

Program on International Financial Systems

Mandatory Central Clearing for U.S. Treasuries and U.S. Treasury Repos

NOVEMBER 2021



The Program on International Financial Systems (PIFS) is a 501(c)(3) organization that conducts research on issues impacting the global financial system. PIFS also hosts international symposia, executive education programs and special events that foster dialogue and promote education on these issues. PIFS was founded in 1986, by Hal S. Scott, now Professor Emeritus of Harvard Law School. Over thirty years later, Hal Scott continues to lead PIFS.

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Executive Summary

This report is the first in a series of reports by the Program on International Financial Systems on enhancing the market structure for trading U.S. Treasuries (“**cash Treasuries**”) and for repurchase agreements of U.S. Treasuries (“**Treasury repos**”). In this report, we assess whether policymakers should mandate central clearing in both markets. In future reports we will consider whether policymakers should require the public disclosure of transaction-level data and evaluate design considerations for the standing Treasury repo facility.

We note that on November 8th, staff from the U.S. Department of the Treasury, the Board of Governors of the Federal Reserve System, the Federal Reserve Bank of New York, the Securities and Exchange Commission and the Commodity Futures Trading Commission released an inter-agency progress report on their assessment of potential reforms to U.S. Treasury markets in response to recent disruptions.¹ The report noted that staff are evaluating the expansion of central clearing to segments of the U.S. Treasury market that are not centrally cleared, including certain cash Treasury and Treasury repo transactions. We support these efforts, and our report is intended to provide an in-depth analysis to support this important work.

In Part I of this report, we review two recent market events—the September 2019 Treasury repo market spike and the March 2020 stress in cash Treasury markets. We explain the causes of both market events, describe the illiquidity of U.S. Treasury markets during each crisis and review the role of the Federal Reserve in stabilizing U.S. Treasury markets in 2019 and again in 2020.

These market events demonstrate that policymakers should evaluate how to enhance the stability of both cash Treasury and Treasury repo markets, with a focus on increasing the resilience of liquidity during periods of volatility. Our report therefore considers whether mandatory central clearing would enhance the liquidity and resiliency of cash Treasury and Treasury repo markets during periods of market volatility.

Part II begins by providing a brief overview of bilateral clearing and central clearing. We then examine the current market structure for central clearing in cash Treasury markets and Treasury repo markets. We find that a majority of trading in both markets is not centrally cleared.

In Part III, we evaluate the potential benefits and risks of a central clearing mandate. First, we consider whether a central clearing mandate would enhance the efficiency of market intermediation during a crisis, including by expanding the capacity of dealers and other market makers to provide liquidity. Second, we examine the extent to

¹ 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, and U.S. COMMODITY FUTURES TRADING COMMISSION, *Recent Disruptions and Potential Reforms in the U.S. Treasury Market: A Staff Progress Report* (Nov. 8, 2021) (the “IAWG Report”), <https://home.treasury.gov/system/files/136/IAWG-Treasury-Report.pdf>.

which a central clearing mandate would reduce counterparty risk and settlement risk in both markets. And third, we assess other potential market stability benefits of central clearing such as enhanced transparency into market risks and standardized collateralization and risk management processes. To do so, we review empirical studies on the effects of central clearing on cash Treasury and Treasury repo markets. We also evaluate the impact of central clearing on government bond and repo markets in other jurisdictions and other asset classes, including swaps and equities markets.

Next, we evaluate the potential risks of a central clearing mandate, such as a risk management failure by a clearinghouse. The likelihood of a risk management failure depends in part on the characteristics of the cleared financial asset, such as its standardization, liquidity and volatility. We therefore examine the characteristics of cash Treasuries and Treasury repos and compare them to other centrally cleared assets. Finally, we evaluate the moral hazard associated with government support in the event of a clearinghouse risk management failure. We conclude that the significant benefits to market liquidity and resiliency for cash Treasury and Treasury repo markets from a central clearing mandate would outweigh these risks.

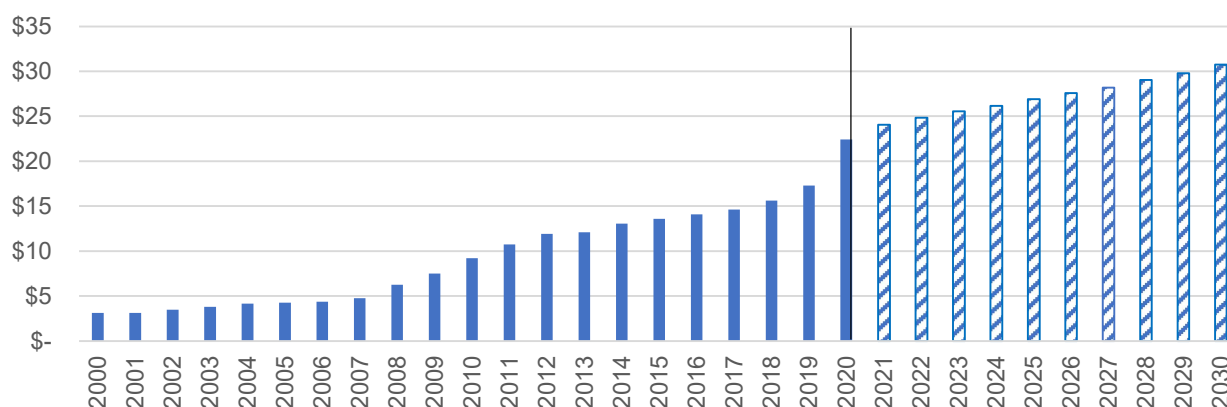
In Part IV, we evaluate certain design considerations for central clearing. We consider whether central clearing should be mandated solely for interdealer markets or also for dealer-to-client markets and the need to ensure access to central clearing for all types of market participants. We evaluate what a central clearing mandate would mean for the tri-party Treasury repo market and also assess whether clearing should be centralized at one central clearinghouse or whether multiple clearinghouses should be encouraged. Finally, we evaluate potential governance issues with central clearinghouses.

Part I: Recent Market Events in Cash Treasury and Treasury Repo Markets

The September 2019 Treasury repo market spike and March 2020 stress in cash Treasury markets suggest that U.S. Treasury markets may be prone to bouts of severe illiquidity that could threaten financial stability. In Part I, we review both market events as well as the role of the Federal Reserve in stabilizing markets. For a description of repo transactions, please see **Box A** on the next page.

We agree with the G30's primary finding that "the root cause of the increasing frequency of episodes of Treasury market dysfunction under stress is that the aggregate amount of capital allocated to market-making by bank-affiliated dealers has not kept pace with the very rapid growth of marketable Treasury debt outstanding."² Indeed, as displayed in **Figure 1**, total marketable Treasury securities outstanding reached nearly \$23 trillion dollars as of August 2021, growing roughly 615 percent since January 2000, when it stood at \$3 trillion.³ This growth is projected to continue, with the market size forecasted to reach roughly \$30 trillion by 2030.⁴ Although the most recently-issued (on-the-run) Treasury securities constitute less than 5% of Treasuries outstanding compared to older (off-the-run) Treasury securities, on-the-run Treasuries account for more than half of total trading activity.⁵

Figure 1: Total Marketable Treasuries Outstanding (\$T) – 2030 Forecast *



* Forecasts based off of CBO budget deficit projects as of March 2021.

Source: Federal Reserve Bank of St. Louis, FRED Economic Data (Oct. 4, 2021); CBO, Budget and Economic Data, Budget Deficit Forecasts (Nov. 2021), <https://www.cbo.gov/data/budget-economic-data#1>.

² GROUP OF THIRTY (G30), *U.S. Treasury Markets Steps Toward Increased Resilience*, 1 (July 2021), https://group30.org/images/uploads/publications/G30_U.S._Treasury_Markets-Steps_Toward_Increased_Resilience_1.pdf.

³ FEDERAL RESERVE BANK OF SAINT LOUIS, *FRED Economic Data: Market Value of Outstanding Marketable Treasury Debt* (accessed October 4, 2021): <https://fred.stlouisfed.org/series/MVMTD027MNFBDAL#0>.

⁴ See *id.* Forecasts were calculated using Congressional Budget Office budget deficit projections. U.S. CONGRESSIONAL BUDGET OFFICE, *Budget and Economic Data* (last accessed Oct. 4, 2021), <https://www.cbo.gov/data/budget-economic-data#1>.

⁵ GROUP OF THIRTY (G30), *U.S. Treasury Markets Steps Toward Increased Resilience*, 1, n. 2 (July 2021), https://group30.org/images/uploads/publications/G30_U.S._Treasury_Markets-Steps_Toward_Increased_Resilience_1.pdf.

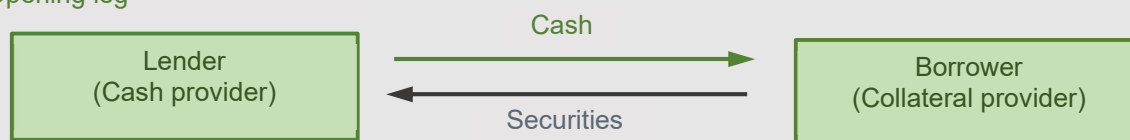
Box A – Anatomy of a Repurchase Transaction:

Repurchase transactions (or “**repos**”) are a form of borrowing in which the borrower obtains cash by posting collateral (see below).⁶ In a repo transaction, the collateral provider, or “borrower,” sells securities to the cash provider, or “lender,” with an agreement to repurchase those securities on a later date at a prearranged price.⁷ That later date is typically the next day (in the case of overnight repos), but it can be as much as one year later in the case of term repos.⁸

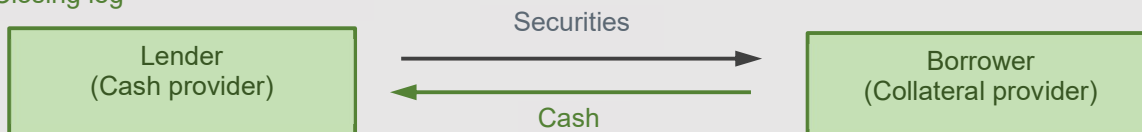
A repo is economically equivalent to a secured loan: the difference between the initial purchase price and later repurchase price is the lender’s return (the interest, or “repo rate”).⁹ The securities, meanwhile, serve as borrower’s collateral. The collateral value of the securities is usually set below their market value (the difference is referred to as a “haircut”). Securities with more stable values and more liquid markets are typically assigned lower haircuts. For repo transactions involving Treasury securities, which pose minimal credit risk and are highly liquid, the haircut is typically small.

A Typical Repo Transaction:

Opening leg



Closing leg



⁶ See Victoria Baklanova, Adam Copeland and Rebecca McCaughrin, *Reference Guide to U.S. Repo and Securities Lending Markets*, FRBNY Staff Report, 4 (Dec. 2015); Richard Comotto, *Frequently Asked Questions on Repo*, International Capital Markets Association, 3–4 (January 2019), available at <https://www.icmagroup.org/assets/documents/Regulatory/Repo/Repo-FAQs-January-2019.pdf>.

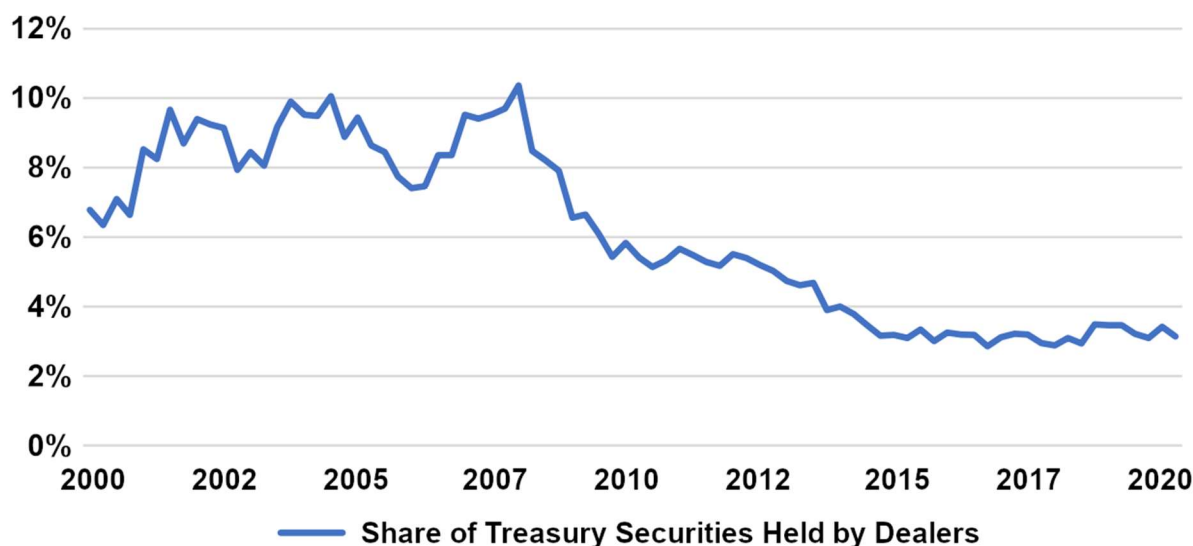
⁷ Adam Copeland, Darrell Duffie, Antoine Martin, and Susan McLaughlin, *Key Mechanics of The U.S. Tri-Party Repo Market*, FEDERAL RESERVE BANK OF NEW YORK, 2 (Dec. 2012), <https://www.newyorkfed.org/medialibrary/media/research/epr/2012/1210cope.pdf>; BNY Mellon, *Triparty: An Introduction* (2020), <https://www.bnymellon.com/content/dam/bnymellon/documents/pdf/articles/triparty-repo-brochure.pdf.coredownload.pdf>.

⁸ See Victoria Baklanova, Adam Copeland and Rebecca McCaughrin, *Reference Guide to U.S. Repo and Securities Lending Markets*, FRBNY Staff Report, 12 (Dec. 2015).

⁹ Richard Comotto, *Frequently Asked Questions on Repo*, INTERNATIONAL CAPITAL MARKETS ASSOCIATION, 2–4 (January 2019), available at <https://www.icmagroup.org/assets/documents/Regulatory/Repo/Repo-FAQs-January-2019.pdf>.

And the share of outstanding U.S. Treasuries held by dealers is declining.¹⁰ **Figure 2** illustrates this decline. In 2007, dealers held inventories of as much as 10% of outstanding Treasury securities, however as of 2020 they held less than 4% of outstanding securities. This suggests that dealer balance sheets play a reduced role in intermediating Treasury markets during normal times. As demonstrated in the next section, dealers are a particularly important source of liquidity during periods of market volatility. The reduced role of dealers during normal times may indicate a reduced ability to increase their capacity to provide sufficient liquidity in Treasury markets during periods of stress.¹¹

Figure 2: Share of U.S. Treasuries Held by Dealers



Source: Nellie Liang and Pat Parkinson, *Enhancing Liquidity of the U.S. Treasury Market Under Stress*, Hutchins Center Working Paper #72, Figure 3 (December 2020): https://www.brookings.edu/wp-content/uploads/2020/12/WP72_Liang-Parkinson.pdf.

¹⁰ Security brokers and dealers are firms that buy and sell securities for a fee, hold an inventory of securities for resale, or do both. The firms that make up this sector are those that submit information to the Securities and Exchange Commission on one of two reporting forms, either the Financial and Operational Combined Uniform Single Report of Brokers and Dealers (FOCUS) or the Report on Finances and Operations of Government Securities Brokers and Dealers (FOGS).” *Financial Accounts of the United States*.

¹¹ Indeed, with respect to recent market events, the IAWG Report found that, “A recurring theme is that trading volumes and demand for intermediation can surge suddenly, but intermediaries’ willingness or capacity to respond can be relatively inelastic compared with these surges, potentially leading to rapid deterioration in market functioning.” IAWG Report, *supra* note 1, at 7.

a. The September 2019 Repo Market Spike

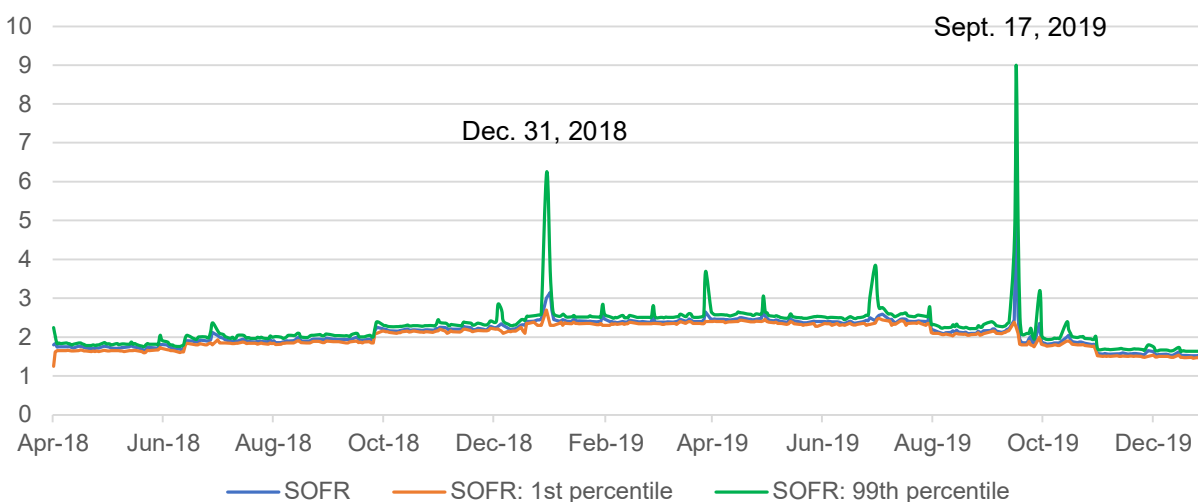
On September 17, 2019, the secured overnight funding rate (“**SOFR**”) unexpectedly spiked to an unprecedented level, even higher than the 2008-2009 financial crisis. SOFR is calculated by the New York Federal Reserve (“**FRBNY**”)¹² and includes overnight Treasury repo rates on a volume-weighted basis.¹³ SOFR more than doubled on September 17th to 5.25%, and the intraday range increased to nearly 7%. As demonstrated by **Figure 3**, certain Treasury repos occurred at interest rates as high as 9%. For context, SOFR for the prior day, September 16, was 2.43%, and during the previous month, it had ranged between 2.09% and 2.21%. However, September 17, 2019 was not the first time that overnight Treasury repo rates experienced a sharp increase. On December 31, 2018, SOFR increased from about 2.56% to more than 6.125%—with overnight repo rates reaching what was, at the time, their highest level since 2001—before falling back to a normal range.¹⁴

¹² We note that the financial industry is currently transitioning to the use of SOFR as a benchmark for financial contracts. Pursuant to guidance published by the Federal Reserve and other regulators, beginning in January 2022, capital markets and lending contracts cannot be benchmarked to the London Inter-Bank Offered Rate (“**LIBOR**”), because LIBOR is based on shallow trading volume among a narrow subset of firms, which makes it more vulnerable to manipulation. In June 2017, the Federal Reserve’s Alternative Reference Rates Committee identified SOFR as its recommended alternative benchmark, because its greater depth of trading liquidity more accurately reflects real interbank borrowing costs. However, there are concerns about the use of SOFR as the sole benchmark for financial contracts. For instance, former CFTC Chair Christopher Giancarlo has cautioned against a one-size-fits-all framework, because different benchmarks may better reflect the real borrowing costs of different types of institutions. In particular, SOFR may be a better risk-free benchmark for large financial institutions active in the U.S. Treasury market, but other rates (such as AMERIBOR) may be better credit-sensitive benchmarks for community and regional banks that lend to small and medium-sized businesses. AMERIBOR benchmarks are derived from interbank lending in the American Financial Exchange’s institutional market, where community and regional banks lend to each another on terms that reflect their own lending to the real economy. See Hon. J. Christopher Giancarlo, *Testimony on The Libor Transition: Protecting Consumers and Investors*, U.S. SENATE COMMITTEE ON BANKING, HOUSING, AND URBAN AFFAIRS (Nov. 2, 2021), <https://www.banking.senate.gov/imo/media/doc/Giancarlo%20Testimony%2011-2-21.pdf>; Vice Chair for Supervision Randal K. Quarles, *Goodbye to All That: The End of LIBOR*, FEDERAL RESERVE SYSTEM (Oct. 5, 2021), <https://www.federalreserve.gov/newsevents/speech/quarles20211005a.htm>; FEDERAL RESERVE BANK OF NEW YORK, *Transition from LIBOR* (last accessed Nov. 10, 2021), <https://www.newyorkfed.org/arcc/sofr-transition>; U.S. SEC. & EXCH. COMM’N, *Alternative Reference Rates Committee – Frequently Asked Questions* (Jan. 31, 2019), <https://www.sec.gov/spotlight/fixed-income-advisory-committee/arcc-faqs-041519.pdf>. See also H.R. 4616, *Adjustable Interest Rate (LIBOR) Act of 2021* (introduced July 22, 2021), <https://www.congress.gov/bill/117th-congress/house-bill/4616/actions>.

¹³ The SOFR includes overnight rates from the tri-party, general collateral financing, and bilateral repo markets, as explained in further detail in Part II. See FEDERAL RESERVE BANK OF NEW YORK, *Secured Overnight Financing Rate Data* (Jan. 22, 2020), <https://apps.newyorkfed.org/markets/autorates/sofr>.

¹⁴ See FEDERAL RESERVE BANK OF NEW YORK, *Secured Overnight Financing Rate Data* (Jan. 22, 2020), <https://apps.newyorkfed.org/markets/autorates/sofr>.

Figure 3:
Secured Overnight Financing Rate (%) - April 2018 to December 2019



Source: Federal Reserve Bank of New York, <https://www.newyorkfed.org/markets/reference-rates/sofr>.

i. What are the Potential Consequences of a Spike in Treasury Repo Markets?

Does a sharp but brief increase in overnight repo rates pose any consequence for the U.S. financial system? One reason the repo market funding spike warrants policymakers' attention is that a similar, but more protracted spike would cause funding problems for cash borrowers that depend on this \$4 trillion short-term funding market to finance their investments and meet short-term obligations. Because dealers fund their portfolios with repos of safe assets, if cash borrowers in repo markets could not bear the high cost of financing their holdings of Treasuries (and other assets), then they would be required to sell those assets with widespread negative effects on the prices of Treasuries (and other assets). Such lack of access to short-term funding and attendant asset sales could spread to other short-term funding markets similar to the contagion effects that occurred in the 2008 global financial crisis.¹⁵

Another concern with the repo market disruption is the potential impact on other financial assets. For example, in September 2019, repo market stress bled into foreign

¹⁵ See Fernando Avalos, Torsten Ehlers and Egemen Eren, *September stress in dollar repo markets: passing or structural?*, BIS QUARTERLY REVIEW (December 2019), https://www.bis.org/publ/qtrpdf/r_qt1912v.htm.

exchange markets, as the cost of borrowing dollars also spiked.¹⁶ And the ability of securities dealers to make markets in certain equities was also reduced.¹⁷

ii. What Caused the Treasury Repo Market Spike of 2019?

The broad trends shaping the Treasury repo markets in late-2019 were a large reduction in cash available for lending in repo markets and a large increase in demand for that cash from primary dealers seeking to finance their increasingly large holdings of Treasuries. Primary dealers are dealers that apply to trade with the New York Fed in its implementation of monetary policy, and they are expected to bid on a pro-rata basis in all Treasury auctions at reasonably competitive prices.¹⁸ The eligibility requirements and current list of primary dealers is available on the New York Fed's website¹⁹

By the end of August 2019, the U.S. Treasury had raised more than \$500 billion in 2019 alone, bringing the total amount of outstanding Treasury securities to more than \$16.1 trillion.²⁰ While the supply of Treasuries was increasing, however, demand for Treasuries from market participants other than primary dealers was falling.

Beginning in October 2017, the Federal Reserve had started to shrink its balance sheet, including its portfolio holdings of Treasuries, as part of its “balance sheet normalization program” to reduce assets acquired in earlier monetary stimulus efforts.²¹ Between October 2017 and August 2019, the Federal Reserve reduced its Treasury holdings by approximately \$400 billion.²² In addition, changes to U.S. tax rules that took effect in January 2018 eliminated the deferral benefit to non-financial U.S. corporations of reinvesting foreign profits in Treasuries held by offshore entities. These tax changes reduced demand for Treasuries from U.S. corporations by about \$50 billion.²³ Furthermore, the inversion of the Treasury curve—where interest rates on three-month

¹⁶ See Stephen Spratt, *Repo Squeeze Threatens to Spill Over into Funding Markets*, BLOOMBERG NEWS (Sep. 17, 2019), <https://www.bloomberg.com/news/articles/2019-09-17/it-starts-as-a-repo-squeeze-before-spilling-into-funding-markets>.

¹⁷ See Zoltan Pozsar, *Why the Repo Markets Went Crazy*, ODD LOTS PODCAST (interview with Joe Weisenthal and Tracy Alloway) (Nov. 8, 2019), <https://www.bloomberg.com/news/audio/2019-11-08/why-the-repo-markets-went-crazy-podcast>.

¹⁸ FEDERAL RESERVE BANK OF NEW YORK, *Primary Dealers* (last accessed Nov. 5, 2021), <https://www.newyorkfed.org/markets/primarydealers>.

¹⁹ FEDERAL RESERVE BANK OF NEW YORK, *Primary Dealers* (last accessed Nov. 5, 2021), <https://www.newyorkfed.org/markets/primarydealers>.

²⁰ See SECURITIES INDUSTRY AND FINANCIAL MARKETS ASSOCIATION, *U.S. Marketable Treasury Issuance, Outstanding, and Interest Rates* (Dec. 5, 2019), <https://www.sifma.org/resources/research/us-marketable-treasury-issuance-outstanding-and-interest-rates/>.

²¹ See Jeff Cox, *Fed approves October reversal of historic stimulus, leaves rates unchanged*, CNBC (Sept. 20, 2017), <https://www.cnbc.com/2017/09/20/fed-approves-october-reversal-of-historic-stimulus-leaves-rates-unchanged.html>.

²² See FEDERAL RESERVE BANK OF SAINT LOUIS, *FRED Economic Data: Assets: Securities Held Outright: U.S. Treasury Securities: All: Wednesday Level* (January 7, 2020), <https://fred.stlouisfed.org/series/TREAST>.

²³ See Brad W. Setser, *Follow the Money: Finding Ireland in the U.S. Balance of Payments Data*, COUNCIL ON FOREIGN RELATIONS (July 16, 2019), available at <https://www.cfr.org/blog/finding-ireland-us-balance-payments-data>.

Treasury bills exceeded rates on 10-year Treasury bonds—also resulted in less demand for Treasury bonds as they were comparatively low yield. According to one estimate, the inversion reduced demand for Treasuries by at least \$350 billion.²⁴ Another important factor that reduced demand for Treasuries involved the Fed’s foreign repo pool, which permits foreign central banks to invest cash by lending to the Fed through overnight repos.²⁵ Foreign central banks responded to the inversion of the yield curve by selling Treasuries in the public market and moving the cash proceeds into the foreign repo pool, thereby engaging in repo transactions directly with the Fed, effectively withdrawing cash liquidity from public markets and offering it to the Federal Reserve.²⁶ Between the beginning of 2019 and the beginning of September, the Fed’s foreign repo pool saw nearly \$50 billion in inflows.²⁷

But why is an increase in supply and a reduction in demand for Treasuries relevant to overnight Treasury repo markets? Because the purchases of the excess supply of Treasuries are funded by overnight Treasury repo markets.²⁸ The excess supply of Treasuries is held by primary dealers, which are required to bid for Treasuries at auction. Primary dealers also act as market makers in cash Treasury markets²⁹ and fund their holdings in overnight Treasury repo markets as these short-term funding markets are typically a cheaper source of funding than alternatives, such as unsecured loans or equity financing. Indeed, the value of Treasuries held by primary dealers increased from just over \$80 billion at the beginning of 2018 to approximately \$250 billion by the second quarter of 2019, as demonstrated by **Figure 4**.³⁰ Since primary dealers financed these purchases with repo, the increase in Treasury purchases by primary dealers led to an increased demand for Treasury repo financing.

²⁴ See Zoltan Pozsar, *Global Money Notes #23: The Revenge of the Plumbing*, CREDIT SUISSE, 2 (Aug. 12, 2019), <https://plus.credit-suisse.com/rpc4/ravDocView?docid=V7iZsF2AN-XtNI>.

²⁵ See FEDERAL RESERVE BANK OF NEW YORK, *Central Bank & International Account Services* (Jan. 23, 2020), <https://www.newyorkfed.org/markets/central-bank-and-international-account-services>.

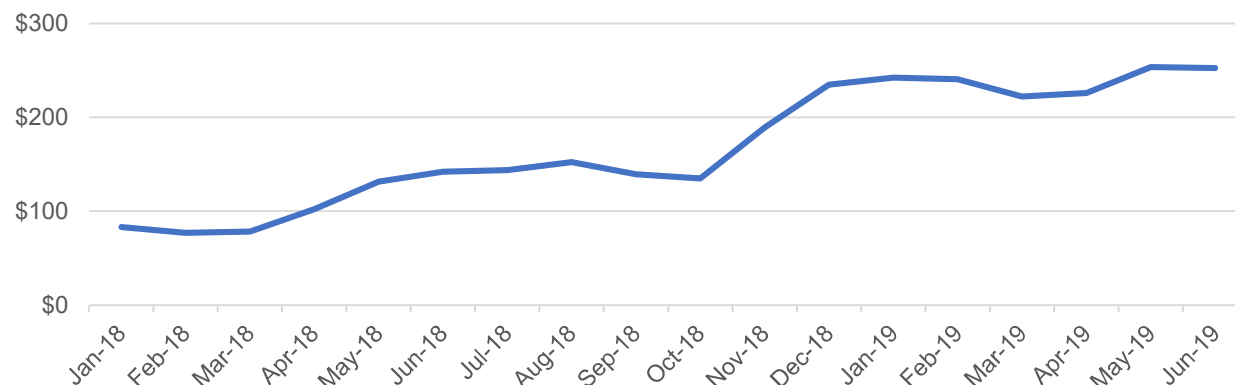
²⁶ See Matthew C. Klein, *The Federal Reserve Should ‘Put America First’*, BARRON’S (March 29, 2019), <https://www.barrons.com/articles/the-federal-reserve-should-put-america-first-51553874768>.

²⁷ See FEDERAL RESERVE BANK OF SAINT LOUIS, *FRED Economic Data: Liabilities and Capital: Liabilities: Reverse Repurchase Agreements: Foreign Official and International Accounts: Wednesday Level* (January 7, 2020), <https://fred.stlouisfed.org/series/WLRRRAFOIAL>.

²⁸ See Zoltan Pozsar, *Global Money Notes #22: Collateral Supply and o/n Rates*, CREDIT SUISSE, 17–19 (May 31, 2019), <https://plus.credit-suisse.com/rpc4/ravDocView?docid=V7hgU2AN-VH5K>.

²⁹ See FEDERAL RESERVE BANK OF NEW YORK, *Primary Dealers* (last accessed Oct. 2021), <https://www.newyorkfed.org/markets/primarydealers> (noting that primary dealers are “expected make markets for the New York Fed on behalf of its official accountholders as needed, and to bid on a pro-rata basis in all Treasury auctions at reasonably competitive prices”).

³⁰ Data on primary dealer inventories is available from the FEDERAL RESERVE BANK OF NEW YORK, *Primary Dealer Statistics* (Dec. 25, 2019), <https://www.newyorkfed.org/markets/primarydealers>.

Figure 4: U.S. Treasuries Held by Primary Dealers (\$B)

Source: Federal Reserve Bank of New York, Primary Dealer Data (Nov. 2021), <https://www.newyorkfed.org/markets/counterparties/primary-dealers-statistics>.

iii. Precipitating Events on September 17th, 2019 & Federal Reserve Intervention

On September 17, these long-term factors – rising demand for cash in Treasury repo markets accompanied by declining cash available for lending – were compounded by a temporary decrease in cash reserves for lenders in Treasury repo markets and an increase in the supply of Treasuries that would need repo financing. September 16th was the due date for estimated tax payments for calendar-year taxpayers; as a result, cash that would normally be held at banks, in money market funds or in corporate treasuries and available for lending in repo markets was instead withdrawn to pay taxes, reducing the amount of cash liquidity available to the Treasury repo market.³¹ Approximately \$36 billion in corporate tax payments were made on September 16 and September 17.³² The reduction in cash available for lending in repo markets coincided with a sharp increase in newly issued Treasuries and the corresponding demand to finance the acquisition of these Treasuries through repo financing. After the debt ceiling was suspended in August 2019, the U.S. Treasury quickly issued more than \$285 billion of net debt between August 14 and September 17, including more than \$90 billion on the day of September 17.³³ Primary dealers therefore had to fund additional Treasury purchases on September 17 by increasing their reliance on repo markets.

³¹ See Fernando Avalos, Torsten Ehlers and Egemen Eren, *September stress in dollar repo markets: passing or structural?*, BIS QUARTERLY REVIEW (Dec. 2019), available at https://www.bis.org/publ/qtrpdf/r_qt1912v.htm.

³² Data on the U.S. Treasury's daily and monthly cash and debt operations, including corporate tax payments and debt issuances, is available from the U.S. TREASURY BUREAU OF THE FISCAL SERVICE, *Daily Treasury Statement* (last accessed Oct. 2021), <https://fiscal.treasury.gov/reports-statements/>.

³³ Between August 14 and September 18, the Treasury General Account at the Fed increased by more than \$170 billion, with most of the increase coming in the week preceding September 18. See FEDERAL RESERVE BANK OF SAINT LOUIS, *FRED Economic Data: Liabilities and Capital: Liabilities: Deposits With F.R. Banks, Other Than Reserve Balances: U.S. Treasury, General Account: Wednesday Level* (January 7, 2020), <https://fred.stlouisfed.org/series/WDTGAL>.

The various factors described above caused the repo rate to spike to as high as 9%, until the Federal Reserve intervened by supplying liquidity directly. From September 18-20, the Federal Reserve offered overnight repos to primary dealers of an aggregate amount up to \$75 billion against Treasury, agency debt and agency mortgage-backed securities collateral.³⁴ These operations were subsequently expanded in size and scope. Between November 15 and December 12, the Fed offered to primary dealers at least \$120 billion in daily overnight repos, in addition to at least \$35 billion in two-week term repos twice a week and at least \$15 billion for four- or six-week repos weekly.³⁵ And on December 12, the Fed announced that it would continue overnight repo operations and offer two-week and four-week term repos.³⁶ The Fed also announced that it would offer longer-maturity repo operations spanning the year end of at least \$50 billion.³⁷ On January 29, the Fed's Open Market Committee authorized plans to continue repo operations through April 2020 to ensure an ample supply of reserves in order to mitigate the risk of money market pressures.³⁸ Support from the Federal Reserve for the Treasury repo market therefore extended until the March 2020 COVID crisis, which we further describe in the next section.

b. March 2020 Cash Treasury Market Stress

The cash Treasury market stress in March 2020 was triggered by a large sell-off of Treasuries. That sell-off involved a significant increase in trading volume and led to an increase in yields and severe liquidity strains in the Treasury market. The Federal Reserve intervened with massive purchases of Treasuries that successfully quelled the sell-off. **Figure 5** below shows yields for 1-year, 5-year and 10-year Treasury bonds (left axis)³⁹ and the Fed's Treasury purchases (right axis)⁴⁰ between February 24 and March 30, 2020 during the peak of the COVID-induced turmoil in financial markets.

³⁴ See FEDERAL RESERVE BANK OF NEW YORK, *Statement Regarding Policy Operation* (September 18, 2019), https://www.newyorkfed.org/markets/opolicy/operating_policy_190918.

³⁵ See FEDERAL RESERVE BANK OF NEW YORK, *Statement Regarding Repurchase Operations* (Nov. 14, 2019), https://www.newyorkfed.org/markets/opolicy/operating_policy_191114.

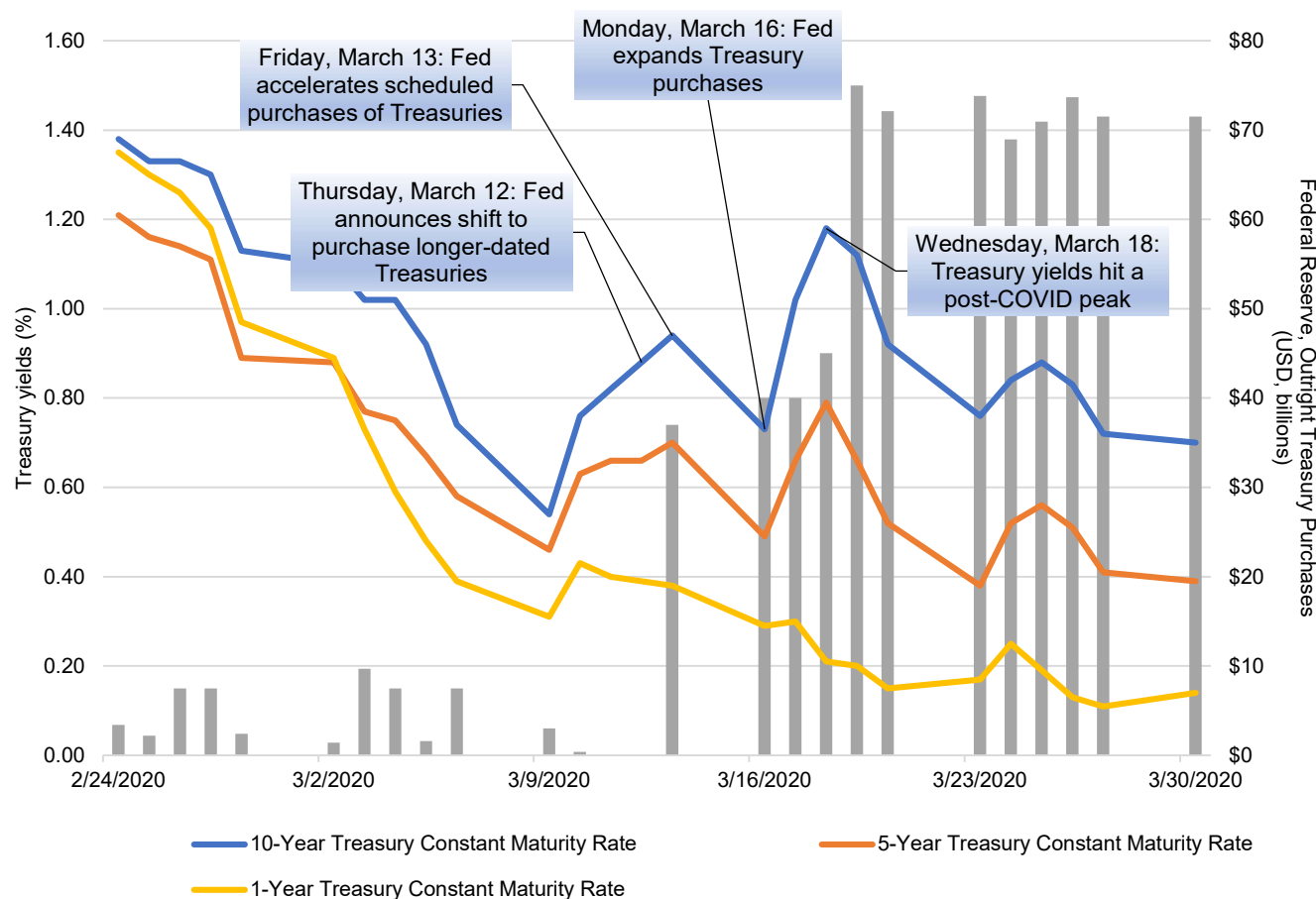
³⁶ See FEDERAL RESERVE BANK OF NEW YORK, *Statement Regarding Repurchase Operations* (Dec. 12, 2019), https://www.newyorkfed.org/markets/opolicy/operating_policy_191212.

³⁷ See *id.*

³⁸ See BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM, *Decisions Regarding Monetary Policy Implementation* (January 29, 2020), <https://www.federalreserve.gov/newsevents/pressreleases/monetary20200129a1.htm>.

³⁹ See FEDERAL RESERVE BANK OF ST. LOUIS, *FRED Economic Data: Market Yield on U.S. Treasury Securities at 1-Year Constant Maturity* (last accessed Oct. 2021), <https://fred.stlouisfed.org/series/DGS1>; FEDERAL RESERVE BANK OF ST. LOUIS, *FRED Economic Data: Market Yield on U.S. Treasury Securities at 5-Year Constant Maturity* (last accessed Oct. 2021), <https://fred.stlouisfed.org/series/DGS5>; FEDERAL RESERVE BANK OF ST. LOUIS, *FRED Economic Data: Market Yield on U.S. Treasury Securities at 10-Year Constant Maturity* (last accessed Oct. 2021), <https://fred.stlouisfed.org/series/DGS10>. Data on Treasury yields is retrieved from FEDERAL RESERVE BANK OF ST. LOUIS, *FRED Economic Data* (last accessed Oct. 2021), <https://fred.stlouisfed.org/series/>.

⁴⁰ FEDERAL RESERVE BANK OF NEW YORK, *Treasury Securities Operations* (last accessed Oct. 2021), <https://www.newyorkfed.org/markets/desk-operations/treasury-securities>.

Figure 5: Treasury Yields and Fed Purchases (February - March 2020)*(Horizontal Lines Correspond to the Left Axis; Vertical Bars Correspond with the Right Axis)*

Source: COMMITTEE ON CAPITAL MARKETS REGULATION, *Nothing but the Facts: The U.S. Treasury Market During the COVID-19 Crisis*, 1 (March 2021), <https://www.capmktreg.org/wp-content/uploads/2021/03/NBTF-US-Treasury-Markets-During-Covid.pdf>.

As **Figure 5** demonstrates, Treasury yields initially followed a familiar “flight-to-quality” pattern for economic crises at the start of the COVID-19: as investors began to fear the economic effects of COVID-19, they sold risky assets and bought Treasuries, causing yields to fall.⁴¹ Of course, as demand for Treasuries increased, so did trading volume. Trading of cash Treasuries by primary dealers was the highest on record, peaking at an average daily trading volume of more than \$1 trillion at the beginning of March.⁴²

However, beginning on Monday, March 9, yields on Treasuries began to sharply increase. Widespread selling pressure for Treasuries had not previously occurred during a market crisis and trading volumes in the Treasury market continued to remain

⁴¹ Zhiguo He and Arvind Krishnamurthy, *Are US Treasury Bonds Still a Safe Haven?*, NATIONAL BUREAU OF ECONOMIC RESEARCH REPORTER (Oct. 2020), <https://www.nber.org/reporter/2020number3/are-us-treasury-bonds-still-safe-haven>.

⁴² FEDERAL RESERVE BANK OF NEW YORK, *Primary Dealer Statistics* (last accessed Oct. 2021), <https://www.newyorkfed.org/markets/counterparties/primary-dealers-statistics>.

elevated.⁴³ Owners of Treasuries were liquidating Treasuries to satisfy cash demands.⁴⁴ Cash demands came from, for example: foreign central banks that needed immediate dollar cash liquidity to support their local financial markets; mutual funds needing to redeem withdrawing investors; and brokers and investors needing to satisfy clearinghouse margin calls.⁴⁵ While there is some publicly available information on trading and changes in position by various types of entities during March 2020, it is insufficient to accurately pinpoint the respective role of each type of entity in the sell-off due to a lack of transaction-level data for the dealer-to-customer market for cash Treasuries.⁴⁶

Evidence also suggests that the swift rise in Treasury yields reflected liquidity strains in cash Treasury markets. One way to measure market functioning is based on pricing differences between highly similar assets. The yields of recently issued, more frequently traded (on-the-run) Treasury securities and older, less frequently traded (off-the-run) Treasury securities is one example. Because these securities have equivalent maturities, coupons and default risk, any difference in yields is a proxy for the premium that investors pay for more liquid Treasuries—a widening spread reflects deterioration in the liquidity of off-the-run securities relative to on-the-run securities.⁴⁷ During the second week of March, the spread more than quadrupled.⁴⁸

Another measure of Treasury market liquidity is the bid-ask spread on the automated electronic venues where dealers trade with one another and with other institutional intermediaries (the “**interdealer market**”), albeit exclusively in on-the-run US Treasuries. In March, bid-ask spreads in these interdealer markets increased sharply, peaking on March 13 (for ten- and thirty-year Treasuries) and March 16 (five-year).⁴⁹ The presence of significant strain on the Treasury market during this period is confirmed by

⁴³ FINANCIAL INDUSTRY REGULATORY AUTHORITY, *Treasury Aggregate Statistics* (last accessed Oct. 2021), <https://www.finra.org/finra-data/treasury-weekly-aggregates> (showing that weekly trading volume in all Treasury securities for the week ended March 13 was \$4.9 trillion); FEDERAL RESERVE BANK OF NEW YORK, *Primary Dealer Statistics* (last accessed Oct. 2021), <https://www.newyorkfed.org/markets/counterparties/primary-dealers-statistics> (showing that average daily trading volume by primary dealers for the weeks ended March 11 and March 18 was \$869 billion and \$771 billion, respectively).

⁴⁴ FINANCIAL STABILITY OVERSIGHT COUNCIL, *2020 Annual Report*, 27–29 (Dec. 2020), <https://home.treasury.gov/system/files/261/FSOC2020AnnualReport.pdf>.

⁴⁵ BLACKROCK, *Lessons from COVID-19: Market Structure Underlies Interconnectedness of the Financial Market Ecosystem*, 6 (Nov. 2020), <https://www.blackrock.com/corporate/literature/whitepaper/viewpoint-lessons-from-covid-19-market-structure-november-2020.pdf>.

⁴⁶ See COMMITTEE ON CAPITAL MARKETS REGULATION, *Nothing but the Facts: The U.S. Treasury Market During the COVID-19 Crisis* (March 2021), <https://www.capmksreg.org/wp-content/uploads/2021/03/NBTF-US-Treasury-Markets-During-Covid.pdf>.

⁴⁷ Tobias Adrian, Michael Fleming, and Erik Vogt, *Staff Report No. 827: An Index of Treasury Market Liquidity: 1991–2017*, FEDERAL RESERVE BANK OF NEW YORK (Oct. 2017), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr827.pdf.

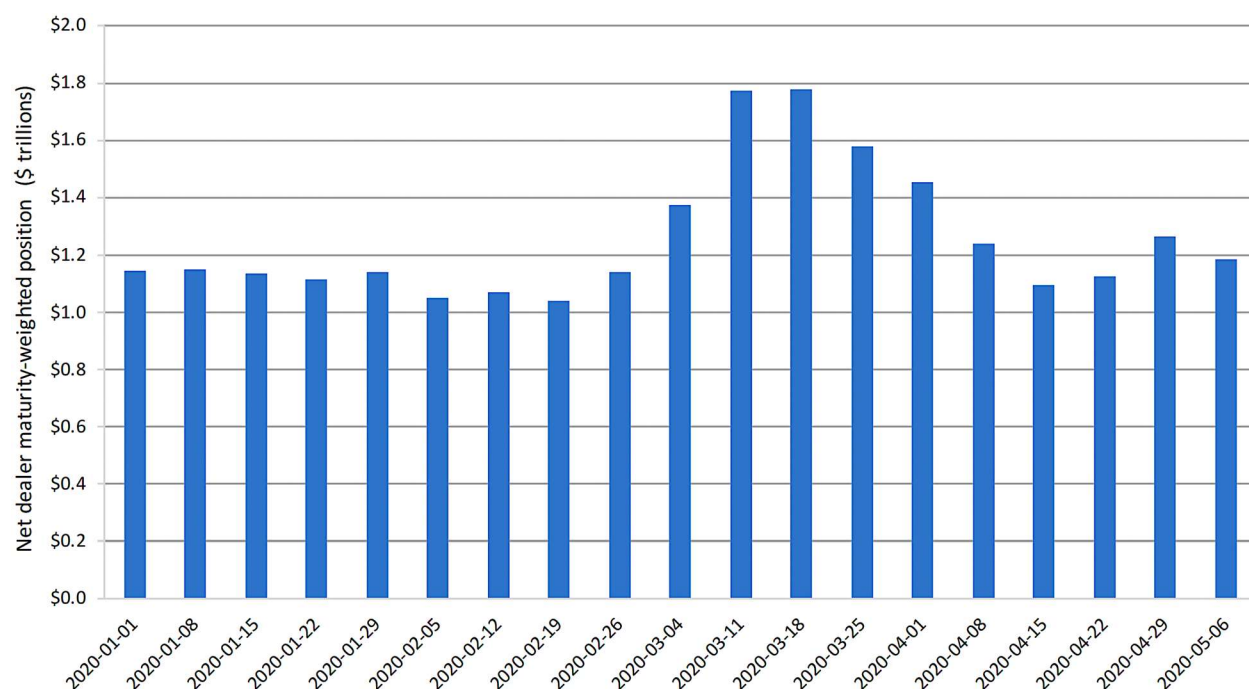
⁴⁸ BANK FOR INTERNATIONAL SETTLEMENTS, *Annual Economic Report*, 44 (June 30, 2020), <https://www.bis.org/publ/arpdf/ar2020e.htm>.

⁴⁹ Michael Fleming and Francisco Ruela, *Treasury Market Liquidity during the COVID-19 Crisis*, LIBERTY STREET ECONOMICS (April 17, 2020), <https://libertystreeteconomics.newyorkfed.org/2020/04/treasury-market-liquidity-during-the-covid-19-crisis.html>.

the volatility of Treasury yields, which reached a peak on March 19 that exceeded the volatility at the height of the 2008 financial crisis.⁵⁰

Dealers played a critical role in the March 2020 crisis as they again increased their aggregate holdings of U.S. Treasuries due to a reduction in demand from other market participants. **Figure 6** demonstrates the rise in Treasury holdings by primary dealers during the March 2020 crisis. However, several reports indicate that primary dealers were again limited in their ability to provide additional liquidity to the market for a number of reasons, including capital constraints on their holdings of Treasuries. For example, the Fed's 2020 Financial Stability Report notes that, "it is possible that some dealers reached their capacity to absorb these sales, leading to a deterioration in Treasury market functioning."⁵¹ Duffie (2020) summarizes other evidence that primary dealers were unable to further expand their balance sheet holdings of Treasuries due to minimum capital requirements.⁵²

Figure 6: Primary Dealer Maturity Weighted Net Inventory of Treasuries (\$T)



Source: Darrell Duffie, *Still the World's Safe Haven? Redesigning the U.S. Treasury Market After the COVID19 Crisis*, HUTCHINS CENTER WORKING PAPER #62, Figure 4 (June 2020), https://www.brookings.edu/wp-content/uploads/2020/05/WP62_Duffie_v2.pdf.

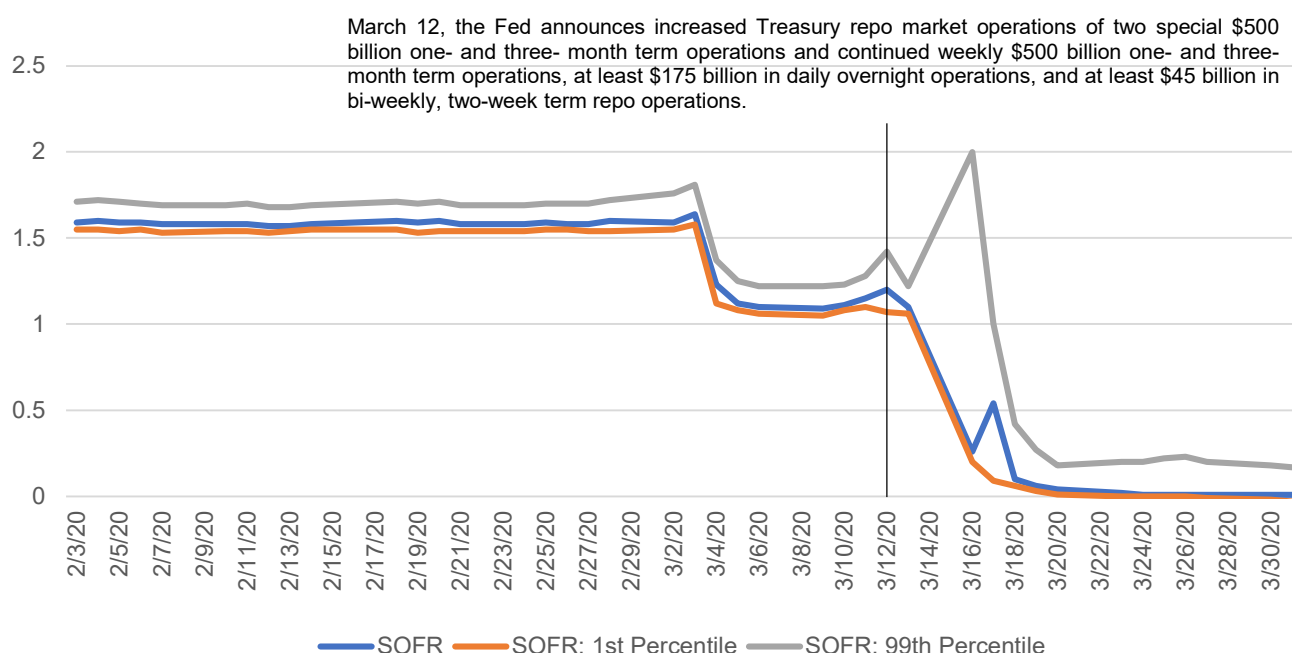
⁵⁰ FEDERAL RESERVE BANK OF ST. LOUIS, *FRED Economic Data: CBOE 10-Year Treasury Note Volatility Futures* (last accessed Oct. 2021), <https://fred.stlouisfed.org/series/VXTYN>.

⁵¹ BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM, *Financial Stability Report* (May 2020), <https://www.federalreserve.gov/publications/files/financial-stability-report-20200515.pdf>.

⁵² Darrell Duffie, *Still the World's Safe Haven? Redesigning the U.S. Treasury Market After the COVID19 Crisis*, HUTCHINS CENTER WORKING PAPER #62, 7-9 (June 2020), https://www.brookings.edu/wp-content/uploads/2020/05/WP62_Duffie_v2.pdf.

Although there were also strains in Treasury repo markets during March 2020,⁵³ repo markets had ongoing support from the Fed from the September 2019 Treasury repo market spike, as described in the prior section, and the Fed quickly expanded such support as demonstrated by **Figure 7**.

Figure 7: Secured Overnight Financing Rate (%) – February to March 2020



Source: Federal Reserve Bank of New York, SOFR Data. Federal Reserve Bank of New York, *Statement Regarding Treasury Reserve Management Purchases and Repurchase Operations* (March 12, 2020).

The consequences of illiquidity in cash Treasury markets can be significant for the United States and financial markets more generally. For Treasuries to continue to function as a global safe haven asset, Treasuries must trade efficiently at their then fair value, especially during periods of market stress. Moreover, holders of Treasuries, including large financial institutions and foreign investors, derive confidence from the fact that Treasuries are reliably cash-like instruments. If they are unable to exchange Treasuries for cash during periods of market stress, they may face a liquidity crisis threatening their solvency.⁵⁴ Resilient cash Treasury markets are therefore critical to financial stability, particularly during a broader market and economic crisis.

⁵³ According to the IAWG Report, “repo rates were volatile at times, and some investors reported difficulty obtaining financing from dealers.” IAWG Report, *supra* note 1, at 11.

⁵⁴ Arvind Krishnamurthy and Annette Vissing-Jorgensen, *The Aggregate Demand for Treasury Debt*, 120 J. OF POL. ECON. 233 (April 2012), https://faculty.haas.berkeley.edu/vissing/demandtreas_jan6.pdf.

c. Conclusion

The September 2019 repo market spike and March 2020 stress in cash Treasury markets both demonstrated that U.S. Treasury markets can be subject to bouts of illiquidity that require Federal Reserve support. They also demonstrate that both markets are dependent on intermediation from dealers that may be unable to provide sufficient liquidity during periods of volatility. Given the projected growth in the notional value of outstanding Treasury securities, it is possible that the existing problem could worsen. Market structure reforms that would enhance the liquidity and resiliency of cash Treasury and Treasury repo markets, as well as increase the capacity of dealers and other market participants to provide liquidity to Treasury markets, should therefore be considered. In this report, we will examine whether mandatory central clearing of cash Treasuries and Treasury repos would enhance Treasury market liquidity, efficiency, and resiliency.

Part II: Overview of Clearing in Cash Treasury and Treasury Repo Markets

a. What is Clearing?

Clearing refers to the process for the settlement of a financial transaction after a trade is executed. Final settlement is the time at which ownership of a financial asset (e.g., security) and cash payment are exchanged and therefore a transaction is complete and there is no risk from a counterparty failing to deliver payment or a security. A settlement failure occurs when a counterparty fails to deliver payment or a security.

Different financial assets have different settlement periods, often depending on the settlement process, which can involve multiple entities including a clearing agent and custodian. Cash Treasury transactions and overnight Treasury repos typically settle in one day, whereas equities trades, for example, settle in two days. Term repo transactions do not settle until completion of the agreed-upon term of the repo (e.g., 30 days), and each counterparty bears counterparty and settlement risk until the transaction is complete. In general, the shorter the settlement cycle the lower the risks associated with the clearing process.

Settlement failure, often referred to as counterparty risk, can impose substantial losses on the counterparty to the trade. If the counterparty to a trade fails to receive the security, then the counterparty will face a cost in replicating the trade with another party. The cost of replacing a trade will depend on the market risk or price volatility of the security being exchanged. Similarly, if the counterparty to a trade fails to receive the cash payment for a security, then the loss of such funding may impede the counterparties' ability to efficiently operate, thereby posing liquidity risk, and in extreme cases, insolvency risk.

One way that counterparties for cash trades of U.S. Treasuries manage their settlement risk is through the exchange of margin, whereby counterparties agree to exchange collateral before settlement depending on counterparty risks. Counterparty risks for Treasury repos can also be mitigated through haircuts on the Treasuries.

Trades can be cleared in two ways. First, counterparties can manage counterparty risks through bilateral clearing arrangements negotiated with each other. Alternatively, trades can be cleared through a central counterparty.

b. What is Central Clearing?

According to the Bank for International Settlements, a central counterparty (“**CCP**”) is “a clearinghouse that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the future performance of open contracts.”⁵⁵ This process is

⁵⁵ BANK FOR INTERNATIONAL SETTLEMENTS, *CRE: Calculation of RWA for Credit Risk*, 50.2 (Dec. 15, 2019), [https://www.bis.org/basel_framework/chapter/CRE/50.htm#:~:text=A%20central%20counterparty%20\(CCP\)%20is,future%20performance%20of%20open%20contracts](https://www.bis.org/basel_framework/chapter/CRE/50.htm#:~:text=A%20central%20counterparty%20(CCP)%20is,future%20performance%20of%20open%20contracts).

called novation. And only financial institutions that are members of a CCP can clear their trades or their customers' trades at the CCP.

CCPs assume counterparty risks for all trades that they clear. If any of a CCP's counterparties default and there is a cost to replace the contracts by that counterparty, then the risk of that default is mutualized at the CCP, which maintains financial resources to cover the replacement costs.⁵⁶ CCPs seek to manage these counterparty risks in three primary ways. First, CCPs establish minimum risk-management standards for their members, including minimum capital requirements. CCPs also monitor the financial conditions of their members. Second, CCPs require all counterparties to contribute collateral, commonly referred to as initial margin. CCPs also have risk models that determine how much collateral (i.e., so-called variation margin) should be posted based on the daily movements in the market value of the cleared financial contract to prevent the build-up of uncollateralized exposures among market participants. CCP risk models also take into account leverage and the concentration of member positions. CCPs typically provide members with transparency as to key details of their risk models but do not always provide full disclosure of their risk models. Third, CCPs maintain a default fund that is intended to ensure that the CCP can withstand the losses associated with the default of a CCP member. Typically, CCPs and CCP members contribute to the default fund, and CCPs often have the authority to require additional contributions to the default fund in the event that the CCP's financial resources are insufficient to cover the losses from defaulting members.

A critical benefit of central clearing is that it allows market participants to reduce their settlement obligations and balance sheet usage by offsetting all of their short and long positions for the same financial contract across all counterparties (so-called **"multilateral netting"**). This also reduces market-wide settlement risk. Bilateral clearing does not allow for multilateral netting.

The fundamental tradeoff of central clearing is that counterparty risk is now at CCPs and thus a failure by a CCP to manage payment and settlement risks could threaten the solvency of its members and severely disrupt trading in the cleared asset. Worse yet, a failure of a CCP itself could threaten financial stability. Due to their importance, CCPs are typically considered systemically important and,⁵⁷ in certain circumstances, CCPs also have access to emergency liquidity from central banks.⁵⁸ For that reason, CCPs and their members are subject to extensive regulations and supervisory oversight intended to ensure that CCPs are well-capitalized and managing risk effectively.

We now shift to a review of clearing practices in cash Treasury and Treasury repo markets.

⁵⁶ Craig Pirrong, *The Economics of Central Clearing: Theory and Practice*, INTERNATIONAL SWAPS AND DERIVATIVES ASSOCIATION (May 2011), <https://www.isda.org/a/yiEDE/isdadiscussion-ccp-pirrong.pdf>.

⁵⁷ Froukelien Wendt, *Central Counterparties: Addressing their Too Important to Fail Nature*, INTERNATIONAL MONETARY FUND, 3 (Jan. 2015), <https://www.imf.org/external/pubs/ft/wp/2015/wp1521.pdf>.

⁵⁸ See, e.g., 12 U.S.C. § 5465(b).

c. Market Structure for Clearing in Cash Treasury Markets

The secondary market for cash Treasuries can be divided into two main segments—the interdealer market and the dealer-to-client market. Each market constitutes about half of the average \$600 billion in daily trading volume in cash Treasuries.⁵⁹

According to the Treasury Markets Practices Group (2018) (the “**TMPG**”), a group of Treasury market experts sponsored by the Federal Reserve Bank of New York, less than 25% of the overall trading volume in cash Treasury markets is centrally cleared by the Government Securities Division of the Fixed Income Clearing Corporation (“**FICC**”).⁶⁰

The FICC is a subsidiary of the Depository Trust & Clearing Corporation (“**DTCC**”), a financial services firm owned by its principal users, which are securities industry participants such as banks, broker-dealers, mutual funds, and other financial institutions.⁶¹ Unlike futures clearinghouses, which are integrated with the exchanges on which market participants trade futures, FICC solely provides post-trade infrastructure, so trades are not executed on an FICC-operated trading venue.⁶² FICC novates all cash Treasury trades that it centrally clears and provides for multilateral netting, thereby establishing a single net long or short position for each participant’s daily trading activity in a given security and reducing the number of securities that must be exchanged to settle obligations.⁶³ FICC does the same for U.S. Treasury auction purchases.⁶⁴ FICC then settles transactions using the Fedwire, which ensures that all deliveries of Treasury securities are made against full payment.⁶⁵

i. Clearing in the Interdealer Market

The interdealer market consists of wholesale trading primarily involving traditional broker-dealers that are affiliated with banking institutions and principal trading firms

⁵⁹ COMMITTEE ON CAPITAL MARKETS REGULATION, *Nothing but the Facts: The U.S. Treasury Market During the COVID-19 Crisis*, 6 (March 2021), <https://www.capmktreg.org/wp-content/uploads/2021/03/NBTF-US-Treasury-Markets-During-Covid.pdf>.

⁶⁰ TREASURY MARKET PRACTICES GROUP, *White Paper on Clearing and Settlement in the Secondary Market for U.S. Treasury Securities* (July 12, 2018), <https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/CS-DraftPaper-071218.pdf>.

⁶¹ THOMSON REUTERS: PRACTICAL LAW: *Depository Trust & Clearing Corporation (DTCC)* (Nov. 2021), [https://uk.practicallaw.thomsonreuters.com/9-386-5617?transitionType=Default&contextData=\(sc.Default\)&firstPage=true](https://uk.practicallaw.thomsonreuters.com/9-386-5617?transitionType=Default&contextData=(sc.Default)&firstPage=true).

DEPOSITORY TRUST & CLEARING CORPORATION, *DTCC Common Stock Reallocation* (March 28, 2018), [https://www.dtcc.com/-/media/Files/pdf/2018/3/28/7949-](https://www.dtcc.com/-/media/Files/pdf/2018/3/28/7949-18.pdf#:~:text=DTCC%20is%20owned%20by%20the,Participants%20of%20the%20Clearing%20Agencies.&text=The%20system%20of%20Participant%20ownership,it%20was%20formed%20in%201999.)

[18.pdf#:~:text=DTCC%20is%20owned%20by%20the,Participants%20of%20the%20Clearing%20Agencies.&text=The%20system%20of%20Participant%20ownership,it%20was%20formed%20in%201999.](https://www.dtcc.com/-/media/Files/pdf/2018/3/28/7949-18.pdf#:~:text=DTCC%20is%20owned%20by%20the,Participants%20of%20the%20Clearing%20Agencies.&text=The%20system%20of%20Participant%20ownership,it%20was%20formed%20in%201999.)

⁶² DEPOSITORY TRUST & CLEARING CORPORATION, *Fixed Income Clearing Corporation* (October 2021), <https://www.dtcc.com/about/businesses-and-subsidiaries/ficc>.

⁶³ DEPOSITORY TRUST & CLEARING CORPORATION, *Netting and Settlement Services* (last accessed Nov. 10, 2021), <https://www.dtcc.com/clearing-services/ficc-gov/gov-netting>

⁶⁴ *Id.*

⁶⁵ *Id.*

(“PTFs”).⁶⁶ Banks and independent broker-dealers that are not PTFs play a limited role in interdealer markets.⁶⁷

Most of the traditional broker-dealers in interdealer markets are registered with the Securities and Exchange Commission (the “SEC”) as primary dealers and act as the trading counterparty for the FRBNY in implementing monetary policy.⁶⁸ PTFs are not a formal regulatory category—it is a description commonly used by regulators, including the Treasury Department and the Federal Reserve, to describe market participants that trade for their own account, engage in a high volume of small trades, rarely carry inventory overnight and typically use algorithmic and high frequency trading strategies.⁶⁹ However, we note that traditional broker-dealers are increasingly adopting similar trading strategies and vice versa, for example, PTFs are increasingly active in the dealer-to-client market, execute large trades and carry inventory overnight.

Central clearing in the interdealer cash Treasury market has evolved over time. Until the late 1980s all interdealer trades were bilaterally cleared. However, following the enactment of the Government Securities Act of 1986 (“GSA”), the National Securities Clearing Corporation for equities and municipal debt (now a subsidiary of DTCC), established the Government Securities Clearing Corporation (the “GSCC”) to act as the central counterparty for the clearing and settlement of interdealer trades in U.S. Treasuries.⁷⁰ Primary dealers of U.S. Treasuries are required to centrally clear their cash trades.⁷¹

From the late 1980s to the early 2000s, trading in the interdealer market was centrally cleared by the GSCC, which eventually became the Government Securities Division of FICC.⁷² However, beginning in the early 2000s trading of cash Treasuries in interdealer markets became increasingly automated, resulting in the entrance of new market participants, many of which are PTFs and not primary dealers or members of

⁶⁶ COMMITTEE ON CAPITAL MARKETS REGULATION, *Nothing but the Facts: The U.S. Treasury Market During the COVID-19 Crisis*, 7 (March 2021), <https://www.capmktreg.org/wp-content/uploads/2021/03/NBTF-US-Treasury-Markets-During-Covid.pdf>. See also James Collin Harkrader and Michael Puglia, *FEDS Notes: Principal Trading Firm Activity in Treasury Cash Markets*, FEDERAL RESERVE SYSTEM (Aug. 4, 2020), <https://www.federalreserve.gov/econres/notes/feds-notes/principal-trading-firm-activity-in-treasury-cash-markets-20200804.htm>.

⁶⁷ COMMITTEE ON CAPITAL MARKETS REGULATION, *Nothing but the Facts: The U.S. Treasury Market During the COVID-19 Crisis* (March 2021), <https://www.capmktreg.org/wp-content/uploads/2021/03/NBTF-US-Treasury-Markets-During-Covid.pdf>.

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ Jeffrey F. Ingber, *The Development of the Government Securities Clearing Corporation*, FEDERAL RESERVE BANK OF NEW YORK ECONOMIC POLICY REVIEW (December 2017), https://www.newyorkfed.org/medialibrary/media/research/epr/2017/epr_2017_gsc Ingber.pdf?la=en.

⁷¹ GROUP OF THIRTY (G30), *U.S. Treasury Markets Steps Toward Increased Resilience*, 8 (July 2021), https://group30.org/images/uploads/publications/G30_U.S._Treasury_Markets-Steps_Toward_Increased_Resilience__1.pdf.

⁷² See *id.*

FICC. As a result, the majority of trading in interdealer markets is no longer centrally cleared.⁷³ Cash Treasury transactions that are not cleared at FICC are bilaterally cleared.

ii. Clearing in the Dealer-to-Client Market

The dealer-to-client market is where end-users of Treasuries—such as institutional investors (e.g., mutual funds, hedge funds and pension funds), foreign central banks and sovereign wealth funds—transact with dealers. Trades in the dealer-to-client market are typically bilaterally cleared.⁷⁴

d. Market Structure for Clearing in Treasury Repo Markets

As of 2020, the average daily size of outstanding Treasury repos was approximately \$3.1 trillion and the majority of Treasury repo transactions were not centrally cleared. The Treasury repo market can be divided into three segments, as demonstrated on the next page by **Figure 8**.

First, there is the tri-party repo market, where the collateral provider and cash provider contract not only with each other but also with a “clearing bank” that provides clearing, settlement, custodial, and other services in connection with the repo transaction, including collateral valuation and margining.⁷⁵ In 2020, average outstanding tri-party Treasury repo transactions were approximately \$1.2 trillion, which represented 39% of all repos outstanding.⁷⁶

In a tri-party repo transaction, counterparties enter into Treasury repos on a “**general collateral basis**,” meaning that cash providers are willing to accept certain classes of Treasury securities as collateral for repos (e.g., Treasury securities maturing in less than ten years) rather than a specific security as collateral for repos (e.g., a 2-year Treasury note issued in April 2020).⁷⁷ Although BNY Mellon and JP Morgan Chase, both commercial banking firms, had historically served as the two clearing banks in the tri-party

⁷³ TREASURY MARKET PRACTICES GROUP, *White Paper on Clearing and Settlement in the Secondary Market for U.S. Treasury Securities*, 2 (July 12, 2018), <https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/CS-DraftPaper-071218.pdf>.

⁷⁴ TREASURY MARKET PRACTICES GROUP, *White Paper on Clearing and Settlement in the Secondary Market for U.S. Treasury Securities*, 5 (July 12, 2018), <https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/CS-DraftPaper-071218.pdf>.

⁷⁵ Adam Copeland, Darrell Duffie, Antoine Martin, and Susan McLaughlin, *Key Mechanics of The U.S. Tri-Party Repo Market*, FEDERAL RESERVE BANK OF NEW YORK, 3 (Dec. 2012), <https://www.newyorkfed.org/medialibrary/media/research/epr/2012/1210cope.pdf>.

⁷⁶ FEDERAL RESERVE BANK OF NEW YORK, *Tri-Party Treasury Repo* (last accessed Nov. 4, 2021), <https://www.newyorkfed.org/data-and-statistics/data-visualization/tri-party-repo>.

⁷⁷ See INTERNATIONAL CAPITAL MARKET ASSOCIATION, *Frequently Asked Questions on Repo* (Jan. 2019), <https://www.icmagroup.org/assets/documents/Regulatory/Repo/Repo-FAQs-January-2019.pdf>; Michael Fleming and Kenneth Garbade, *The Repurchase Agreement Refined: GCF Repo*, FEDERAL RESERVE BANK OF NEW YORK (June 2003), https://www.newyorkfed.org/medialibrary/media/research/current_issues/ci9-6.pdf.

Treasury repo market, JP Morgan Chase largely withdrew from this role in 2018,⁷⁸ and since then, BNY Mellon has been the predominant clearing bank.⁷⁹ Critically, because BNY Mellon does *not* become a counterparty to both trades (i.e., the repo transaction is not novated), BNY Mellon does not act as a central clearinghouse, and it is not, therefore, in a position to provide multilateral netting of trades in the tri-party repo market. However, BNY Mellon does handle delivery versus payment of the transaction as it acts as a transfer agent, ensuring that the borrower does not receive cash before transferring the collateral to BNY Mellon and vice-versa.⁸⁰

Second, FICC centrally clears “general collateral” Treasury repo transactions through its general collateral finance (“**GCF**”) service in which members of FICC can anonymously enter into Treasury repos on a general collateral basis. FICC’s GCF service novates all Treasury repos and provides for multilateral netting.⁸¹ In 2020, average outstanding transactions in FICC’s GCF service were approximately \$137 billion, which represented only 4% of all repos outstanding.⁸²

Third, there are Treasury repos that are not “general collateral” repos. These Treasury repos are negotiated bilaterally between two counterparties and are for specific Treasury securities (e.g., a 2-year Treasury note issued on April 2020). These Treasury repos are generally referred to as “bilateral” repos, although some are centrally cleared. In 2020, the average outstanding volume in the bilateral Treasury repo market was approximately \$1.742 trillion, which represented 57% of all repos outstanding.⁸³ FICC centrally clears some of these Treasury repos through its “delivery versus payment” (“**DVP**”) service which, like the GCF service, novates transactions and provides for

⁷⁸ Mark E. Paddrik, Carlos A. Ramírez, and Matthew J. McCormick, *FEDS Notes: The Dynamics of the U.S. Overnight Triparty Repo Market*, FEDERAL RESERVE SYSTEM (Aug. 2, 2021), <https://www.federalreserve.gov/econres/notes/feds-notes/the-dynamics-of-the-us-overnight-triparty-repo-market-20210802.htm>.

⁷⁹ *Id.* See also INTERNATIONAL CAPITAL MARKET ASSOCIATION, *What is Tri-Party Repo?* (last accessed Oct. 2021), <https://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/repo-and-collateral-markets/icma-ercc-publications/frequently-asked-questions-on-repo/24-what-is-tri-party-repo/>. See also BNY MELLON, *Triparty: An Introduction* (2020), <https://www.bnymellon.com/content/dam/bnymellon/documents/pdf/articles/triparty-repo-brochure.pdf.coredownload.pdf>.

⁸⁰ <https://www.bnymellon.com/content/dam/bnymellon/documents/pdf/articles/triparty-repo-brochure.pdf.coredownload.pdf>

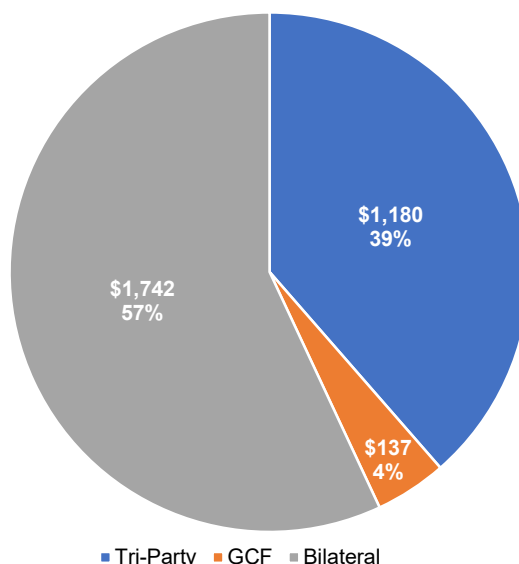
⁸¹ David Bowman, Joshua Louria, Matthew McCormick, and Mary-Frances Styczynski, *FEDS Notes: The Cleared Bilateral Repo Market and Proposed Repo Benchmark Rates*, FEDERAL RESERVE SYSTEM (Feb. 27, 2017), <https://www.federalreserve.gov/econresdata/notes/feds-notes/2017/cleared-bilateral-repo-market-and-proposed-repo-benchmark-rates-20170227.html>; DEPOSITORY TRUST & CLEARING CORPORATION, *GCF Repo* (last accessed Nov. 10, 2021), <https://www.dtcc.com/clearing-services/ficc-gov/gcf-repo>.

⁸² FEDERAL RESERVE BANK OF NEW YORK, *GCF Treasury Repo* (last accessed Nov. 4, 2021), <https://www.newyorkfed.org/data-and-statistics/data-visualization/tri-party-repo>.

⁸³ SIFMA, *US Repo Market Fact Sheet* (Jan. 19, 2021), <https://www.sifma.org/resources/research/us-repo-market-fact-sheet/>.

multilateral netting.⁸⁴ However, the DVP service is different than the GCF service, because Treasury repo transactions in DVP are between two identified FICC members (not anonymous, like GCF) and security-specific transactions (not general collateral, like GCF).⁸⁵ Although FICC does not publicly disclose trading volumes for Treasury repos in their DVP service, close to half of trades in the bilateral Treasury repo market are not centrally cleared at FICC.⁸⁶

Figure 8: Average Treasury Repo Volumes by Repo Type \$Bn (2020)



Note: Bilateral data is the average outstanding as reported by SIFMA.

Source: GCF and Tri party volumes are reported by the Federal Reserve here: <https://www.newyorkfed.org/data-and-statistics/data-visualization/tri-party-repo#interactive/tripartygcf>, and SIFMA reports bilateral repo averages here: <https://www.sifma.org/wp-content/uploads/2020/04/2021-US-Repo-Fact-Sheet.pdf>.

⁸⁴ David Bowman, Joshua Loria, Matthew McCormick, and Mary-Frances Styczynski, *FEDS Notes: The Cleared Bilateral Repo Market and Proposed Repo Benchmark Rates*, FEDERAL RESERVE SYSTEM (Feb. 27, 2017), <https://www.federalreserve.gov/econresdata/notes/feds-notes/2017/cleared-bilateral-repo-market-and-proposed-repo-benchmark-rates-20170227.html>; DEPOSITORY TRUST & CLEARING CORPORATION, *Learning Center – DVP Service* (last accessed Nov. 8, 2021), <https://dtcclearing.com/products-and-services/fixed-income-clearing/government-securities-division-gsd/dvp-service.html>.

⁸⁵ David Bowman, Joshua Loria, Matthew McCormick, and Mary-Frances Styczynski, *FEDS Notes: The Cleared Bilateral Repo Market and Proposed Repo Benchmark Rates*, FEDERAL RESERVE SYSTEM (Feb. 27, 2017), <https://www.federalreserve.gov/econresdata/notes/feds-notes/2017/cleared-bilateral-repo-market-and-proposed-repo-benchmark-rates-20170227.html>.

⁸⁶ U.S. DEPT. OF TREASURY – OFFICE OF FINANCIAL RESEARCH, *Ongoing Data Collection of Centrally Cleared Transactions in the U.S. Repurchase Agreement Market*, 83 FED. REG. 31896, 31900 (July 10, 2019), <https://www.federalregister.gov/documents/2018/07/10/2018-14706/ongoing-data-collection-of-centrally-cleared-transactions-in-the-us-repurchase-agreement-market>. In addition, according to the IAWG Report, “non-centrally cleared bilateral repo represents a significant portion of the Treasury market, roughly equal in size to centrally cleared repo.” IAWG Report, *supra* note 1, at 29. The IAWG report also notes that “given that the FICC requires its full members (also called netting members) to centrally clear trades with each other, a non-centrally cleared bilateral repo typically involves an institution that is not a FICC netting member.” IAWG Report, *supra* note 1, at 4.

e. Conclusion

In Part II, we reviewed the risks associated with clearing and how central clearing is intended to mitigate those risks through minimum requirements for clearing members, multilateral netting and CCP's margining practices, default management procedures, and financial resources. We then reviewed the extent of central clearing in cash Treasury markets and Treasury repos. We found that the majority of trading in both markets is not centrally cleared, so the benefits from a central clearing mandate could be substantial.

Part III: The Benefits and Risks of Mandatory Clearing

In Part III, we evaluate the potential benefits and risks of mandatory central clearing in cash Treasury and Treasury repo markets. We ultimately conclude that the benefits of mandatory central clearing in Treasury markets likely outweigh the risks. Policymakers should therefore consider mandating central clearing in cash Treasury markets and Treasury repo markets, because doing so would enhance the liquidity and efficiency of Treasury markets and reduce risks to financial stability.

We begin by considering the benefits of central clearing. First, we examine the potential increase in market liquidity from mandatory central clearing with a focus on reduced capital constraints on dealers. We note that in Part IV we further consider how a central clearing mandate could increase Treasury market liquidity by allowing for the emergence of all-to-all trading thereby reducing the reliance of Treasury markets on the intermediation capacity of dealers. Second, we show the reduction in gross exposures and settlement failures from mandatory central clearing. Next, we consider other benefits to financial stability from improved risk management practices as well as increased market transparency associated with central clearing. Finally, we consider the risks of central clearing, including the possibility of a risk management failure at a CCP and the moral hazard posed by the expectation of government support if a CCP were to fail.

a. Central Clearing Would Enhance Market Liquidity & Market Quality

An important benefit of mandatory central clearing is that it would enhance the ability of dealers to provide liquidity to financial markets during market volatility by reducing the usage of their balance sheets through multilateral netting. Reducing balance sheet usage is particularly important to market liquidity considering that many of the most active dealers in cash Treasury markets and Treasury repo markets are affiliated with large banking institutions and are therefore subject to restrictions on their ability to lend due to capital requirements that apply based on a dealer's balance sheet size. Expanded balance sheet capacity is particularly important considering the rise in the size of outstanding U.S. Treasuries as compared to dealer inventories of Treasuries highlighted in **Part I**.

But how would central clearing reduce balance sheet usage? First, dealers are required to hold capital against exposures from gross settlement obligations and counterparty risks,⁸⁷ and by permitting multilateral netting, central clearing would reduce gross settlement obligations and the associated capital constraints. Moreover, independent of netting, the Basel framework imposes lower capital requirements on

⁸⁷ FIA PRINCIPAL TRADERS GROUP, *Clearing a Path to a More Resilient Treasury Market*, 4 (July 2021), https://www.fia.org/sites/default/files/2021-07/FIA-PTG_Paper_Resilient%20Treasury%20Market_FINAL.pdf.

centrally-cleared positions because they are considered to pose lower risks as compared to bilaterally-cleared transactions.⁸⁸

The benefits of expanded balance sheet capacity are particularly pronounced for the bank-affiliated dealers that are subject to more stringent capital requirements – particularly the leverage ratio. Specifically, the leverage ratio requires banks and bank-affiliated dealers to hold capital of 5-7% against the total size of a firm's balance sheet,⁸⁹ and as repo transactions increase the size of a bank's balance sheet, they increase the amount of capital that bank-affiliated dealers must hold. These higher capital requirements restrict the ability of bank-affiliated dealers to borrow and lend in Treasury repo markets and more generally. Indeed, research by the Bank for International Settlement's Committee on the Global Financial system and a number of academic studies have found that capital charges from the leverage ratio have reduced Treasury repo market activity.⁹⁰

A 2021 FRBNY study found that almost 80% of the netting benefits (\$640 billion during peak March 2020 volatility) from moving cash Treasuries to market wide central clearing would go to the 16 primary dealers that are affiliated with banks and hence subject to the Fed's leverage ratio requirements.⁹¹ The benefits would also be particularly high during market stress (when gross exposures and counterparty risks typically increase due to increased trading activity). For example, the 2021 FRBNY study found that multilateral netting benefits are 10% higher during periods of high market volatility as compared to during stable trading markets.⁹² Central clearing therefore not only expands balance sheet capacity for dealers during stable markets but it is in fact most beneficial precisely when dealers need expanded capacity, during periods of high volatility.

⁸⁸ BANK FOR INTERNATIONAL SETTLEMENTS, FINANCIAL STABILITY BOARD, and PICU-IOSCO, *Incentives to centrally clear over-the-counter (OTC) derivatives: A post-implementation evaluation of the effects of the G20 financial regulatory reforms – final report*, 2 (Nov. 19, 2018), <https://www.fsb.org/wp-content/uploads/R191118-1-1.pdf>; BANK FOR INTERNATIONAL SETTLEMENTS – BASEL COMMITTEE ON BANKING SUPERVISION, *CRE54: Capital Requirements for Bank Exposures to Central Counterparties* (Dec. 15, 2019), https://www.bis.org/basel_framework/chapter/CRE/54.htm.

⁸⁹ See 12 C.F.R. § 217.10.

⁹⁰ See BANK FOR INTERNATIONAL SETTLEMENTS: COMMITTEE ON THE GLOBAL FINANCIAL SYSTEM, *Repo Market Functioning*, 21 (April 12, 2017), <https://www.bis.org/publ/cgfs59.htm>; Antonis Kotidis and Neeltje van Horen, *Staff Working Paper No. 746: Repo Market Functioning: The Role of Capital Regulation*, BANK OF ENGLAND (Aug. 3, 2018), <https://www.bankofengland.co.uk/working-paper/2018/repo-market-functioning-the-role-of-capital-regulation> (finding that dealers subject to a more binding leverage ratio reduced liquidity in the repo market); Darrell Duffie, *Post-Crisis Bank Regulations and Financial Market Liquidity*, BAFFI LECTURE (March 31, 2018), <https://www.darrellduffie.com/uploads/policy/DuffieBaffiLecture2018.pdf> (stating that post-crisis capital regulations and new failure resolution rules increase the cost of space on the balance sheets of large banks).

⁹¹ Michael Fleming and Frank Keane, *Staff Report No. 964: Netting Efficiencies of Marketwide Central Clearing*, FEDERAL RESERVE BANK OF NEW YORK, Figure 7 (April 2021), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr964.pdf.

⁹² *Id.*

i. Central Clearing Can Dramatically Reduce Balance Sheet Size for Treasury Repos

In terms of reducing balance sheet usage, the benefits of central clearing would be particularly significant for Treasury repos, because Treasury repos that are bilaterally cleared directly increase balance sheet size whereas trading in cash Treasuries does not. This is best described with an example. A typical repo transaction involves Counterparty A agreeing to borrow \$98 in cash overnight from Counterparty B in exchange for selling Counterparty B \$100 in Treasury securities. Counterparty A and Counterparty B also agree that on the next day they will unwind the transaction and Counterparty A will repurchase the Treasury securities from Counterparty B. However, accounting rules require that the balance sheet of Counterparty A must temporarily increase by \$98 before the transaction is unwound. So, Counterparty A's balance sheet temporarily includes \$98 in borrowed cash and the \$100 in Treasury securities that Counterparty A has promised to repurchase.

However, centrally cleared repos allow for multilateral netting whereby dealers can offset their borrowing and lending in repo transactions across all counterparties, reducing the impact of repo market activity on their balance sheet size. Research indicates that centrally clearing Treasury repos can reduce capital charges for dealers by 60% to 80%.⁹³

As described in more detail in **Part I**, capital charges for bilaterally cleared repos were a contributing factor to the September 2019 Treasury repo market spike. Reports indicate that dealers affiliated with large banks had to pull back from the Treasury repo markets due to capital charges from the leverage ratio. When large financial institutions have difficulty obtaining short-term funding from Treasury repos they reduce their market making in other asset classes thereby harming overall market liquidity. Indeed, such effects were evident in FX, derivatives and equities markets during the September 2019 repo spike. In March 2020, dealers again pulled back from Treasury repo markets due to capital constraints.⁹⁴

ii. Other Market Quality Benefits from Central Clearing

In theory by lowering counterparty risk and expanding the ability of dealers to provide liquidity to markets, central clearing should provide additional benefits to market quality. Empirical evidence from central clearing in other financial assets supports the benefits of central clearing for market quality.

For example, if central clearing efficiently reduces counterparty risk, market participants should be willing to pay more for an asset because the risk of holding that asset are lower and the returns should remain the same. Loon & Zhong (2014) test this

⁹³ FINADIUM LLC, *Netting rules for Repo, Securities Lending and Prime Brokerage* (Sept. 2014), <https://finadium.com/finadium-report-desc/netting-rules-for-repo-securities-lending-and-prime-brokerage/>.

⁹⁴ Nellie Liang and Pat Parkinson, *Enhancing Liquidity of the U.S. Treasury Market Under Stress*, HUTCHINS CENTER WORKING PAPER #72, Figure 3 (December 2020): https://www.brookings.edu/wp-content/uploads/2020/12/WP72_Liang-Parkinson.pdf.

theory by studying the pricing of credit default swaps, for which central clearing was introduced by ICE between 2009 and 2011.⁹⁵ They find that, with central clearing, buyers of CDS were willing to pay 1.4% more for CDS. Similarly, Akari, Abdhalla et al (2019) also found that the introduction of central clearing resulted in an increase in the prices that buyers were willing to pay for CDS protection.⁹⁶

Volatility of the financial asset should also be reduced due to the reduction in counterparty risk. Menkveld, Pagnotta & Zoican (2015) studied the introduction of central clearing for equities in 2009 in Denmark, Finland, and Sweden.⁹⁷ They found that the daily volatility of stocks in these jurisdictions declined by an average of 20 basis points or almost 9% after the introduction of central clearing.

Other market quality benefits from central clearing are also evident. For example, Loon & Zhong (2016) found positive effects on market quality from the central clearing of CDS, such as lower trading costs and price impact.⁹⁸

b. Central Clearing Would Reduce Gross Exposures and Settlement Failures

Mandatory central clearing would reduce the likelihood that the failure of a dealer or other market participant in cash Treasury markets or Treasury repo markets would cause losses at other market participants and potentially threaten financial stability. It would do so by mitigating counterparty risk primarily through multilateral netting that reduces market participants' gross exposures to each other and the frequency of settlement failures. The only way to achieve multilateral netting is through central clearing. Moreover, research shows that the reduction in these risks would be most significant during periods of high market volatility when gross exposures and settlement failures are significantly higher. Although there were no failures of any dealers in the Treasury repo spike of September 2019 or the March 2020 stress in cash Treasury markets, mitigating the risk of such cascading failures should be a priority of policymakers due to the systemic importance of Treasury markets.

⁹⁵ Yee Cheng Loon and Zhaodong Ken Zhong, *The impact of central clearing on counterparty risk, liquidity, and trading: Evidence from the credit default swap market*, 112(1) JOURNAL OF FINANCIAL ECONOMICS 91 (2014),

https://econpapers.repec.org/article/eee/jfinec/v_3a112_3ay_3a2014_3ai_3a1_3ap_3a91-115.htm.

⁹⁶ Mohamed-Ali Akari, Ramzi Ben-Abdallah, Michèle Breton, and Georges Dionne, *The impact of central clearing on the market for single-name credit default swaps*, CANADIAN DERIVATIVES INSTITUTE (Jan. 2019), https://cdi-icd.org/en/wp-content/uploads/sites/2/2019/02/WP-18-03_Dionne_Breton_Akari_Ben-Abdallah_Mise-a-jour-janvier2019.pdf.

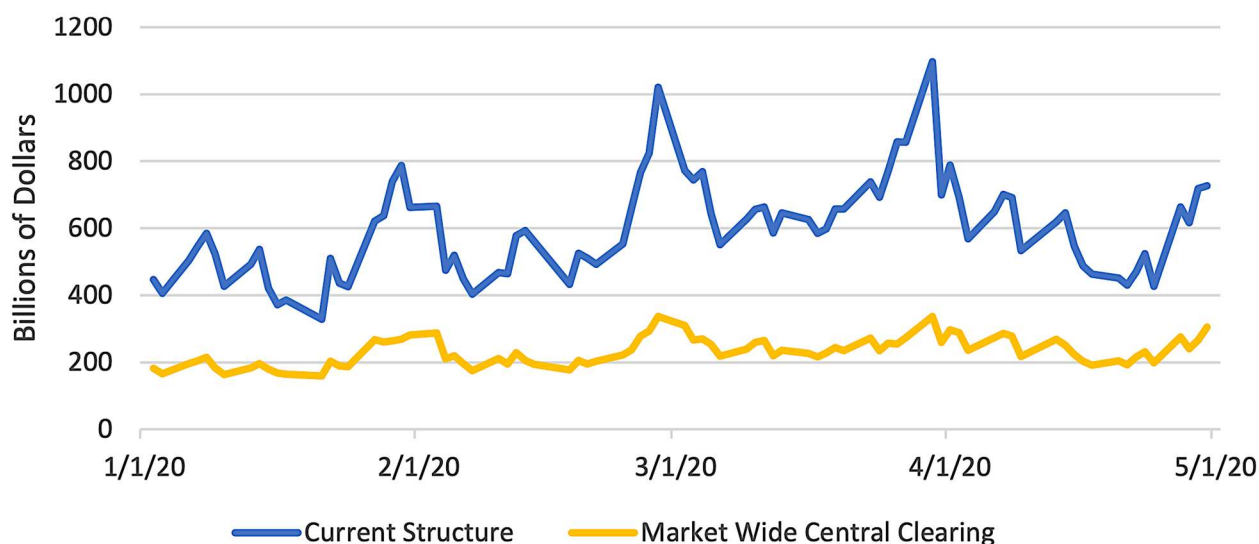
⁹⁷ Albert Menkveld, Emiliano Pagnotta, Marius Andrei Zoican, *Does Central Clearing Affect Price Stability? Evidence from Nordic Equity Markets*, HAL (Oct. 2015), <https://hal.archives-ouvertes.fr/hal-01253702/document>

⁹⁸ Yee Cheng Loon and Zhaodong Zhong, *Does Dodd-Frank affect OTC transaction costs and liquidity? Evidence from real-time CDS trade reports*, 119(3) JOURNAL OF FINANCIAL ECONOMICS, ELSEVIER, 645 (2016), <https://ideas.repec.org/a/eee/jfinec/v119y2016i3p645-672.html>.

i. Estimating the Reduction in Counterparty Risk from Central Clearing

A recent 2021 FRBNY study estimates the reduction in counterparty risk from mandatory central clearing of cash Treasuries. As demonstrated by **Figure 9**, the study found that a central clearing mandate would have lowered dealers' daily gross settlement obligations by roughly 60% or \$330 billion in the weeks preceding and following the market disruptions of March 2020 and nearly 70% or \$800 billion during the peak of the volatility in March.⁹⁹ According to the Treasury Markets Practices Group, risk management practices should focus on gross settlement obligations, because the entire notional value of cash Treasuries is required for settlement.¹⁰⁰ As for the Treasury repo market, a 2017 study by the Office of Financial Research (the "OFR") found that introducing central clearing for dealer-to-client Treasury repos would have reduced dealer exposures from Treasury repos by over 80% to \$12.8 billion from \$66.5 billion in 2015.¹⁰¹

Figure 9: Dealers' Gross Settlement Obligations for Cash Treasuries by Market Structure (\$B)



Source: Michael Fleming and Frank Keane, *Staff Report No. 964: Netting Efficiencies of Marketwide Central Clearing*, FEDERAL RESERVE BANK OF NEW YORK, Figure 7 (April 2021), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr964.pdf.

The frequency of individual settlement failures in cash Treasury and Treasury repo markets also increases during periods of high market volatility, as demonstrated for March 2020 by **Figure 10**. Thus, reducing settlement failures, which can pose losses for

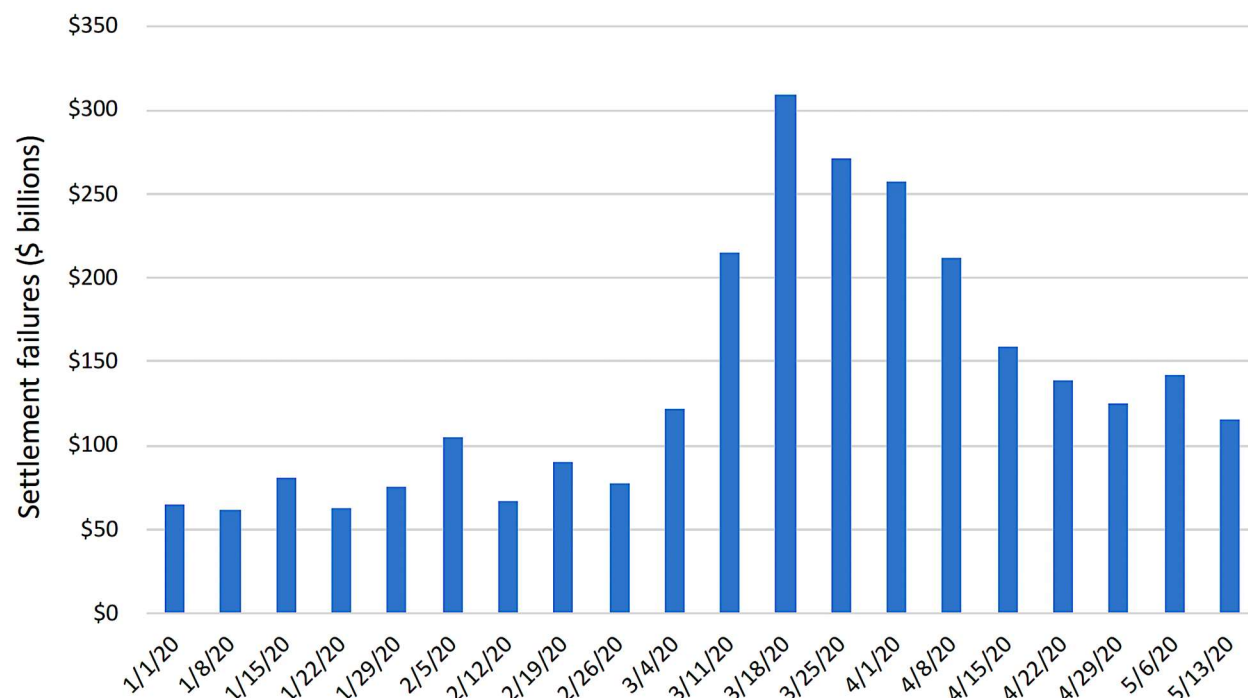
⁹⁹ Michael Fleming and Frank Keane, *Staff Report No. 964: Netting Efficiencies of Marketwide Central Clearing*, FEDERAL RESERVE BANK OF NEW YORK (April 2021), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr964.pdf.

¹⁰⁰ TREASURY MARKET PRACTICES GROUP, *White Paper on Clearing and Settlement in the Secondary Market for U.S. Treasury Securities*, 4 (July 12, 2018), <https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/CS-DraftPaper-071218.pdf>.

¹⁰¹ OFFICE OF FINANCIAL RESEARCH, *Benefits and Risks of Central Clearing in the Repo Market*, 5-6 (March 9, 2017), https://www.financialresearch.gov/briefs/files/OFRBr_2017_04_CCP-for-Repos.pdf.

counterparties, is particularly important to reducing risk during a crisis. Central clearing for Treasury markets is an effective means of doing so. Indeed, Duffie (2020) finds that centrally cleared transactions were less prone to settlement failures than bilaterally cleared cash Treasuries in March 2020.¹⁰² And Fleming and Keane (2021) find that the introduction of market-wide central clearing of cash Treasuries would have reduced settlement failures by 75% during March 2020.¹⁰³

Figure 10: Primary Dealer Settlement Failures of U.S. Treasuries (\$B)



Source: Darrell Duffie, *Still the World's Safe Haven? Redesigning the U.S. Treasury Market After the COVID19 Crisis*, HUTCHINS CENTER WORKING PAPER #62, Figure 12 (June 2020), https://www.brookings.edu/wp-content/uploads/2020/05/WP62_Duffie_v2.pdf.

Studies find that similar positive effects in terms of reduced settlement and counterparty exposures were evident when central clearing was initially introduced in cash Treasury and Treasury repo markets in the 1980s and 1990s. A 2017 FRBNY review found that the introduction of central clearing for cash Treasuries in the late 1980s reduced operational costs for broker-dealers and settlement exposures for banks.¹⁰⁴ A 1992 report by the Federal Reserve, the SEC, and the Treasury Department found that

¹⁰² Darrell Duffie, *Still the World's Safe Haven? Redesigning the U.S. Treasury Market After the COVID19 Crisis*, HUTCHINS CENTER WORKING PAPER #62 (June 2020), https://www.brookings.edu/wp-content/uploads/2020/05/WP62_Duffie_v2.pdf.

¹⁰³ Michael Fleming and Frank Keane, *Staff Report No. 964: Netting Efficiencies of Marketwide Central Clearing*, FEDERAL RESERVE BANK OF NEW YORK (April 2021), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr964.pdf.

¹⁰⁴ Jeffrey F. Ingber, *The Development of the Government Securities Clearing Corporation*, FEDERAL RESERVE BANK OF NEW YORK ECONOMIC POLICY REVIEW, 33-50 (December 2017), https://www.newyorkfed.org/medialibrary/media/research/epr/2017/epr_2017_gsccl_ingber.pdf?la=en.

central clearing made the market for cash Treasuries “even more efficient,” and that the central clearing netting process “substantially reduces counterparty risk.”¹⁰⁵ The report also found that central clearing led to increased liquidity, lower costs, more efficient collateral allocation, reduced operational costs, and improved safety in cash Treasury markets. With respect to Treasury repos, the 2017 FRBNY review found that the introduction of central clearing for Treasury repos in the early 1990s “dramatically reduced the number of total daily settlements for broker participants and made their back-office settlement process much more cost-efficient.”¹⁰⁶

Empirical research also indicates that similar effects have been observed in other financial markets that introduced central clearing. For example, Campbell (2014) estimates that the central clearing of credit default swaps (“CDS”) reduced overall settlement exposures by 60% for dealers.¹⁰⁷ Moreover, the reduction in overall settlement exposures should reduce the demand for collateral to be posted as margin thereby increasing overall market liquidity. Duffie et al. (2015) confirm that central clearing can lower overall collateral demand when there is no substantial clearing fragmentation.¹⁰⁸

c. Central Clearing Would Enhance Market Stability Through Improved Risk Management and Market Confidence

Cash Treasury markets and Treasury repos would also benefit from enhanced, standardized and transparent risk management processes associated with central clearing as compared to bilateral clearing. Enhanced risk management processes can reduce overall market risk by instilling greater valuation and margin discipline, minimizing market-wide leverage, ensuring that CCP members are adequately capitalized and that financial resources are available to ensure that the cost of a dealer or market participant’s failure could be borne by the CCP. Market participants would have substantially greater transparency into the effects, costs and process for handling the failure of a major counterparty or the effects of market volatility than in a bilaterally cleared market.

Mandatory central clearing of cash Treasuries and Treasury repos would also provide regulators, the CCP and CCP members with comprehensive transparency into trading activity in cash Treasuries and Treasury repos. For example, FICC does not presently have visibility into bilaterally-cleared cash Treasury and Treasury repo market activity, and without a comprehensive picture of the entire market, FICC’s ability to

¹⁰⁵ U.S. DEPT. OF THE TREASURY, SEC. & EXCH. COMM’N, and FEDERAL RESERVE SYSTEM, *Joint Report on the Government Securities Market* (Ja. 1992), <https://home.treasury.gov/system/files/276/joint-report-on-the-government-securities-market-1992.pdf>

¹⁰⁶ Jeffrey F. Ingber, *The Development of the Government Securities Clearing Corporation*, FEDERAL RESERVE BANK OF NEW YORK ECONOMIC POLICY REVIEW, 48 (December 2017), https://www.newyorkfed.org/medialibrary/media/research/epr/2017/epr_2017_gsc Ingber.pdf?la=en.

¹⁰⁷ Sean Campbell, *Estimating the Effect of Central Clearing on Credit Derivative Exposures*, FEDERAL RESERVE SYSTEM (Feb. 26, 2014), <https://www.federalreserve.gov/econresdata/notes/feds-notes/2014/estimating-the-effect-of-central-clearing-on-credit-derivative-exposures-20140226.html>.

¹⁰⁸ Darrell Duffie, Martin Scheicher, and Guillaume Vuillemeys, *Central Clearing and Collateral Demand*, SSRN (April 16, 2014), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2388894.

manage risks to the CCP and its clearing members is limited.¹⁰⁹ Market participants also presently lack such transparency as to counterparty and settlement risks.¹¹⁰ Regulators and the CCP would be better able to identify crowded positions when multiple market participants take positions on the same side of the market and have highly correlated risks in a centrally cleared market. CCP risk management processes are also generally available to members and subject to certain public disclosures.¹¹¹

i. Risk Management in Bilaterally Cleared Cash Treasury Markets is Suboptimal

There are clear indications that the existing bilateral clearing process for cash Treasuries has major shortcomings. In 2018, the TMPG surveyed the existing market structure for clearing in cash Treasury markets.¹¹² The TMPG found that for bilaterally cleared cash Treasuries:

“market participants may not be applying the same risk management rigor to the clearing and settlement of their U.S. Treasury activities as they do to other aspects of risk taking. This may be in part due to the risk-free nature of the underlying instrument and in part due to the typically short settlement cycle...there have been instances in the past in which Treasury market participants have suffered substantial and rapid losses from unexpected counterparty credit concerns and leveraged positions [such as the failure of Long-term Capital Management in 1998].”¹¹³

The TMPG also found that margining is not a common practice for bilaterally cleared transactions, whereas centrally cleared transactions are margined twice a day.¹¹⁴ They noted the lack of margining is a particular concern for interdealer markets that typically involve high-speed automated trading with large trading volumes as such trading can quickly lead to significant risk exposures. The TMPG concluded that:

“the default of a large market participant...could disrupt Treasury market functioning through contagion spreading to interconnected institutions...[a] default can leave a counterparty with long or short security exposures to cover; so it is

¹⁰⁹ DEPOSITORY TRUST & CLEARING CORPORATION, *Making the U.S. Treasury Market Safer for All Participants*, (October 2021), <https://www.dtcc.com/-/media/Files/Downloads/WhitePapers/Making-the-Treasury-Market-Safer-for-all-Participants.pdf>; TREASURY MARKET PRACTICES GROUP, *White Paper on Clearing and Settlement in the Secondary Market for U.S. Treasury Securities*, 2 (July 12, 2018), <https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/CS-DraftPaper-071218.pdf>.

¹¹⁰ TREASURY MARKET PRACTICES GROUP, *White Paper on Clearing and Settlement in the Secondary Market for U.S. Treasury Securities* (July 12, 2018), <https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/CS-DraftPaper-071218.pdf>.

¹¹¹ See, e.g., INTERNATIONAL SWAPS AND DERIVATIVES ASSOCIATION, *CCP Best Practices*, 13 (Jan. 2019), <https://www.isda.org/a/cigME/CCP-Best-Practice.pdf>.

¹¹² TREASURY MARKET PRACTICES GROUP, *White Paper on Clearing and Settlement in the Secondary Market for U.S. Treasury Securities* (July 12, 2018), <https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/CS-DraftPaper-071218.pdf>.

¹¹³ *Id.* at 2.

¹¹⁴ *Id.* at 3.

incorrect to assume that the risk of clearing and settlement is necessarily low because of the asset's high quality and credit status. Participants should avoid the temptation to conflate asset quality with counterparty creditworthiness. Moreover, in reaction to a large participant's default, a flight to quality could push U.S. Treasury security prices rapidly higher, escalating replacement costs [such flights to quality occurred in 1986, 1994 and 2008]."¹¹⁵

ii. *Empirical Research Demonstrates Market Stability Benefits of Central Clearing*

A few empirical studies have examined the role of central clearing of trading in government securities and government repos for market stability, although the breadth of these studies is limited by the fact that in most jurisdictions there is only a small amount of central clearing of cash transactions in government securities.¹¹⁶ Japan is an exception where a significant majority of trades in Japanese Government Bonds ("JGBs") are centrally cleared.¹¹⁷ Hattori (2020) examined the performance of the JGB market during the 2008 financial crisis, finding that market participants view CCPs as effective mitigants of counterparty risk, particularly during volatile markets.¹¹⁸

Mancini et al. (2016) examined the central clearing of repos of European government bonds.¹¹⁹ They studied these markets from 2006 to 2013, including periods of market stability and stress. Ultimately, they found that the central clearing of European government bond repos allowed these markets to act as shock-absorbers during a crisis. Boissel et al. (2015) also found that CCPs can help stabilize repo markets in times of sovereign stress.¹²⁰ Another study by Paddrik et al. (2018) shows that CCPs enhance market stability for swaps following a market shock.¹²¹ It is worth noting that derivative contracts are considerably more complex than repo transactions and require a more complicated risk management framework than would be required for Treasuries.

¹¹⁵ TREASURY MARKET PRACTICES GROUP, *White Paper on Clearing and Settlement in the Secondary Market for U.S. Treasury Securities*, 31 (July 12, 2018),

<https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/CS-DraftPaper-071218.pdf>.

¹¹⁶ GROUP OF THIRTY (G30), *U.S. Treasury Markets Steps Toward Increased Resilience* (July 2021),

https://group30.org/images/uploads/publications/G30_U.S._Treasury_Markets-Steps_Toward_Increased_Resilience_1.pdf.

¹¹⁷ *Id.* at 6.

¹¹⁸ Takahiro Hattori, *Estimation of CCP premium during the financial crisis of 2008: Evidence from Japanese Government Bond Market*, SSRN (February 12, 2020),

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3118042.

¹¹⁹ Lorian Mancini, Angelo Ranaldo, and Jan Wrampelmeyer, *The Euro Interbank Repo Market*, 29(7) SOCIETY FOR FINANCIAL STUDIES: REVIEW OF FINANCIAL STUDIES 1747 (2016),

<https://ideas.repec.org/a/oup/rfinst/v29y2016i7p1747-1779.html>.

¹²⁰ Charles Boissel, François Derrien, Evren Ors, and David Thesmar, *Systemic Risk in Clearing Houses: Evidence from the European Repo Market* (Oct. 9, 2015),

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2506677

¹²¹ Mark E. Paddrik, Sriram Rajan, and Peyton Young, *Contagion in Derivatives Markets* (Jan. 18, 2018),

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2880927.

d. Possible Costs of Central Clearing: A Risk Management Failure of a CCP

The primary risk associated with central clearing is that the central clearinghouse for cash Treasury markets or Treasury repo markets would fail to properly manage risk.¹²² By concentrating counterparty risk at the CCP and then failing to properly manage it, central clearing could theoretically *enhance* the risk of a destabilizing market failure in cash Treasury and Treasury repo markets as all market participants are exposed to the CCP.

Although there is no way to ensure that such an event would not occur, the likelihood of a risk management failure depends in large part on the characteristics of the asset being cleared, including the standardization, complexity, liquidity and volatility of the asset. These characteristics affect the difficulty that a CCP faces in managing the risk of clearing a financial asset. In this section we review these characteristics for cash Treasuries and Treasury repos and find that they are very well-suited for effective risk management by a CCP, reducing the likelihood of a major risk management failure, although not eliminating such a possibility.

First, central clearing requires that a financial asset contain standardized terms to allow for efficient netting of offsetting positions in identical or close to identical contracts. Although Treasury securities have a variety of different maturities and issuance dates, the terms of all Treasury securities with a given maturity and issuance date are standardized (e.g., 5-year Treasury notes issued in August 2020 all have standardized terms and can be netted). Importantly, Treasury securities are issued infrequently enough to allow for sufficient volumes of Treasuries with the same issuance date and maturity. For example, 2 and 5-year notes are auctioned once a month, while 10-year notes are auctioned every three months (the most recent issuance date is referred to as on-the run Treasuries while all other Treasuries are referred to as off-the-run). Concentrating issuances around fewer issuance dates allows for higher volumes of Treasuries with identical terms, thus allowing for more netting among those securities. For example, in 2020, monthly 2-year note issuances averaged \$71.0 billion, while monthly 5-year note issuances averaged \$72.5 billion.¹²³ Treasury repos are also standardized in terms of the length of the repurchase agreement (e.g., overnight) and the underlying asset (e.g., 5-year Treasury security).

Second, the financial asset must not contain overly complex terms that make it excessively difficult to value. CCPs must be able to accurately value a financial asset in order to ensure an appropriate amount of collateralization, since under-collateralization can expose the CCP to risks and over-collateralization can unnecessarily increase the cost of trading. Both Treasury securities and Treasury repos satisfy this requirement, as they are generally very simple financial assets with straightforward valuation calculations.

¹²² See Craig Pirrong, *The Economics of Central Clearing: Theory and Practice*, INTERNATIONAL SWAPS AND DERIVATIVES ASSOCIATION (May 2011), <https://www.isda.org/a/yiEDE/isdadiscussion-ccp-pirrong.pdf>.

¹²³ This average does not include months with zero issuances (February, May, and October 2020). SECURITIES INDUSTRY AND FINANCIAL MARKETS ASSOCIATION, *U.S. Treasury Securities Statistics* (accessed Oct. 8, 2021), <https://www.sifma.org/resources/research/us-treasury-securities-statistics/>.

Treasury securities are the U.S. Treasury's promise to pay a fixed set of cash flows from issuance to maturity, while Treasury repos are short-term collateralized loans, structured as a sale and promise to repurchase.

Third, trading in the financial asset should be sufficiently liquid to allow for accurate pricing and to facilitate marking-to-market. As discussed above, appropriate valuation of cleared financial assets is critical for CCPs to properly collateralize and manage risk. Higher liquidity allows for improved price information and more efficient risk models. Moreover it is less costly for a CCP to replace defaulted positions for highly liquid instruments than less liquid financial assets. The netting opportunities are also greater for highly liquid financial assets, because there are more trades that offset each other.¹²⁴

As described throughout this report, Treasury securities and Treasury repos are among the most liquid financial assets in the world. In 2020, the average daily volume of cash Treasuries was over \$600 billion (as compared to average daily U.S. equity trading of \$479 billion).¹²⁵ Although there are 400 different issuances of Treasuries outstanding, the six on-the-run coupons (2-year, 3-year, 5-year, 7-year, 10-year, and 30-year) account for over 60 percent of trading volume and are therefore highly liquid markets that are well-suited for clearing.¹²⁶ Trading in off-the-run Treasury securities is also highly liquid and daily volume of overnight Treasury repos, for example, exceeds \$1 trillion.¹²⁷

Fourth, highly volatile products are riskier to centrally clear, including products that are subject to discontinuous price movements such as tail-risk. Treasuries and Treasury repos are highly stable financial assets that are not prone to bouts of volatility or tail-risk of the same magnitude as compared to other centrally cleared assets such as equities, swaps or futures. For example, Duffie (2020) demonstrates that in March 2020 the settlement risk posed for clearing trading in on-the-run 10-year Treasuries was substantially lower than the settlement risk posed for clearing equity trades in the SPDR S&P 500, a popular exchange traded fund.¹²⁸ Indeed, even during the most turbulent market periods, volatility in U.S. Treasuries is less than the levels of volatility experienced in U.S. equity markets. For example, in March 2020 the worst drop for 30-year bond prices

¹²⁴ Michael Fleming and Frank Keane, *Staff Report No. 964: Netting Efficiencies of Marketwide Central Clearing*, FEDERAL RESERVE BANK OF NEW YORK (April 2021), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr964.pdf.

¹²⁵ SECURITIES INDUSTRY AND FINANCIAL MARKETS ASSOCIATION, *U.S. Treasury Securities Statistics* (accessed Oct. 8, 2021), <https://www.sifma.org/resources/research/us-treasury-securities-statistics/>; SECURITIES INDUSTRY AND FINANCIAL MARKETS ASSOCIATION, *U.S. Equity and Related Statistics* (last accessed Oct. 2021), <https://www.sifma.org/resources/research/us-equity-and-related-securities-statistics/>.

¹²⁶ Doug Brain, Michiel De Pooter, Dobrislav Dobrev, Michael Fleming, Peter Johansson, Frank Keane, Michael Puglia, Tony Rodrigues, and Or Shachar, *FEDS Notes: Breaking Down TRACE Volumes Further*, FEDERAL RESERVE SYSTEM (Nov. 29, 2018), <https://www.federalreserve.gov/econres/notes/feds-notes/breaking-down-trace-volumes-further-20181129.htm>

¹²⁷ SECURITIES INDUSTRY AND FINANCIAL MARKETS ASSOCIATION, *U.S. Repo Statistics* (last accessed Oct. 2021), <https://www.sifma.org/resources/research/us-repo-statistics/>.

¹²⁸ Darrell Duffie, *Still the World's Safe Haven? Redesigning the U.S. Treasury Market After the COVID19 Crisis*, HUTCHINS CENTER WORKING PAPER #62 (June 2020), https://www.brookings.edu/wp-content/uploads/2020/05/WP62_Duffie_v2.pdf.

was a 10% decline in market value over 2 days,¹²⁹ while the S&P 500 index experienced a 12% decline in a single day.¹³⁰

Therefore, cash Treasury markets and Treasury repo markets appear well-suited for effective risk management by a CCP, although the possibility of a risk management failure cannot be eliminated.

e. The Moral Hazard Problem

The failure of a CCP for cash Treasuries or Treasury repos would undoubtedly pose systemic risk, and it is reasonable to expect a CCP for Treasuries to have access to central bank liquidity. Indeed, FICC has already been designated a systemically important financial market utility by the Financial Stability Oversight Council,¹³¹ which authorizes the Federal Reserve to extend liquidity to FICC in certain unusual or exigent circumstances.¹³² Without appropriate oversight and regulation by regulators, moral hazard could develop whereby the CCP and market participants take excessive risk based on the expectation that their positions will receive government backing in a crisis.¹³³ However, this type of moral hazard risk is already present in the market today given prior government support and therefore central clearing would not increase moral hazard in these markets.

f. Conclusion

A central clearing mandate through multilateral netting would expand the balance sheet capacity of dealers thereby increasing intermediation capacity, particularly during a crisis, and potentially providing other market quality benefits, such as lower transaction costs as demonstrated in other financial markets. A central clearing mandate would also reduce market exposures and settlement failures as a result of multilateral netting. This decreases the likelihood that a failure of a market participant could cause the failure of other market participants through their direct exposures. Furthermore, standardized and transparent risk management practices would be an improvement over the shortcomings of the existing risk management practices in bilaterally cleared markets and their relative lack of transparency.

¹²⁹ See GROUP OF THIRTY (G30), *U.S. Treasury Markets Steps Toward Increased Resilience* (July 2021), https://group30.org/images/uploads/publications/G30_U.S._Treasury_Markets-Steps_Toward_Increased_Resilience_1.pdf (noting that “[t]he 30-year bond lost 10 percent of its market value over March 16 and 17”).

¹³⁰ Bloomberg data on SPX index prices (Mar. 16, 2020).

¹³¹ FEDERAL RESERVE SYSTEM, *Designated Financial Market Utilities* (Jan. 29, 2015), https://www.federalreserve.gov/paymentsystems/designated_fmu_about.htm; FEDERAL RESERVE SYSTEM, *Designated Financial Market Utilities - Title VIII of the Dodd-Frank Act* (Jan. 29, 2015), <https://www.federalreserve.gov/paymentsystems/title-viii-dfa.htm>.

¹³² See 12 U.S.C. § 5465(b).

¹³³ See Craig Pirrong, *The Economics of Central Clearing: Theory and Practice*, INTERNATIONAL SWAPS AND DERIVATIVES ASSOCIATION (May 2011), <https://www.isda.org/a/yiEDE/isdadiscussion-ccp-pirrong.pdf>.

The primary risk of central clearing is that it would concentrate risk at a clearinghouse, and if the CCP then failed to manage that risk effectively, it would impose direct losses on all market participants. However, we find that cash Treasuries and Treasury repos are well-suited for effective risk management by a CCP, and authorities can ensure appropriate risk management practices adopting robust regulatory requirements. Finally, we consider the moral hazard problem and find that a central clearing mandate would not increase the likelihood of government support in a crisis. We conclude that the benefits of a central clearing mandate for cash Treasuries and Treasury repos outweigh the potential risks.

Part IV: Design Issues for Mandatory Central Clearing

There are several key design issues that policymakers must address when implementing a central clearing mandate for cash Treasuries and Treasury repo markets. First, should the mandate also apply to the dealer-to-client market? Second, how do we ensure that all market participants have effective access to a CCP before the mandate is implemented? Third, what would a central clearing mandate mean for the tri-party repo market? Fourth, should the mandate allow for competition among CCPs, or should clearing be fully centralized at one CCP? And finally, how should a CCP be governed? We now briefly consider and take a position on certain of these design issues.

a. Central Clearing of Dealer-to-Client Trades

Applying a central clearing mandate to dealer-to-client trades in cash Treasuries and Treasury repo markets (in addition to a central clearing mandate for interdealer trades) would likely further enhance Treasury market liquidity, efficiency and stability.

Most importantly, central clearing of dealer-to-client trades would increase the likelihood that *all-to-all trading* would emerge in cash Treasury and Treasury repo markets. All-to-all trading provides another mechanism for buyers and sellers to interact in the Treasury market, particularly during times of stress. Central clearing can facilitate all-to-all trading because market participants are able to trade with anyone (rather than going through a dealer) if the CCP immediately steps in as the new counterparty.¹³⁴ There would also no longer be a need to negotiate bilateral clearing and settlement arrangements between counterparties.¹³⁵ Competition among liquidity providers can also be improved by central clearing because barriers to entry are structurally lowered and new entrants can more easily compete. Studies have shown that the emergence of all-to-all trading can lower transaction costs and enhance market liquidity.¹³⁶

All-to-all trading can also enhance stability during market shocks, as the market would no longer be limited by the balance sheet capacity of capital-constrained dealers.¹³⁷ Instead, end investors that hold the majority of outstanding issuances could directly trade

¹³⁴ Darrell Duffie, *Still the World's Safe Haven? Redesigning the U.S. Treasury Market After the COVID19 Crisis*, HUTCHINS CENTER WORKING PAPER #62, Figure 12 (June 2020), https://www.brookings.edu/wp-content/uploads/2020/05/WP62_Duffie_v2.pdf. The IAWG Report also noted that “the benefits provided by central clearing could in principle support other potential improvements in market infrastructure such as all-to-all trading.” IAWG Report, *supra* note 1, at 30.

¹³⁵ Michael Fleming and Frank Keane, *Staff Report No. 964: Netting Efficiencies of Marketwide Central Clearing*, FEDERAL RESERVE BANK OF NEW YORK (April 2021), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr964.pdf.

¹³⁶ Evangelos Benos, Richard Payne and Michalis Vasios, *Working Paper No. 580: Centralized Trading, Transparency and Interest Rate Swap Market Liquidity: Evidence from the Implementation of the Dodd-Frank Act*, BANK OF ENGLAND (Jan. 15, 2016), <https://www.bankofengland.co.uk/working-paper/2016/centralized-trading-transparency-and-interest-rate-swap-market-liquidity-evidence-from-the>.

¹³⁷ Nellie Liang and Pat Parkinson, *Enhancing Liquidity of the U.S. Treasury Market Under Stress*, HUTCHINS CENTER WORKING PAPER #72, Figure 3 (December 2020): https://www.brookings.edu/wp-content/uploads/2020/12/WP72_Liang-Parkinson.pdf.

cash Treasuries or Treasury repos.¹³⁸ This would be particularly beneficial for cash Treasury and Treasury repo markets, as these markets are highly concentrated. For example, in the dealer-to-client segment of the cash Treasury market, the top 10 dealers constitute 74 percent of trading activity.¹³⁹ And in the tri-party repo market, the three largest dealers account for 34 percent of Treasury repo.¹⁴⁰

The 2021 FRBNY study also finds that the cash Treasury market may be well-suited for all-to-all trading as over two-thirds of dealer-to-client trading represents dealers intermediating trades between buyers and sellers on an intraday basis. Demand for intraday trading by buyers and sellers is necessary for an all-to-all market to develop – otherwise there would not be sufficient liquidity for the market to function.¹⁴¹

Centrally clearing dealer-to-client trades in addition to interdealer trades would also reduce counterparty and settlement risk through multilateral netting with benefits to market liquidity and resiliency. For example, both the 2021 FRBNY study and a 2019 OFR study both found that centrally clearing dealer-to-client trades in cash Treasury markets and Treasury repo markets increased the benefits of multilateral netting and further reduced settlement exposures for *dealers* as compared to solely clearing interdealer trades.¹⁴²

However, neither study focused on how the netting of customer trades could reduce settlement obligations and hence counterparty risk for *customers*. That is because regulators and the public lack identifying information on customers in both markets that is necessary to accurately estimate how central clearing would affect the netting of customer trades. Nonetheless, the FRBNY (2021) study shows that the potential benefits could be very large. They find that, for from January to April 2020, netting of customer trades could have reduced customer gross exposures by *as much as* \$225 billion overall, or 52% of the \$432 billion average dealer-to-client gross settlement obligations for clients.¹⁴³

¹³⁸ The IAWG Report also notes that “an increase in all-to-all trading could allow for a larger share of trading directly between non-dealer buyers and sellers and potentially lessen the reliance on dealer intermediation.” IAWG Report, *supra* note 1, at 25.

¹³⁹ *See id.*

¹⁴⁰ *See id.*

¹⁴¹ GROUP OF THIRTY (G30), *U.S. Treasury Markets Steps Toward Increased Resilience* (July 2021), https://group30.org/images/uploads/publications/G30_U.S._Treasury_Markets-Steps_Toward_Increased_Resilience_1.pdf.

¹⁴² Michael Fleming and Frank Keane, *Staff Report No. 964: Netting Efficiencies of Marketwide Central Clearing*, FEDERAL RESERVE BANK OF NEW YORK (April 2021), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr964.pdf; OFFICE OF FINANCIAL RESEARCH, *Benefits and Risks of Central Clearing in the Repo Market* (March 9, 2017), https://www.financialresearch.gov/briefs/files/OFRBr_2017_04_CCP-for-Repos.pdf.

¹⁴³ Michael Fleming and Frank Keane, *Staff Report No. 964: Netting Efficiencies of Marketwide Central Clearing*, FEDERAL RESERVE BANK OF NEW YORK, 34 (April 2021), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr964.pdf.

Therefore, including dealer-to-client trades in the central clearing mandate would enhance Treasury market liquidity as well as reduce counterparty and settlement risk in Treasury markets.

b. Access to Central Clearing

In order for a central clearing mandate to increase liquidity in Treasury markets, all market participants must have efficient access to centrally clear their trades in cash Treasury markets and Treasury repos. Otherwise, market participants will reduce their trading activity and certain market makers may have to exit Treasury markets completely, reducing overall market liquidity and having the opposite of the intended effect of a central clearing mandate.

Central clearing in futures, swaps, equities and options markets provide all market participants with effective access to central clearing. Typically non-dealers receive indirect access to central clearing through clearing members that are dealers. However, indirect access must be provided in a manner that does not impose unnecessarily high costs on clients and non-dealers or otherwise restrict their trading activity. Certain limitations presently exist at FICC for the central clearing of cash Treasuries and likely contribute to the lack of voluntary take-up of central clearing thus far by PTFs and other market participants in cash Treasury markets. For example, FICC permits clearing members to impose restrictions on customer trading activity, such as limiting eligible trading counterparties for clearing customers.¹⁴⁴ Similar limits on access to central clearing were initially proposed in connection with the clearing mandate for swaps, however the CFTC eventually prohibited such restrictions.¹⁴⁵ We therefore recommend that policymakers ensure that all market participants can efficiently access CCPs for clearing cash Treasuries and Treasury repos. Access must be ensured *before* a central clearing mandate comes into effect, or else a clearing mandate will negatively affect market liquidity and functioning. Additionally, we support the G30 recommendation that the official sector conduct a review of the design and operation of FICC and recommend a focus on the issue of clearing access.¹⁴⁶

c. What Would a Central Clearing Mandate Mean for the Tri-Party Repo Market?

The tri-party Treasury repo market provides for some of the benefits of central clearing, namely standardized margining and settlement processes for Treasury repos. However, it does not provide for multilateral netting of Treasury repos, which as explained throughout **Part III**, is the key to enhancing the liquidity and resiliency of Treasury repo markets. Moreover, the tri-party repo market is largely centralized at a commercial banking entity, BNY Mellon, that is engaged in banking and trading activities that can

¹⁴⁴ FIA PRINCIPAL TRADERS GROUP, *Clearing a Path to a More Resilient Treasury Market*, 7 (July 2021), https://www.fia.org/sites/default/files/2021-07/FIA-PTG_Paper_Resilient%20Treasury%20Market_FINAL.pdf.

¹⁴⁵ *Id.* at 9.

¹⁴⁶ GROUP OF THIRTY (G30), *U.S. Treasury Markets Steps Toward Increased Resilience*, 8 (July 2021), https://group30.org/images/uploads/publications/G30_U.S._Treasury_Markets-Steps_Toward_Increased_Resilience_1.pdf.

pose risks to the consolidated entity and clearing bank. More importantly, the failure of BNY Mellon's role as the predominant clearing bank in the tri-repo market, constituting approximately 39% of the entire Treasury repo market, could pose risk to the entire Treasury repo funding system, clearly constituting systemic risk. Although BNY Mellon is subject to oversight by banking regulators and must submit "living wills" explaining to regulators why BNY Mellon's failure would not pose systemic risk,¹⁴⁷ BNY Mellon is not subject to regulatory oversight as a clearinghouse. In our view, a central clearing mandate should ensure that all Treasury repo transactions are cleared at a clearinghouse that is regulated and supervised as a clearinghouse and is not affiliated with a banking entity. The central clearing mandate should also define central clearing in a manner that ensures that multilateral netting is possible.

d. Centralizing Clearing at One CCP or Multiple CCPs

Another policy issue is whether central clearing of cash Treasuries and Treasury repos should be fully centralized at one CCP or whether there should be competition among multiple CCPs.

There are benefits to a fully centralized model for central clearing. Studies have uniformly shown that the multilateral netting benefits of central clearing are always greater when clearing for a financial asset takes place at one CCP rather than fragmented among multiple CCPs.¹⁴⁸ A fully centralized market would also better ensure that regulators and the CCP have full transparency into risk in cash Treasury and Treasury repo markets. It would also prevent CCPs from competing against one another in ways that could enhance risk by, for example, lowering CCP member requirements or margin requirements, which could result in increased settlement and counterparty risk as compared to a fully centralized clearing model.

However, it is important not to overstate the benefits of a fully centralized clearing model. Even if central clearing of cash Treasuries and Treasury repos were to be divided across more than one CCP, CCPs can offer interoperability arrangements that can still allow participants to achieve multilateral netting benefits.¹⁴⁹ Although interoperability is effectively not possible for swaps transactions, because swaps cleared at one CCP (e.g., CME interest rate swaps) are not completely economically equivalent to swaps cleared at another CCP (e.g., LCH interest rate swaps), cash Treasuries and Treasury repos are fungible. Interoperability arrangements allow clearing members of one CCP to centrally

¹⁴⁷ See FEDERAL RESERVE SYSTEM, *Living Wills (or Resolution Plans)* (July 19, 2021), <https://www.federalreserve.gov/supervisionreg/resolution-plans.htm>. See, e.g., BNY MELLON, *Resolution Plan – Public Section* (July 1, 2019), <https://www.federalreserve.gov/supervisionreg/resolution-plans/bk-ny-mellon-3g-20190701.pdf>.

¹⁴⁸ Darrell Duffie and Haoxiang Zhu, *Does a Central Clearing Counterparty Reduce Counterparty Risk?* (2011), https://www.mit.edu/~zhuh/DuffieZhu_CCP.pdf

¹⁴⁹ See generally EUROPEAN SYSTEMIC RISK BOARD, *CCP interoperability arrangements* (Jan. 2019), https://www.esrb.europa.eu/pub/pdf/reports/esrb.report190131_CCP_interoperability_arrangements~99908a78e7.en.pdf.

clear trades carried out with members of another CCP, without needing to become a member of the other CCP.¹⁵⁰

Moreover, there are potential risks and costs associated with a fully centralized model for central clearing. Most obviously, the centralization of clearing at one CCP increases the systemic importance of that CCP and the potential consequences of a risk management failure at that CCP. It would also effectively prevent market participants from designing alternative central clearing solutions to address problems that commonly arise with monopolies. A fully centralized central clearing model would therefore eliminate any potential benefits from competition among CCPs, such as innovation, competition over clearing fees, customer service, or enhanced operational resilience.

A fully centralized central clearing model would also raise the question of who should operate the government-sanctioned monopoly—the government or the private sector?¹⁵¹ On the one hand, policymakers may prefer a government-run CCP for government securities in order to maximize public control and oversight of a market so crucial to the United States and financial stability. Market participants may also place the greatest confidence in a public-sector CCP backed by the full fiscal and monetary resources of the government.¹⁵²

If there were a single government-run CCP, one option would be to house it within the Federal Reserve. Indeed, central banks and CCPs are both in the business of insuring against financial risk – the former against liquidity risk and the latter against counterparty risk.¹⁵³ However, it is worth noting that, when CCPs design their waterfalls, they must determine who bears losses, which could pose political risk to the Federal Reserve; and it may not be entirely appropriate to vest that authority in an independent agency.

Government-run CCPs have other limitations. For instance, government-run CCPs may struggle to establish sufficient expertise to operate efficiently, may have incentives distorted by short-term political pressures, and may prove difficult to reform if ineffective.¹⁵⁴ For these and related reasons, in a paper examining the role of CCPs and central banks in the financial system generally, Sir Paul Tucker has argued that CCPs should remain private entities, but that authorities should ensure that CCPs are properly incentivized to manage system risk and are subject to an orderly resolution regime.¹⁵⁵

¹⁵⁰ EUROPEAN SYSTEMIC RISK BOARD, *CCP interoperability arrangements*, 26 (Jan. 2019), https://www.esrb.europa.eu/pub/pdf/reports/esrb.report190131_CCP_interoperability_arrangements~99908a78e7.en.pdf.

¹⁵¹ Paul Tucker, *Are Clearing Houses the New Central Banks?*, OVER-THE-COUNTER DERIVATIVES SYMPOSIUM – CHICAGO, 8 (April 11, 2014), <https://www.chicagofed.org/~media/others/events/2014/annual-over-the-counter-derivatives-symposium/tucker-clearinghouses-new-central-banks-tucker-2014-pdf.pdf>.

¹⁵² Tucker, *supra* note 151, at 6-7.

¹⁵³ Tucker, *supra* note 151, at 1.

¹⁵⁴ Tucker, *supra* note 151, at 9.

¹⁵⁵ Tucker, *supra* note 151, at 9-10, 12.

e. Governance Structure for CCPs

The governance structure of CCPs should also ensure representative participation from different types of market participants to ensure that the clearing rules of the CCP are designed to serve the overall market. Presently, DTCC's Board of Directors, which oversees FICC, is primarily composed of its members, which includes buy-side end-users, sell-side dealers, exchange representatives and clearing banks.¹⁵⁶ According to DTCC, this organizational structure is designed to ensure that DTCC (and its subsidiaries) do not act based on profit or the preferences of the major dealers, but rather in a manner that reflects the views of its various stakeholders and promotes fair, orderly and efficient markets.¹⁵⁷ However, the G30 report (2021) notes that non-banks have expressed concerns that a small number of large banks dominate FICC's governance with negative implications for market participants and the public.¹⁵⁸ A clearing mandate should therefore be accompanied by a requirement ensuring that all market participants are appropriately represented on the governance structure of CCPs, as was required by the CFTC for swaps.¹⁵⁹ Doing so would reduce the likelihood of unnecessary restrictions or unnecessarily high costs of clearing for certain market participants.

Another important consideration in CCP governance is “gating,” or the minimum financial resources (e.g., capital requirements) firms are required to hold in order to be eligible for membership in a CCP. For instance, in the derivatives market, the CFTC required that CCP members possess “sufficient financial resources to meet obligations arising from participation in the derivatives organization in extreme but plausible market conditions.”¹⁶⁰ However, this requirement entails an important tradeoff between resilience and access.¹⁶¹ On the one hand, when CCP membership requires more capital, the CCP itself is more resilient, but fewer firms have direct access to the CCP, which favors larger financial firms at the expense of smaller market participants. On the other hand, lower capital requirements expand access while potentially exposing the CCP to losses from the failure of a thinly capitalized member. Therefore, membership requirements for a CCP would need to strike an appropriate balance between these competing policy objectives while ensuring capital requirements remain proportionate to risk.

¹⁵⁶ DEPOSITORY TRUST & CLEARING CORPORATION, *Making the U.S. Treasury Market Safer for All Participants*, (October 2021), <https://www.dtcc.com/-/media/Files/Downloads/WhitePapers/Making-the-Treasury-Market-Safer-for-all-Participants.pdf>.

¹⁵⁷ *See id.*

¹⁵⁸ GROUP OF THIRTY (G30), *U.S. Treasury Markets Steps Toward Increased Resilience*, 14 (July 2021), https://group30.org/images/uploads/publications/G30_U.S._Treasury_Markets-Steps_Toward_Increased_Resilience_1.pdf.

¹⁵⁹ 7 U.S.C. § 7a-1(c)(2)(Q); COMMODITY FUTURES TRADING COMMISSION, *Derivatives Clearing Organization General Provisions and Core Principles*, 85 FED. REG. 4800, 4825 (Jan. 27, 2020)

¹⁶⁰ *See generally* 17 C.F.R. § 39.12(a)(2).

¹⁶¹ U.S. COMM. FUT. TRAD. COMM'N, *Derivatives Clearing Organization General Provisions and Core Principles*, 76 FED. REG. 69333, 69352 (Nov. 8, 2011), <https://www.federalregister.gov/documents/2011/11/08/2011-27536/derivatives-clearing-organization-general-provisions-and-core-principles>.

f. Conclusion

In Part IV, we reviewed five policy issues that relate to a central clearing mandate. First, a central clearing mandate should include dealer-to-client trades (in addition to trading in interdealer markets) for cash Treasuries and Treasury repo markets as this would increase market liquidity, potentially facilitate the emergence of all-to-all trading, and reduce counterparty and settlement risks. Second, it is critical that all market participants have effective access to centrally clear their cash Treasury and Treasury repo transactions or else a central clearing mandate could result in reduced liquidity in Treasury markets. Third, we considered what a central clearing mandate would mean for the tri-party repo market and determined that a central clearing mandate should ensure that Treasury repos can be multilaterally netted and should not be cleared at an affiliate of a banking entity. Fourth, we examine whether clearing should be centralized at one CCP or dispersed across competing CCPs; and if clearing is centralized at one CCP, whether that CCP should be a private or public entity. Finally, we recommend that the governance structure for a CCP must include a diverse group of market participants to ensure that the terms of central clearing are designed to serve the entire market.

Conclusion

We conclude that policymakers should consider mandating central clearing of cash Treasuries and Treasury repos, because doing so is likely to enhance the liquidity and stability of Treasury markets and the financial system more broadly. It is also likely to enhance the efficiency of these markets, thereby reducing the cost of funding for the U.S. government and short-term funding costs for financial institutions that depend on Treasury repos. Although a central clearing mandate may not by itself obviate the need for future Federal Reserve support of Treasury markets in a crisis, policymakers should nonetheless aim to enhance the liquidity, efficiency and stability of these critical financial markets.

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