The Role of Hedge Funds in the 2020 Treasury Market Turmoil

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Abstract

This paper provides new evidence about the behavior of hedge funds during the disruptions that occurred in the Treasury market in March 2020. In contrast to some recent policy papers arguing that hedge funds were a major amplifier of those disruptions, we show that aggregate Treasury positions held by hedge funds were far too small to be the main disruptive factor. Moreover, we find that a range of parties, especially non-US official institutions, sold Treasuries as they sought to lock in US dollars in cash. The hedge funds implementing the Fixed Income Relative Value strategy behaved in a way that was consistent with market expectations as they faced challenging financing conditions when banks abruptly withdrew from funding their positions in the repo market. Overall, this evidence also highlights important vulnerabilities of the Treasury market. Since the last financial crisis, exploding federal deficits led to a significant increase in the stock of marketable Treasuries which outstripped the capacity of dealers to safely intermediate the market on their own balance sheets.

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1. **Introduction**

In hindsight, it might be an understatement to say that March 2020 witnessed an unusual episode in financial markets. The growing concerns over the COVID-19 pandemic and the initiation of shutdowns of major economies around the world was an unprecedented situation for market participants and investors. Unemployment surged as many people were unable to work or lost their jobs, all major stock market indices fell by at least 25 percent in early March, and the index that measures market volatility, the VIX (sometimes dubbed the “fear index”), more than doubled in the first half of March alone and reached levels last seen in 2008.

In fixed income markets, the turmoil was initially accompanied by the usual flight-to-safety in a crisis, as investors sold risky assets in exchange for less risky ones. Treasury yields plunged to new lows - that is, until March 9. In the two weeks that followed, Treasury yields bounced up sharply even as risk aversion remained acute and volatility elevated. This suggested that investors were unwinding even their Treasuries positions resulting in liquidity becoming strained (Figure 1). The Treasury markets eventually started to stabilize as the Federal Reserve ramped up purchases of Treasury securities toward the end of the month, but there is no definitive explanation yet of the confluence of factors that led to the dislocations in trading activities for Treasuries.

![Figure 1](image-url)

**Figure 1.** From top to bottom: the 10-year Treasury yield, the ICE BofA MOVE index, and the bid-ask spread from February 2020 to April 2020. Yield bounced back shortly after March 9th while volatility remained at an elevated level. The bid-ask spread also deteriorated considerably, a sign of illiquidity. The vertical line indicates March 9th. *Source: Bloomberg.*

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Various recent papers document the events and present their hypotheses. One early theory, suggested by Schrimpf, Shin and Sushko (2020), posits that hedge funds, especially those implementing the Fixed Income Relative Value strategy (henceforth the FI-RV strategy), were a major amplifier. Picking up on this analysis, some began to estimate that FI-RV participants unwound $90 billion of their Treasury holdings (Bank of England, 2020). Increased margin requirements on the futures positions reportedly prompted the selling, as this analysis goes, and this in turn generated a margin spiral. Meanwhile, the primary dealers, constrained by their balance sheet and capital ratio requirement, were unable to absorb the volume.

In contrast, we provide evidence that:

1. Aggregate Treasury positions held by hedge funds were far too small to be the main cause of the disruptions in the Treasury market. A range of parties, especially non-US institutions, sold Treasuries as they sought to lock in US dollars in cash. Our calculations suggest that FI-RV hedge fund positions were not large enough to disrupt the market to the extent that we observed, as their total size, even after accounting for leverage, was still significantly less than that which is necessary to move the multi-trillion dollar Treasury market.

2. Furthermore, selling by FI-RV funds was likely to be concentrated in a specific type of Treasury, the cheapest-to-deliver Treasuries, which did not show the same level of dislocation as other parts of the Treasury market.

3. The FI-RV hedge funds behaved in a way that was consistent with market expectations as they faced challenging financing conditions when banks abruptly withdrew from funding their positions. There is evidence that—despite the pullback in bank financing—hedge funds continued to provide liquidity to the Treasury markets.

Our examination of the data during March dovetails broadly with the recent analysis of a senior policy official at the Federal Reserve Bank of New York (Logan, 2020) and with the evidence provided by Goldberg (2020) about the decline in dealer inventory capacity in March. Our conclusions are also consistent with many of the findings discussed by contemporaneous work by Barth and Kahn (2020).

The remainder of the paper is structured as follows. Section 2 describes the FI-RV strategy and provides evidence with respect to the assets under management and leverage of the hedge funds involved in the FI-RV trade. Section 3 shows that foreign official accounts, i.e. non-US institutions, seeking to lock in dollar liquidity, exerted significant selling pressure on the Treasury market. Section 4 describes how the price on Treasury securities owned by FI-RV funds traded at a premium compared to other similar Treasury securities during March. Section 5 provides evidence that one of the main sources of distress was the deterioration of the wholesale funding market. Section 6 presents concluding remarks and policy implications.
2. Fixed Income Relative Value Strategy Explained

Relative value (RV) strategies are but one of the many strategies across a broad range of diverse market participants that fall under the umbrella term “hedge fund.” RV strategies in total account for about $315 billion of hedge fund assets under management (Figure 2), of which a subset is the fixed income relative value (FI-RV) strategies of the type that we examine in this paper.

![Hedge Fund AUM as of Q1 2020](image)

**Figure 2.** The Asset under Management (AUM) of various hedge fund strategies as of Q1 2020. The RV strategy, including equity relative value, fixed income relative value and others, is but one of the many strategies across a broad range of diverse market participants that fall under the umbrella term hedge fund. **Source:** Preqin Report.

In particular, the Treasury futures-cash relative value strategy usually consists of a long leg, a Treasury position in the cheapest-to-deliver bond, financed through the repo market, and a short leg in the Treasury futures contract (Figure 3). In recent years, the Treasury futures contract price has usually been slightly higher than that of the underlying, because holding spot Treasury securities consumes more balance sheet capacity or balance sheet financing than holding a long position in a futures contract.

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3 The buyer of a futures contract has the obligation to purchase a specific quantity of a particular underlying security, while the seller must deliver this security on a specific date. For Treasury bond futures contracts, the parties typically agree that any Treasury bond can be delivered so long as it is within a certain maturity range and has a certain coupon rate. The term cheapest to deliver (CTD) refers to the cheapest bond that can be delivered in a futures contract to satisfy the contract specifications.
Figure 3. Comparison of positions in Treasury futures by entity between 2010 and 2020. As banks/dealers gradually stepped away from the futures business, institutional asset managers such as pension funds or insurance companies became the biggest buyer and leveraged funds became the biggest liquidity provider (seller) in the Treasury futures market. Source: Commodity Futures Trading Commission

By executing these basis trades, the FI-RV strategy is able to lock in a small but almost-certain gain as futures and spot prices converge, which they must do as the contract approaches maturity because the two assets are nearly identical. In fact, in normal times, investors can buy Treasuries, sell the futures contract, and pocket the difference. The strategy is usually leveraged through the repo agreement enabled by posting the Treasury securities as collateral. Investors can then use this additional cash to improve returns by increasing the size of their trade. Due to the liquid nature of the Treasury products, banks are usually quite willing to lend to facilitate the trade.

However, contrary to the narrative that RV funds are highly levered (Schrimpf et al. 2020), Barth, Hammond, and Monin (2020) exploits regulatory data to show that on average, the RV strategy has a leverage ratio of 3 (Figure 4, top panel) with the funds in the 90th percentile having a ratio of about 5 (Figure 4, bottom panel).
Figure 4. Average hedge fund leverage by strategy as well as its distribution. The RV strategy (top panel, rightmost bar), a superset of FI-RV strategy, reports an average leverage level of around 3. Even the more highly leveraged ones do not usually go beyond a ratio of 5, as indicated by the 90th percentile (bottom panel, rightmost bar). Source: Barth, Hammond, and Monin (2020).

Finally, to further clarify the strategy, similarly to Barth and Kahn (2020), we provide an overview of how cash flows among different market participants involved in the repo market in Figure 5. Money market funds, as well as pension and insurance funds, are the main cash lenders in this transaction, with the largest broker/dealers facilitating the transactions for the cash borrowers, i.e. hedge funds. The role of banks in intermediating cash flows in the repo market is an important point to help understand the stresses that occurred in March and is discussed in Section 5.

Figure 5. The repo market connects cash lenders with cash borrowers through broker/dealer. The arrow indicates the direction of cash. Source: Barth and Kahn (2020).
3. AUM and Trading Volume

There is ample evidence that the hedge funds active in the FI-RV strategy did not possess the capacity or resources to drive the Treasury sell-off. As mentioned before, the overall asset under management of the RV strategy is about $315 billion as of Q1, significantly lower than the weekly trading volume (Figure 6) of Treasury securities averaging around $4.8 trillion in March.

![Figure 6. Weekly trading volume of Treasury securities. The turmoil in March was accompanied by a surge in volume throughout the month. Source: Financial Industry Regulatory Authority.](image)

To get a sense of the biggest players in terms of trading volume in the Treasury market, a joint report by Treasury, Federal Reserve System, SEC and CFTC (2014) points out that principal trading firms accounted for more than half of the transactions. Banks/dealers came second and hedge funds, even after taking into account leverage, only contributed about 4-9 percent of the total volume in the spot market and 12-15 percent in the futures market (Figure 7).

![Figure 7. The composition of Treasury securities trading volume by firm type. Hedge funds overall accounted for 4-9% of the volume in the cash market and 12-15% in the futures market, while principal trading firms contributed more than half of it. Highlighted rectangles indicate the portion of trading volume attributable to hedge funds. Source: Treasury, Federal Reserve, SEC, CFTC.](image)
Furthermore, foreign sector (Figure 8) saw a net outflow as large as $260.4 billion in Treasury securities during March, including $147 billion in official accounts, which dwarfs the $90 billion reportedly sold by the FI-RV strategy as previously cited.

![Net Foreign Purchases in Treasury Securities](image)

**Figure 8.** Net foreign purchases in Treasury securities. March saw a significant outflow by both foreign official accounts and other foreign accounts, totaling $260.4 billion, almost three times the $90 billion allegedly attributed to the FI-RV strategy. The horizontal line indicates the $90 billion mark. *Source: Treasury International Capital System.*

At this point we can ask what would be the volume needed to be sold to explain the price pattern observed in March 2020. Assuming a linear relationship between the price and volume on the bid side of the order book, a back-of-the-envelope analysis (Table 1) shows that even with the worst order book seen in March, i.e., the one with the lowest depth (Fleming and Ruela, 2020; and Fleming, 2020), it takes a total sales of approximately $205 billion worth of 10-year Treasury notes to push the 10-year yield from 0.54 percent (lowest in March) to 1.18 percent (highest in March). This is already comparable to the total AUM of the entire RV strategy and this is only with respect to the 10-year Treasury note, which accounts for about one-sixth of the total Treasury trading volume.
Table 1. Simple estimation of 10-year Treasury note’s worst market depth during March based on data by Fleming and Ruela (2020) and Fleming (2020). The analysis suggests that it takes a sale of at least $205 billion to push the 10-year yield from 0.54% (lowest in March) to 1.18% (highest in March). Price increment is 32nds of a dollar. The calculation is based on the assumption of a linear relationship between price and volume and other price-volume structure would likely lead to a different outcome.

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<th>Yield</th>
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<td>5</td>
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<td>$103.01</td>
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</tr>
</tbody>
</table>

4. Price of Cheapest-to-Deliver Treasuries during March 2020

Even when the overall Treasury market experienced significant selling pressure after March 9th, Barth and Khan (2020) identify a price premium found in some Treasury instruments. They point out that there was a positive spread in yield between the otherwise similar non-deliverable Treasuries and the comparable cheapest-to-deliver bond during the March turmoil (Figure 9). As mentioned previously, the FI-RV strategy typically focuses on holding only one particular type of Treasury, the cheapest-to-deliver one as specified by the Treasury futures contract (the short leg of basis trade). The fact that such Treasury notes were trading at a higher price than others suggests that selling pressure exerted by the strategy was likely to have been more than offset by other market participants’ continuing demand for such instruments. The increased premium on cheapest-to-deliver Treasury notes relative to other Treasury notes further proves that the illiquidity and dislocations in other parts of the Treasury market were unlikely to be caused by FI-RV funds selling the cheapest-to-deliver Treasury notes.
Figure 9. The difference in yield between non-deliverable but otherwise similar bonds and the cheapest-to-deliver bonds. The spread peaked during mid-March, indicating cheapest-to-deliver bond trading at a premium over others. Barth and Kahn (2020) states that such premium contradicts the belief that illiquidity was driven by FI-RV hedge funds dumping their cheapest-to-deliver Treasury positions onto the market. Source: Bloomberg.

5. FI-RV Financing

The lack of available repo financing is one of the pivotal reasons that drove the FI-RV sales of Treasury securities during March. Barth, Hammond, and Monin (2020) establishes that the RV strategy relies on repo financing by the banks more than any other in the hedge fund universe. Figure 10 reports hedge funds’ funding sources by strategy and shows that for RV strategies on average more than 50 percent of their total assets are funded by repos. As such, stress tends to materialize upon banks’ withdrawal from the repo market.

Figure 10. Average hedge fund financing source by strategy. The FI-RV has a larger reliance on the repo market than any other hedge fund strategy. Source: Barth, Hammond, and Monin (2020).
Since the last financial crisis, various leverage and capital ratio constraints have led to an increasing unwillingness and a decreasing capacity for the banks to act as the market maker of last resort and as funding provider (Committee on the Global Financial System, 2014). Primary dealers’ net Treasury positions reached near-maximum capacity as Treasury issuance skyrocketed in the last two years (Figure 11).

![Figure 11.](image.png)

**Figure 11.** Primary dealer’s monthly average net Treasury positions and market value of marketable Treasury debt. Along with the increase in Treasury debt, the primary dealers’ aggregate position has been growing since 2018. Its high level during March further limited their ability to provide repo access to their hedge fund clients. Highlighted bar indicates March 2020. Source: Federal Reserve Bank of New York and Federal Reserve Bank of St. Louis.

So, it shouldn’t come as a surprise that a quarter of them reportedly claimed that the availability of repo financing to FI-RV clients decreased in mid-March (Board of Governors of the Federal Reserve System, 2020), at the same time as liquidity in Treasury markets became scarce for some maturities. Goldberg (2020) also points out that according to the implied supply and demand index of dealer-provided liquidity, demand for it soared while supply retreated during March 2020, and while demand quickly stabilized to pre-March levels, supply of dealer liquidity remained at its lowest level since 2018 (Figure 12).
Figure 12. The supply and demand of dealer-provided liquidity, backed out from the proxies of price and quantity of liquidity. The recent market turmoil saw some of the biggest mismatch between supply and demand of such liquidity. Highlighted bar indicates March 2020. Source: Goldberg (2020).

We also provide an additional quantification of the lack of banks’ financing. To some extent, the aggressive repo operations (Figure 13) by the Federal Reserve during March provides a rough estimate of the maximum size of the gap resulting from banks shying away from financing their customers. The Federal Reserve had to intervene in order to inject the massive amount of liquidity that markets needed to unfreeze in the second half of March, as banks could no longer take additional assets onto their balance sheet or provide repo access to their clients.

Figure 13. The volume of repo operations by the Federal Reserve. Massive amount of liquidity has been injected into the Market in the second half of March as banks could no longer absorb additional assets onto their balance sheet. Source: Federal Reserve Bank of New York.
Consistent with the view that market participants had trouble in financing their positions, we provide evidence that the terms of repo financing deteriorated dramatically for some asset managers. According to the Federal Reserve Bank of New York data, in the extreme case (Figure 14), the SOFR rate\(^4\) ranged from as low as 0.20 percent (1st-percentile) to as high as 2 percent (99th-percentile) on March 16th, the day after the Federal Reserve slashed interest rates to near 0.

![SOFR Repo Rate](image)

**Figure 14.** The distribution of SOFR repo rate during March. Both the median and skewness of the distribution shifted significantly on March 16th, the day after the Federal Reserve announced that interest rates would be cut to near 0. *Source: Federal Reserve Bank of New York.*

The extreme tiering in repo markets, coupled with the loss-making positions for some FI-RV trades, likely forced some fund managers to step away from repo financing and as a result, further unwind their Treasury positions. In accordance with this view, a recent survey by International Swaps and Derivatives Association (2020) shows that the market participants listed “reduced risk appetite of banks” as the top reason that resulted in the illiquidity in the swap market.

\(^4\) The Secured Overnight Financing Rate (SOFR) reflects the cost of overnight cash borrowing collateralized by Treasury securities.
6. Conclusion

In conclusion, the FI-RV hedge funds’ behavior was overall consistent with market conditions and it is unlikely to have been the main driver of the recent market turmoil. While some funds had to unwind some of their Treasury holdings due to the lack of available repo financing, they also provided liquidity to the Treasury futures market. Furthermore, FI-RV hedge funds tended to trade in instruments that did not show the same evidence of dislocation as in other parts of the Treasury market, as indicated by the premium in the cheapest-to-deliver bond. Moreover, the size of FI-RV hedge funds, even including leverage, is unlikely to be large enough relative to the Treasury market to cause the disruptions that the market experienced in March. Finally, selling pressure from the foreign sector might have been a more significant cause behind illiquidity.

The March 2020 episode has exposed important vulnerabilities of the Treasury market. Since the last financial crisis, exploding federal deficits led to a significant increase in the stock of marketable Treasuries which outstripped the capacity of dealers to safely intermediate the market on their own balance sheets. The situation is also the result of dealers’ balance sheets being severely constrained by the capital and liquidity requirements implemented after the 2008-2009 crisis. Duffie (2020) argues that these conditions are likely to cause “more frequent bouts of market illiquidity that will raise doubts over the safe haven status of U.S. Treasuries and increase the cost to taxpayers of financing growing federal deficits.” He recommends the introduction of a central clearing of the Treasury transactions which requires less commitment of dealers’ balance sheets because trades can be netted against each other. The introduction of a central clearing, as well as policies aimed at improving the efficient functioning of the Treasury market, are likely to ultimately increase financial stability.
References


Board of Governors of the Federal Reserve System. 2020. “Senior Credit Officer Opinion Survey on Dealer Financing Terms,” June 18, 2020


