-1.49]	[-2.76]	[-1.71]	[-2.11]	[0.57]

Days = 680 for Q5 & 826 for Q1?

- (Table 5) $\hat{E}[r^{SPX}]$ in bp is
  - -36 on Q5-η_t^{UST}
  - $+15$ on Q5-η_t^{USD}\Q5-η_t^{UST}
  - -7 on Q5-η_t^{VIX}\Q5-η_t^{UST}
- "… its clear that the U.S. equity market is much less stressed on the Q5 days captured by η_t^{USD} and η_t^{VIX}."
- $\hat{E}[r^{SPX}]$ for Q5-η_t^{USD} & -η_t^{VIX} would be fairer
  - Or for both Q5-η_t^{UST}\Q5-η_t^{USD} & Q5-η_t^{UST}\Q5-η_t^{VIX}

Comment 3: Comparing η_t^{UST} & η_t^{Others}?



- Figure 5 shows the cross-section of asset returns and the assets' ρ against US market
- Q5-η_t^{USD}\Q5-η_t^{UST} & Q5-η_t^{VIX}\Q5-η_t^{UST} in panels (c–d)
- Instead, Q5-η_t^{UST}\Q5-η_t^{USD} & Q5-η_t^{UST}\Q5-η_t^{VIX} would be more informative as η_t^{UST} is the main variable in this paper
- Or more directly, ρ/overlapping among η_ts

Comment 4: $\eta_t^{\text{JPY/USD}}$ as Safe Haven?

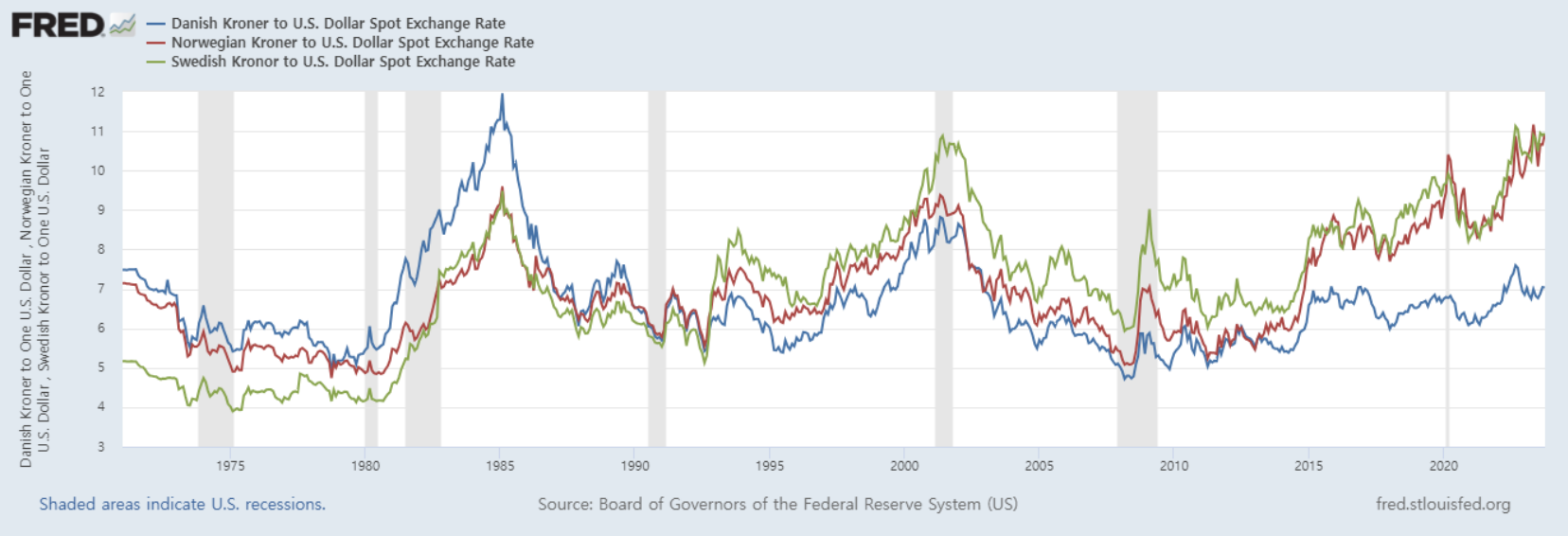
- Both Tables 2 & 5 are suggesting JPY/USD rather than DXY & EUR/USD as safe haven
- What if $\eta_t^{\text{JPY}} = -corr(r_t^{\text{SPX}}, r_t^{\text{JPY/USD}})$ then?
- Section 3.3/Figure 7 show the importance of η_t^{USD} during the 2011 European debt crisis & the most recent inflation surge
- It would be further interesting if η_t^{JPY} & η_t^{EUR} have distinct contents
  - ρ/overlapping

Comment 4: $\eta_t^{JPY/USD}$ as Safe Haven?

yvar=	The Dollar Index		USD/Foreign			Foreign/USD	
	(1)	(2)	(3)	(4)		(5)	(6)
$\Delta y^{UST} \times Q5$		-1.33***		-1.45***	$\Delta y^{Local\ Bond} \times Q5$		1.79***
		[-2.67]		[-2.84]			[2.75]
$\Delta y^{UST} \times Q1$		1.95***		1.98	$\Delta y^{Local\ Bond} \times Q1$		-2.05
		[4.47]		[4.44]			[-4.70]
Δy^{UST}	1.49***	1.10***	1.58***	1.25***	$\Delta y^{Local\ Bond}$	1.57***	1.66***
	[6.73]	[4.14]	[3.93]	[2.97]		[7.93]	[6.80]
$r^{SPX} \times Q5$		-0.04*		-0.04	$r^{Local\ Equity} \times Q5$		-0.05
		[1.69]		[1.77]			[-2.59]
$r^{SPX} \times Q1$		-0.04		-0.02	$r^{Local\ Equity} \times Q1$		-0.01
		[-1.56]		[-0.85]			[-0.34]
r^{SPX}	-0.09***	-0.08***	-0.18***	-0.17***	$r^{Local\ Equity}$	0.05	0.06*
	[-7.66]	[-5.28]	[-3.98]	[-3.70]		[1.55]	[1.79]
Q5	-0.25	-0.91	-1.10	-1.99	Q5	-0.44	0.10
	[-0.12]	[-0.45]	[-0.58]	[-1.09]		[-0.15]	[0.04]
Q1	1.59	0.67	1.25	0.05	Q1	-2.81	-1.76
	[0.83]	[0.34]	[0.74]	[0.03]		[-1.48]	[-0.92]
Intercept	0.44	0.35			Intercept		
	[0.51]	[0.40]					
Currency FE	No	No	Yes	Yes	Currency FE	Yes	Yes
NOBS	4622	4622	46220	46220	NOBS	46220	46220
R2 (%)	4.90	6.41	8.51	9.27	R2 (%)	2.43	3.02

- Table 7 regresses r^{FX} on Q5, Δy^{UST}, & their interactions
- Likewise, panel regressions (3, 6) based on equation (7) might contain the distinct effects of JPY (CHF) & other currencies
  - b^{Q5} & d^{UST} for JPY (CHF)

Comment 5: Denmark/Norway/Sweden



$r^{\mathrm{DNK/USD}}$, $r^{\mathrm{NOK/USD}}$, & $r^{\mathrm{SEK/USD}}$ often exhibit reasonable ρs (0.7–0.8 at daily/monthly levels) & insignificantly different $\hat{\mathrm{E}}[r]$s

Comment 5: Denmark/Norway/Sweden

Panel C. Other G10 currencies (ex. YEN, CHF)

	NZD	AUD	NOK	GBP	CAD	SEK	EUR	DKK
Q5	-10.08***	-13.05***	-8.03**	-5.69*	-11.92***	-4.65	-1.47	-1.38
	[-2.59]	[-3.16]	[-2.17]	[-1.93]	[-4.05]	[-1.35]	[-0.53]	[-0.50]
Q1	-4.22	-3.99	-5.33*	-0.09	-1.15	-4.44	-3.35	-3.35
	[-1.45]	[-1.49]	[-1.68]	[-0.04]	[-0.60]	[-1.59]	[-1.45]	[-1.44]
VIX	-0.74***	-0.61**	-0.69**	-0.51**	-0.49***	-0.54***	-0.28*	-0.28*
	[-2.94]	[-2.29]	[-2.07]	[-2.34]	[-3.02]	[-2.60]	[-1.76]	[-1.74]
Ted	0.03	-0.00	0.03	0.01	0.02	0.02	0.01	0.01
	[0.58]	[-0.01]	[0.51]	[0.20]	[0.34]	[0.37]	[0.36]	[0.37]
Intercept	15.34***	14.76***	13.78**	9.83***	11.24***	10.72***	5.33*	5.25*
	[3.34]	[2.81]	[2.50]	[2.69]	[3.23]	[2.98]	[1.76]	[1.74]
NOBS	4621	4621	4621	4621	4621	4621	4621	4621
R2 (%)	0.91	1.06	0.75	0.82	1.40	0.47	0.19	0.18

Their intercept, b^{Q5}, & R^2 in Table 6 seem significantly different from each other

$\Longrightarrow$ Are their roles as safe haven different?

Comment 6: BAB Returns During Q5?

Portfolio	Excess Return	CAPM β	CAPM α Full	CAPM α Q5	CAPM α Q1	CAPM α Normal
1 (low beta)	3.38***	0.61***	0.68	7.66***	-3.08**	-0.47
	[3.14]		[1.02]	[4.95]	[-2.18]	[-0.55]
2	3.90***	0.75***	0.61	6.29***	-0.25	-1.03
	[3.14]		[1.09]	[4.94]	[-0.22]	[-1.52]
3	5.15***	0.92***	1.10**	2.44**	0.83	0.74
	[3.50]		[2.35]	[1.98]	[0.75]	[1.20]
4	5.44***	0.98***	1.13**	-1.27	1.13	1.94***
	[3.36]		[2.12]	[-1.10]	[0.95]	[2.84]
5	5.91***	1.06***	1.24**	0.67	0.65	1.62**
	[3.34]		[2.22]	[0.47]	[0.55]	[2.28]
6	5.54***	1.12***	0.62	-0.85	-0.18	1.38*
	[2.95]		[1.04]	[-0.56]	[-0.15]	[1.76]
7	5.86***	1.17***	0.75	-2.35	-0.14	2.08**
	[2.91]		[0.98]	[-1.38]	[-0.09]	[2.24]
8	5.65**	1.27***	0.06	-4.41**	2.24	0.88
	[2.45]		[0.07]	[-2.33]	[1.19]	[0.71]
9	5.49**	1.36***	-0.50	-7.39***	1.77	1.10
	[2.15]		[-0.47]	[-3.11]	[0.88]	[0.78]
10 (high beta)	5.71*	1.53***	-0.99	-8.72***	1.02	0.96
	[1.90]		[-0.73]	[-3.15]	[0.36]	[0.53]
BAB	1.75		1.75	18.16***	-5.69	-1.40
	[1.02]		[1.02]	[4.86]	[-1.59]	[-0.61]

- As Q5-η_t^{UST} is a safety measure, the behavior of betting-against-beta (BAB, long low-β short high-β) is examined
  - $r^{\text{Low-}\beta} \uparrow$, $r^{\text{High-}\beta} \downarrow$, $\Longrightarrow$ BAB $\uparrow$
- "… clear that the information captured by η_t^{UST} is not identical to those reflected by the equity returns."
- Quality-minus-junk (Asness *et al.*), illiquid-minus-liquid (Pastor and Stambaugh)

Conclusion

- Extensive empirical findings timely & interesting
  - Stocks, bonds, currencies, commodities, derivatives, *etc.*
- A lot of upside potential
  - Time-varying multi-dimensionality
  - High- versus low-frequency correlation
  - Future research: Asset pricing, international finance, macro-finance
- Gorton (2017): "… safe assets play a critical and fundamental role in any economy and yet are associated with financial crises when the safety attribute of short-term debt comes into question."
- Thanks for this opportunity to discuss this impressive paper!

Miscellaneous

- PCA in Figure 1: 3-month or -year rolling window?
- Figure 2: Additional 20% cutoff for η_t^{USD} is suggested
  - So that one can visually detect major FTS periods
- Page 8
  - "… falls sharply after the the (?) Fed announced …"
  - "… statistics of the the (?) daily safety measures …"
- Page 16: "… is the short term 3- (?) Treasuries, which …"
- Format: Equation (3) versus Equations (2) & (4)
- Baele *et al.* (2019): 2020?
- Jiang *et al.* (2020): 2023 in RES?