# Beyond Incomplete Spanning: Convenience Yields and Exchange Rate Disconnect,
## by Jiang, Krishnamurthy and Lustig

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# Overview

▶ Introducing a stochastic wedge into investors' Euler equations can help resolve exchange rate puzzles (Gabaix and Maggiori, 2015; Itskhoki and Mukhin, 2019; Sandulescu, Trojani and Vedolin, 2020).

▶ Foreign investors derive a convenience yield on their holdings of USD bonds, which shows up as a stochastic wedge in foreigner's Euler equation (Jiang, Krishnamurthy and Lustig, 2020).

▶ **Question:** Can introducing a USD convenience yield into a model of exchange rates help resolve asset pricing puzzles?

# This Discussion

1. A simplified version

▶ **Comment 1: What is in the convenience yield?**

▶ **Comment 2: How should we think about the cross-section?**

▶ **Comment 3: Quantities**

▶ **Comment 4: Expand quantitative easing section.**

# A Simple Model

A static version of the model in the paper highlights the key assumptions needed to address asset pricing puzzles.

▶ 2 Countries. Foreign investors derive a convenience yield ($\lambda_t > 0$) from investing in U.S. bonds. $\Xi = \exp(\xi)$ represent marginal utilities.

$$\mathbb{E}_t \left[ \frac{\Xi_{t+1}^*}{\Xi_t^*} \frac{S_{t+1}}{S_t} R_{f,t}^\$ \right] = e^{-\lambda_t}.$$

▶ U.S. investors do not: $\mathbb{E}_t \left[ \frac{\Xi_{t+1}^\$}{\Xi_t^\$} R_{f,t}^\$ \right] = 1$

▶ Assume $\Xi$ and $S$ are log-normally distributed. Doing a little algebra shows:

$$s_t = \mathbb{E}_t \xi_{t+1}^* - \xi_t^* + \frac{1}{2}\mathsf{var}\xi_{t+1}^* - \left( \mathbb{E}_t \xi_{t+1}^\$ - \xi_t^\$ + \frac{1}{2}\mathsf{var}\xi_{t+1}^\$ \right) + \lambda_t - rx_t + \mathbb{E}_t s_{t+1} \quad (1)$$

# Key Assumption: Foreigners "fly to safety" in bad times

Assume $\text{cov}[\xi_t^*, \lambda_t] = \psi^* > 0$. In the bad states of the world (marginal utilities are high), foreign investors derive greater convenience yield.

▶ Pass-through of SDF shocks: Simultaneous increases in $\xi_t^*$ and $\lambda_t$ partially offset.

$$\text{cov}[s_t, \xi_t^*] = \left(1 - \frac{\psi^*}{\sigma_\xi^2}\right) \times \left(-\sigma_\xi^2\right)$$

▶ Exchange rates are too smooth: This offsetting behavior dampens exchange rate fluctuations — depending on the calibration of $\psi^*$.
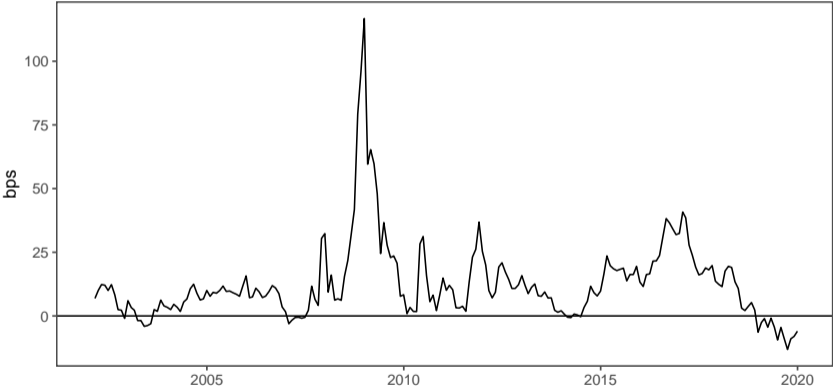
$$\text{var}[s_t] = 2\sigma_\xi^2 + \sigma_\lambda^2 - \psi^*$$

▶ Backus-Smith Puzzle: Breaks tight link between differences in marginal utility (growth) and exchange rates.

$$\frac{\text{cov}[s_t, -\xi_t^* + \xi_t^\$]}{\text{var}[-\xi_t^* + \xi_t^\$]} = 1 - \frac{\psi^*}{2\sigma_\xi^2}$$

# Average currency bases over time

Dollar convenience yield (1 year)



► Dollar convenience yield indeed spikes when marginal utility of investors is high.

# Recap: Contributions to the literature

- ▶ Use 1-year U.S. Treasury premium to calibrate the stochastic wedge in investor's Euler equations.

- ▶ A realistic calibration helps address exchange rate puzzles.

- ▶ Final exercise also provides a unique interpretation of QE.

# Comment 1: What does the convenience yield capture?

Here is a useful equation from Liao and Zhang (2020) — Equation (5):

$$\text{Currency basis} = \underbrace{(\text{Intermediary constraints})}_{\text{Supply}} \times (\text{Demand for currency forward})$$

- The currency basis is a function of intermediary constraints *and* demand for currency forward.

- Large part of the early literature focused on the supply-side story (Ivashina, Scharfstein and Stein, 2015; Du, Tepper and Verdelhan, 2018).

- Individual countries hedging demands enters through demand side (Liao and Zhang, 2020).

- Convenience yield captures **demand** for the liquidity and safety properties of the U.S. dollar (Jorgensen and Krishnamurthy, 2012; Jiang, Krishnamurthy and Lustig, 2020).

## Comment 1: What does the convenience yield capture?

Perhaps it is therefore useful to think about a model where:

$$\text{U.S. Treasury basis} = \underbrace{(\text{Intermediary constraints})}_{\text{Supply}} \times (\text{Demand for USD safety / liquidity})$$

▶ Convenience yield is proportional to the U.S. Treasury basis.

▶ Thus, changes in convenience yields could capture changes in intermediary constraints and demand for safety / liquidity (and hedging demands).

▶ Separating these motives is hard, but it's useful to clarify.

# Hedging channel (Liao and Zhang, 2021)
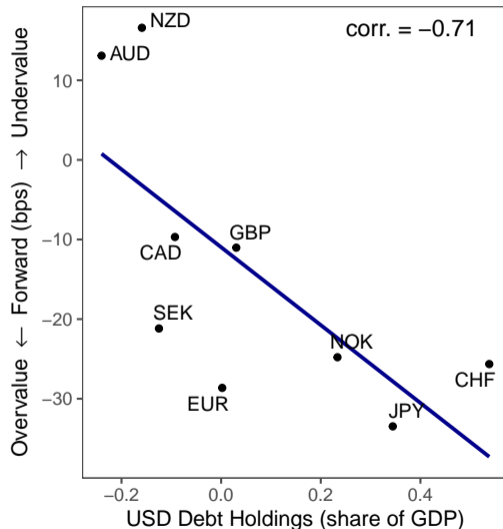


- ▶ Convenience yields (1) vary dramatically across countries and (2) reflect differences in net foreign asset imbalances.

- ▶ Figure shows unconditional currency bases against countries' dollar imbalances.

- ▶ Countries with positive dollar imbalances buy domestic currency on the forward market — they are charged a "positive convenience yield".

- ▶ Countries with negative dollar imbalances sell domestic currency on the forward market and are charged a *negative* dollar convenience yield.

# Comment 2: What about the cross-section?

Overall, should I think about this model as U.S. vs the Rest? Or a model of U.S. vs another foreign country?

▶ For me, the covenience yield is a very convenient way to think about some *average* desire to hold dollars.

▶ However, there is large variation in average currency bases across countries (both relative to the dollar and other G10).

▶ Is there something special about calibrating to U.S. Treasury basis or is theory more general?

▶ One possibility is to rebase and show that calibrating with respect to different currencies can explain a cross-section of currency risk premia.

# Comment 3: Quantities

▶ Paper focuses on asset pricing puzzles.

▶ Liao and Zhang (2020) shows a tight link between net foreign asset imbalances, exchange rate behavior and currency bases.

▶ Can the model be extended to address open questions in capital flows literature?

▶ For example, does variation in the dollar convenience yield help explain the increase in U.S. imbalances?

# Comment 4: Quantitative easing

- ▶ Current exercise estimates the exchange rate response to a $\lambda_t$ shock.

- ▶ This experiment does not seem specific to QE.

- ▶ Any shock to the dollar convenience yield should generate a similar response.

- ▶ Perhaps useful to expand this section to say something more generally about monetary policy.

# Conclusions

▶ Paper does a great job showing how the dollar convenience yield helps explain exchange rate volatility and disconnect puzzles.

▶ Can the authors be more precise about the source of U.S. convenience?

▶ Can the authors expand the model to think about capital flows (quantities) as well as prices?