Rescuing the market for government securities when its liquidity fails

Darrell Duffie
Graduate School of Business, Stanford University

From work with
Michael Fleming, Frank Keane, Or Shachar, and Peter Van Tassel

Brunel University seminar on bond markets
April 2023

Research assistance by Renhao Jiang and Claire Nelson.

Views expressed are not necessarily those of the Federal Reserve Bank of New York or the Federal Reserve System.

COVID induced record foreign gross sales of Treasuries to U.S. dealers

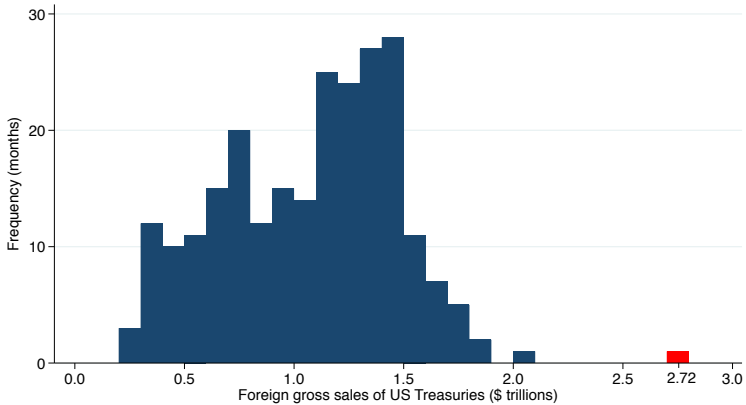
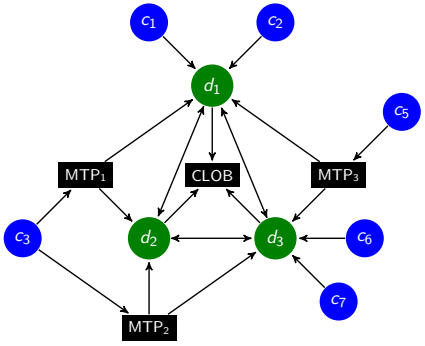
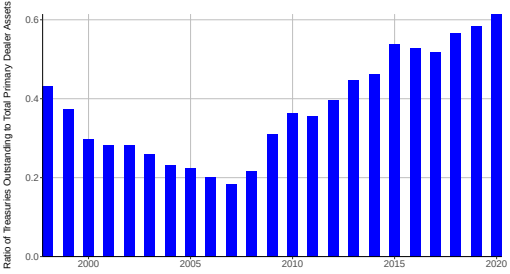


Figure: A histogram of monthly gross sales of U.S. Treasury bonds and notes by foreigners to U.S. residents, from January 2000. Data source: U.S. Department of the Treasury, Treasury International Capital System. The March 2020 observation is indicated in red.

US Treasury market resilience is limited by dealer intermediation capacity



(a) market structure schematic



(b) The ratio of Treasuries outstanding to primary dealer assets

Figure: *Fragmenting Markets*, Duffie (2022)

Dealer-to-customer bid-offer spreads

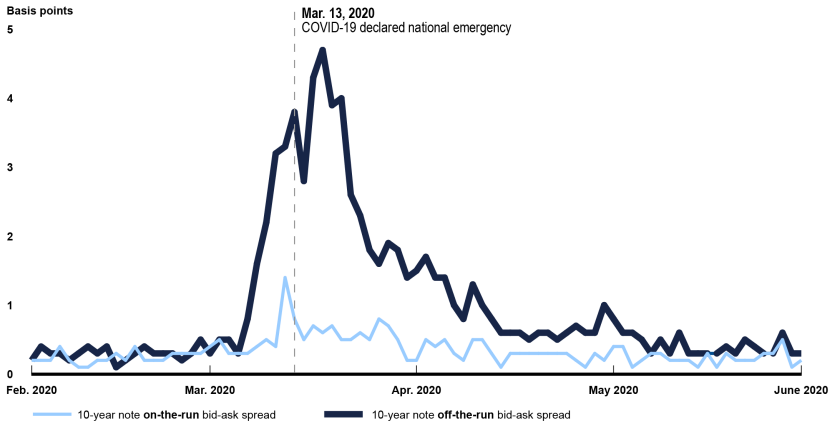


Figure: Source: Congressional General Accounting Office, August, 2021. The underlying data source is Bloomberg Financial LP. Bloomberg.

Interdealer market depth

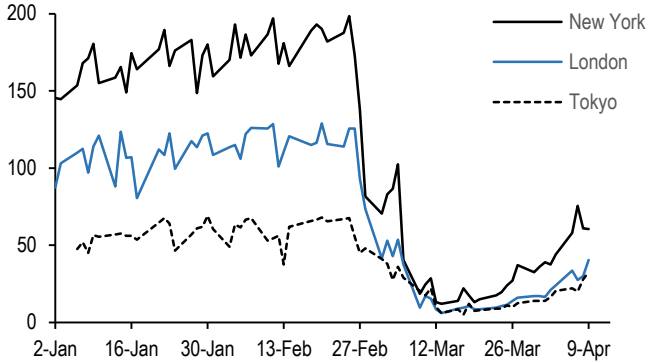


Figure: Treasury market depth on Brokertec, in millions of dollars. The market depth shown is the average of the largest three amounts bid or offered on Brokertec's interdealer central limit order book market (New York, London, and Tokyo, respectively) for on-the-run 10-year U.S. treasuries between 8:30am and 10:30am EST. The figure was obtained from JP Morgan, US Fixed Income Strategy, Joshua Younger and Henry St. John, April 2, 2020.

The Fed's market-function purchases of US Treasuries

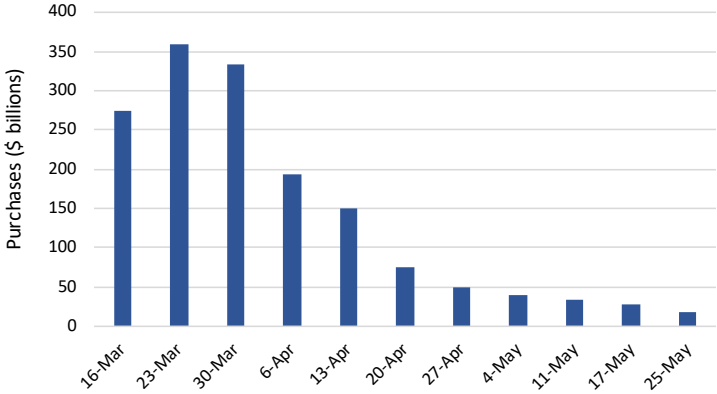


Figure: The Fed's purchases of treasuries, March 16 to May 25, 2020. Data source: Federal Reserve Bank of New York.

How much illiquidity should trigger purchases?

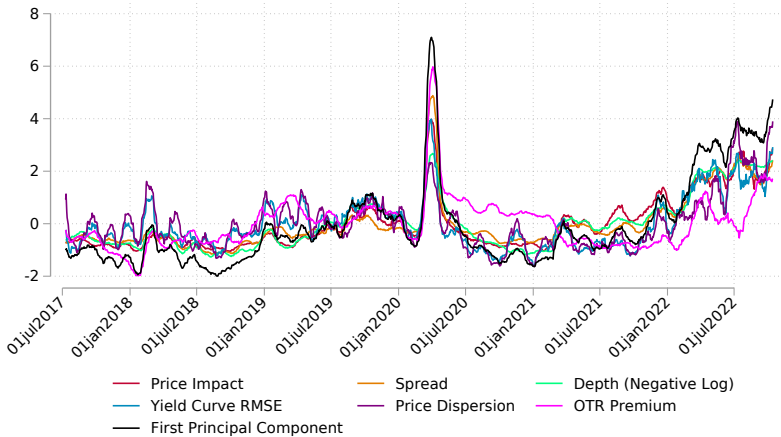
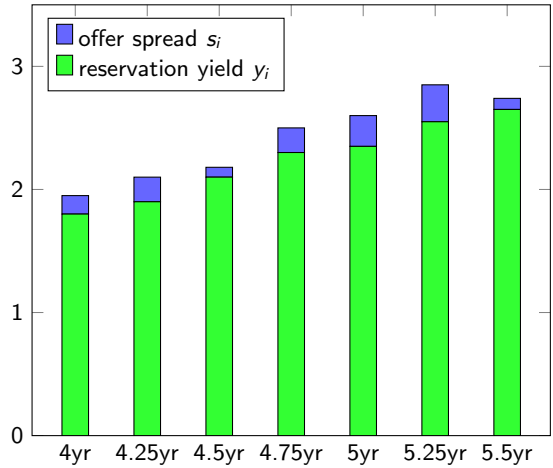


Figure: 21-day moving averages of Z-scores of six illiquidity metrics for the 5-year sector, and their first principal component. We include the 2-year, 5-year, and 10-year sectors, and for a market-wide illiquidity measure apply the first PC of the $6 \times 3 = 18$ underlying metrics. Duffie, Fleming, Keane, Shachar, and Van Tassel (2023).

Estimating dealer capacity utilization

- Net and gross positions in UST and agency MBS, dealer level, are from FR2004.
- Dealer purchases from customers over the past three business days, are from TRACE.
- Risk adjustment is based on swaption-implied volatilties and security-level DV01.
- The capacity of a dealer for a given activity is estimated, based on revealed preference, as the sample maximum (implying a downward bias).
- The capacity utilization of a dealer is the ratio of its current activity metric normalized by its estimated maximum.
- The collective capacity utilization of dealers is the weighted average of utilization across dealers, using capacity weights.

A traditional multi-price QE reverse auction



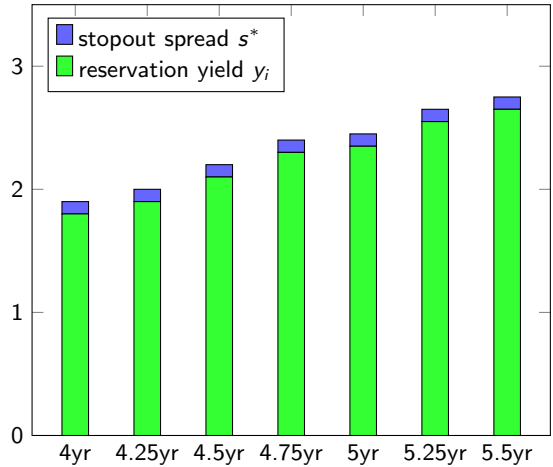
Reservation yields $y_1, \ldots, y_n$ are confidential.

An offer is to sell quantity q of security i at yield y_i^*.

Offers are awarded in order of spread $s_i = y_i^* - y_i$ until exhausting the total purchase quantity Q.

An awardee delivers the offered security i and is compensated at the offer yield y_i^*.

A delivery-choice auction for market-function purchases



Reservation yields $y_1, \ldots, y_n$ are announced.

An offer is to sell a quantity q at spread s_i.

Offers are awarded in order of spread until exhausting the total purchase. quantity Q at the stop-out spread s^*.

An awardee delivers any security i and is compensated at the yield $y_i + s^*$.

Figure: Duffie and Keane (2023).

Market function purchase programs

1. Purchase only when lending is insufficient to quell market dysfunction.
2. Distinguish between market function purchases and QE, to improve the effectiveness of both.
3. Transparency can mitigate moral hazard by causing investors to pay at issuance for the implied liquidity put.
4. Monitor dealer balance-sheet capacity utilization for signs of stress.
5. Adapt reverse-auction design to settings of market dysfunction. Consider a "delivery-choice" auction design.
6. Consider harnessing buybacks by the fiscal authority, to mitigate potential concerns over monetary policy communication and central bank independence.