Discussion: U.S. Risk and Treasury Convenience

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Summary of the paper

$$\underbrace{\text{Carry-trade returns}}_{\text{Borrow in \$}} = \underbrace{\text{Cross-country risk differential}}_{\text{(U.S. - foreign) risk}\uparrow} + \underbrace{\text{Convenience yield differential}}_{\text{(U.S. - foreign) convenience yield}\downarrow}$$

- Somehow, stable long- and short-maturity carry-trade returns since late 90s.

Two countervailing forces:

- Rising U.S. (total and permanent) risk: rising U.S. equity premium compared to G.7. Permanent risk from Alvarez and Jermann (2005)
- Falling U.S. relative convenience yield: falling Treasury basis on long-maturity bonds, which is documented in Du and Schreger (2021)
- Asset pricing framework based on Jiang et al. (2021)

Extremely interesting, impactful, and well-executed paper with a ton of interesting policy-relevant points. One of the most interesting works I read this year

- I am very much convinced. Here, I want to put the paper into a broader context

Simpler model (with $\theta_t^{F,F(k)} = \theta_t^{H,F(k)} = 0$) à la Jiang et al. (2021)

For home country:

$$\mathbb{E}_t \left[M_{t,t+k} \right] R_t^{(k)} = e^{-\theta_t^{H,H(k)}} \quad \text{and} \quad \mathbb{E}_t \left[M_{t,t+k} \frac{\mathcal{E}_{t+k}}{\mathcal{E}_t} \right] R_t^{(k)*} = 1$$

For foreign country:

$$\mathbb{E}_t \left[M^*_{t,t+k} \right] R_t^{(k)*} = 1 \quad \text{and} \quad \mathbb{E}_t \left[M^*_{t,t+k} \frac{\mathcal{E}_t}{\mathcal{E}_{t+k}} \right] R_t^{(k)} = e^{-\theta_t^{F,H(k)}}$$

Assuming

Backus and Smith (1993)
(complete market)

$$\frac{\mathcal{E}_{t+1}}{\mathcal{E}_t} = \frac{M^*_{t,t+1}}{M_{t,t+1}} \cdot e^{\eta_{t+1}}$$

Then

$\simeq$ Expected foreign appreciation

$$\mathbb{E}_t(\eta_{t+1}) = \mathcal{L}_t(e^{-\eta_{t+1}}) + \mathcal{C}_t(M_{t,t+1}, e^{-\eta_{t+1}}) + \theta_t^{F,H(1)} - \theta_t^{H,H(1)}$$

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1. $\mathcal{L}_t(e^{-\eta_{t+1}})\uparrow$: from domestic perspectives, FX is more volatile $\longrightarrow$ then foreign currency drops and appreciates over time. Ignored
2. $\mathcal{C}_t(M_{t,t+1}, e^{-\eta_{t+1}})\uparrow$: \$ moves with U.S. SDF $\longrightarrow$ foreign currency drops and appreciates over time. Ignored
3. $\theta_t^{F,H(1)}\uparrow$: U.S. convenience$\uparrow$ $\longrightarrow$ foreign currency drops and appreciates over time. Confirmed by Jiang et al. (2021) based on widening of the U.S. Treasury basis

   – this paper is focused on narrowing of the long-maturity U.S. Treasury basis

Carry trade return

Borrowing in \$, long-maturity carry trade return is given by

$$\underbrace{\mathbb{E}_t\left[rx_{t+1}^{CT(\infty)}\right]}_{\simeq\text{Constant}} = \underbrace{\mathcal{L}_t\left(M_{t,t+1}^{\mathbb{P}}\right) - \mathcal{L}_t\left(M_{t,t+1}^{\mathbb{P}*}\right)}_{\text{Permanent risk differential}} + \underbrace{\mathbb{E}_t\left[\theta_{t,t+1}^{F,H(\infty)}\right]}_{\text{U.S. convenience (long)}}$$

with

$$\mathcal{L}_t\left(M_{t,t+1}^{\mathbb{P}}\right) \underbrace{\geq}_{=} \underbrace{\log \mathbb{E}_t\left[\frac{R_{t,t+1}^{g}}{R_t}\right]}_{\text{Equity premium}\uparrow} - \frac{VIX_t^2}{2} - \underbrace{\mathbb{E}_t\left[rx_{t+1}^{(10Y)}\right]}_{\text{Long bond premium}} - \mathbb{E}_t\left[\theta_{t,t+1}^{H,H(10Y)}\right]$$

Calculation:

- $\mathbb{E}_t\left[\theta_{t,t+1}^{H,H(10Y)}\right]$ from interest-swap spreads at 10 year maturity (i.e., swap rate - U.S. Treasury)↓
- $\mathbb{E}_t\left[\theta_{t,t+1}^{F,H(10Y)}\right]$ from CIP deviation based on government bonds (i.e., Treasury basis)↓
  - proportional to $\theta_t^{F,H(\infty)}$ (hold-to-maturity convenience)

Some identification issue

Based on Jiang et al. (2021), define the synthetic U.S. Treasury with lower convenience:

$$\mathbb{E}_t\left[M^*_{t,t+k}\frac{F^{(k)}_t}{\mathcal{E}_{t+k}}\right]R^{(k)*}_t = e^{-\beta^*_{t,k}\theta^{F,H(k)}_t},$$

leading to

$$\text{CIP}^{(k)}_t = \left(1-\beta^*_{t,k}\right)\theta^{F,H(k)}_t$$

Jiang et al. (2021) and this paper assume $\beta^*_{t,k} = \beta^*_k, \forall t$ (for long bonds), but why?

- If the U.S. convenience yield is declining (e.g., the Treasury market liquidity is declining), then synthetic dollar bond becomes closer to U.S. Treasuries, meaning $\beta^*_{t,k}\uparrow$
- $\beta^*_{t,k}\uparrow$ can explain $\text{CIP}^{(k)}_t\downarrow$ given $\theta^{F,H(k)}_t$

Then, it is not clear why

- $\theta^{F,H(k)}_t \propto \text{CIP}^{(k)}_t$ and $\theta^{H,H(k)}_t \simeq$ interest-swap spreads, given that U.S. Treasuries are largely held by foreigners ($\simeq 30\%$), so interest-swap spreads are influenced by foreign convenience on U.S. Treasuries
- If we assume $\theta^{F,H(k)}_t = \theta^{H,H(k)}_t$, then can we get information about $\beta^*_{t,k}$?

U.S. convenience yield

Why has U.S. convenience yield been declining?

- Hedging role of U.S. Treasuries↓: Acharya and Laarits (2023)
- Based on convenience yield $\simeq$ TIPS + inflation swap - Treasury

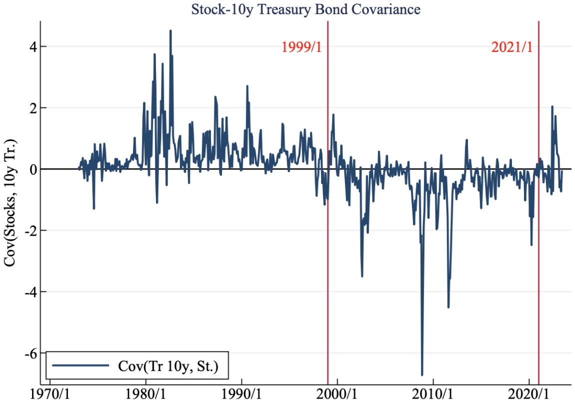

Figure 1: Aggregate Stock-Bond Covariance. Nominal 10-year constant maturity bond. Covariances with the market calculated using a 30 trading day rolling window. Plot shows end of month values. Monthly data 1973-2022.

U.S. convenience yield

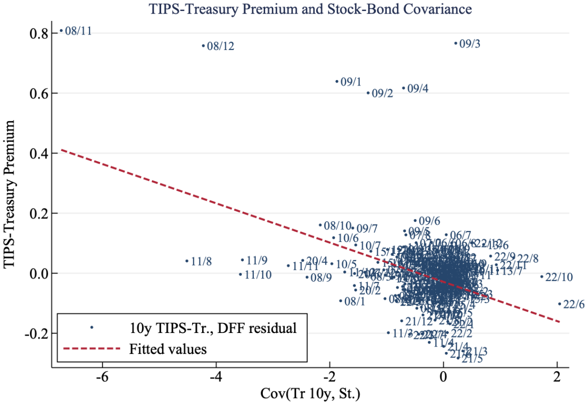

Figure 3: Treasury Convenience Yield and the Stock-Bond Covariance. Scatterplot of the 10-year TIPS-Treasury premium and the aggregate stock-bond covariance. Monthly data 2005-2022. TIPS-Treasury premium residualized with respect to the effective Fed funds rate.

Monetary policy and stock-bond covariance

Campbell et al. (2014): covariance sign mostly determined by monetary policy (and nature of shocks)

1. During the 70s and 80s: negative supply shock $\longrightarrow$ policy tightening $\longrightarrow$ stock-bond covariance becomes positive
2. During the Great Moderation: long-term inflation target$\downarrow$ and mostly demand shocks $\longrightarrow$ bond$\downarrow$ while stock$\uparrow$ (with positive demand shocks)
3. After Covid-19: inflation expectation$\uparrow$ and policy tightening $\longrightarrow$ positive covariance

Big Question (Rising U.S. Risk)

Has monetary policy caused U.S. permanent risk to rise?

- U.S. policy rate was at the zero lower bound (ZLB) during the great recession
- Paper says falling $\mathbb{E}_t\left[\theta_{t,t+1}^{H,H(10Y)}\right]$ has a minor role in explaining rising permanent risk. But monetary policy might have affected the rising equity premium
- More economics is always better

Minor question

Table 1: Unit Root Test

Variable	ADF Test Statistic	
	Without Trend	With Trend
Panel A: Long-Maturity Variables		
$CIP_t^{(10Y)}$	-1.674	-2.91
$\mathcal{D}PermRisk_t$	-2.579*	-2.658
$rx_{t+1}^{CT(10Y)}$	-4.222***	-4.242***
Panel B: Short-Maturity Variables		
$CIP_t^{(6M)}$	-3.442**	-3.444**
$\mathcal{D}TotRisk_t$	-2.51	-2.467
rx_{t+1}^{FX}	-4.242***	-4.362***

Notes: Augmented Dickey-Fuller (ADF) tests (Dickey and Fuller, 1979), with 6 lags of change in dependent variable. Sample: 2000:01-2021:03. Null hypothesis: series is a random walk (without drift). Alternative hypothesis: series does not include a unit root. *** denotes $p < 0.01$, ** $p < 0.05$ and * $p < 0.10$.

For short-maturity variables, $\text{CIP}_t^{(6M)}$ and rx_{t+1}^{FX} are stationary while $DTotRisk_t$ is not

$$\underbrace{\mathbb{E}_t\left[rx_{t+1}^{FX}\right]}_{\simeq\text{Stationary}} = \underbrace{\mathcal{L}_t\left(M_{t,t+1}\right) - \mathcal{L}_t\left(M_{t,t+1}^*\right)}_{\text{Unit root}} + \underbrace{\theta_{t,t+1}^{F,H(1)}}_{\text{Stationary}}\ ?$$

Thank you very much!
(Appendix)