

Enhancing Liquidity of the U.S. Treasury Market Under Stress

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Abstract: Liquidity in U.S. Treasury markets evaporated in March 2020 as the economic and financial implications of COVID-19 became apparent. Large and widespread selling of bonds by foreign central banks and many types of nonbank financial intermediaries overwhelmed the supply of liquidity by the securities dealers that act as bond market intermediaries. The Federal Reserve took massive, unprecedented actions to restore market liquidity. These events reflect the extraordinary growth in the size of U.S. bond markets in recent years, increased holdings of Treasury securities by investors that may need to rapidly sell them in periods of stress, and a substantial reduction in the capacity or willingness of securities dealers to meet demands for liquidity in U.S. bond markets under market-wide stresses. We propose four complementary measures that are intended to increase the provision of Treasury market liquidity in stress periods and thus increase market resilience, which is critical for the strength and stability of the U.S. economy.

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1. Introduction and Summary

Liquidity in U.S. bond markets evaporated in March 2020 as the economic and financial implications of COVID-19 became apparent. Large and widespread selling of bonds by nonbank financial institutions, foreign central banks, and many others overwhelmed the supply of liquidity by the securities dealers that act as bond market intermediaries.¹ The Federal Reserve took massive, unprecedented interventions to restore market liquidity. Although the evaporation of liquidity, especially in the U.S. Treasury markets, came as a shock to both market participants and policymakers, in retrospect it was unsurprising. There has been extraordinary growth in the size of U.S. bond markets in recent years, increased holdings of Treasury securities by investors that may need to rapidly sell them in periods of stress, and a substantial reduction in the capacity or willingness of securities dealers to meet demands for liquidity in U.S. bond markets under market-wide stresses. As Randal Quarles, vice chair of the Federal Reserve Board for supervision, said recently, the rapid expansion of Treasury market debt in recent years “may have outpaced the ability of the private-market infrastructure to support stress of any sort.”²

We are confident that policymakers are carefully considering potential regulatory changes that could reduce demand surges for market liquidity under stress, especially procyclical demands from nonbank financial institutions, including prime money market mutual funds, open-end bond funds, and leveraged funds.³ We seek to complement those efforts by considering and proposing measures that are intended to increase the supply of market liquidity in stress periods.

First, we propose that the Federal Reserve create a new standing repo facility to support market liquidity in periods of broad stress through regulated dealers under pre-established arrangements. The Fed would use a repurchase agreement (repo) to make a loan to a dealer collateralized by Treasury or agency securities. Currently the Federal Reserve can provide liquidity directly only to commercial banks (and other insured depository institutions), except in emergency situations. This patchwork backstop is ineffective for supporting credit in stress situations when the credit needs of the U.S. economy now are met more through bond issuance in markets than through bank loans.

A standing repo facility that offers backstop secured financing of Treasury and agency securities in stress periods would encourage more dealers to invest in market-making capacity, and that, in turn, would allow them to supply liquidity to U.S. bond markets in normal periods and to be able to accommodate clients’ needs in abnormal periods. It would be open to both bank-affiliated and independent dealers that meet prudential requirements established by the Federal Reserve, in consultation with the Securities and Exchange Commission (SEC), to reduce any moral hazard brought about by the facility. The requirements would be tailored to the size and complexity of the individual dealer, which would allow smaller dealers to compete more effectively with large dealers. The facility would provide secured funding at prudent haircuts and at an interest rate modestly above the current market rate, high enough to ensure the facility is used only in abnormal times but not so high as to stigmatize the use of the facility and defeat its purpose. By increasing confidence in the availability of repo financing, a facility could also reduce the “dash for cash” motive that was evident in March, when investors rushed to liquidate their Treasury securities for cash.

¹ See Duffie (2020) for a description of the dislocations in the Treasury market, and Liang (2020) for the effects of the corporate bond market on sales of Treasury securities.

² Reported in “Why the bond market might keep America’s next president awake at night,” Nov. 4, 2020, *The Economist*. <https://www.economist.com/finance-and-economics/2020/11/04/why-the-bond-market-might-keep-americas-next-president-awake-at-night>

³ Financial Stability Board, “Holistic Review of the March Market Turmoil,” November 17, 2020.

Second, we propose serious consideration be given to a mandate for wider use of central clearing for Treasury securities, starting with a thorough study, as proposed by Darrell Duffie (2020). Broader central clearing through a central counterparty clearinghouse (CCP) would increase the supply of liquidity by the largest bank-affiliated dealers by easing constraints because bank capital and leverage requirements recognize the risk reduction from multilateral netting of cleared trades. The rules of the CCP should be designed to enhance the ability of smaller bank and independent dealers to compete and not further increase the dominant positions of the largest dealers. It might also eventually enable more all-to-all trading, which could reduce the need for dealer intermediation altogether by permitting investors to provide the flexibility in the system, as in the equity markets. To be sure, central clearing raises concerns about concentrations of risk in CCPs and in clearing firms, so expanded clearing would make their regulation even more important. Thus, a thorough study should be conducted to assess the costs and benefits. If such a study were to conclude that expanded clearing is not appropriate for Treasury securities, it should explain what distinguishes Treasury markets from the many other markets, such as equities and Treasury futures, for which there is a clearing mandate.

Third, we propose targeted changes to bank regulations that we believe could improve liquidity provision by bank-affiliated dealers without reducing their overall safety and soundness. Specifically, the Federal Reserve in March temporarily exempted deposits at Federal Reserve Banks (hereafter “reserves”) and holdings of U.S. Treasury securities from the supplementary leverage ratio (SLR) to alleviate constraints that were hindering dealers from providing liquidity during the pandemic crisis. We propose that reserves at the central bank be permanently excluded because they are riskless. We do not support permanent exclusion of Treasuries, which have interest rate risk. We also propose replacing some of the higher static buffers of the enhanced SLR (eSLR) with a countercyclical component, which could be released in episodes of market-wide stress to support liquidity of Treasury markets and other bond markets. We also suggest that the Federal Reserve should review certain elements of the methodology for determining the GSIB capital surcharge, which that may be unnecessarily restraining market-making by bank-affiliated dealers in times of market stress.

Fourth, we propose increased data collection, especially for bilateral uncleared repo, and disclosure to improve transparency about broker-dealers and leveraged funds. These data are critical to better monitor funding risks and leverage in nonbank financial intermediation and to reduce moral hazard from a standing facility.

We believe that all four sets of reforms are needed. Any one on its own would not be enough to significantly increase the resilience of Treasury markets in both normal periods and stress periods. These reforms are intended to expand the capacity for dealers to absorb demand surges for liquidity, while minimizing drawbacks to safety and soundness of large bank-affiliated dealers. Importantly, they would reduce the need for the Federal Reserve to intervene with ex post emergency actions to support Treasury market liquidity outside of the most extreme circumstances. The Fed purchased nearly \$800 billion in Treasury and agency securities in the last half of March and has continued to purchase at a rate of \$120 billion a month. While these quick actions were necessary and successful, ex post interventions can be more costly to the Fed and financial stability than those under a well-designed repo facility with pre-established rules and prudential regulation of dealers. Ex post emergency actions in periods of stress could give rise to moral hazard if such actions are expected again in future stress, and the beneficiaries of emergency actions include a very broad set of bond issuers and bond investors, many of whom are not, and some of which realistically cannot, be regulated. In addition, relative to repo, outright purchases to address market imbalances expand Fed actions beyond traditional lender of last resort functions based on collateralized lending, increase interest rate risk, and potentially constrain the use of asset purchases for monetary policy objectives.

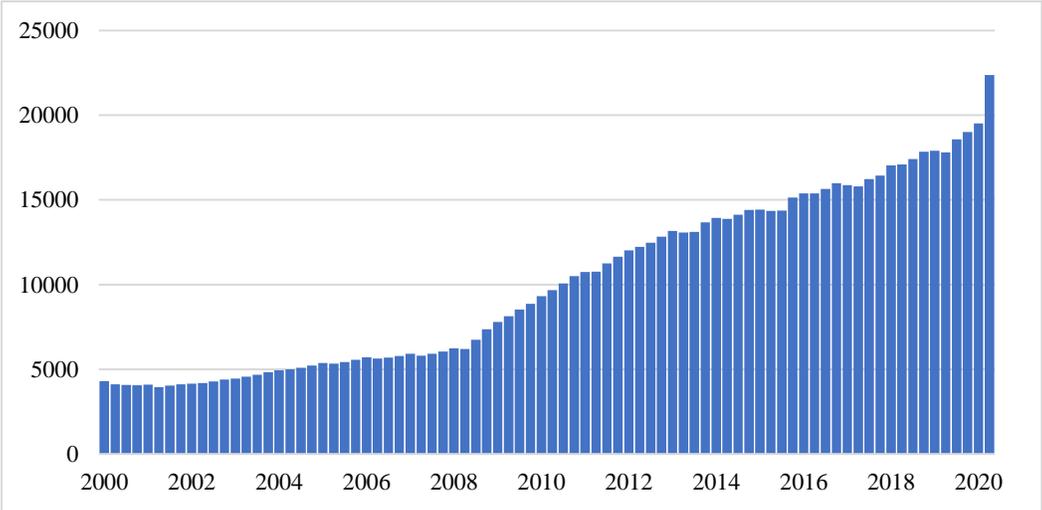
The next section documents the structural problem that has developed in recent years—the markets have grown enormously, while the capacity of dealers to provide liquidity to those markets has shrunk—has resulted in the under-provision of liquidity in stress periods. Section 3 presents our proposed reforms.

2. The Structural Problem

U.S. bond markets have grown enormously. Credit is increasingly provided by bonds issued in markets to investors, held directly or through funds, rather than loans made by banks. Bond financing relies on the market liquidity of the bonds, especially of Treasury securities, since investors want assurance they can sell bonds when they want to without having a material impact on their price. But broker-dealers, the traditional market-makers in the bond markets, have substantially reduced their capacity since the global financial crisis (GFC). Moreover, the broker-dealer market has become increasingly concentrated, and all of the very largest dealers are now affiliates of global systemically important banks (GSIBs). That the liquidity of these enormous markets is dependent on such a small set of such dealers raises concerns regarding market efficiency and financial stability.

The amount of Treasury securities outstanding has grown rapidly in recent years (Chart 1). Debt has quadrupled to \$20 trillion, rising significantly in the second quarter of 2020, reflecting the federal government’s spending response to the coronavirus pandemic. The Congressional Budget Office projects that, under current legislation, Treasury issuance will continue to increase substantially for the next few years.

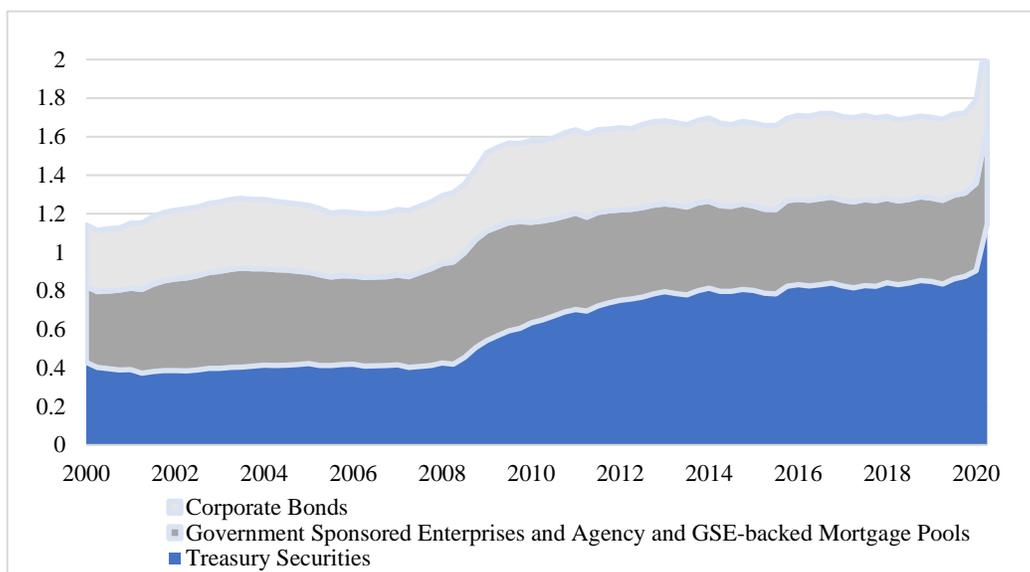
Chart 1. Treasury securities outstanding (\$ billion)



Source: *Financial Accounts of the U.S.*

Treasury debt held by the public (including the Federal Reserve) relative to GDP rose from 40 percent in 2008 to more than 110 percent in the second quarter of 2020 (Chart 2). At the same time, agency debt and corporate bonds have been increasing in line with GDP. The sum of Treasury, agency, and corporate debt now equals two times GDP, up from about 1.4 times in 2008. In addition, corporate bonds have grown much more rapidly than bank loans to businesses. Bonds issued by nonfinancial businesses rose, in nominal terms, from \$355 billion in 1980 to \$6.38 trillion in 2020, while business loans from depository institutions grew more slowly, from \$206 billion to \$1.34 trillion over that same period.

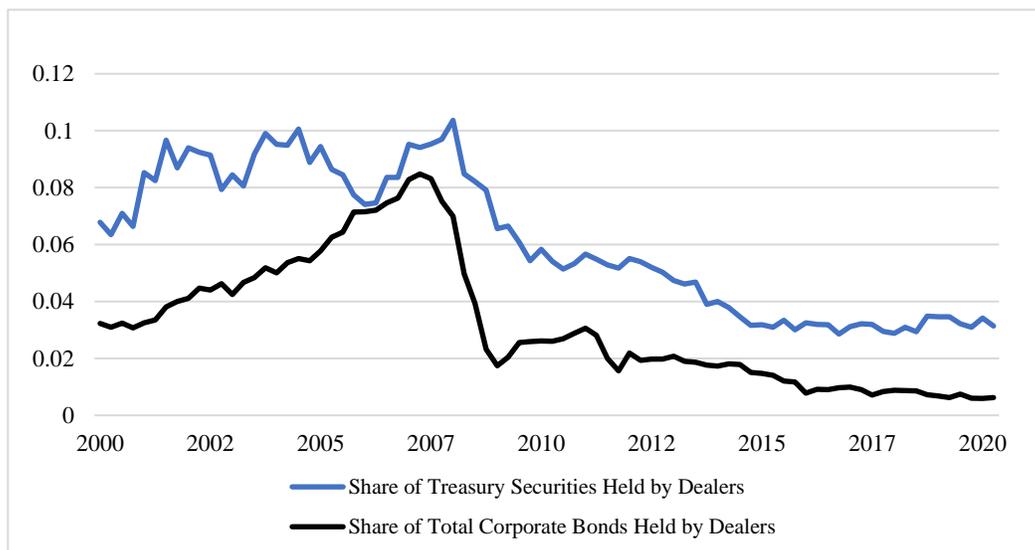
Chart 2. Treasury, agency, corporate securities to GDP, 2000 to 2020: Q2



Source: *Financial Accounts of the U.S.*

Broker-dealers play a central role in U.S. bond markets by providing liquidity by buying and selling securities and financing purchases of securities by other market participants. But while gross inventory positions of Treasury securities of dealers have held about steady since 2008, positions as a share of Treasury securities outstanding declined markedly, from 10 percent in 2008 to 3.1 percent in 2019 (Chart 3), indicating reduced market-making. Dealer inventories of corporate bonds fell even more than for Treasury securities. These lower inventories and less flexibility to respond to events because of stricter regulations and internal risk management protocols suggest a greater risk of insufficient provision of liquidity in stress.

Chart 3. Share of Treasury and corporate bonds held by dealers



Source: *Financial Accounts of the U.S.*

At the same time, the share of Treasury securities held by funds that are reliant on the ability to quickly sell Treasuries for liquidity has risen. In 2019, open-end mutual funds held 12 percent of Treasury securities outstanding, and hedge funds held 9 percent, indicating a greater risk of a surge in liquidity demand in stress periods. In addition, the increase in trading by proprietary trading funds (PTFs) may make the Treasury markets more vulnerable to a sharp pullback in market liquidity in times of stress, even though market liquidity is ample in normal periods. PTFs now account for nearly half of the daily volume in the inter-dealer market on typical days. PTFs tend to take small positions throughout a trading day but close without any position. While they provide market liquidity in normal periods, they withdraw when volatility increases and events are less predictable, such as in March (Harkrader and Puglia, 2020). Overall, indicators of market liquidity, such as bid-asked spreads and market depth, suggest Treasury markets function well in normal times. But these measures have proven to be poor indicators of how the markets function under stress.

Another feature of the Treasury market is the high degree of market concentration among the largest dealers. In the dealer-to-client segment of the Treasury market, the top 10 dealers have 74 percent of the market. In the inter-dealer broker segment, where dealers account for 48 percent of daily trading volume, the largest 10 dealers account for 67 percent of the dealer share, and primary dealers account for 84 percent of the dealer share (Brain, et al, 2018, Harkrader and Puglia, 2020). In the tri-party repo market, the three largest dealers account for 34 percent of Treasury repo, and 40 percent of Agency MBS repo.

In corporate bond markets, the top 10 dealers account for 70 percent of daily transaction volume, although there are more than 600 dealers that transact in bonds as reported in TRACE (O'Hara and Zhou, 2020). Most of the largest dealers are bank-affiliated, although their identities are not publicly disclosed.⁴

The vulnerabilities of bond markets were revealed when financial markets tumbled in response to COVID in February and March, and sales of Treasury securities intensified. Treasury prices fell in early March even as equity prices were falling, rendering Treasuries ineffective as a market hedge. Spreads on agency MBS and corporate bonds widened sharply. As volatility surged, CCPs increased margins substantially, and PTFs withdrew from Treasury trading. There was a deluge of selling in March across a range of investors, including selling by foreign official institutions of deep off-the-run Treasuries to obtain dollars, by corporate bond mutual funds of Treasuries and investment-grade corporate bonds to meet record investor redemptions, and by leveraged funds to rebalance portfolios or to unwind leveraged trades. The amounts offered for sale were extraordinary and overwhelmed dealer capacity (Logan, 2020). Market depth for Treasuries plunged and bid-asked spreads widened (Muzinich, 2020).

In response to these substantial market imbalances, the Fed announced on March 15 it would purchase Treasuries and agencies and offer repo financing, but there was little take-up on repo as dealers did not want to expand their balance sheets to provide additional intermediation. The Fed followed the initial intervention on March 23 with an open-ended commitment to purchase Treasury and agency securities to restore market functioning, and also announced the Primary Market Corporate Credit Facility, to purchase new issues of investment-grade corporate bonds, and the Secondary Market Corporate Credit Facility, to purchase bonds in the secondary market. This represented the first time the Fed has intervened in the corporate bond markets.

⁴ As discussed below, public data on the size and market shares of individual dealers are fragmentary, in stark contrast to the abundance of public information on banks.

3. Proposed Reforms

We propose a set of four reforms to improve the provision of bond market liquidity in stress periods. We believe that none on their own is sufficient. Elements of all are needed.

a. A Federal Reserve standing repo facility

The principal reform that we propose is for the Federal Reserve to create a standing repo facility, which would offer secured financing to broker-dealers that had applied for access to the facility and agreed to meet a set of prudential requirements established by the Fed and the SEC. It would be attractive to dealers only in stress situations, and thus differs from proposals for standing repo facilities to manage the Federal Reserve's monetary policy rate (Gagnon and Sack, 2014).⁵ A standing repo facility is the modern-day counterpart to the discount window, which is available to banks (and other insured depository institutions).⁶ That was the appropriate scope when the provision of credit to households and businesses was provided mainly by banks, but is too narrow for the current credit needs of the U.S. economy, one that relies less on bank loans and more on bonds, which depend on the liquidity of markets. Market liquidity is provided largely by broker-dealers, and their ability to supply liquidity is dependent on a stable and elastic supply of funding through repos.

No dealers in the United States currently have direct standing access to a Federal Reserve liquidity facility. Bank-affiliated dealers have indirect access through their ability to borrow from bank affiliates with access to the discount window. However, for securities other than U.S. government securities, even that indirect access is limited by section 23A of the Federal Reserve Act and by supervisory expectations with respect to resolution planning that discourage reliance by broker-dealer subsidiaries on funding from their bank affiliates. In both the GFC and in March 2020, the Federal Reserve used its emergency lending authority under section 13(3) of the Federal Reserve Act to support market liquidity by opening the Primary Dealer Credit Facility (PDCF), a repo facility for a range of securities, including investment-grade corporate and municipal bonds and asset-backed securities. The twenty or so primary dealers, which include domestic and foreign bank-affiliated dealers and three independent dealers, had access to the PDCF, but other dealers did not have access even in those emergency circumstances.

As in the case of the PDCF, a standing repo facility would extend collateralized funding to dealers in sound financial condition at pre-established prudent haircuts. It would offer financing at a rate of interest that constitutes a modest penalty, high enough to ensure that the facility is used only in abnormal market conditions but not so high as to stigmatize use of the facility and thereby defeat its purpose. A standing facility offered to a broad range of dealers could make it more attractive for independent middle-market dealers to enter the intermediation business because it could provide assurance that they could fund securities that they purchase or finance in stress periods. In this way, the facility could successfully encourage more depth and diversity in intermediation in the bond and repo markets, not only in stress periods but also in normal market conditions. Under section 14 of the Federal Reserve Act, the facility would need to be limited to repos of U.S. government and agency securities.

Even if financing provided through the facility is provided at penalty rates, an important and legitimate concern is that the creation of the facility could create moral hazard.⁷ In that situation, dealers with access to the facility might take on excessive leverage and maintain inappropriately small liquidity

⁵ Other proposals for a standing repo facility also have been made for monetary policy purposes. See Nelson (2019).

⁶ This is not an important issue in many jurisdictions outside the United States because market-based finance is less significant and dealer intermediation is conducted by banks, who have direct access to a central bank liquidity facility. In the UK, dealers generally are not banks, but the largest dealers have access to a liquidity facility at the Bank of England in the Sterling Monetary Framework put in place after the GFC.

⁷ See FOMC minutes for discussion of a standing repo facility to improve the control of the federal funds rate. <https://www.federalreserve.gov/monetarypolicy/fomcminutes20191030.htm>

buffers. As in the case of banks and the discount window, however, the concern could be addressed through prudential regulation of the dealers that have access to the repo facility.

All dealers with access to the facility should agree to prudential standards that address (at a minimum) capital, liquidity, and counterparty risk management requirements (so that dealers do not facilitate excessive leverage by their counterparties). For bank-affiliated dealers, the existing bank regulatory framework already addresses these moral hazard concerns through, among other measures, capital and leverage requirements, and, with respect to leverage of customers, requirements that address counterparty exposures on repos (and securities loans, which are economically equivalent transactions) and counterparty risk management practices with respect to those exposures. As discussed below, however, the post-GFC bank regulatory framework should be reviewed and certain modifications made to ensure that the provision of liquidity to markets is not unnecessarily impeded.

For independent dealers, however, the existing SEC standards for broker-dealers alone may not be adequate for firms to be granted access to Fed standing liquidity facility. To appropriately address the potential moral hazard, the Fed should work with the SEC to develop enhanced standards for those firms, including the primary dealers that currently are not subject to consistent prudential standards.⁸ Those standards would need to be tailored to a dealer's size and business model, and any risks posed to financial stability. Encouraging independent dealers could increase the breadth of liquidity provision on the margin. According to one report, independent middle-market dealers accounted for a meaningful share—about \$175 billion of the daily \$1 trillion in daily Secured Overnight Financing Rate (SOFR) in early 2019—and appear to have offered much-needed liquidity to repo markets at quarter-ends when large foreign bank-affiliated dealers pull back to reduce their balance sheets for reporting reasons.⁹ Developing appropriate standards for independent dealers would be challenging, but we believe it is necessary to increase the supply of liquidity without perpetuating or increasing the dominance of the existing dealers.¹⁰

Even if permissible collateral were limited to Treasury and agency securities, we believe prudential regulation of dealers as a condition of access is needed to mitigate moral hazard arising from the ensured provision of funds in times of market stress. While the Federal Reserve would not face credit risk for such collateral, the access would, by providing downside risk protection to dealers, create incentives for them to increase leverage or hold smaller liquidity buffers and to not effectively screen and monitor their customers, and thus increase risks to financial stability.

Some believe, however, that because the Fed does not bear any credit risk when it lends secured by Treasury and agency collateral, a standing facility would not create moral hazard.¹¹ In this case, the Fed could offer a standing repo facility for Treasury and agency securities to a broader set of counterparties, such as nonbank financial entities for which the same set of prudential regulations that would apply to dealers would not be suitable or feasible. In practice, repo transactions are based not only on the quality of the collateral but the creditworthiness of the counterparty as well. During the GFC, for example, some investment banks could not repo even with Treasuries because no asset manager wanted to have to report that they had any exposure to those investment banks, regardless of whether the exposure was fully

⁸ While most primary dealers are broker-dealer subsidiaries of bank holding companies or international holding companies regulated consistently by the Fed, some are U.S. branches or agencies of foreign banks, and others are independent dealers not subject to any Federal Reserve regulations. The SEC's standards for broker-dealers are designed for investor protection, not for limiting moral hazard or systemic risk. See Potter (2015) for more detail.

⁹ Independent Dealer and Trader Association, Dec. 6, 2019.

¹⁰ The facility would also reduce the interconnectedness of the largest dealers with their GSIB bank affiliates, and would enhance the resolvability of bank holding companies and their bank subsidiaries. For the largest bank-affiliated dealers, realization of these benefits could be encouraged by tightening the restrictions in section 23A, which would induce those dealers to use the standing facility rather than continue to rely on their bank affiliates.

¹¹ Some have argued that it is a market failure that entities cannot always have access to funds collateralized by Treasury securities, which have no credit risk. A standing facility offered by the Federal Reserve to a broad set of counterparties would fix that market failure.

secured. The facility could set higher minimum haircuts for borrowers that pose more systemic risk to mitigate some moral hazard, but we do not believe it is an adequate substitute for prudential regulation of borrowers. Furthermore, sufficiently higher haircuts might stigmatize use of the facility by borrowers in sound condition.

A standing repo facility, by providing a reliable source of alternative funding to financially sound dealers when markets are under stress, would give confidence to all dealers with access that they can fund securities they purchase or finance to provide liquidity to markets under stress. Combined with tailored regulations, the facility would enable and encourage more bank-affiliated and independent dealers to provide bond market intermediation in competition with the current dominant dealers, all of which are affiliates of GSIBs. Indeed, a critical aim of these initiatives to enhance market liquidity is to encourage more dealers to increase their capacity to provide market liquidity and expand total dealer capacity while reducing, rather than preserving or increasing, concentration among dealers.¹² A facility could also diminish investors' incentives to quickly liquidate securities to raise cash in a high-stress event, to the extent that the backstop provided makes it easier for them to access cash through repos with dealers rather than by selling their securities.

b. Expanded central clearing

Another measure that could increase the intermediation capacity of both bank-affiliated dealers and independent dealers would be expanded central clearing of Treasury securities and Treasury repos. Lael Brainard, Federal Reserve Board governor, recently called for exploration of wider use of central clearing in the Treasury markets, and also wider access to platforms that could promote “all-to-all” trading of Treasury securities. More specifically, we support Darrell Duffie’s proposal for a study of the merits of mandating the central clearing of Treasury transactions of all firms that are active in the Treasury markets. In central clearing, the CCP interposes itself between buyers and sellers of financial instruments, becoming the buyer to every seller and the seller to every buyer. Expanded central clearing would increase the intermediation capacity of bank-affiliated dealers because bank capital and leverage requirements recognize the risk-reducing effects of multilateral netting of trades that CCP clearing accomplishes. They also measure more appropriately the counterparty exposures associated with bank guarantees of customers’ cleared trades than exposures on a dealer’s uncleared trades. The netting benefits of central clearing can also enhance the ability of smaller bank and independent dealers to compete with the incumbent bank dealers, especially if smaller dealers were to have access to a Federal Reserve standing repo facility.

In the United States, some trades in Treasury securities and certain other U.S. government securities are cleared by the Fixed Income Clearing Corporation (FICC). However, clearing of trades in U.S. government securities until recently was limited largely to inter-dealer trades; the Treasury Market Practices Group (2018) estimated that in 2017, 68 percent of all such transactions were uncleared. Trades of principal trading firms—which now account for about one-half of the inter-dealer market—typically are not cleared. The expansion of clearing to additional counterparties has been limited in part both by clearing systems’ concerns about counterparty risks to some types of counterparties, and by some counterparties’ concerns about the financial obligations and operational burdens associated with central clearing.

¹² The Federal Reserve should also consider whether expansion of the standing facility beyond U.S. government and agency securities as collateral would be desirable. If the law allowed, the facility could extend to all securities that are sufficiently liquid that their values can be reasonably determined in normal times. An expansion might also make use of the facility and its associated prudential requirements more attractive to smaller dealers and facilitate their ability to compete with the current dominant dealers. To be sure, not all bonds issued in the United States are sufficiently liquid to be safely covered by the facility. It is not clear where exactly to draw the line, but the scope might be similar to the scope of the Primary Dealer Credit Facility (PDCF), which covered essentially all investment grade corporate and municipal debt. Any expansion beyond U.S. government and agency securities would require new legislation.

Those concerns typically have been overcome by client clearing arrangements in which banks (and some nonbank dealers) intermediate between the clearing system and a wide range of bank clients. For U.S. government securities, the relevant arrangement is FICC's Sponsored Service. However, such client clearing arrangements can leave the supply of liquidity dependent on a small number of firms, because client clearing is also dominated by a small number of firms, most of which are subsidiaries of GSIBs—in some cases, the same GSIBs whose dealer subsidiaries dominate intermediation of uncleared bond and repo trades. For example, three custody bank subsidiaries of GSIBs reportedly sponsor a very high share of FICC's sponsored repos. For that reason, the membership criteria of a central counterparty, including criteria for firms to act as client clearers, are quite important for determining the market structure. Especially if a clearing mandate were imposed, regulators must ensure that central counterparties do not unnecessarily impede membership by smaller dealers or impose unnecessary constraints on client clearing activity by smaller dealers. If sponsorship at FICC really is as concentrated as reported, regulators should satisfy themselves that this outcome has not been produced by an unlevel playing field.¹³

A central clearing mandate would also enable broader participation in all-to-all trading systems in which holders of bonds could trade directly with one another rather than trade exclusively with dealers. In an all-to-all trading system, a bid or offer submitted by one market participant can be accepted by any other market participant, and trades are executed at the best bid or offer. The trades should be cleared through a CCP so that market participants can be indifferent to the identity of the participant posting the best bid or offer. As in the case of CCPs, access to trading platforms is an important issue. Market participants that have made arrangements to clear their trades through the platform's CCP should also have access to the trading platform. All-to-all trading would reduce the need for traditional dealer intermediation, though dealers would still be needed, especially during stress periods. In addition, as noted above, central clearing often is dependent on intermediation by clearing firms. But central clearing that results in all-to-all trading potentially would allow a broader range of participants, including independent dealers, to provide liquidity to the Treasury markets, as is the case in U.S. equity markets and in U.S. futures and option markets, including Treasury futures markets.

To be sure, a clearing mandate would double down on the importance of effective risk management by FICC. But FICC already is systemically important, and even with a large share of Treasury trades uncleared, any weaknesses in FICC's risk management procedures need to be addressed even if clearing is not expanded. As a designated systemically important financial market utility, FICC is subject to cooperative oversight arrangements between the SEC as the primary regulator and the Fed as a secondary regulator, as established by the Dodd-Frank Act. Indeed, the recent Financial Stability Oversight Council (FSOC) annual report reiterated the importance of coordinated supervision of systemically important CCPs and recommended that regulators continue to evaluate whether existing risk management expectations for CCPs are sufficiently robust to mitigate potential threats to financial stability. The report also highlighted margining practices of CCPs, including FICCs, in the March market turmoil, and the procyclical impact of contingent liquidity demands on clearing members and their clients.¹⁴

A study of mandating central clearing for Treasury securities should consider these concerns about CCP risk management and concentration in client clearing, and other costs, in addition to the benefits of central clearing. If it were to conclude that a central clearing mandate was not appropriate, the study

¹³ In April 2019, the sponsored service broadened the category of market participants who can participate as sponsors based on increased interest from dealers, non-U.S. banks, and prime brokers that were previously not able to be sponsors. It also changed how the service could be used, with sponsors now able to let their clients trade with counterparties other than themselves. This expansion followed an earlier one in 2017 which allowed buy side firms beyond money funds and mutual funds to participate in the service as sponsored members.

<http://www.dtcc.com/news/2019/april/01/dtcc-to-expand-sponsored-service-to-bring-greater-capacity-to-the-repo-market>

¹⁴ Financial Stability Oversight Council, 2020 Annual Report, 7-8, 118-122, 175-177.

should explain what distinguishes the Treasury markets from others, such as equity, futures, options, and other markets, which have mandated clearing.

c. Changes to bank holding company regulations

Market commentary on the March 2020 turmoil in the Treasury markets typically points to limits on the intermediation capacity of the existing dealers as an important factor in the market turmoil. Capacity limits arose from a combination of regulatory constraints and limits on the dealers' appetites for risk.¹⁵ Although the importance of regulatory constraints cannot be pinned down precisely, the Fed's temporary relaxation of the SLR for BHCs is widely believed to have helped ease the pressures on dealer balance sheets. In addition, the Fed and other U.S. banking regulators allowed banking firms to exempt purchases of assets from prime and tax-exempt money market mutual funds to be funded from the Money Market Liquidity Facility (MMLF) from risk-based and leverage capital ratios. This exemption was viewed as a key factor in the MMLF's success in easing stresses in short-term funding markets, also suggesting regulatory constraints were significant.

We propose certain targeted changes to banking regulations that could increase the supply of liquidity to markets under stress by bank-affiliated dealers without reducing their overall safety and soundness. The most important change would be a permanent exclusion of reserves from the denominator of the SLR, which currently applies to about twenty large BHCs.¹⁶ This rule was modified temporarily in response to the market turmoil to allow banks to exclude U.S. Treasury securities and reserves from the SLR's calculation until the end of the first quarter of 2021. But the Federal Reserve's balance sheet now is far larger than before the COVID crisis and likely to continue to grow until the economy has recovered from the COVID shock. Reserves have grown from \$1.7 trillion at the beginning of the year to \$2.9 trillion at the end of the third quarter, and are expected to keep growing rapidly. Thus, if reserves are not excluded permanently, the minimum SLR, if not adjusted, would require banks to hold substantially more capital, and the SLR likely would no longer be a backstop to risk-based capital requirements.

We propose that a permanent exclusion of reserves at the central bank would be appropriate because they are riskless.¹⁷ We do not propose a permanent exclusion of Treasury securities because they may pose significant amounts of interest rate risk, which is not covered directly by risk-based capital requirements. Indeed, the fact that risk-based capital requirements treat many government securities, including U.S. Treasury securities, as riskless is one of the most important reasons why a leverage ratio backstop is needed in the first place.¹⁸ The Federal Reserve would need to review whether the minimum SLR requirement should be increased in light of excluding reserves.¹⁹

We also propose to replace some or all of the current buffer requirement for the enhanced SLR (eSLR) with a countercyclical component that the Fed could release in stress periods to reduce the constraints that a leverage ratio can have on market-making. The U.S. GSIBs are subject to the eSLR,

¹⁵ Federal Reserve Board, Financial Stability Report, November 2020, pp. 32, 38-39.

¹⁶ Specifically, the SLR applies to Category I BHCs (the U.S. GSIBs), Category II BHCs (other BHCs with \$75 billion or more in cross-jurisdictional activity), and Category III BHCs (other BHCs with \$250 billion or more in assets or \$75 billion or more in nonbank assets, short-term wholesale funding, or off-balance sheet exposures).

¹⁷ In the U.S., the Federal Reserve debated in 2014 whether to exclude reserves from the SLR. See <https://www.federalreserve.gov/mediacenter/files/open-board-meeting-transcript-20140409.pdf>. While they did not do so, the decision seems to have been based in part on a belief that reserves would decline significantly in coming years, rather than increase as dramatically as they have since COVID.

¹⁸ A more fundamental fix to improve liquidity provision would be to tighten risk-based requirements for holdings of Treasuries (and, if appropriate, Treasury reverse repos) and permanently exclude holdings of Treasuries (and Treasury reverse repos) from both the SLR and the Tier 1 leverage ratio at the bank holding company (BHC) level and the bank level. But that would be a major undertaking that would require careful study and would require legislative action because the Tier 1 leverage ratio is a statutory requirement.

¹⁹ In 2016, the Bank of England announced it would exclude reserve balances at the central bank from the SLR; they announced they would offset the implied reduction in the amount of capital by increasing the minimum SLR from 3 percent to 3.25 percent.

which is a buffer of 2 percent at the BHC and 3 percent at the depository institution, on top of the 3 percent minimum requirement. A countercyclical leverage buffer component of the eSLR could operate like the countercyclical capital buffer (CCyB) that applies to risk-weighted capital requirements for GSIBs. A buffer would be built up in expansionary periods in anticipation of being released when broad financial and economic risks are realized, to offset constraints of declining capital and leverage ratios that would discourage banks from supporting the needs of the economy, including providing liquidity to markets.

This re-purposing of existing eSLR buffers would be similar to practices being adopted in other countries, like the UK, which had started before the COVID pandemic to replace a static capital Pillar II buffer with the CCyB, because it provided a clear lever to reduce minimum requirements in the event of stress. Of 15 countries that had activated the CCyB before COVID, all but one wholly or partially released it as the market turmoil intensified, effectively reducing the minimum capital requirement (Edge and Liang, 2020). Most of those countries also required that banks not increase shareholder payouts so that the lower requirement could support lending. Some countries, such as Canada, that released other buffers, such as the domestic systemic risk buffer, in response to COVID, have expressed interest in replacing the static buffer with the CCyB when the time comes to build up buffers again, suggesting value in a countercyclical tool.

In addition, we propose that the Federal Reserve and other banking regulators review the GSIB surcharge methodology.²⁰ Banks have an incentive to hold down their GSIB scores and associated capital surcharges. At the margin, these incentives are magnified when a bank approaches one of the thresholds at which a higher GSIB score would lead to an increase of ½ percentage point in its capital surcharge, even if a firm crosses a threshold into the next highest category by only a small amount. We propose revising the methodology to allow for a more gradual increase in capital requirements to avoid these cliff effects. More broadly, regulators should review whether repos, which are critical to market liquidity and enter into multiple components to calculate GSIB scores, are impeding the provision of liquidity in stress periods, or if indicators for GSIB scores combined with other regulations, like higher risk weights for trading assets, are reducing flexibility to provide liquidity.

A critical consideration for bank and dealer regulations and access to a Federal Reserve standing facility is a level playing field. In addition to the minimum SLR that applies to large BHCs and the eSLR that applies to the GSIBs, a minimum Tier 1 leverage ratio of 4 percent applies to all depository institutions and BHCs.²¹ For large nonbank dealers with similar characteristics to large banking firms, it would be appropriate for the same SLR and Tier 1 leverage ratio to apply. However, for smaller nonbank and bank dealers (those with total trading accounts less than some appropriate threshold), we believe consideration should be given to excluding reverse repos from the Tier 1 leverage ratio.²² Reverse repos that finance clients' holdings of Treasury securities are less risky than the Treasury securities themselves because a dealer would suffer a loss only if the value of the Treasury security declines and the counterparty defaults. In the past, counterparty defaults on Treasury repos have been rare, even when collateral values fall. This proposal would likely require legislation.

d. Improved data collection and disclosure

Finally, we recommend more data collection and disclosure to improve transparency about dealers and risks in nonbank financial intermediation and the provision of market liquidity. We propose that

²⁰ Federal Reserve Board, 2015. "Calibrating the GSIB surcharge," July 20.

<https://www.federalreserve.gov/aboutthefed/boardmeetings/gsib-methodology-paper-20150720.pdf>.

²¹ In general, the SLR significantly improves upon the simple Tier 1 leverage ratio by requiring capital to support off-balance sheet exposures, including, among others, counterparty exposures on repos and derivatives transactions.

²² As noted above, however, the Tier 1 leverage ratio is a statutory requirement. Without legislative action, reverse repos could not be excluded from the denominator of the Tier 1 leverage ratio of small bank-affiliated dealers. Thus, relief for small nonbank dealers could harm the competitive position of small bank dealers, unless the law were changed.

additional data on the bilateral repo market be collected in order to better estimate funding risks and leverage in the financial system. The Office of Financial Research (OFR), with the Federal Reserve Board, the Federal Reserve Bank of New York, and the SEC, launched a pilot program in 2014 to determine what data to collect on the bilateral repo market (Baklanova et al, 2016). In 2019, the OFR began reporting rate and volume data for bilateral repo that is cleared through the FICC, which is used to calculate the new SOFR rate. But the OFR has not yet initiated data collection on bilateral repo that is uncleared, an important segment of dealer-to-client financing. Were these data available, regulators would have much more insight into whether investors actually lost access to repo funding in the March market turmoil.

Moreover, previous work by a hedge fund working group of the FSOC indicated that existing data reported on Form PF were not adequate to measure exposures and leverage (Crane, 2016). The working group had started seeking input from industry participants to develop better measures and recommendations for data collection. We believe that this work should be re-started to improve better assessment of systemic risks.

In addition, we propose greater disclosure of dealers' financial conditions, to help reduce moral hazard concerns of the standing facility, and to monitor progress of the proposed reforms. We are struck by the contrast between the detailed information on banks and BHCs that is publicly available from regulatory reports and the very limited information on even the largest broker-dealers. We recommend the dissemination of additional information of the balance sheets and activities of securities dealers, perhaps based on the SEC's existing FOCUS and TRACE reports.

Moreover, we recommend more disclosure of the data on cleared repo, especially repos cleared through FICC's sponsored repo service, because that may well be the principal means through which a broader clearing mandate would be met. Sponsored repo apparently has been expanding rapidly since 2017, judging from available data on MMF repos cleared through FICC. OFR reports that reverse repo in this sponsored service has ranged from between \$150 billion to more than \$200 billion since the data began to be collected systematically in late 2019 (Barth and Kahn, 2020). But no data are currently available on concentration among sponsors or, aside from money market funds, the types of firms whose activity is being sponsored. Before a mandate for central clearing is imposed, greater transparency with respect to existing cleared repo is necessary.

4. Conclusion

Treasury markets have experienced a number of liquidity stress events in recent years. The March event was especially significant for what it revealed about the resilience of Treasury markets. Demand from various types of investors surged, including by open-end bond funds that offer daily liquidity and leveraged funds, and such sharp responses to a fall in asset prices could become more frequent in the future as bond markets continue to grow and interest rates remain low. In addition, bank-affiliated dealers were less able to meet a sharp rise in need for liquidity, due to regulations to make banking firms stronger and more resilient and their own internal risk management practices. While it is critical for policymakers to try to reduce procyclical surges in demand that put undue stress on the financial system, it is also clear that the supply of liquidity must be made more resilient as well, and should expand beyond the existing set of dealers that are currently the dominant players.

We believe the reforms that we have proposed would have reduced the need for the Fed to purchase such large amounts of Treasury securities beginning in mid-March. A standing backstop repo facility, wider central clearing, and less binding leverage constraints in market-wide stress events would have resulted in greater market-making capacity of existing dealers and more depth and diversity of other dealers, which would improve liquidity in normal times and flexibility to respond to clients' needs in stress times. The reforms are complementary. Central clearing on its own can increase market-making capacity of dealers because of netting, but netting does not mean necessarily that dealers will be prepared

to offer more liquidity in stress events. Excluding reserve balances from the SLR and replacing the eSLR buffer with a countercyclical component would help the largest bank-affiliated dealers but would not attract more dealers to the business. A standing facility would lead to more diverse dealers, and it could also reduce a surge in investor demand to liquidate Treasuries for cash because the Fed would be a backstop. However, a standing facility could create moral hazard, so dealers with access to the facility should be subject to prudential regulation. Improved data collection and disclosures are critical for investors to be able to assess the risks of their positions and for regulators to monitor new emerging risks.

To be sure, we can't be confident that the package of policy reforms recommended here would have resulted in adequate provision of market liquidity by dealers and investors in U.S. bond markets given the extreme COVID shock in March. However, the event pointed to reforms that should include a combination of a more expansive Federal Reserve backstop to reflect a market-based financial system, serious consideration of a mandate for wider use of central clearing in the Treasury markets, changes to bank and dealer regulations that may be limiting market-making while not materially increasing resilience of these firms, and more data to better monitor risks in nonbank financial intermediation. These reforms should be implemented to encourage smaller dealers also to increase capacity and not to increase the concentration of the largest dealers. Absent significant changes to improve the supply of liquidity in stress, we are concerned that large-scale ad hoc interventions by the Federal Reserve with its associated costs will become more frequent in the future.

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