

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

<i>Panel A: Safety Measures</i>					
	Q5	Q1	Non-FOMC	FOMC	Diff
η_t^{UST}	0.64*** [201.95]	-0.07*** [-13.03]	0.32*** [36.74]	0.03 [0.83]	0.28*** [9.89]
# Days	926	926	4509	147	

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

Panel B: Major Market Return and Implied Volatility

	Return		CAPM α		Δ Imp. Vol	
	Q5	Q1	Q5	Q1	Q5	Q1
SPX	-36.20*** [-8.04]	13.75*** [4.76]			0.51*** [6.48]	-0.16*** [-4.12]
UST	13.60*** [9.57]	-6.05*** [-3.92]	5.03*** [4.42]	-7.96*** [-4.92]	0.79*** [4.68]	-0.11 [-0.96]
DXY	1.20 [0.63]	2.14 [1.22]	-0.89 [-0.49]	3.61** [2.06]	0.07*** [3.75]	-0.05*** [-3.13]
EUR/USD	-1.90 [-0.82]	-1.87 [-0.99]	-0.22 [-0.10]	-3.99** [-2.06]	0.07*** [3.42]	-0.03** [-2.47]
YEN/USD	16.48*** [7.07]	-8.43*** [-4.42]	10.27*** [5.10]	-9.76*** [-5.03]	0.14*** [4.28]	-0.04*** [-3.04]

Implied $\sigma \uparrow$

$r^{\text{JPY/USD}} \uparrow$

Panel C: Major Market Liquidity

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

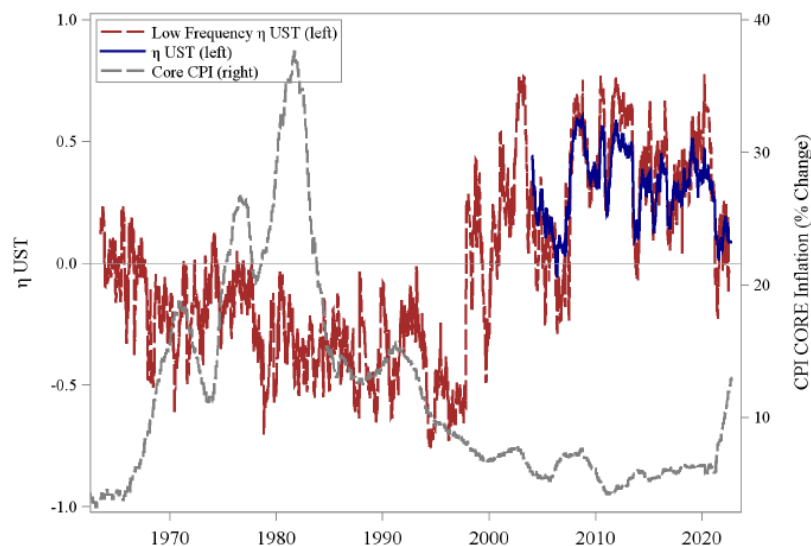
During Q1, UST's liquidity \uparrow

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

Comment 1: Compared to Existing FTS

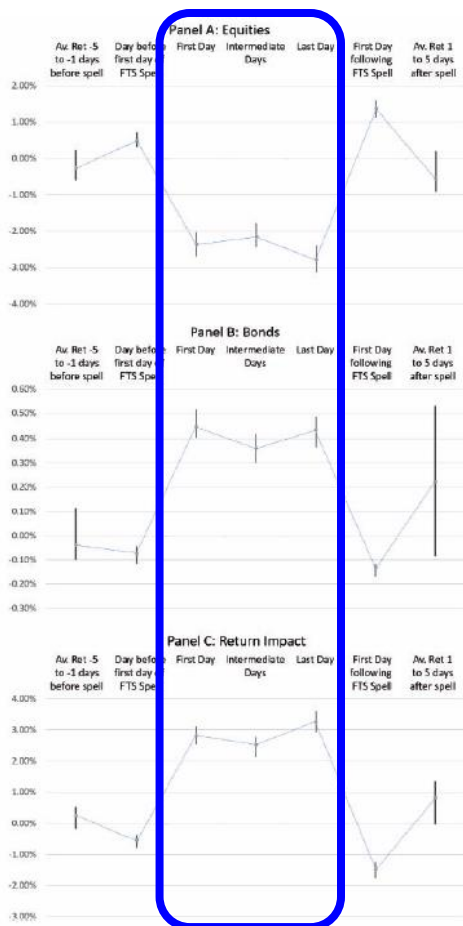
- ▶ This paper
 - ▶ “We are mostly related to the recent paper Baele, Bekaert, Inghelbrecht, and Wei (2019), which use the daily returns of international equity and government bonds to infer flight-to-safety episodes based on multiple indicators such as return impact, correlation, and volatility spikes. 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



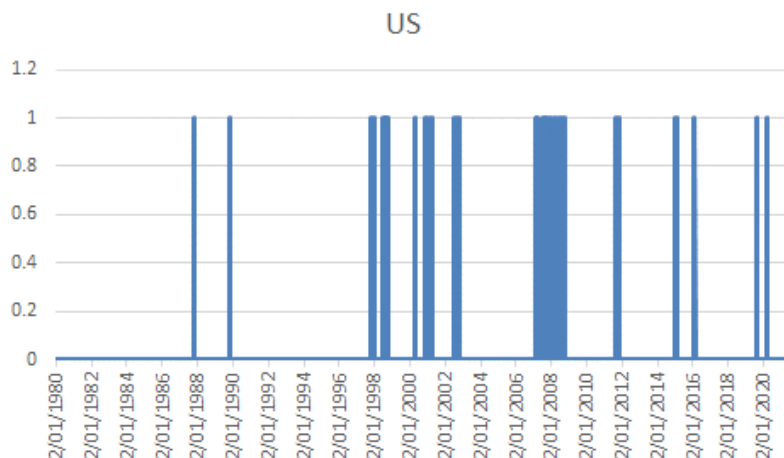
- ▶ Section 2.5/Figure 4 are describing/displaying the difference between high- & low-frequency safety measures
- ▶ Correlation/overlapping b/w their top-20% η_t^{UST} days?
- ▶ “... its construction method limits its ability to capture flight-to-safety at the daily basis.”

Comment 1: Compared to Existing FTS



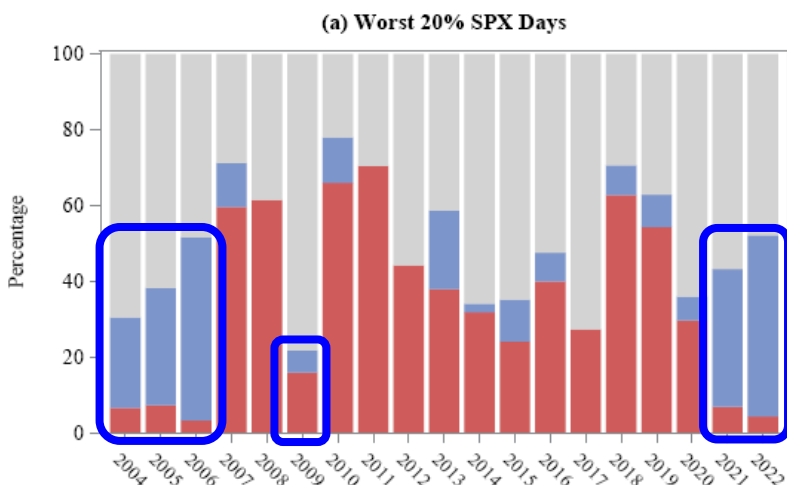
- ▶ Table 6/Figure 4 in Baele *et al.* (2020)
- ▶ “During the FTS days, equities drop, on average, 2.29% ... whereas Treasury bonds increase, on average, 0.43% ...”
- ▶ “... we note that the 2.79% return impact on the first day of an FTS represents a 2.3 standard deviation move above its daily average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

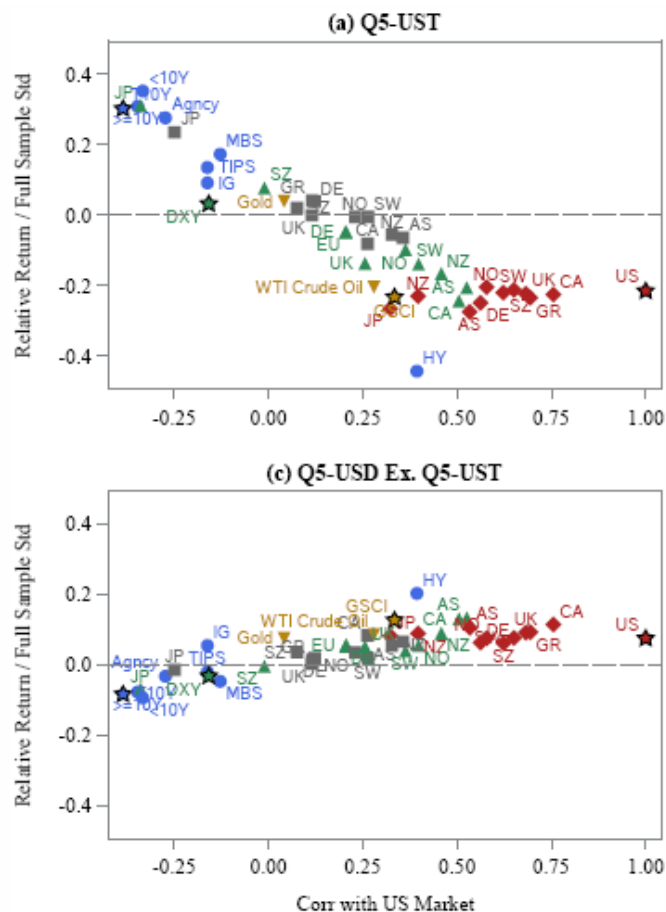
Comment 3: Comparing η_t^{UST} & $\eta_t^{\text{Others?}}$

Panel A: Summary Statistics						
	Q5	Q1		Q5	Q1	
η_t^{USD}	0.45*** [92.72]	-0.30*** [-55.92]	η_t^{VIX}	0.91*** [617.79]	0.43*** [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	Δ Imp. Vol	Return	CAPM α	Δ Imp. Vol
SPX	14.81*** [2.98]		-0.18*** [-2.78]	-7.24* [-1.74]		0.05 [0.71]
UST	-2.23 [-1.12]	-1.13 [-0.52]	-0.30* [-1.71]	-1.88 [-1.07]	-2.52 [-1.48]	0.17 [1.25]
DXY	-0.97 [-0.45]	2.04 [1.07]	-0.05*** [-3.87]	3.41** [2.00]	2.59 [1.57]	0.00 [0.29]
EUR/USD	0.63 [0.27]	-2.21 [-1.00]	-0.06*** [-3.65]	-4.20** [-2.19]	-4.28** [-2.25]	-0.00 [-0.19]
YEN/USD	-4.69** [-1.98]	-3.63 [-1.49]	-0.06*** [-2.76]	-3.41* [-1.71]	-4.23** [-2.11]	0.01 [0.57]

Days = 680 for Q5 & 826 for Q1?

- ▶ (Table 5) $\hat{E}[r^{\text{SPX}}]$ in bp is
 - ▶ -36 on $Q5-\eta_t^{\text{UST}}$
 - ▶ +15 on $Q5-\eta_t^{\text{USD}} \setminus Q5-\eta_t^{\text{UST}}$
 - ▶ -7 on $Q5-\eta_t^{\text{VIX}} \setminus Q5-\eta_t^{\text{UST}}$
- ▶ “... 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} .”
- ▶ $\hat{E}[r^{\text{SPX}}]$ for $Q5-\eta_t^{\text{USD}}$ & $-\eta_t^{\text{VIX}}$ would be fairer
 - ▶ Or for both $Q5-\eta_t^{\text{UST}} \setminus Q5-\eta_t^{\text{USD}}$ & $Q5-\eta_t^{\text{UST}} \setminus Q5-\eta_t^{\text{VIX}}$

Comment 3: Comparing η_t^{UST} & $\eta_t^{\text{Others?}}$



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

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 $\eta_t^{\text{JPY}} = -\text{corr}(r_t^{\text{SPX}}, r_t^{\text{JPY/USD}})$ 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

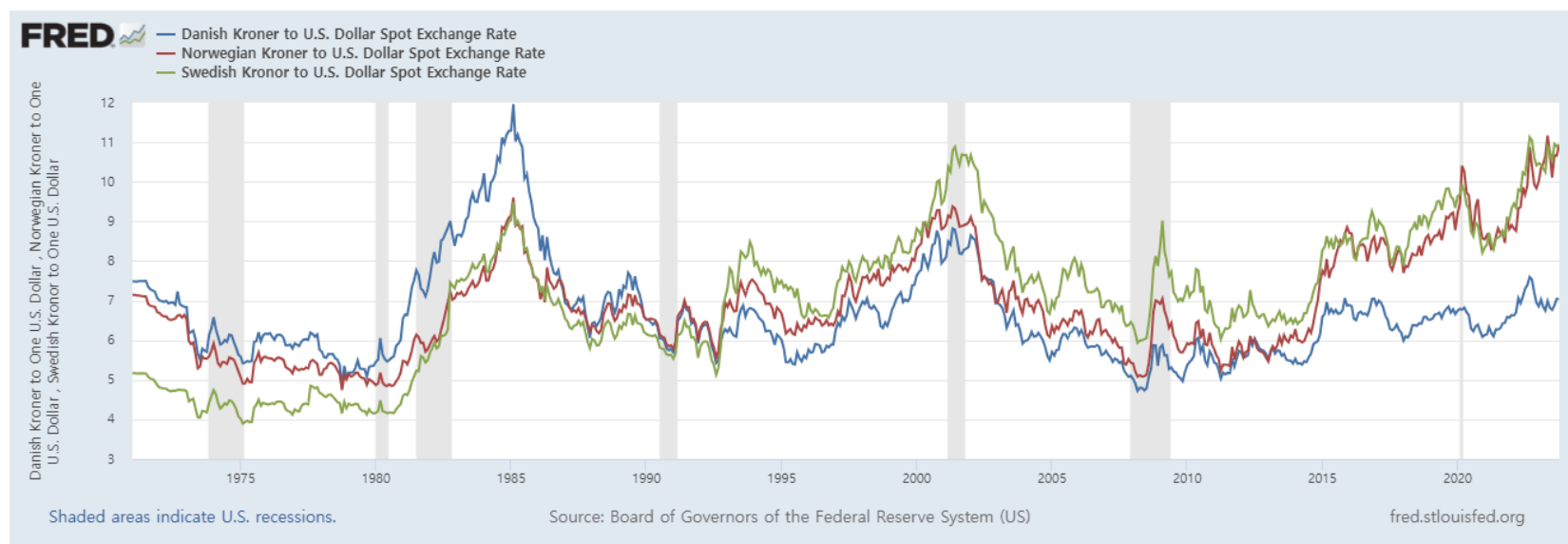
Comment 4: $\eta_t^{\text{JPY/USD}}$ as Safe Haven?

- ▶ Table 7 regresses r^{FX} on $Q5$, Δy^{UST} , & their interactions

yvar=	The Dollar Index		USD/Foreign		Foreign/USD	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta y^{\text{UST}} \times Q5$		-1.33*** [-2.67]		-1.45*** [-2.84]		1.79*** [2.75]
$\Delta y^{\text{UST}} \times Q1$		1.95*** [4.47]		1.98*** [4.44]		2.09*** [4.70]
Δy^{UST}	1.49*** [6.73]	1.10*** [4.14]	1.58*** [3.93]	1.25*** [2.97]	1.57*** [7.93]	1.66*** [6.80]
$r^{\text{SPX}} \times Q5$		-0.04* [1.69]		-0.04 [1.77]		-0.05 [-2.59]
$r^{\text{SPX}} \times Q1$		-0.04 [-1.56]		-0.02 [-0.85]		-0.01 [-0.34]
r^{SPX}	-0.09*** [-7.66]	-0.08*** [-5.28]	-0.18*** [-3.98]	-0.17*** [-3.70]	0.05 [1.55]	0.06* [1.79]
$Q5$	-0.25 [-0.12]	-0.91 [-0.45]	-1.10 [-0.58]	-1.99 [-1.09]	-0.44 [-0.15]	0.10 [0.04]
$Q1$	1.59 [0.83]	0.67 [0.34]	1.25 [0.74]	0.05 [0.03]	-2.81 [-1.48]	-1.76 [-0.92]
Intercept	0.44 [0.51]	0.35 [0.40]				
Currency FE	No	No	Yes	Yes	Yes	Yes
NOBS	4622	4622	46220	46220	46220	46220
R2 (%)	4.90	6.41	8.51	9.27	2.43	3.02

- ▶ 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



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

Comment 5: Denmark/Norway/Sweden

<i>Panel C. Other G10 currencies (ex. YEN, CHF)</i>								
	NZD	AUD	NOK	GBP	CAD	SEK	EUR	DKK
Q5	-10.08*** [-2.59]	-13.05*** [-3.16]	-8.03** [-2.17]	-5.69* [-1.93]	-11.92*** [-4.05]	-4.65 [-1.35]	-1.47 [-0.53]	-1.38 [-0.50]
Q1	-4.22 [-1.45]	-3.99 [-1.49]	-5.33* [-1.68]	-0.09 [-0.04]	-1.15 [-0.60]	-4.44 [-1.59]	-3.35 [-1.45]	-3.35 [-1.44]
VIX	-0.74*** [-2.94]	-0.61** [-2.29]	-0.69** [-2.07]	-0.51** [-2.34]	-0.49*** [-3.02]	-0.54*** [-2.60]	-0.28* [-1.76]	-0.28* [-1.74]
Ted	0.03 [0.58]	-0.00 [-0.01]	0.03 [0.51]	0.01 [0.20]	0.02 [0.34]	0.02 [0.37]	0.01 [0.36]	0.01 [0.37]
Intercept	15.34*** [3.34]	14.76*** [2.81]	13.78** [2.50]	9.83*** [2.69]	11.24*** [3.23]	10.72*** [2.98]	5.33* [1.76]	5.25* [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
 \Rightarrow Are their roles as safe haven different?

Comment 6: BAB Returns During Q5?

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

- ▶ As $Q5-\eta_t^{UST}$ is a safety measure, the behavior of betting-against-beta (BAB, long low- β short high- β) is examined
 - ▶ $r^{Low-\beta} \uparrow$, $r^{High-\beta} \downarrow$, \Rightarrow 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?