Discussion of “U.S. Risk and Treasury Convenience”

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West Coast Workshop in International Finance 2025

Overview

- Three facts and one coherent explanation on U.S. risks, Treasury convenience yield, and carry trade returns.
- Facts
  - Fact 1: carry trade (U.S. v.s. G7) returns have been stable in the last 30 years.
  - Fact 2: U.S. equity premium has been rising compared to G7.
  - Fact 3: long-term Treasury convenience relative to G7 govt bonds has been declining.
- Theory
  - Carry trade returns = risk differential + convenience yield differential
- A very clean and powerul exercise. Great paper!

Key Theoretical Results

- Proposition 1: one-period carry-trade return on one-period bond is

$$\mathbb{E}_t\left[rx_{t+1}^{FX}\right] = \underbrace{\mathcal{L}_t(M_{t,t+1}) - \mathcal{L}_t(M_{t,t+1}^{*})}_{\text{SDF total risk differential}} + \underbrace{\theta_t^{F,H(1)} - \theta_t^{F,F(1)}}_{\text{Convenience differential}}$$

- Proposition 2: one-period carry-trade return on long-term bonds is

$$\mathbb{E}_t\left[rx_{t+1}^{CT(\infty)}\right] = \underbrace{\mathcal{L}_t(M_{t,t+1}^{\mathbb{P}}) - \mathcal{L}_t(M_{t,t+1}^{\mathbb{P}*})}_{\text{SDF permanent risk differential}} + \underbrace{\mathbb{E}_t\left[\theta_{t,t+1}^{F,H(\infty)} - \theta_{t,t+1}^{F,F(\infty)}\right]}_{\text{Holding-period convenience differential}}$$

- Note: $\mathcal{L}_t(X) = \log \mathbb{E}_t[X] - \mathbb{E}_t[\log X]$ reflects variance in X.

Quantitative Implementation

$$
\begin{aligned}
\mathcal{L}_t(M^{\mathbb{P}}_{t,t+1}) &\geq \mathbb{E}_t\left[\log\left(\frac{R^g_{t,t+1}}{R_t}\right)\right] - \mathbb{E}_t\left[rx^{(10Y)}_{t+1}\right] - \theta^{(10Y)}_{t,t+1} \\
&= \log \mathbb{E}_t\left[\frac{R^g_{t,t+1}}{R_t}\right] - \mathcal{L}_t\left(\frac{R^g_{t,t+1}}{R_t}\right) - \mathbb{E}_t\left[rx^{(10Y)}_{t+1}\right] - \theta^{(10Y)}_{t,t+1}
\end{aligned}
\tag{1}
$$

Component	What It Represents	How It's Measured
$\log \mathbb{E}_t\left[\frac{R^g_{t,t+1}}{R_t}\right]$	Log expected equity excess return	Valuation-based: dividend-price ratio, expected dividend growth, and real interest rate
$\mathcal{L}_t\left(\frac{R^g_{t,t+1}}{R_t}\right)$	Entropy of equity excess return	Approximated by $\text{VIX}^2_t/2$
$\mathbb{E}_t\left[rx^{(10Y)}_{t+1}\right]$	Expected 1-period excess return on long-term bond	Realized return on 10Y bond over 6-month horizon, smoothed over time
$\theta^{(10Y)}_{t,t+1}$	Holding-period convenience yield on 10Y bond	Proxied using 10Y CIP deviations (scaled as needed)

Measuring SDF Risk

- Current approach needs to decompose expected log excess return into two parts using two separate methods:

$$\mathbb{E}_t\left[\log\left(\frac{R^g_{t+1}}{R_t}\right)\right] = \log \mathbb{E}_t\left[\frac{R^g_{t+1}}{R_t}\right] - \mathcal{L}_t\left(\frac{R^g_{t+1}}{R_t}\right)$$

- Both parts can be proxied following Martin (2017). First part (currently using "valuation model"):

$$\mathbb{E}_t[R^g_{t+1}] - R_{f,t} \;\geq\; \frac{1}{R_{f,t}} \cdot \text{Var}^{\mathbb{Q}}_t\left(R^g_{t+1}\right) = R_{f,t} \cdot \text{SVIX}^2_{t,t+1}$$

$$\mathbb{E}_t\left[\frac{R^g_{t+1}}{R_{f,t}}\right] \geq 1 + \text{SVIX}^2_{t,t+1}$$

- Second part (in the paper),

$$\mathcal{L}_t\left(\frac{R^g_{t,t+1}}{R_t}\right) \approx \mathcal{L}_t\left(R^g_{t,t+1}\right) \approx \mathcal{L}^{\mathbb{Q}}_t\left(R^g_{t,t+1}\right) \approx \frac{1}{2}\text{VIX}^2_{t,t+1}$$

Using Stock-Market Implied SDF for Bonds?

- Authors assume that stock and bond market are priced with the same SDF.
- What is the no-convenience one-year risk-free rate in each market? Different answers:
  - From stock market: the rate is the “zero-beta rate” (figure below). E.g., 15% in 2010.
  - From bond market: swap rates. E.g., 0.2% in 2010 (ZLB period).

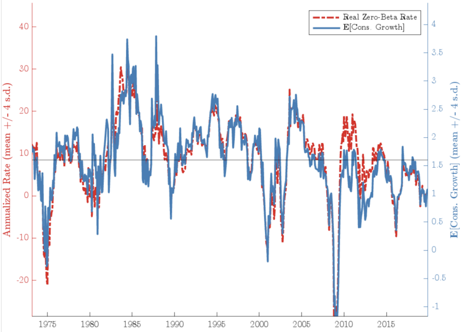


Figure from Di Tella, Hébert, Kurlat, and Wang (2023), The zero-beta interest rate.

A Stronger Test of Propositions

- Proposition 1 and 2 are not only about long-term average, but also **dynamics**.
- For example, measurement equations for Proposition 1 and 2 are

$$\mathbb{E}_t\left[rx^{FX}_{t+1}\right] = \underbrace{\mathcal{L}_t(M_{t,t+1}) - \mathcal{L}_t(M^*_{t,t+1})}_{\text{SDF total risk differential}} + \underbrace{\theta^{F,H(1)}_t - \theta^{F,F(1)}_t}_{\text{Convenience differential}} + \epsilon^{(1)}_t$$

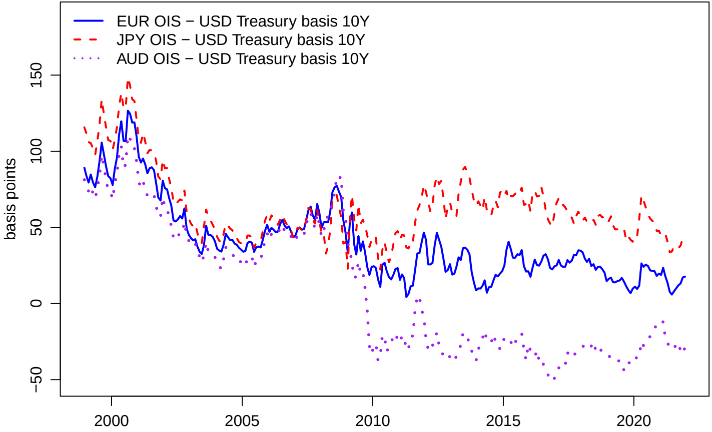
$$\mathbb{E}_t\left[rx^{CT(\infty)}_{t+1}\right] = \underbrace{\mathcal{L}_t(M^{\mathbb{P}}_{t,t+1}) - \mathcal{L}_t(M^{\mathbb{P}*}_{t,t+1})}_{\text{SDF permanent risk differential}} + \underbrace{\mathbb{E}_t\left[\theta^{F,H(\infty)}_{t,t+1} - \theta^{F,F(\infty)}_{t,t+1}\right]}_{\text{Holding-period convenience differential}} + \epsilon^{\infty}_t$$

  where ϵ_t is the residual term.

- Follow Campbell-Shiller decompsition. What is the R^2 of the first two terms? How much is the "dark matter" in ϵ_t?

Fact Confirmed: Declining U.S. Treasury Basis

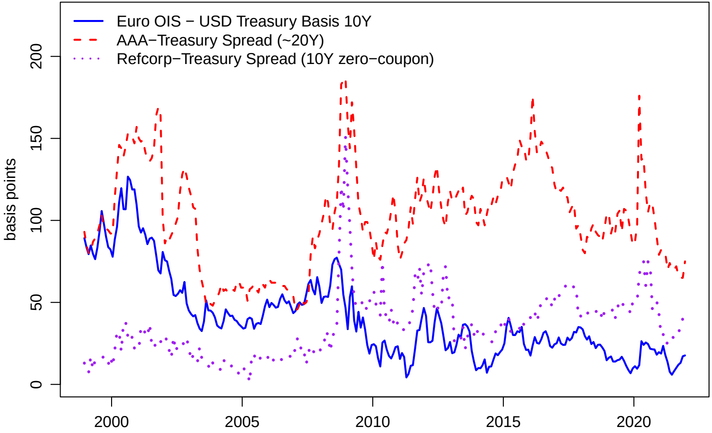
- The decline is mainly driven by U.S. Treasuries having less convenience, not foreign government bonds having more convenience.
- Below: Replication of Treasury basis, using foreign OIS rates rather than govt debt yields.



Data source: Du, Hebert, and Li (2023), Intermediary balance sheets and the treasury yield curve. Journal of Financial Economics

Is the U.S. Treasury Convenience Yield Declining?

- It will be cool (another paper) if we can show that higher U.S. risks can harm Treasury convenience.
- Puzzling phenomenon: Different trends emerge using different measures.



Reality: Convenience is in Eyes of Beholders

- International investors
  - Bank of Japan (BoJ): Significant U.S. Treasury positions as part of its reserve asset. Rarely ventures into agencies or corporates. Mandate for sovereign-level credit quality.
- Domestic investors
  - U.S. pension funds and insurance companies tend to concentrate their portfolios in U.S. assets.
  - AAA-Treasury and Refcorp-Treasury are more relevant for these investors.
- Global arbitrageurs
  - As shown in Du, Hebert, and Li (2023), balance sheet costs + funding market explains all of the swap-Treasury basis.
  - No "convenience" is needed to explain the facts on Treasury basis.

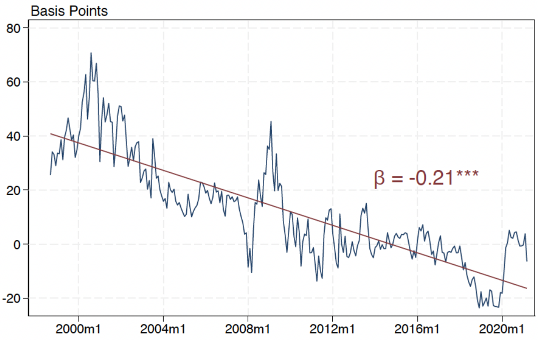
Long-Term v.s. Short-Term Carry Trade and Convenience Yields

- There is a puzzle at the short-term.
  - Proposition 1: Short-term carry trade returns = SDF total risk diff + Treasury basis.
  - SDF total risk diff is rising.
  - 6-month Treasury basis and 6-month carry-trade returns do not have trends.
- Implications:
  - "Dark matter": The residual term $\epsilon_t^{(1)}$ is much stronger than ϵ_t^{∞}, i.e., Proposition 1 has a larger unexplained term, such as money market distortions.
  - Treasury basis issue: Investors may not trade 6-month Treasury basis and enforce the connection with carry trade returns.
  - Different SDFs: Short-horizon investors do not price equity risks, but long-horizon investors, such as pension funds, care about equity risks.

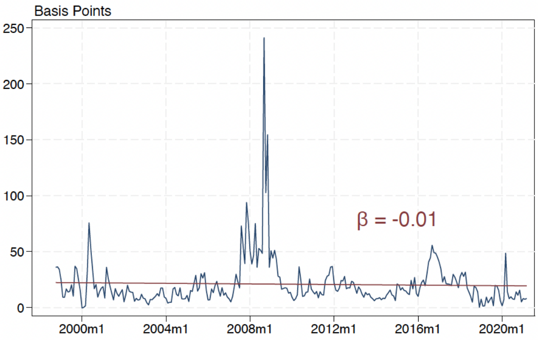
The Disconnection between Long v.s. Short Treasury Basis

- 10Y and 6M Treasury basis are highly disconnected (Below: Figure 3 in the paper)
- More frictions at the short-term? Liquidity, regulation, or investor segmentation?

(a) U.S. 10Y Treasury Basis

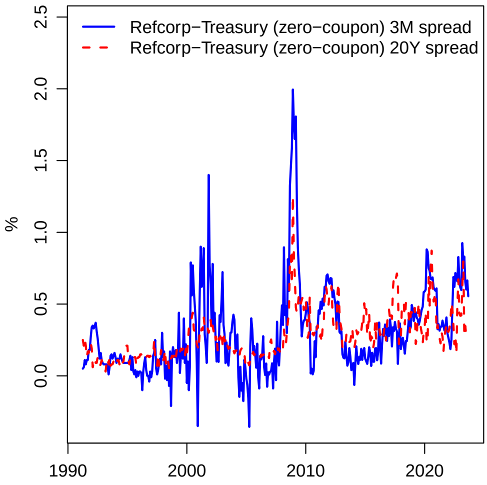


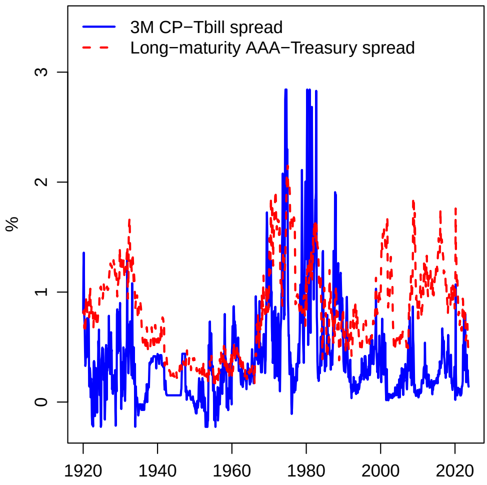
(b) U.S. 6M Treasury Basis



The Disconnection between Long v.s. Short Treasury Basis is Abnormal

- Typically, long-term convenience yield strongly comoves with short-term convenience yield.





Source: left panel from Joslin, Li, and Song (2020), and right panel from Cieslak, Li, and Pflueger (2024)

Summary

- Amazing paper that coherently connects carry trade with U.S. risks and convenience yield, both theoretically and empirically.
- The paper raises a big-picture question: Does rising U.S. risk erode Treasury convenience—and what does that mean for debt capacity and reserve currency status?"
- My comments:
  - Use SVIX and VIX to measure expected log excess equity returns for consistency.
  - Whether a single SDF can explain both stocks and bonds, or we need a bond/exchange rate SDF.
  - A Campbell-Shiller type decomposition on carry-trade returns and quantify "dark matter".
  - Whose convenience yield is relevant?
  - Puzzle between long v.s. short horizon Treasury basis.