

Submission in Response to U.S. Treasury Notice
Seeking Public Comment
on the Evolution of the Treasury Market Structure

Darrell Duffie*

(EXTREMELY PRELIMINARY)

Friday 22nd April, 2016

*Dean Witter Distinguished Professor of Finance, Graduate School of Business, Stanford University, and National Bureau of Economic Research. I am grateful for research assistance from Yang Song. This comment is in reference to Docket Number TREAS-DO-2015-0013.

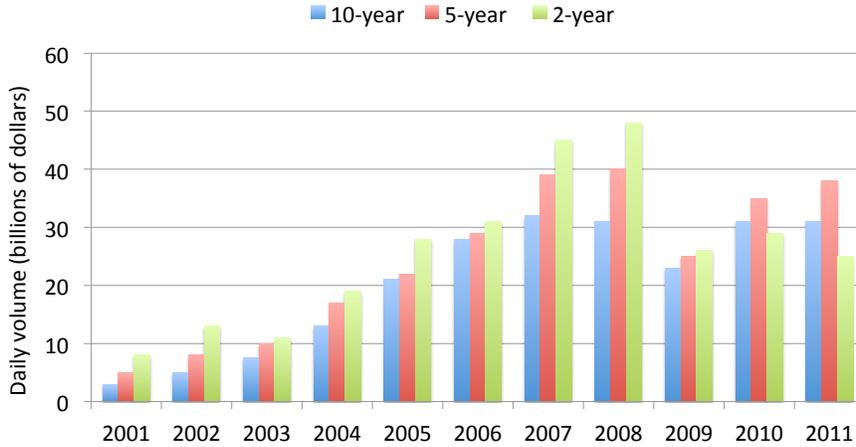
I am grateful to be permitted to submit this response. I will address only a narrow set of issues related to the liquidity of secondary markets for treasuries.

Secondary treasury market efficiency has been of increasing concern to me over the past decade, and especially over the past five years. I believe changes in market performance are due to a number of factors, among which the two most important are the following.

1. All-to-all electronic trade platforms have significantly disintermediated large dealers and are a venue for competition for order flow by principal trading firms (PTFs).¹ Among PTFs, high-frequency trading (HFT) is a dominant trading approach. PTFs are active liquidity suppliers for small trades, but are not equipped with the capital or expertise to provide immediacy for large block trades. As a result, in order to avoid costly price impacts, large trade interests are optimally fed into the market in small pieces over time, often with attendant delay costs. Mitigants include workup sessions.² Significant growth in the volume of benchmark notes traded on one of these platforms, BrokerTec, was evident in advance of post-crisis financial regulations, shown in Figure 1.
2. Basel III capital requirements, while improving financial stability, have somewhat discouraged large bank-affiliated dealers from holding large market-making positions in cash treasuries, treasury repos, and related rates-trading products. Matched-book treasury repo intermediation is particularly impaired by the Supplementary Leverage Ratio (SLR). I will later elaborate on this point.

¹See Kevin McPartland, U.S. Treasury Trading: The Intersection of Liquidity Makers and Takers,” Greenwich Associates, October 2015.

²See “Size Discovery,” by Darrell Duffie, D., and Haoxiang Zhu, Working paper, Stanford University, April, 2016; Fleming, M., and G. Nguyen, “Order Flow Segmentation and the Role of Dark Trading in the Price Discovery of U.S. Treasury Securities,” Working paper, Federal Reserve Bank of New York, 2015; and Fleming, M., E. Schaumburg, and R. Yang “The Evolution of Workups in the U.S. Treasury Securities Market,” Liberty Street Economics, Federal Reserve Bank of New York, 2015.

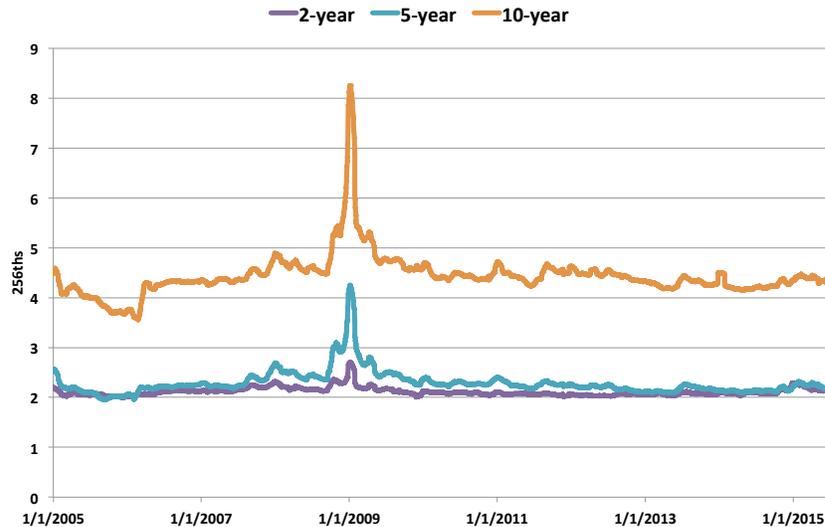


Source: Fleming (2014) (BrokerTec data)

Figure 1: Emergence of all-to-all treasuries trade platforms evidences significant disintermediation of dealers well before the onset of post-crisis regulation.

The first of the above two factors is a partial remedy for the second. If large dealers are not making markets as robustly, in part due to new capital regulations, it is beneficial that others are supplying more liquidity and that there are active all-to-all trading venues. Market liquidity and lower trading costs are generally assisted by all-to-all competition on electronic central-limit-order-book trading venues. Indeed, it would be helpful to bring more buy-side firms onto treasury securities trading platforms.

However, the liquidity of markets is not one-dimensional. While some aspects of liquidity have not been harmed, others have suffered. Any losses in market efficiency caused by capital regulations have undoubtedly been exceeded by the associated benefits of improved financial market stability.



Source: Adrian, Fleming, Stackman, and Vogt (2015) (BrokerTec data)

Figure 2: Source: “Has U.S. Treasury Market Liquidity Deteriorated?” Tobias Adrian, Michael Fleming, Daniel Stackman, and Erik Vogt, Liberty Street Economics, Federal Reserve Bank of New York, August, 2015.

I am not concerned that financial stability has been given too much weight in this tradeoff. It is nevertheless valuable to diagnose any deterioration in market liquidity in order to better address it, if possible.

Among many other relevant factors are post-financial-crisis regulations (beyond Basel III) and the Large Scale Asset Purchase program of the Federal Reserve. Overall, however, I believe that the first two enumerated factors dominate what we have been seeing. Bid-ask spreads are relatively stable, as shown in Figure 2, whereas the largest trade sizes and total turnover (trade volume divided by outstanding) have decreased, as shown in Figures 3 and 4. The reduction in turnover is only mildly related to the quantity of securities “trapped” in the Fed’s portfolio.



Source: Adrian, Fleming, Stackman, and Vogt (2015) (BrokerTec data)

Figure 3: Source: “Has U.S. Treasury Market Liquidity Deteriorated?” Tobias Adrian, Michael Fleming, Daniel Stackman, and Erik Vogt, Liberty Street Economics, Federal Reserve Bank of New York, August, 2015.

Some “air pockets” in market liquidity have been in evidence, for example³ with the “flash rally” of October 15, 2014, and in response to various communications of monetary policy by the Federal Reserve.

Delivery failures are high⁴ due to many causes that are difficult to disentangle, but which must surely include reduced dealer market-making inventories. I recommend a moderate increase in the delivery failure penalty, to

³ See the “Joint Staff Report: The U.S. Treasury Market on October 15, 2014,” U.S. Department of the Treasury, Board of Governors of the Federal Reserve System, Federal Reserve Bank of New York, U.S. Securities and Exchange Commission, U.S. Commodity Futures Trading Commission, Washington D.C., July 13, 2015.

⁴ See, for recent evidence, “What’s Behind the March Spike in Treasury Fails?,” by Michael Fleming and Frank Keane, Liberty Street Economics, Federal Reserve Bank of New York, April 18, 2016.

Treasury market turnover

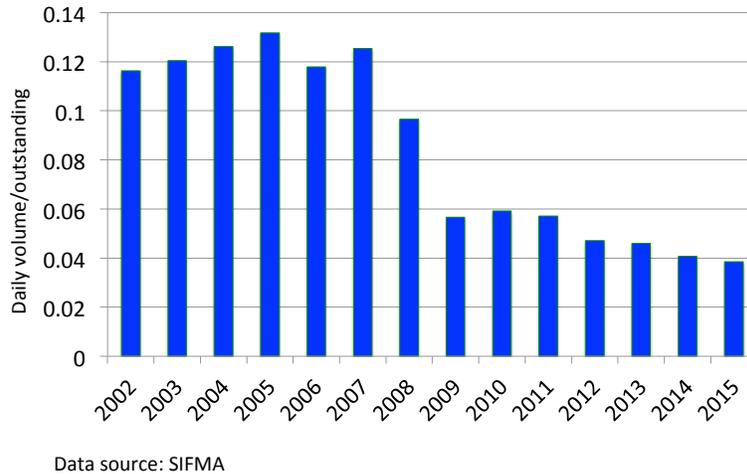


Figure 4: Total annual trade volume normalized by the total outstanding supply of treasuries. Data source: SIFMA.

a level that could perhaps be found through experimentation. The optimal level of delivery failures is not zero. The option to fail expands the virtual supply of securities available to the market. Extreme penalties would cause extreme aversion on the part of those offering to deliver securities without an ironclad “locate.”

Cost of dealer balance sheet space

The amount of liquidity offered to bond markets, in general, by large bank-affiliated dealers is markedly reduced.⁵ Large banks are stocking much smaller market-making inventories. Balance sheet space is treated like expensive real estate, available only to positions that can afford to pay rental fees that are now much higher.

⁵Here, I am repeating some of the arguments in my blog posting: “Why are Big Banks Supplying Less Liquidity to Bond Markets?” *Forbes*, March 11, 2016.

The “rent” for the balance sheet space associated with a given trade is the cost to bank shareholders when bringing the trade onto the banks balance sheet, above and beyond the mark-to-market profit on the trade. The main source of this cost is debt overhang.”⁶ When a bank finances the purchase of an asset, it effectively transfers some of the value of the asset to its legacy creditors, who now have more backing for their debt claims. Similarly, when a bank issues equity in order to meet a higher regulatory capital requirement for a new position, thus making its balance sheet safer, creditors benefit from a transfer of wealth through the increased safety of their claim. For a trade to be viable, its mark-to-market profit must exceed the associated wealth transfer to creditors. Debt overhang is smaller for more highly capitalized banks, giving them an important advantage in competing for trades.

In the case of intermediation of treasury repurchase agreements, the rental fee for balance sheet space has been sharply increased by regulation. On a typical repo intermediation trade, a dealer bank lends cash (in effect) to a counterparty who secures the loan with treasuries. The treasuries received by the bank are then usually financed by the bank itself on another repo, typically at a lower financing rate. The bank profits from the difference between the two repo rates. Absent capital requirements, this repo intermediation trade is almost self-financing because the bank passes the cash from one counterparty to the other, and the treasuries in the opposite direction. If a counterparty fails, the position can be liquidated with very low risk to the bank because it is almost fully secured or over-secured by cash or safe treasuries. Aside from any needed addition to regulatory capital, this trade causes almost no net economic change in the banks balance sheet, so the economic rental fee for space on the banks balance sheet would be almost zero. (It is not literally zero because there is a small risk and there are also short time lags between inflows and outflows of cash and treasuries.)

The new Supplementary Leverage Ratio (SLR) rule has significantly changed the liquidity of the treasury repo market. For the largest U.S.

⁶See Stewart C. Myers, “Determinants of Corporate Borrowing,” *Journal of Financial Economics*, 1977, Volume 5, pages, 147-175.

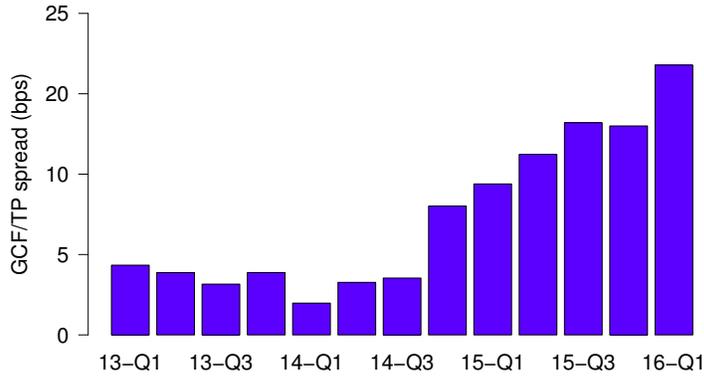


Figure 5: Average of overnight repo rate difference, GCF repo less tri-party repo, quarterly. Data sources: Bloomberg and BNY-Mellon

banks, the SLR, meant to backstop risk-adjusted capital requirements, now requires 6% capital for all assets, regardless of their risk. For a typical large dealer bank, the SLR is likely to be a binding constraint, or is viewed as potentially be a binding constraint, and therefore pushes up the banks required equity for a \$100 million repo trade by as much as for any other new position of the same gross size, for example a risky real estate loan of \$100 million. This means that a bank's required profit on a repo trade (once adjusting for maturity) must be in the vicinity of the profit on a risky loan in order for the repo trade to be viable for shareholder value maximization. That profit hurdle has become almost prohibitive for repo intermediation, so banks are providing dramatically less liquidity to the repo market. As a result, the spread between repo rates paid by non-banks and by banks has roughly tripled.

In the last quarter of 2015, the three-month treasury-secured repo rates paid by non-bank dealers became even higher than three-month unsecured borrowing rates paid by banks, a significant market distortion. Trade volume in the bank-to-non-bank dealer market for U.S. government securities repo

has become less than half of 2012 levels.⁷ European repo markets have also suffered some loss in liquidity, although European banks have been subject to a less severe version of SLR than U.S. banks.⁸

Recently, demands for interest-rate swap positions relative to U.S. treasury investments has driven swap spreads to extremely low levels across the maturity spectrum, as shown in Figure 5. As illustrated, medium term swap spreads became negative when 3-month GCF treasury repo rates fell below 3-month LIBOR. While the demand pressures that have lead to low or negative swap spreads are not themselves caused by treasury market illiquidity, the illiquidity of treasury repo markets is a prime suspect for the inability of arbitrage forces to drive swap spreads back toward their normal levels.

Repo market liquidity is an important ingredient in the general liquidity of bond markets, and especially cash treasury markets. Repos are used to finance bond trades, to short bonds, and to hedge interest rate risk. A natural fix would be to relax the Supplementary Leverage Ratio for extremely safe forms of government securities repo intermediation. For those who favor no change in the SLR, a counter-argument would be: Making exceptions is a slippery slope. Where would it stop? I have argued that risk-weighted capital requirements should instead be made even stronger by using more robust risk weights for some asset classes, including government bonds.

Another fix proposed for the U.S. repo market is the introduction of a market-wide repo central counterparty (CCP), which would reduce the required amount of bank balance sheet space. It has been difficult to get such a CCP started because of the significant liquidity requirements needed to treat the extreme but plausible case of clearing member failures.

⁷See Antoine Martin, Reform, Regulation, and Changes in the U.S. Repo Market, Federal Reserve Bank of New York, Presentation at RISK USA, October 21, 2015.

⁸For the situation in Europe, where the leverage-ratio rule is less severe than the rule applied in the U.S., see “Perspectives from the Eye of the Storm: The Current State and Future Evolution of the European Repo Market,” International Capital Market Association, November 2015.

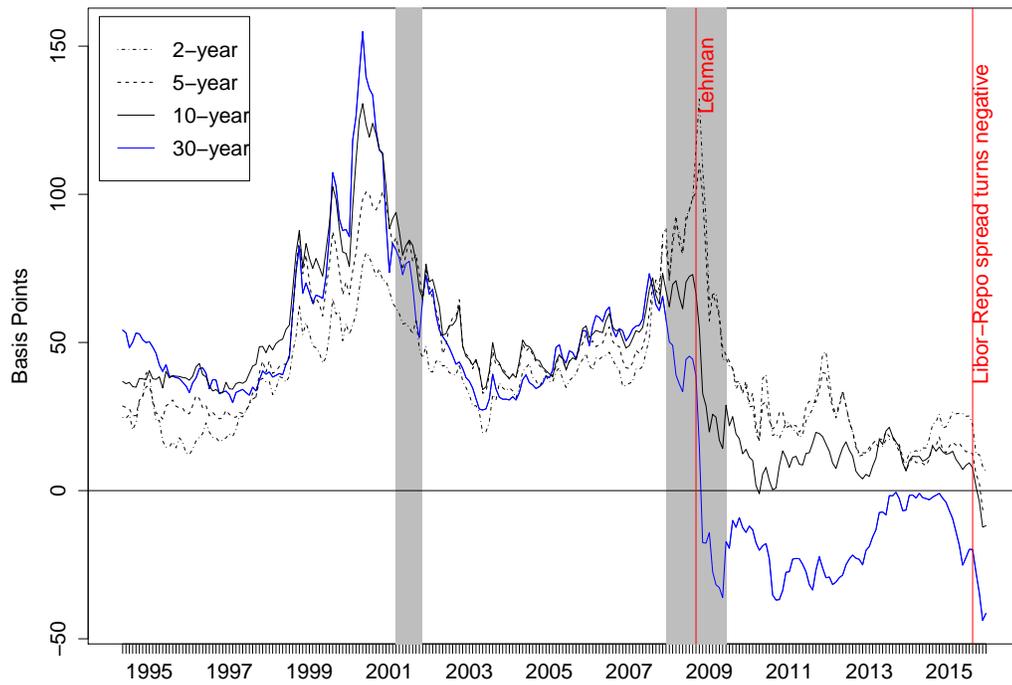


Figure 6: Recent low and negative swap spreads. Figure source: “An Explanation of Negative Swap Spreads,” Sven Klingler and Suresh Sundaresan, Working paper, Columbia University, April 2016.