

# Discussion: Intermediary Balance Sheets and the Treasury Yield Curve

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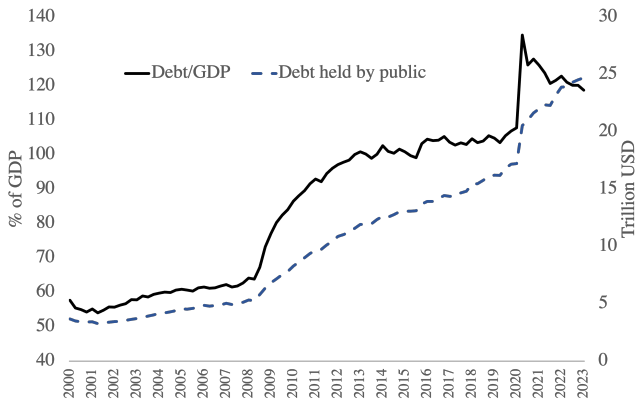
15th Annual Paul Woolley Centre Conference

# Motivation

- Treasury securities market is one of the most important financial markets in the world
- The Treasury market has been going through significant changes in the past decade
  - Dealers are more constrained
  - Massive growth in supply
  - Low interest rate environment
  - Large scale of QE

# Growth in Treasury Debt Supply

- Massive increase in Treasury debt supply



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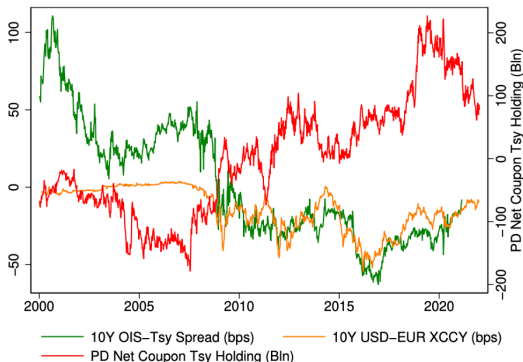
## FirstFT: US government debt 'flood' to put pressure on banks

A \$1tn US government borrowing spree is set to increase the [strain on the country's banking system](#), as the Treasury department seeks to rebuild its cash balance in the aftermath of the debt ceiling fight.

*"Everyone knows the flood is coming..."*

# This Paper: Regime Shift

- Regime shift in the Treasury market post-GFC
  - Swap-spread: +  $\rightarrow$  -
  - Dealer Treasury position: -  $\rightarrow$  +
- Driven by the increase in Treasury supply
  - Effect amplified by dealer balance sheet constraints



# Mispricing

- Negative swap-spread: arbitrage opportunity
- Conditions for mispricing: noise traders + limits to arbitrage
- “Noise traders”
  - E.g., Pension funds use swaps to increase asset side duration and hedge interest rate risks (Klingler and Sundaresan, 2019)
- Limits to arbitrage
  - **Implementation costs**
  - Noise trader risk
  - Agency frictions

# Summary

- Construct net long and net short Treasury curves
  - Boundaries outside of which there is arbitrage opportunities (after accounting for frictions)
- The actual Treasury yield curve shifted from being closer to the net short curve before GFC to the net long curve after GFC
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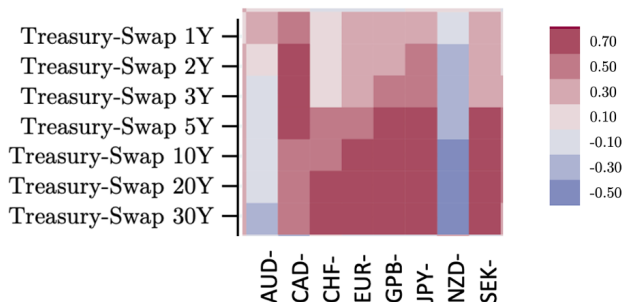
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- Through an equilibrium model, the paper illustrates that the regime shift naturally happens when Treasury supply increases
  - Can explain the negative correlation between Treasury term premium and dealer position
- Policy analysis via the lens of the model
  - Effects of the policies/shocks depend on the Treasury market regime (balance sheet cost related to  $|q|$ )

# Constructing Net Long and Net Short Curves

- Intermediaries/dealers act as arbitrageurs in both the dollar and Treasury-swap market
- Use CIP deviation to approximate the shadow cost of dealer's balance sheet  $f(q^{syn} + |q| + \dots)$ 
  - Doesn't matter whether the balance sheet restriction is modeled as a fixed capacity ( $\bar{q}$ ) or as a convex cost
- Estimate the term structure model to fit dollar swap rates and synthetic dollar swap rates

# Comment 1: Arbitrage Costs

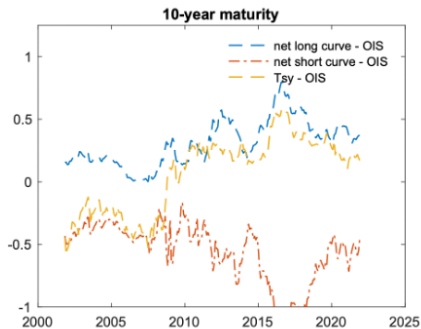
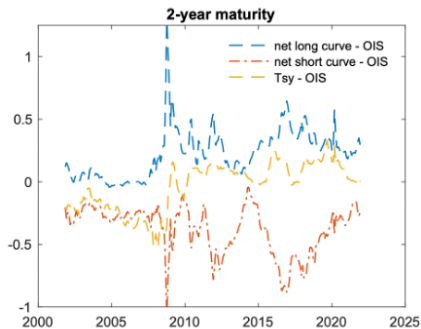
- Is the marginal balance sheet cost the same for different arbitrage activities?  $\Rightarrow$  Spell out explicitly the relevant constraint
- Do they co-move? Yes



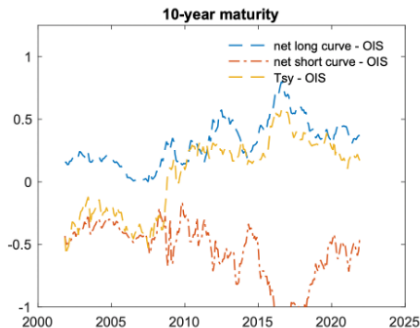
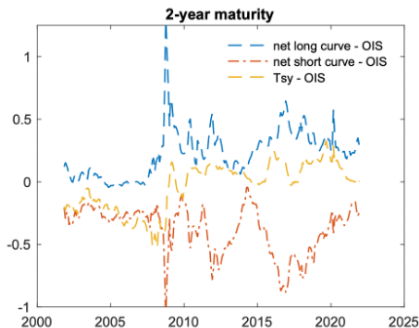
Source: Siriwardane et al (2022)

- Are the noise trader risks similar in the two markets?
- Can potentially apply this method to other markets

# Net Long and Net Short Curves

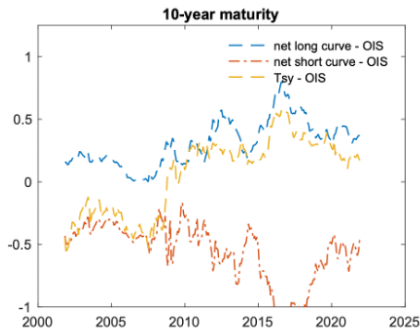
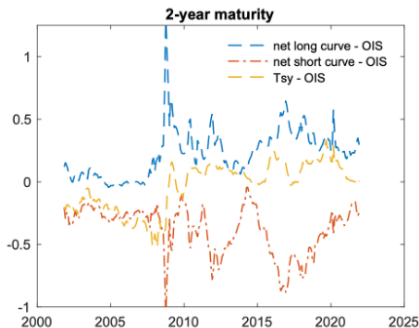


# Net Long and Net Short Curves



- Wider gap between the net long and net short curve post-GFC
  - Dealer balance sheet cost is higher

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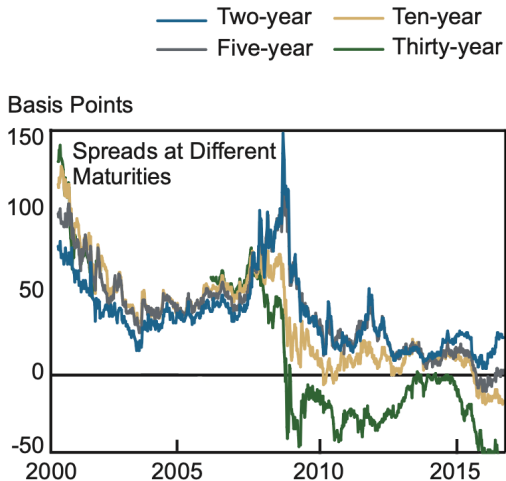


- Wider gap between the net long and net short curve post-GFC
  - Dealer balance sheet cost is higher
- Treasury spreads within bounds but are closer to the net long curve post-GFC
  - Dealer position positive post-GFC

## Comment 2: Variations along the Yield Curve

- It seems that the pattern is more pronounced for long-term bonds (10-year Treasury v.s. 2-year Treasury)
  - Other types of arbitrageurs in the 2-year market?
  - More demand in the 10-year market?
- It would be great to make more use of the quantity data in the cross-section
- Are the arbitrage activities segmented across sub-markets with different maturity?

## Comment 2: Variations along the Yield Curve



Source: *Boyarchenko et al (2018)*

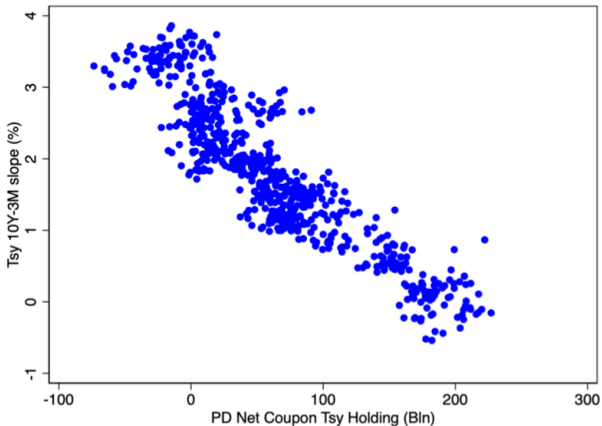


## Comment 2: Variations along the Yield Curve

- If there is some degree of segmentation of arbitrage activities, can we use cross-sectional variation to lend additional support to the theory?
- Larger growth of Treasury debt  $\Rightarrow$  larger fraction of Treasuries held on dealer's balance sheet  $\Rightarrow$  more negative swap spreads and larger  $r^{sync} - r$  (CIP deviations)
- Do we see such patterns in the cross-section for Treasury bonds with different maturities?

# New Fact

- Dealer position is negatively associated with Treasury term spread



# Term Spread and Dealer Position

- In the net-long regime,

$$y = \frac{n-1}{n} \underbrace{y_Q}_{\text{Expected Date 1 yield}} + \frac{1}{n} (i^l + \underbrace{r^{syn} - r}_{\text{CIP deviation}})$$

Term spread:  $y - y^{bill}$

- Dealer position  $q^{bond}$  is pinned down from market clearing

$$q^{bond} + \underbrace{D_H}_{\substack{\text{Demand from} \\ \text{hedged investors} \\ \uparrow \text{ in } (ny - r^{syn})}} + \underbrace{D_U}_{\substack{\text{Demand from} \\ \text{unhedged investors} \\ \uparrow \text{ in } ny}} = \exp(-ny) S^{bond}$$

## Comment 3: Term Spread and Dealer Position

- **Demand shocks** (shifts in  $y_Q$ ,  $D^{syn}$ ) increase  $y$  and demand by other market participants ( $D_H$  or  $D_U$ )  $\Rightarrow$  dealers reduce  $q^{bond}$
- **Supply shocks** (change in  $S^{bond}$ ) increase  $y$  and holdings by all market participants  $\Rightarrow$  dealers increase  $q^{bond}$

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- What types of shocks would induce the observed correlation?

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- What types of shocks would induce the observed correlation?
- How does it differ between the net-long and net-short regime?

## Other Comments/Implications

- Going back to limits to arbitrage, does noise trader risk play any role? Are there potentially agency frictions?
- Optimal monetary policy taking financial stability into account
  - A combination of several tools
- The cost of hedging interest-rate risk is affected by dealer's balance sheet cost + Treasury supply
  - Does this impact interest-rate hedging demand from end-users such as commercial banks and pension funds?
- Implications for government's funding cost

# Conclusions

- Insightful paper on a very important topic!
  - Empirical findings guided by and carefully interpreted through models
- The paper connects several important trends in the Treasury market together via a unified framework
- Method of constructing the arbitrage bounds may be applied widely to study frictions in other markets



Thank You!