Intermediary Balance Sheets and the Treasury Yield Curve

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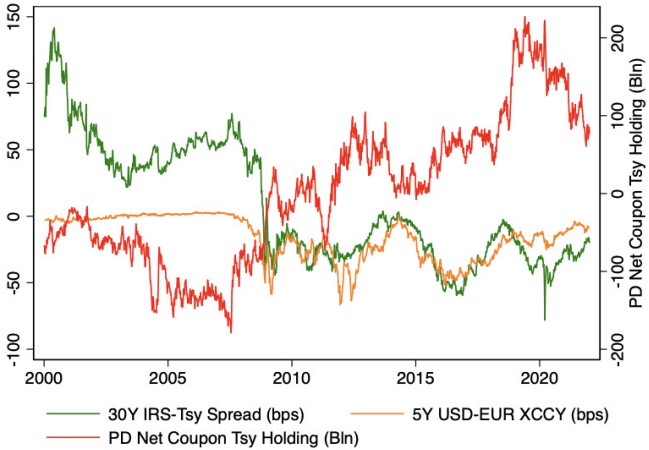
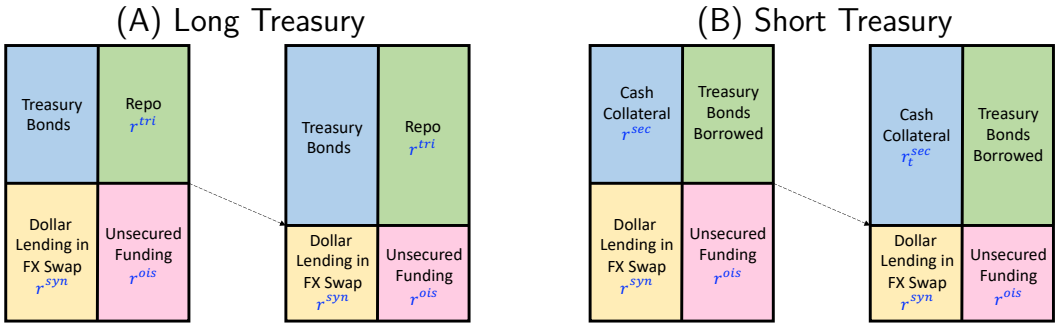
Dealer Treasury Position, Swap Spreads, and CIP Deviations



- Known Facts: (i) swap spread pos. to neg. and (ii) CIP zero to neg.
- New Facts: (i) dealer net position neg. to pos. and (ii) CIP/swap spread correlation

1. Dealer-Long and Dealer-Short Curves

Balance-Sheet Neutral Treasury Trading Strategies



Net-Long vs. Net-Short Curve

- Long regime:

$$y^s \approx r^{syn} - r^{ois} + r^{tri},$$

or equivalently,

$$\underbrace{r^{ois} - y^l}_{\text{swap spread}} \approx -\underbrace{\left(r^{syn} - r^{ois}\right)}_{\text{balance sheet cost}} + \underbrace{\left(r^{ois} - r^{tri}\right)}_{\text{funding benefit}}.$$

- Short regime:

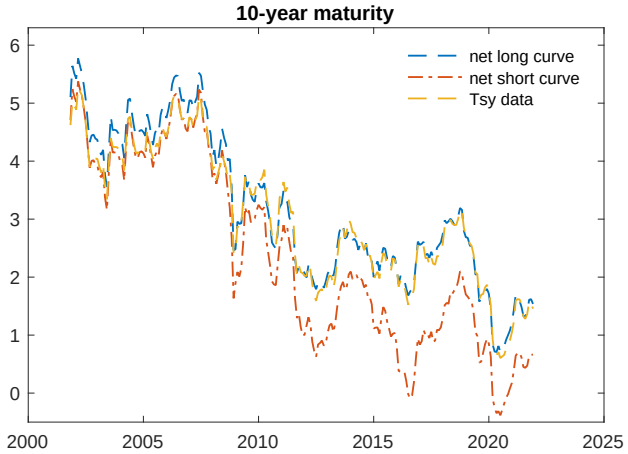
$$y^s \approx -\left(r^{syn} - r^{ois}\right) + r^{sec},$$

or equivalently,

$$\underbrace{r^{ois} - y^s}_{\text{swap spread}} \approx \underbrace{r^{syn} - r^{ois}}_{\text{balance sheet cost}} + \underbrace{\left(r^{ois} - r^{sec}\right)}_{\text{security lending cost}}.$$

10Y Yield pre- and post-GFC

- The actual bond yield switches from the dealer-short to the dealer-long curve, consistent with the change in dealers' position.



2. Equilibrium Model

An Equilibrium Model

- Endogenous variables: (1) current n-period treasury bond yield y; (2) synthetic dollar lending rates r^{syn}. (3) Intermediary choices q^{bond} and q^{syn}.
- Intermediaries (consolidated dealers and levered clients) optimize profit subject to constraint

$$|q^{bond}| + q^{syn} \leq \bar{q}$$

- Real-money investors (e.g., pension funds and mutual funds) demand

$$D_U^{bond} = D_U(\underbrace{ny - (n-1)y_{\mathbb{P}} - y^{bill}}_{\text{Exp. Dollar Return vs Bill}})$$

- FX-hedge foreign investors (e.g., foreign life insurance companies) demand

$$D_H^{bond} = D_H(\underbrace{ny - (n-1)y_{\mathbb{P}} - r^{syn}}_{\text{Exp. Dollar Hedged Excess Return}})$$

- Each unit of bond requires synthetic financing, so $D_H^{syn} = D_H^{bond}$.

Market Clearings

- Treasury market:

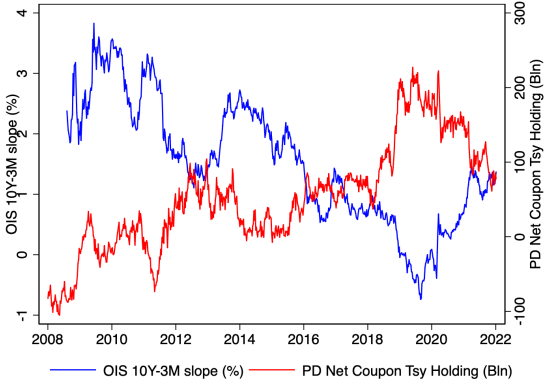
$$\underbrace{\exp(-ny)S^{bond}}_{\text{Treasury bond supply in dollars}} = q^{bond} + D_U^{bond} + D_H^{bond}$$

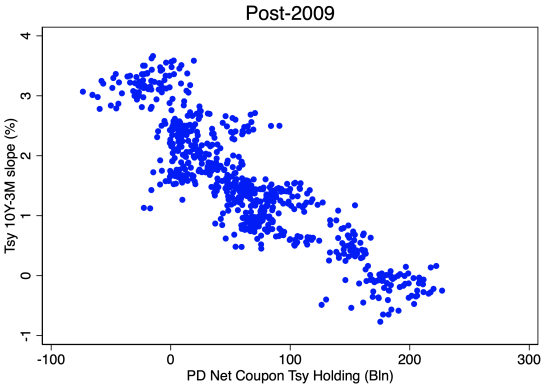
- Synthetic lending market:

$$\underbrace{q^{syn}}_{\text{intermediary supply of syn lending}} = D_H^{bond} + \underbrace{D^{syn}(r^{syn} - r^{ois})}_{\text{residual demand}}$$

Dealers' Position Negatively Correlated with the Slope

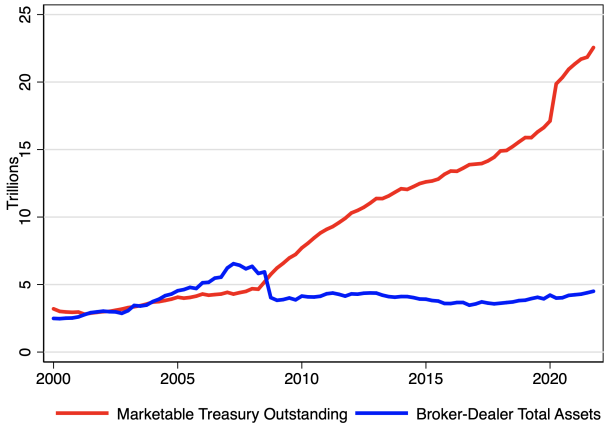
- The model can explain that a steeper Treasury yield slope is correlated with stronger real-money demand for Treasury, which results in a lower dealer position, and a more negative swap spread.
- Contrasts with Jermann (2020) that the dealer inventory increases in the slope.





Key Changes Pre/Post GFC

- Supply of Treasury bonds has increased significantly, dealer balance sheets have contracted



Source: U.S. Flow of Funds

Regimes and Treasury Market Fragility

- Crises reduce dealer capacity $\bar{q}$.
  - In the short regime (pre-2009) a bad shock to intermediary balance sheet decreases the Treasury yield relative to swaps.
  - In the long regime (post-2009) a bad shock to intermediary balance sheet increases the Treasury yield relative to swaps.

- An explanation of the Treasury market turmoil in March 2020 (Duffie (2020)).
  - Our explanation does not rely on "selling pressure" in the Treasury market (He, Nagel, and Song (2022)). Quantifying both forces is an interesting future direction.