Discussion of "Risk-Free Rates and Convenience Yields Around the World"

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SFS Cavalcade 2023

Summary

- This paper measures the option-implied risk-free rates and measure the convenience yields of government debt across 10 developed countries.
- Finding 1: convenience yield in across countries can be best explained by the level of interest rate, a multi-country version of Nagel (2016).
- Finding 2: in crises, convenience yields grow in all countries similarly.
- Finding 3: CIP based on option-implied risk-free rates are on average of similar sizes across countries, unlike other CIP measures.
- Theory: convenience yields are segmented across countries, but CIP is internationally arbitraged.

Why do we care about convenience yield?

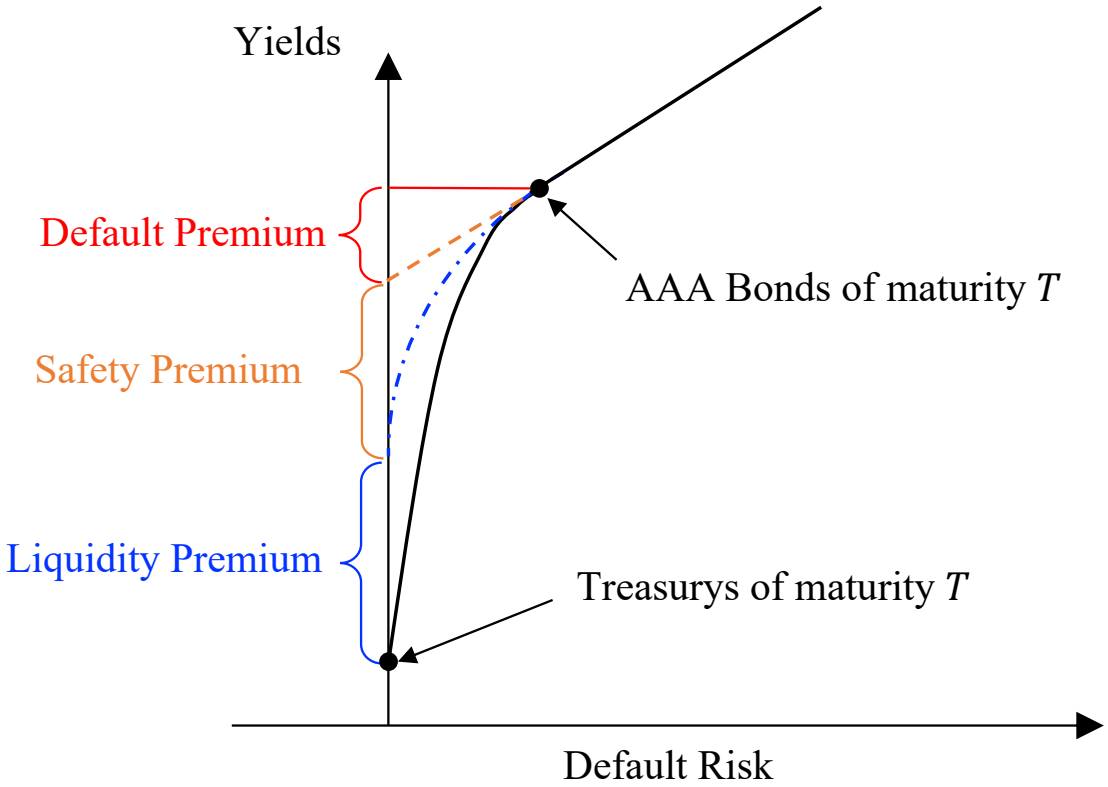
- Magnitude: 30 bps (agency-Treasury) to 90 bps (AAA-Treasury). About 0.35 to 1 trillion extra fiscal capacity.

- The convenience yield ...
  - Affects risk-taking (Drechsler, Savov, and Schnabl 2018).
  - Drives exchange rates (Jiang, Krishnamurthy, and Lustig 2021; Engel and Wu 2022) and reflects dominant currency status (Jiang et al 2023)
  - Influences financial crises (Del Negro et al. 2017; Li 2020).
  - Is an additional pass-through of monetary policy. (Nagel 2016; Piazzesi & Schneider 2018)

- Related to recent debate:
  - High inflation erodes convenience?
  - Credibility of U.S. government.

Theory of convenience yields

- Krishnamurthy and Vissing-Jorgensen: convenience yield = safety premium + liquidity premium.
- Ideal measure: a private claim that is almost as safe as government debt, but illiquid.
- For countries with a stable government. Otherwise could be inconvenient.



Measures of convenience yields

- Krishnamurthy (2002): on-the-run/off-the-run spread.
  - Advantage: Within Treasury-security comparison, no safety premium.
- Longstaff (2002): Refcorp-Treasury spread.
  - Advantage: Refcorp bonds are guaranteed by the govt.
- Krishnamurthy and Vissing-Jorgensen (2012): AAA-Treasury spread.
  - Advantage: long history, starting from 1920.
- Nagel (2016): Repo/T-bill spread (1991 onwards) + Banker's acceptance/T-bill spread (1920 to 1991). Also CD/T-bill and Notes/Bill.
  - Advantage: long history, starting from 1920.

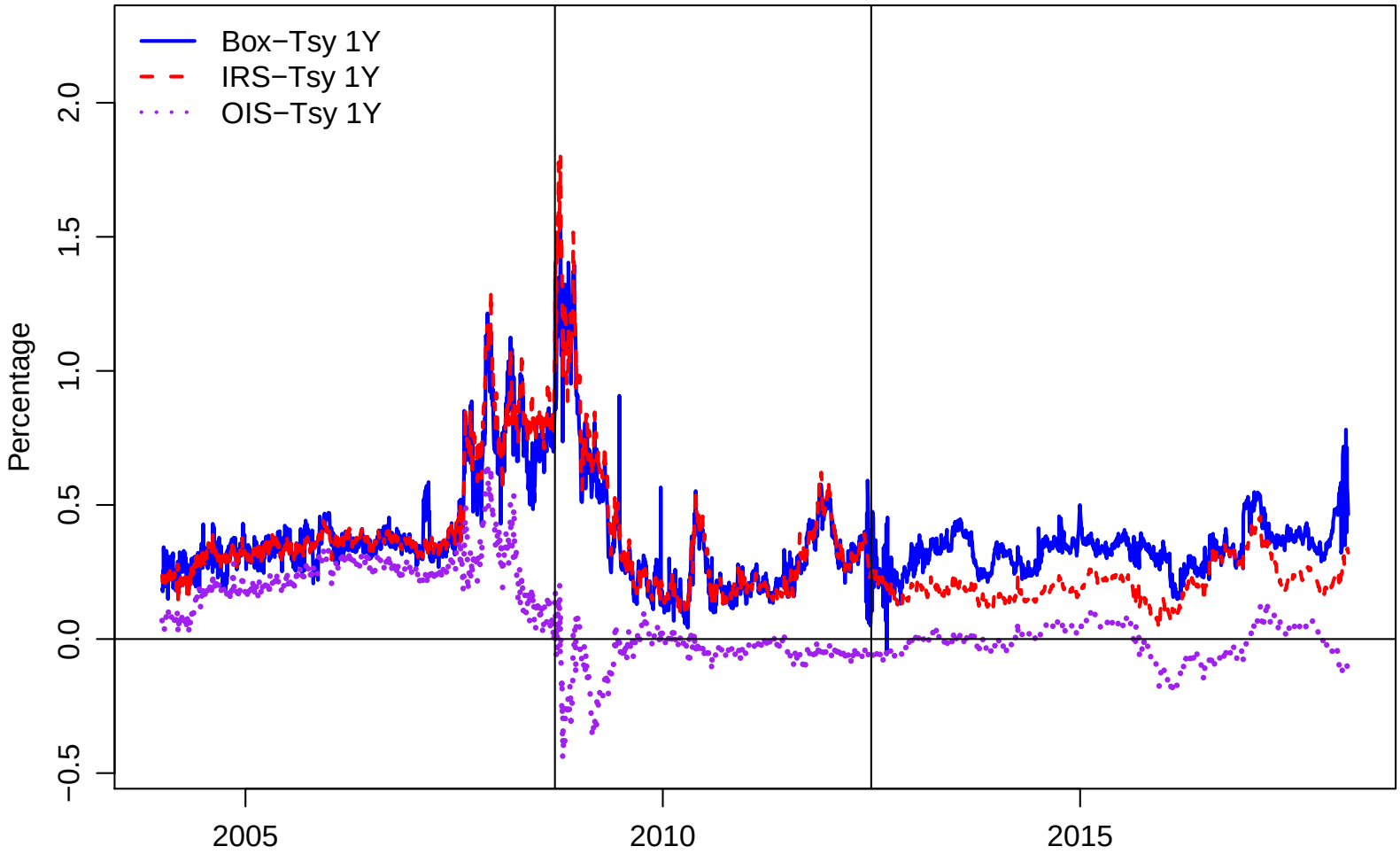
- None of the above has uniform standard across countries!

Which measure is ideal for a cross-country analysis?

- Goal: compare convenience of government debt (NOT inconvenience of the less liquid benchmark).
- Ideally, the benchmark rates are connected across countries through a common set of intermediaries.
- Widely-used derivatives are such choices.
  - Interest-rate swap rates, LIBOR/OIS rates (see Klingler and Sundaresan 2019; Jermann 2020; Du, Hebert, and Li 2022)
  - Equity-option implied box rates (see Van Binsbergen, Diamond, and Grotteria 2022)

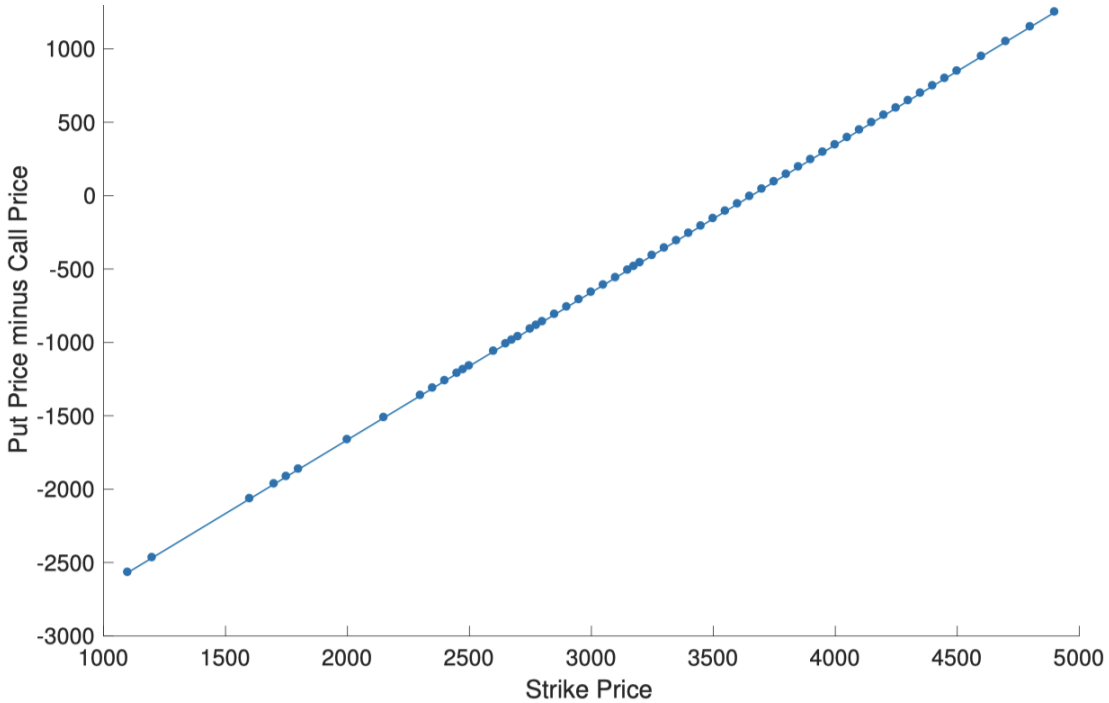
A comparison across measures

- Box: 1-year box rate based on put/call parity.
- IRS: 1-year swap rate based on LIBOR 6M.
- OIS: 1-year swap rate based on overnight interbank rate.



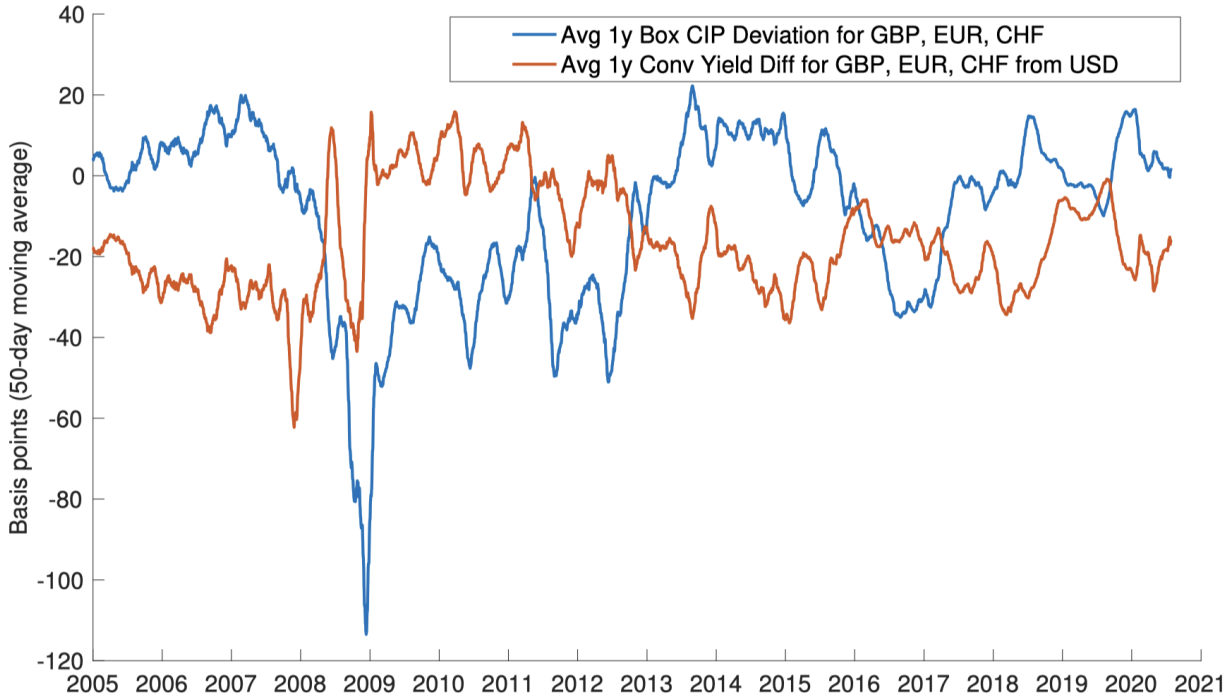
Box rates: shadow rates of intermediaries?

- Suppose the borrowing and lending rates are both $r_{i,t,T}$ for arbitrageur i.
- If $c_{t,T} - p_{t,T} + \exp(-r_{i,t,T}T)K > S_t$ (ignore dividends), then buy the stock, sell a call option, buy the put option, and **borrow** K amount of money **at interest rate** $r_{i,t,T}$. Otherwise reverse the strategy.
- Thus, $c_{t,T} - p_{t,T} + \exp(-r_{i,t,T}T)K = S_t$. If no market segmentation, $r_{i,t,T} = r_{t,T}$.



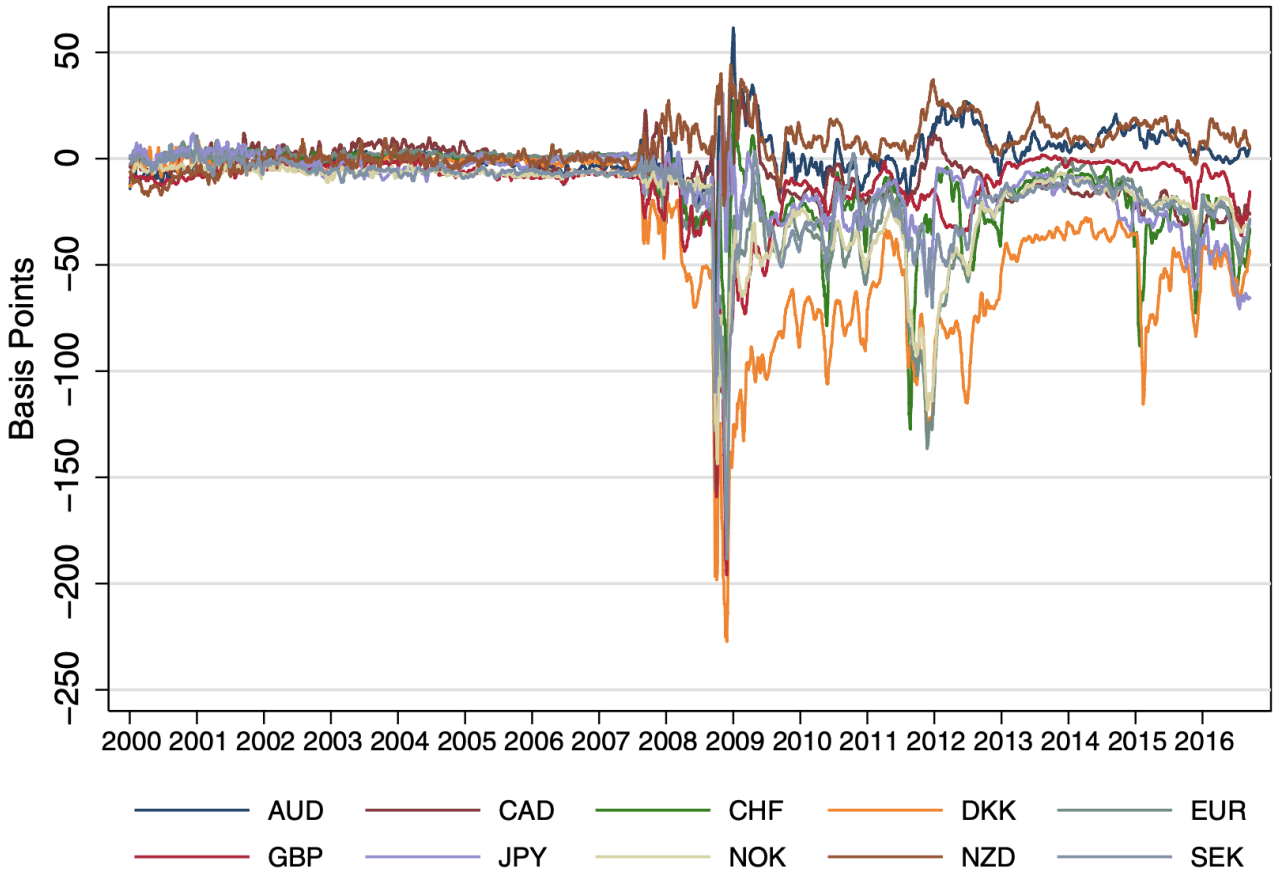
Is U.S. government debt convenience special?

- In each country, the convenience yield is the country-specific box rate minus the matched-maturity government debt yield.
- Difference of other countries' convenience yields with U.S. convenience yield on average does not become significantly lower in crises.
- Note: different from the demand of dollar.



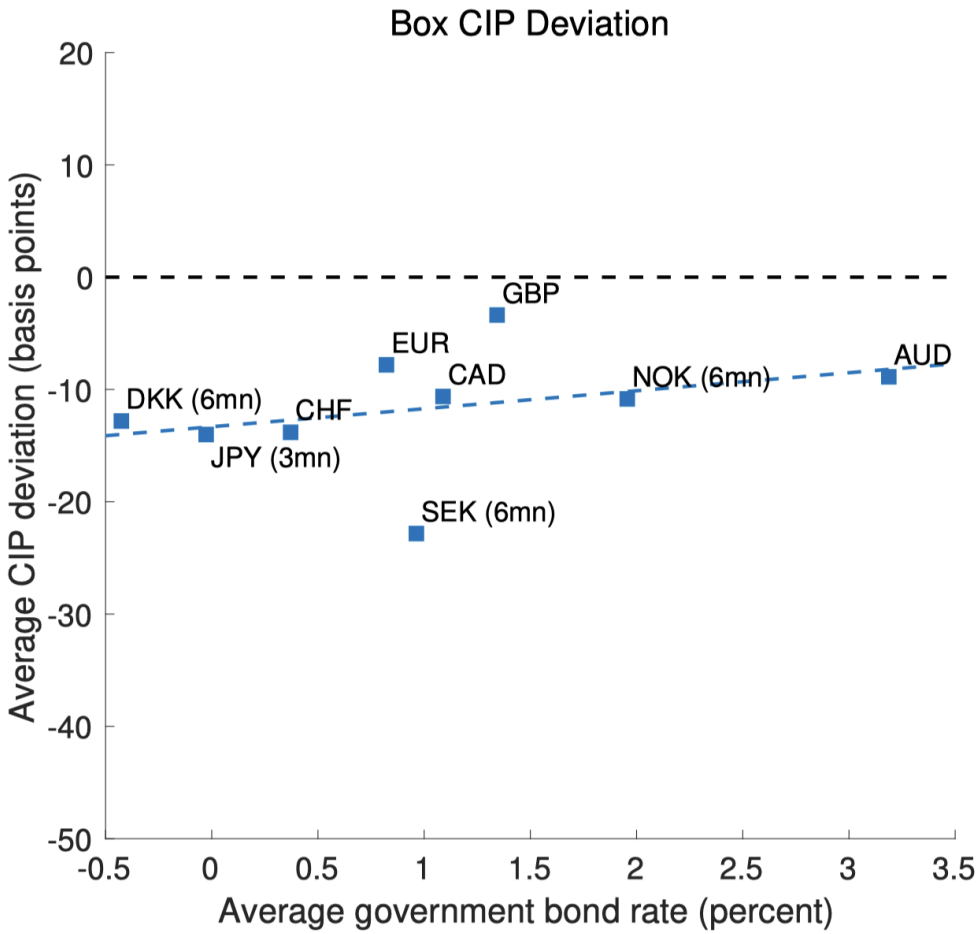
Are traditional CIP measures driven by convenience?

- A puzzle in the CIP literature: the same balance sheet cost should reflect in all CIP deviations **similarly**, but in the data there is wide heterogeneity.
- This paper: the traditional measures may contain convenience that distort the cross-country comparison.



Are traditional CIP measures driven by convenience?

- After removing the convenience component (using box rates instead of LIBOR/OIS), average CIP deviations are similar across countries.



Comment 1: Term Structure of Convenience Yield

- "...The term structure of US convenience yields remains roughly flat at even when it is elevated..."
- Statement is true for below 2-year convenience yield measured by box rates.
- The general phenomenon looks quite different (Joslin, Li, and Song 2021).

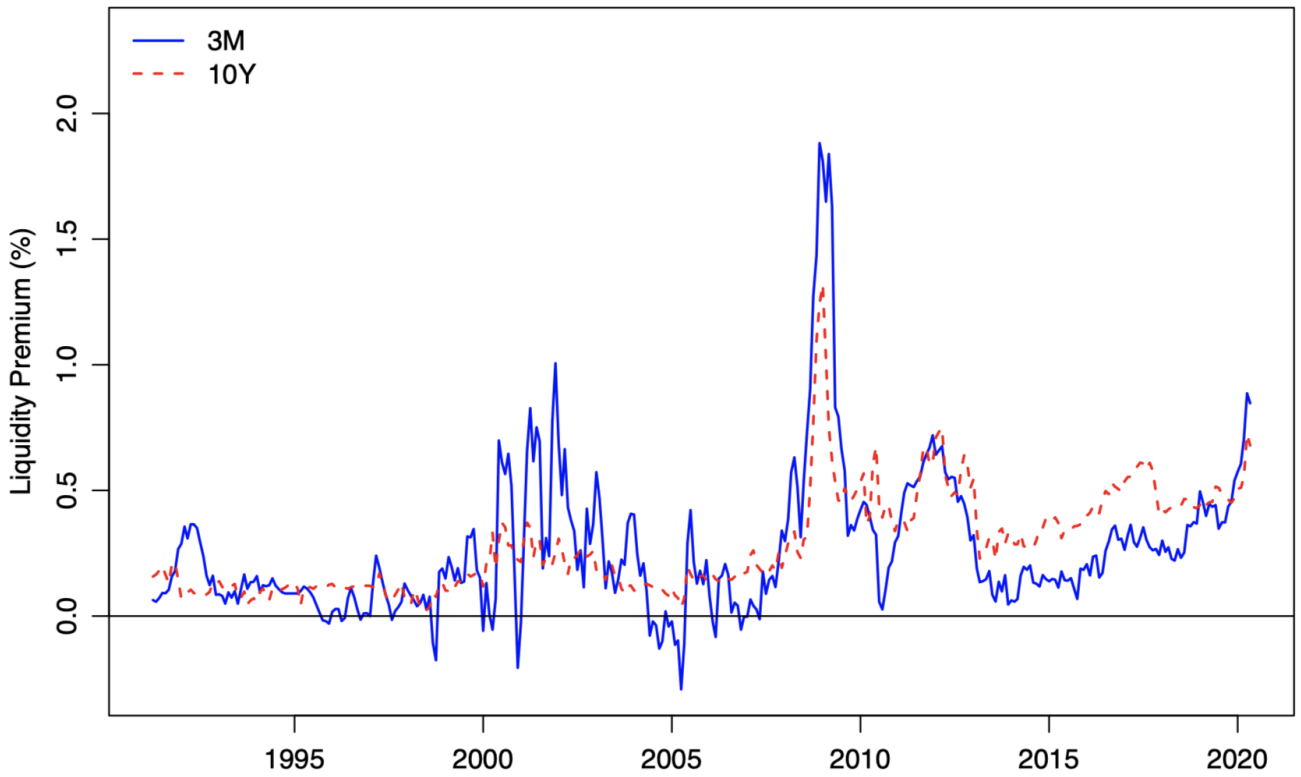


Figure: Time Series of the Liquidity Premium, from Joslin, Li, and Song 2021.

Comment 1: Term Structure of Convenience Yield

- Measure of convenience yield (liquidity premium): Refcorp-Treasury spread. Similar graphs for Agency-Treasury spread.

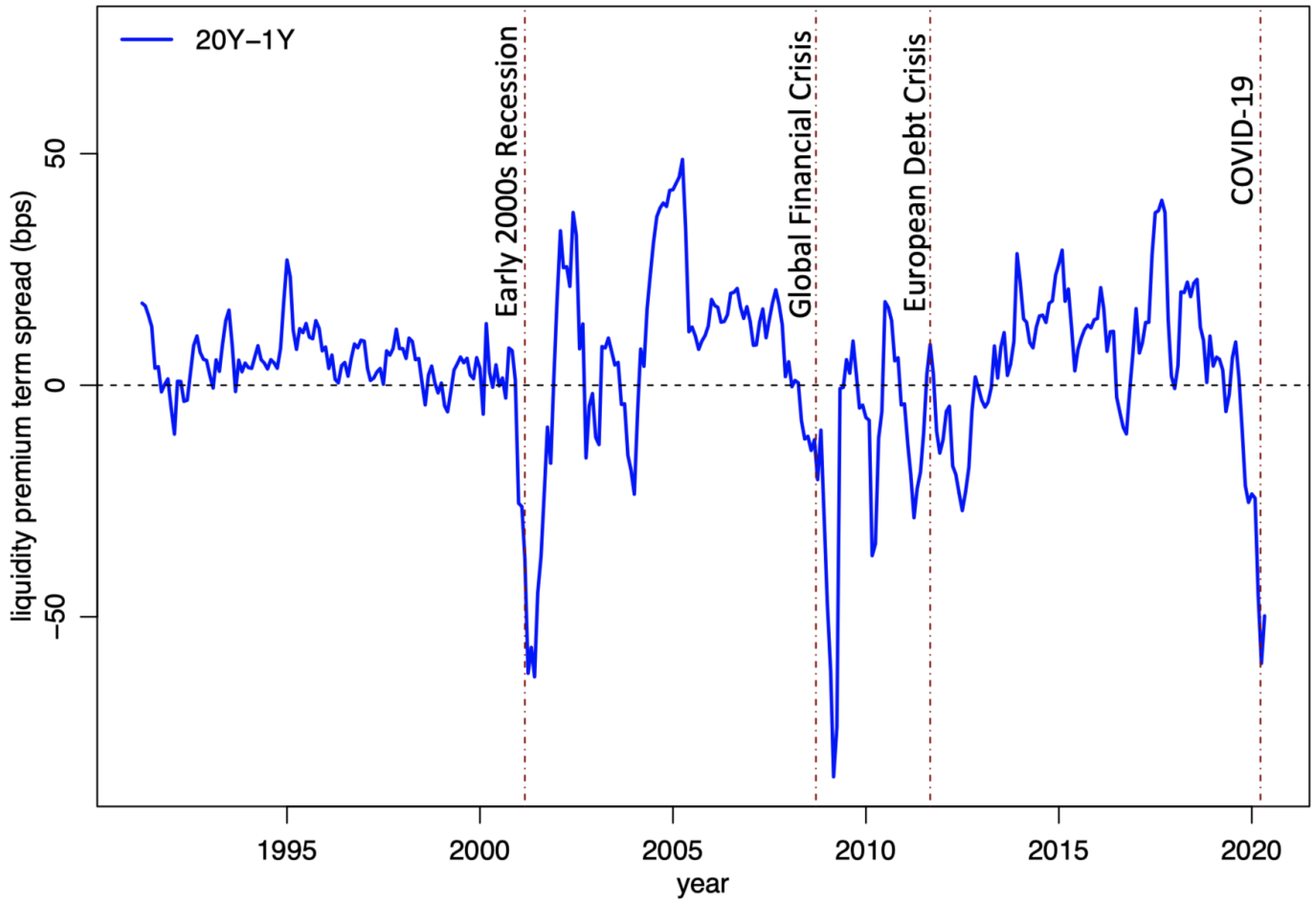


Figure: Liquidity Premium Term Spread, from Joslin, Li, and Song 2021.

Comment 2: Convenience, CIP, and Currency Valuation

- U.S. dollar is the global reserve currency and dominant invoicing currency. Is this status reflected by dollar convenience or Treasury convenience?
- Currency valuation ($\bar{\iota}_t, \bar{\iota}_t^*, \bar{r}_t^{CIP}$ are all risk-free borrowing/lending rates):

$$E_t^{\mathbb{Q}}\left[\underbrace{\bar{\iota}_t}_{\text{dollar benchmark rate}} - \underbrace{\bar{\iota}_t^*}_{\text{foreign benchmark rate}} - \underbrace{s_t}_{\text{foreign currency per dollar}} + s_{t+1}\right] = \underbrace{\bar{r}_t^{CIP}}_{\text{CIP basis}}$$

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$$E_t^{\mathbb{Q}}\left[i_t - i_t^* - s_t + s_{t+1}\right] = \bar{r}_t^{CIP} - \underbrace{\left(\bar{\iota}_t - i_t\right)}_{\text{U.S. debt convenience}} + \underbrace{\left(\bar{\iota}_t^* - i_t^*\right)}_{\text{foreign debt convenience}}$$

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$$s_t = E_t^{\mathbb{Q}}\left[\sum_{k=0}^{\infty}\left(\underbrace{\left(i_{t+k} - i_{t+k}^*\right)}_{\text{rate diff}} + \underbrace{\left(\bar{\iota}_{t+k} - i_{t+k}\right)}_{\text{U.S. convenience}} - \underbrace{\left(\bar{\iota}_{t+k}^* - i_{t+k}^*\right)}_{\text{foreign convenience}} - \underbrace{\bar{r}_{t+k}^{CIP}}_{\text{CIP basis}}\right) + s_\infty\right]$$

Comment 2: Convenience, CIP, and Currency Valuation

$$s_t = E_t^{\mathbb{Q}} \left[\sum_{k=0}^{\infty} \left(\underbrace{(i_{t+k} - i^*_{t+k})}_{\text{rate diff}} + \underbrace{(\bar{\iota}_{t+k} - i_{t+k})}_{\text{U.S. convenience}} - \underbrace{(\bar{\iota}^*_{t+k} - i^*_{t+k})}_{\text{foreign convenience}} - \underbrace{\bar{r}^{CIP}_{t+k}}_{\text{CIP basis}} \right) + s_\infty \right]$$

- Depending on how we measure benchmark rates $\bar{\iota}_t$ and $\bar{\iota}^*_t$, the decomposition could differ.
- Running a horse-rate regression will be informative of the role played by convenience yield and CIP basis in currency valuation.

Summary

- A great paper that significantly improves our understanding of convenience yield around the world!
- Key takeaways:
  - Convenience yield in each country is closely linked to monetary policy;
  - Governments in developed countries all earn a convenience yields;
  - CIP basis could be consistent with integrated intermediation.
- Comments
  - Limited inference on term structure due to limited maturities of box rates.
  - More exercise the contribution of CIP v.s. convenience to exchange-rate valuation.