Intermediary Constraints and Treasury Yield Curve

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The US Treasury market is one of the most liquid financial markets in the world, and Treasury bonds have long been considered a safe haven for global investors. It is often believed that Treasury bonds earn a "convenience yield" in the sense that investors are willing to accept a lower yield on them compared to other investments with the same cash flows owing to Treasury bonds' safety and liquidity. However, since the global financial crisis (GFC), long-maturity US Treasury bonds have traded at a yield consistently above the interest rate swap rate of the same maturity. The emergence of the "negative swap spread" appears to suggest that Treasury bonds are "inconvenient," at least relative to interest rate swaps. Our paper dives into this Treasury "inconvenience" premium and highlights the role of dealers' balance sheet constraints in explaining it.

We begin the paper with a striking chart showing a strong correlation between primary dealers' net Treasury positions and the swap spread. Pre-GFC, when dealers overall had a net-short position in Treasury bonds, the swap spread was positive. The sign flip in the swap spread coincides with primary dealers switching from holding a net-short to a net-long position in Treasury bonds. With this shift in dealers' positioning, dealers continued to earn a positive spread on their Treasury positions hedged using interest rate swaps. In addition, post-GFC, the larger the dealers' net position, the more negative the swap spread, or the more "inconvenient" the Treasury bonds.

The tight correlation between the swap spreads and the cross-currency basis post-GFC further supports the claim that intermediary balance sheet capacity is a key driver of the Treasury swap spread. The cross-currency basis measures deviations from the covered interest parity (CIP) condition, a textbook no-arbitrage condition. The CIP deviations reflect the shadow cost of the intermediary balance sheet constraint. In particular, a larger primary dealer Treasury position corresponds to a tighter balance sheet constraint, and therefore, a more negative swap spread and cross-currency basis.

We build a unified framework that incorporates the convenience (or lack thereof) of Treasury bonds, CIP deviations, and primary dealers' net Treasury positions. Our framework emphasizes the role of balance-sheet-constrained dealers in the Treasury market. This framework naturally leads to regimes in which dealers are net long, net short, or flat with respect to Treasury bonds. Intuitively, in the long regime, Treasury yields should be above the swap rate of the same maturity to compensate for balance sheet costs, while in the short regime, both balance sheet costs and financing spreads lower Treasury yields relative to swap rates. Using CIP deviations as the proxy for dealers' balance sheet costs, our term structure model shows that the Treasury yield curve switched from the dealer-net-short curve to the dealer-net-long curve, consistent with the change in the dealers' position.

What drives the regime change post-GFC? Our model generates a clear prediction that an increase in the Treasury supply increases dealers' Treasury position, other things being equal. Since the GFC, the supply of Treasury bonds, net of Federal Reserve purchases, has experienced a fourfold increase, which acts as an important driver for the regime shift in dealers' position and the sign switch in the swap spread.

Finally, we use our framework to discuss the implications of several monetary and regulatory policies for the Treasury market, including quantitative easing and tightening, central bank swap lines, and the exemption of Treasury securities from the supplementary leverage ratio calculation. In particular, our model suggests that during a monetary policy tightening cycle the yield curve inversion and the Federal Reserve balance sheet runoff would likely create significant pressure for financial

intermediaries to absorb Treasury bonds. As a result, the expected buildup in the intermediary positions might lead to fragility in the Treasury market. On the other hand, we have abstracted two recent developments from our framework that could make the current tightening cycle different. First, the large amount of cash piled in the overnight reverse repo facility can help absorb the Treasury bonds and alleviate the intermediary balance sheet constraints. Second, greater interest rate volatility can discourage the buildup of dealers' inventory and the levered investors' position due to additional value-at-risk-type constraints, which have been abstracted from our framework. Overall, primary dealers' Treasury inventory and various intermediation spreads should be closely monitored by policymakers and market participants.