

Program on International Financial Systems

# Enhancing Post-Trade Transparency for U.S. Treasuries

JUNE 2022

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## Executive Summary

This report is the second in a series of reports by the Program on International Financial Systems on enhancing the market structure for trading U.S. Treasuries (“**cash Treasuries**”). In this report, we assess whether policymakers should mandate the public dissemination of comprehensive real-time transaction-level data in cash Treasury markets.

As described in the first report in this series, the March 2020 stress in cash Treasury markets and the September 2019 Treasury repo market spike were strong indications that Treasury markets are vulnerable to severe bouts of illiquidity that can threaten the broader financial system.<sup>1</sup> Measures to strengthen the liquidity and resiliency of Treasury markets should therefore be a priority for U.S. policymakers.

Policymakers and market participants have recently voiced support for mandatory post-trade transparency in cash Treasury markets. The Group of Thirty, an international body of current and former regulators, academics, and market participants, recommended in its 2021 report on Treasury markets that real-time transaction-specific data on cash Treasuries should be made public in a manner similar to the way that data on U.S. corporate bond transactions are currently disclosed.<sup>2</sup> And Securities and Exchange Commission (“**SEC**”) Chairman Gary Gensler indicated in a speech this year that “[p]ost-trade transparency promotes liquidity and helps investors” and recommended that the Financial Industry Regulatory Authority (“**FINRA**”) consider publishing transaction-specific Trade Reporting and Compliance Engine (“**TRACE**”) data on cash Treasuries.<sup>3</sup> Legislation has also been proposed that would bring comprehensive post-trade transparency to the cash Treasury markets.<sup>4</sup>

This report provides a unique survey of the current structure of cash Treasury markets and relevant academic literature on the effects of mandatory post-trade transparency. Part I describes the extent of pre- and post-trade transparency in cash Treasury markets, finding that pre- and post-trade data in cash Treasury markets is available only on a limited and fragmented basis. Part II evaluates the academic literature on the effects of mandatory real-time post-trade transparency in various asset classes, including corporate bonds, municipal bonds, and agency mortgage-backed securities, finding that post-trade transparency increases liquidity, reduces transaction costs, and enhances price

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<sup>1</sup> See PROGRAM ON INT’L FIN. SYSTEMS, MANDATORY CENTRAL CLEARING FOR U.S. TREASURIES AND U.S. TREASURY REPOS 1 (2021), <https://www.pifsinternational.org/wp-content/uploads/2021/11/PIFS-Mandatory-Central-Clearing-for-U.S.-Treasury-Markets-11.11.2021.pdf>.

<sup>2</sup> GRP. OF THIRTY, U.S. TREASURY MARKETS STEPS TOWARD INCREASED RESILIENCE 17 (2021) (“**G30 Report**”), <https://group30.org/publications/detail/4950>.

<sup>3</sup> Gary Gensler, Chair, U.S. Sec. & Exch. Comm’n (“**SEC**”), “The Name’s Bond:” Remarks at City Week (Apr. 26, 2022), <https://www.sec.gov/news/speech/gensler-names-bond-042622>.

<sup>4</sup> See Treasury Market Transparency Act of 2022 (discussion draft), <https://docs.house.gov/meetings/BA/BA00/20220512/114746/BILLS-117pih-TreasuryMarketTransparencyActof2022.pdf>.

efficiency. We therefore conclude that U.S. policymakers should mandate the public dissemination of real-time transaction-level data in cash Treasury markets.

## Part I: Overview of Transparency in Cash Treasury Markets

Part I of this report overviews the structure of the cash market for U.S. Treasury securities with a focus on pre- and post-trade transparency. Pre-trade transparency means that quotations, bids to buy or offers to sell a security, including price and size information, are displayed or otherwise shared before the execution of the trade. Post-trade transparency means that once a trade is executed, the price, size, and time of the trade is reported.

We find that cash Treasury markets generally lack comprehensive pre-trade and post-trade transparency. Although certain trading venues provide detailed real-time pre-trade and post-trade transparency to their participants and subscribers,<sup>5</sup> this data is not disseminated to the public, and although the Financial Industry Regulatory Authority (“**FINRA**”) collects post-trade transaction data, it only publishes certain aggregate weekly volume statistics.<sup>6</sup> Comprehensive transaction-specific, real-time, and publicly available pre- and post-trade data in cash Treasury markets is thus currently unavailable, in contrast to the markets for other major classes of financial instruments.

### a. Overview of the U.S. Treasury Market

U.S. Treasury securities (“**Treasuries**”) are direct obligations of the U.S. government issued by the Treasury Department. They comprise several types of securities including Treasury bills, nominal coupon notes and bonds, floating rate notes, and Treasury Inflation Protected Securities, and are issued at maturities ranging from less than 1 year up to 30 years. Treasuries are the largest asset class in the U.S. bond market as measured both by total notional outstanding amount and new issuances: Treasuries accounted for \$22.584 trillion (42.7%) of the \$52.890 trillion in U.S. fixed income securities outstanding as of December 31, 2021, and for \$5.139 trillion (38.2%) of the \$13.437 trillion in new U.S. fixed-income securities issued in 2021.<sup>7</sup> Treasuries are also the most liquid and commonly traded government securities in the world.<sup>8</sup> The Treasury market is also growing: the \$22.584 trillion in marketable Treasuries outstanding as of December 31, 2021 represents a 71% increase from 2015 levels and a nearly three-fold increase from

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<sup>5</sup> See U.S. DEP’T OF THE TREASURY, BD. OF GOVERNORS OF THE FED. RSRV. SYS., FED. RSRV. BANK OF N.Y., SEC, & U.S. COMMODITY FUTURES TRADING COMM’N, JOINT STAFF REPORT: THE U.S. TREASURY MARKET ON OCTOBER 15, 2014 47-48 (2015) (“**2015 Treasury Report**”), <https://home.treasury.gov/system/files/276/joint-staff-report-the-us-treasury-market-on-10-15-2014.pdf>.

<sup>6</sup> See U.S. DEP’T OF THE TREASURY, BD. OF GOVERNORS OF THE FED. RSRV. SYS., FED. RSRV. BANK OF N.Y., SEC, & U.S. COMMODITY FUTURES TRADING COMM’N, RECENT DISRUPTIONS AND POTENTIAL REFORMS IN THE U.S. TREASURY MARKET: A STAFF PROGRESS REPORT 27 (2021) (the “**IAWG Report**”), <https://home.treasury.gov/system/files/136/IAWG-Treasury-Report.pdf>.

<sup>7</sup> SEC. INDUS. & FIN. MKTS. ASS’N, U.S. Fixed Income Securities Statistics (May 5, 2022), <https://www.sifma.org/resources/research/us-fixed-income-securities-statistics/>.

<sup>8</sup> See IAWG Report at 1.

2010 levels.<sup>9</sup> As of 2022, the Congressional Budget Office projected that this amount will continue to grow each year through 2031, reaching \$40.213 trillion in 2032.<sup>10</sup>

### *i. The Structure of Cash Treasury Markets*

The most recently issued Treasury securities of each type are referred to as “on-the-run” securities and older issuances as “off-the-run” securities. Trading in on-the-run Treasuries is more liquid than trading in off-the-run Treasuries. For example, although off-the-run securities account for more than 95% of outstanding marketable Treasury securities by value, on-the-run issues account for over 50%, and during certain periods up to nearly 70%, of total Treasury market trading volume.<sup>11</sup>

Trading of Treasuries generally takes place in one of two markets: the interdealer market or the dealer-to-customer (“DTC”) market. These markets account for roughly equal percentages of total trading volume. For example, according to FINRA data, the interdealer and DTC markets each accounted for approximately 50% of total weekly Treasury security trading by volume for the week of May 27, 2022 (interdealer: \$1,630.3 billion; DTC: \$1,637.0 billion).<sup>12</sup> The interdealer market accounts for most of the total volume in the on-the-run market and the DTC market accounts for most of the total volume in the off-the-run market.<sup>13</sup> According to FINRA data, for the week of May 27, 2022, the interdealer market accounted for 62.6% of total weekly volume in the on-the-run market, and the DTC market accounted for 68.0% of total weekly volume in the off-the-run market.<sup>14</sup>

#### *A. The Interdealer Market*

The interdealer market consists primarily of trading among traditional broker dealers (which are largely owned by banks) and principal trading firms (“PTFs”). Traditional broker-dealers often use the interdealer market to hedge their trades with customers.<sup>15</sup> By contrast, PTFs typically trade for their own account using algorithmic and high-frequency trading strategies. Certain institutional investors also participate in the interdealer market, but to a lesser extent.

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<sup>9</sup> See COMM. ON CAP. MKTS. REG., NOTHING BUT THE FACTS STATEMENT: U.S. BOND MARKET LIQUIDITY 1 (2015), <https://www.capmksreg.org/2015/12/14/committee-releases-nothing-but-the-facts-u-s-bond-market-liquidity-statement/>.

<sup>10</sup> See CONG. BUDGET OFF., THE BUDGET AND ECONOMIC OUTLOOK: 2022 TO 2032 7 (2022), <https://www.cbo.gov/system/files/2022-05/57950-Outlook.pdf>.

<sup>11</sup> See G30 Report at 1; Susan Estes, *Treasury Market Liquidity: The Forgotten 98%* (May 24, 2016), <https://www.linkedin.com/pulse/treasury-market-liquidity-forgotten-98-susan-estes>.

<sup>12</sup> FIN. INDUS. REGUL. AUTH. (“FINRA”), Treasury Market Trade Data for the Week of May 27, 2022, <https://www.finra.org/filing-reporting/trace/data/trace-treasury-aggregates>.

<sup>13</sup> See IAWG Report at 3.

<sup>14</sup> See FINRA, *supra* note 12.

<sup>15</sup> U.S. DEP'T OF THE TREASURY, A FINANCIAL SYSTEM THAT CREATES ECONOMIC OPPORTUNITIES – CAPITAL MARKETS 74 (2017) (“**2017 Treasury Report**”), <https://home.treasury.gov/system/files/136/A-Financial-System-Capital-Markets-FINAL-FINAL.pdf>.

Traditional broker-dealers and PTFs each accounted for approximately 48 percent of trading in the interdealer market through most of 2019, and institutional investors accounted for approximately 4 percent.<sup>16</sup>

Trading in the interdealer market generally takes place in one of two ways: (1) via electronic trading platforms that match buyers and sellers automatically often using a central limit order book (“**CLOB**”), and (2) via bilateral transactions negotiated and concluded by phone (typically with the involvement of an interdealer broker). A CLOB is a trading protocol that collects “limit orders at various price levels” and matches those orders with “market orders or marketable limit orders . . . in order of price priority, such that the most competitively priced limit orders . . . are matched first.”<sup>17</sup> The operators of trading platforms in this segment of the market are referred to as interdealer brokers (“**IDBs**”).

Of these trading methods, automated electronic platforms that use a CLOB predominate in the interdealer market. Approximately 70% of interdealer activity occurs on automated electronic platforms.<sup>18</sup> CME BrokerTec and the Dealerweb division of Tradeweb<sup>19</sup> operate the two largest automated electronic platforms by volume, accounting for most trading activity on automated electronic platforms. The remainder generally occurs through voice-based trading or other trading protocols that may combine electronic and voice-based elements.

### *B. The Dealer-to-Customer (DTC) market*

The DTC market consists of transactions between broker-dealers<sup>20</sup>, on the one hand, and their customers, such as investment companies, pension funds, insurance companies, corporations, and retail investors, on the other.<sup>21</sup>

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<sup>16</sup> See James Collin Harkrader & Michael Puglia, *Principal Trading Firm Activity in Treasury Cash Markets*, FEDS NOTES (Aug. 4, 2020), <https://www.federalreserve.gov/econres/notes/feds-notes/principal-trading-firm-activity-in-treasury-cash-markets-20200804.htm>. These data cover only trading in nominal coupon securities, which accounts for most of the trading in the interdealer market.

<sup>17</sup> See Michael J. Fleming et al., *The Evolution of Workups in the U.S. Treasury Securities Market* FED. RSRV. BANK OF N.Y - LIBERTY STREET ECON. (Aug. 20, 2015) <https://libertystreeteconomics.newyorkfed.org/2015/08/the-evolution-of-workups-in-the-us-treasury-securities-market/>.

<sup>18</sup> H. Bessembinder et al., *A Survey of the Microstructure of Fixed-Income Markets* 55(1) J. OF FIN. & QUANTITATIVE ANALYSIS 1, 8 (2020), <https://www.sec.gov/spotlight/fixed-income-advisory-committee/survey-of-microstructure-of-fixed-income-market.pdf>.

<sup>19</sup> *Dealerweb: Wholesale Market*, TRADEWEB, <https://www.tradeweb.com/our-markets/dealerweb-wholesale/> (last visited May 16, 2022).

<sup>20</sup> Most transactions in the DTC market involve one of twenty-three primary dealers designated by the Federal Reserve Bank of New York to participate in primary auctions of Treasury securities. See 2017 Treasury Report at 73.

<sup>21</sup> Amendments Regarding the Definition of “Exchange” and Alternative Trading Systems (ATSs) That Trade U.S. Treasury and Agency Securities, National Market System (NMS) Stocks, and Other Securities, 87 Fed. Reg. 15496, 15513 (Mar. 18, 2022) (“**SEC 2022 Proposal**”), <https://www.sec.gov/rules/proposed/2022/34-94062.pdf>.

Historically, trading in the DTC market consisted solely of voice-based OTC trading, whereby trades are negotiated and concluded bilaterally by phone (or more recently, also by chat or other bilateral electronic communications), such that a customer seeking quotes from multiple dealers would contact each dealer in succession. However, in 1998, Tradeweb launched a fully electronic “request for quote” (“**RFQ**”)<sup>22</sup> platform.<sup>23</sup> These platforms allow a customer to solicit bids from multiple dealers simultaneously via an electronic communication system. Additional electronic RFQ platforms, including those developed by Bloomberg and CME BrokerTec, have subsequently emerged. According to one estimate, 57% of trading in the DTC market is now conducted on these electronic RFQ platforms<sup>24</sup> where dealers can provide a continuous stream of “indicative” or “firm” quotes. Indicative quotes are intended to reflect the approximate price at which dealers would be willing to trade, without constituting a binding offer. If a customer decides to initiate a trade, then willing dealers respond to the request with binding “firm” quotes that a customer may execute.<sup>25</sup> Certain PTFs and bank dealers have also recently developed direct bilateral electronic streams for executable bids and offers to bank dealers and other market participants, which are targeted at individual firms rather than available to the market generally, though these currently only represent a small part of the market.

## *ii. The Regulation of Cash Treasury Trading Venues*

Electronic CLOB platforms that facilitate trades of Treasuries, including those operated by BrokerTec and Tradeweb in the interdealer market, meet the definition of an “alternative trading system” within the meaning of Regulation ATS under the Securities Exchange Act of 1934 (“**ATSs**”).<sup>26</sup>

Notwithstanding their classification as ATSs, electronic CLOB platforms that facilitate trades only of Treasuries and other government securities (“**Government Securities ATSs**”), such as those operated by BrokerTec and Tradeweb, are currently exempt from the registration and other requirements that apply to ATSs generally under Regulation ATS and Regulation SCI, including in particular (i) the fair access rule (which requires ATSs exceeding certain trading volumes to establish reasonable standards for access to the ATS and to apply them in a fair and non-discriminatory manner), (ii) mandatory

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<sup>22</sup> An RFQ protocol allows market participants to request multiple competing market makers simultaneously to provide a quote for a buy or sell order of a particular size. Quotes may be either “executable” or “indicative.”

<sup>23</sup> See Iseult E.A. Conlin, *Building a Better Credit RFQ* TRADEWEB (Nov. 30, 2021) <https://www.tradeweb.com/newsroom/media-center/insights/blog/building-a-better-credit-rfq/>.

<sup>24</sup> See Kevin McPartland, *June Spotlight: U.S. Treasury Electronic Trading Remains Strong Heading into Summer* COALITION GREENWICH (Jun. 14, 2022), <https://www.greenwich.com/market-structure-technology/june-spotlight-us-treasury-electronic-trading-remains-strong-heading>.

<sup>25</sup> SEC 2022 Proposal at 15500.

<sup>26</sup> Rule 300(a) of Regulation ATS defines “alternative trading system” as “any organization, association, person, group of persons, or system: (1) [t]hat constitutes, maintains, or provides a market place or facilities for bringing together purchasers and sellers of securities or for otherwise performing with respect to securities the functions commonly performed by a stock exchange within the meaning of [Rule 3b-16]; and (2) [t]hat does not: (i) [s]et rules governing the conduct of subscribers other than the conduct of such subscribers’ trading on such organization, association, person, group of persons, or system; or (ii) [d]iscipline subscribers other than by exclusion from trading.”

disclosure to the public of information on key aspects of the platform, including potential conflicts of interest, order types, subscriber segmentation, and fees, rebates and incentives, and (iii) the operational capability, security and business continuity planning requirements under Regulation SCI.<sup>27</sup>

In turn, the definition of ATS has been interpreted to exclude multilateral RFQ platforms in the DTC market.<sup>28</sup>

The SEC has however proposed a set of rule changes that would (1) end the Regulation ATS exemption for Government Securities ATSS, and (2) treat multilateral platforms that use RFQ protocols as Government Securities ATSS (the “**SEC 2022 Proposal**”).<sup>29</sup> This proposal would not, however, increase the degree of post-trade transparency required of such platforms, as discussed in Part I(c) below.

## b. Transparency in Cash Treasury Markets

### i. Pre-Trade Transparency

#### A. Automated Electronic Platforms

Electronic CLOB platforms in the interdealer market provide pre-trade information, including the price and size of bid and ask quotes, to their participants – that is, those who execute trades on the relevant platform. It has been reported that certain platforms also make this data available to parties who pay a subscription fee to receive the data. However, this information is not available to the public and the extent to which non-participants subscribe to this information is unclear. Moreover, the precise content of such information and the format in which it is shared can vary among platforms as well as among participants. According to the SEC, certain automated electronic platforms in the interdealer market may allow participants to restrict the information that is disseminated with respect to that participant’s trades (e.g., by limiting the pre-trade information that is disseminated to the symbol of the security and type of order (i.e., buy or sell) and withholding information regarding the price and/or size).<sup>30</sup> As a result, the data available with respect to orders placed on a particular platform can be incomplete even to participants and subscribers to that platform.

Certain platforms also offer direct real-time data feeds of pre-trade information either directly, or via third parties, which aggregate and further disseminate the data to their own

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<sup>27</sup> SEC 2022 Proposal at 15497.

<sup>28</sup> *Id.* at 15505.

<sup>29</sup> *Id.* at 15496.

<sup>30</sup> *Id.* at 15550 (“Covered ATSS [which includes Government Securities ATSS] vary in terms of the types of orders, IOIs, or other forms of trading interest that are confidential on their systems and what information about such trading interest may be shared. For example, an ATS might provide that no IOIs submitted by subscribers will be considered confidential but may provide subscribers with the option to restrict the information in the IOI message to just the symbol and side (i.e., buy or sell.)”).

subscribers.<sup>31</sup> Automated electronic platforms are currently not required to disclose arrangements with third parties to display pre-trade information outside of such platforms, or arrangements with third parties to transmit pre-trade data to subscribers.

### *B. RFQ platforms*

Dealer quotes in the DTC market are largely indicative, rather than firm. As noted earlier, an indicative quote is merely an estimate of the current market price, not a commitment to transact at the quoted price. In the case of RFQ platforms, which predominate in the DTC market, such quotes are typically made available to all participants who may wish to request a quote on the platform. RFQ platforms provide proprietary electronic screens that post the best bids and offers communicated by dealers, along with the associated sizes.<sup>32</sup> Indicative quotes may not accurately reflect current tradeable price levels.

### *C. OTC trading*

Pre-trade data with respect to OTC trades in both the interdealer and the DTC market is generally limited to the parties to the transaction and not available to the public, including through private data providers.<sup>33</sup>

#### *ii. Post-Trade Transparency*

##### *A. Electronic CLOB platforms*

Electronic CLOB platforms generally make available to their participants real-time information on the price and size of executed trades.<sup>34</sup> Many such platforms also make this information available to data subscribers, either directly or through third party data services, though as noted above, it is unclear whether non-participants access this information to any meaningful extent. Moreover, as in the case of pre-trade information, however, the precise content and format of the information that is disseminated can vary among platforms and participants, and data are not available to the public.

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<sup>31</sup> For example, the private data provider GovPX receives trade information from participating interdealer platforms and re-disseminates that information in real time via the internet and data vendors. This information includes the best bid and offer prices, the quantity available at those quotes and the prices and volumes of executed trades. It also sells historical tick data, which provides a record of the real-time data feed for use by researchers and others. See T. ADRIAN ET AL., AN INDEX OF TREASURY MARKET LIQUIDITY: 1991-2017, FED. RSRV. BANK OF NEW YORK, Staff Report No. 827, 4 (2017) (“**NY Fed Report**”), [https://www.newyorkfed.org/research/staff\\_reports/sr827.html](https://www.newyorkfed.org/research/staff_reports/sr827.html).

<sup>32</sup> See NY Fed Report at 3-4.

<sup>33</sup> Treasury Mkts. Prac. Grp., TMPG Releases Updates for Working Groups on Clearing and Settlement Practices for Treasury SFTs, Treasury Market Data and Transparency (Nov. 5, 2021), [https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/DT\\_Draft\\_Catalogues.pdf](https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/DT_Draft_Catalogues.pdf)

<sup>34</sup> Treasury Mkts. Prac. Grp., Treasury Market Data and Transparency Working Group Update (Nov. 5, 2021), [https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/DT\\_Note.pdf](https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/DT_Note.pdf).

### *B. RFQ platforms*

There is effectively no publicly available information regarding executed trades on RFQ platforms in the DTC market other than the weekly aggregate volume statistics published by FINRA, as discussed in the next section.

### *C. OTC trading*

There is effectively no publicly available information regarding trades executed in the OTC sector of the interdealer market and DTC market other than that which is collected by FINRA and released to the public in aggregate form, as discussed in further detail in the next section.<sup>35</sup>

**Appendix A** summarizes in table format the above review of the current extent of pre- and post-trade transparency in Treasuries markets.

#### *iii. TRACE Reporting*

Since 2017, FINRA members have been required to report certain post-trade information with respect to their trades in the cash Treasury market to FINRA's TRACE database in the form of "trade reports." The reporting of Treasury transactions to FINRA was spurred by the significant Treasury market volatility that occurred on October 15, 2014 and to help address the need for "comprehensive official sector access to data . . . with respect to U.S. Treasury cash market activity."<sup>36</sup>

The data collected by FINRA thus includes all transactions in the cash Treasury market where at least one FINRA member is a counterparty. Such "trade reports" must include the price, size, and time of the trade, the identity of the reporting entity, and in cases of trades executed on ATSS, the unique identifying number of the ATS. Beginning September 1, 2022, depository institutions with average daily transaction volumes of over \$100 million in Treasury securities will also be required to report their trades of Treasury securities to the FINRA TRACE database.<sup>37</sup> However, the data collected in FINRA trade reports is not released to the public except in the form of weekly trading volumes aggregated by security type, maturity, on vs. off the run, and interdealer vs. DTC market.

The data collected by FINRA includes nearly all the trading activity in the interdealer market, because trades in the interdealer market typically involve at least one FINRA member. Additional reporting obligations apply to trading venues in the interdealer market for cash Treasuries that execute more than \$10 billion in monthly trading volume for any

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<sup>35</sup> Treasury Markets Practice Group, Draft Catalog Re. Treasury Market Data and Transparency (Nov. 5, 2021) [https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/DT\\_Draft\\_Catalogues.pdf](https://www.newyorkfed.org/medialibrary/Microsites/tmpg/files/DT_Draft_Catalogues.pdf).

<sup>36</sup> Notice Seeking Public Comment on the Evolution of the Treasury Market Structure, 81 Fed. Reg. 3927, 3931 (Jan. 22, 2016), <https://www.federalregister.gov/documents/2016/01/22/2016-01246/notice-seeking-public-comment-on-the-evolution-of-the-treasury-market-structure>.

<sup>37</sup> See FINRA, *TRACE Depository Institution Reporting* (Feb. 16, 2022), <https://www.finra.org/rules-guidance/rulebooks/trace-depository-institution-reporting>.

two months in the preceding calendar quarter. Trading venues meeting this threshold are required to submit trade information to the FINRA TRACE database identifying both counterparties to a trade regardless of whether either counterparty is as FINRA member.<sup>38</sup> In practice, this generally includes electronic platforms in the interdealer market.

Trading of Treasuries in the DTC market platforms is subject to the same TRACE reporting requirements. The vast majority of DTC trading activity is currently covered, and coverage will be nearly comprehensive once the bank reporting requirement comes into effect in September 2022. However, TRACE generally does not include identifying information for customers in trade reports because customers are not FINRA members and FINRA members are not required to identify their non-FINRA counterparties in trade reports. Furthermore, FINRA rules do not require non-ATS venues in which a trade was executed (e.g., a RFQ or other non-ATS platform) to be specifically identified in the trade report to TRACE. As a result, TRACE data generally does not identify the venues in which most DTC trades occur, because trading in the DTC market occurs mainly in the OTC market and on RFQ platforms rather than through electronic CLOB trading venues. FINRA is however considering a rule change that would require specific identification of non-ATS trading venues in trade reports to TRACE.<sup>39</sup>

The SEC's 2022 Proposal would require automated electronic platforms for the trading of Treasuries to disclose (i) whether they display trading interest to subscribers or the public (e.g., whether the platform disseminates orders through market data feeds or a website), (ii) what information they display (e.g., security, price, size, direction, the identity of the sender, rating information based on the sender's past performance in the ATS), (iii) how, when, and to whom such information is displayed (e.g., subscribers, public, types of market participant), and (iv) whether subscribers to the platform are entitled to opt-out of the display of its trading interest.<sup>40</sup> The proposal would also apply the same requirements to manual platforms by expanding the definition of ATS to include such platforms.<sup>41</sup> The proposal would not, however, mandate comprehensive post-trade transparency for the Treasuries market.

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<sup>38</sup> NBTf 2021 at 10, citing FINRA Rule 6730.07.

<sup>39</sup> See FINRA Regulatory Notice 20-43 ("FINRA is considering changes to require members to report information regarding the identity of any non-ATS electronic trading platform through which a transaction in a U.S. Treasury security occurs as well as the method of execution (i.e., voice or electronic) of a transaction in a U.S. Treasury security."). We note that the SEC's proposed expansion of the definition of ATS, if finalized, would presumably mitigate the significance of FINRA's proposed change, by causing the significant manual platforms to be drawn within the scope of the definition of ATS, such that existing FINRA rules would henceforth require the identification of trades on such venues.

<sup>40</sup> SEC 2022 Proposal at 15556.

<sup>41</sup> SEC 2022 Proposal at 15498.

## Part II: Review of Empirical Research on the Effects of Post-Trade Transparency

In this section we review empirical research on the effects of post-trade transparency with respect to other asset classes, particularly corporate bonds, but also municipal bonds, agency MBS, and derivatives. The current state of post-trade transparency in the U.S. with respect to each of these markets is summarized in **Appendix B**. The key findings of the studies are summarized in a table in **Appendix C**. These studies unanimously find that post-trade transparency provides positive effects for investors, including increasing liquidity in these markets and lowering transaction costs. The empirical evidence therefore supports the extension of mandatory post-trade transparency to Treasury markets.

### a. Corporate bonds

In 2002, FINRA required all FINRA-registered dealers to report post-trade data for transactions in USD-denominated corporate debt securities<sup>42</sup> to TRACE within 15 minutes of a transaction.<sup>43</sup> This data includes, among other things, the CUSIP number or other numerical identifier of the bond, time, price, quantity, counterparty identity,<sup>44</sup> and ATS identifier (if the transaction took place on an ATS).<sup>45</sup>

Unlike data for Treasury securities, which are released to the public once per week in aggregate volume form only, FINRA publicly disseminates individual trade-specific data for USD-denominated corporate bonds. The data is released in real time. For trades where aggregate par value exceeds \$5 million for investment-grade bonds and \$1 million for high-yield bonds, the initially published trade size data indicates only that the trade exceeded the relevant threshold, and the exact size of the trade is reported six months later. A 2018 FIMSAC report indicates that for the years 2013-2017, approximately 3% of investment grade bond trades and 12% of high-yield bond trades exceeded these real-time reporting caps.<sup>46</sup> We note also that certain reported information, specifically dealer identifiers (i.e., unique anonymized numbers that permit the association of various trades with a single dealer without disclosing the name of the dealer), were initially withheld from

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<sup>42</sup> More precisely, any U.S. dollar-denominated debt security that is depository-eligible and registered by the SEC or issued under Section 4(2) of the Securities Act of 1933 and purchased or sold pursuant to Rule 144a.

<sup>43</sup> Transactions that occur less than 15 minutes before the closing of the TRACE system or that occur while the TRACE system is closed are required to be reported within 15 minutes of the opening of the TRACE system on the next business day.

<sup>44</sup> The report must either identify the MPID, if the counterparty is a FINRA member, or state that the counterparty is a customer or a non-member affiliate, in the case of a non-FINRA member counterparty.

<sup>45</sup> FINRA, Rule 6730(c) (last accessed Feb. 2022), <https://www.finra.org/rules-guidance/rulebooks/finra-rules/6730>.

<sup>46</sup> SEC, Recommendation for a Pilot Program to Study the Market Implications of Changing the Reporting Regime for Block-Size Trades in Corporate Bonds (Apr. 9, 2018), <https://www.sec.gov/spotlight/fix-income-advisory-committee/fimsac-block-trade-recommendation.pdf>.

public reports and only made available to academic institutions beginning in 2017, and only on an 18-month delayed basis.<sup>47</sup>

Various empirical analyses of the effect of the TRACE reporting and public dissemination regime on the U.S. corporate bond market have been conducted since the introduction of TRACE reporting in 2002. These analyses demonstrate that post-trade transparency has had a positive effect on the U.S. corporate bond market by lowering investor trading costs, including narrowing bid-ask spreads and reducing price impact, as well as increasing trading volume.

We now review the academic literature on the effects of TRACE reporting. We do so chronologically in three separate sections, because the extent of TRACE related data available to the authors changes over three distinct periods. More specifically, the first set of studies looked at the initial impact of post-trade transparency. The second set of studies, with the benefit of a longer-term data set, demonstrated that the positive benefits persisted over time. The third set of studies examined newly available data that was previously unavailable to researchers, specifically dealer-specific information.

*i. Examinations of the initial impact of TRACE reporting demonstrate positive effects of post-trade transparency on corporate bond markets*

Initial empirical analyses on the effect of mandatory post-trade transparency on U.S. corporate bond markets were unanimous in finding a reduction in trading costs and narrowed bid-ask spreads for TRACE-reportable bonds. These studies also found that trading costs and bid-ask spreads were lower for TRACE-reportable bonds than for bonds exempt from TRACE reporting.

Bessembinder (2006)<sup>48</sup> studied the effects of post-trade transparency on trade executions using a sample of trades in corporate bonds by insurance companies for the six months immediately preceding the introduction of mandatory TRACE reporting in July 2002 compared with the six months immediately following that date. The analysis concluded that the introduction of TRACE reporting caused trade execution costs to fall approximately 50% for TRACE-reportable bonds and 20% for non-TRACE-reportable bonds. These changes were robust to potential confounding factors such as changes in interest rate volatility and trading activity. The results were also notable for finding that post-trade transparency for TRACE bonds may have also decreased execution costs for non-TRACE bonds via a “liquidity externality” – that is, better pricing information for post-trade transparent bonds reduced valuation and execution costs for “opaque” bonds.

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<sup>47</sup> See FINRA, Regulatory Notice 16-43 SEC Approves Rule Amendment to Create a New Academic Corporate Bond TRACE Data Product, <https://www.finra.org/rules-guidance/notices/16-43>.

<sup>48</sup> Hendrik Bessembinder et al., *Market transparency, liquidity externalities, and institutional trading costs in corporate bonds*, 82(2) J. OF FIN. ECON. 251 (2006), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=644624](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=644624).

Edwards (2007)<sup>49</sup> compared transaction costs for TRACE-reportable bonds against non-TRACE-reportable bonds for the period from January 2003 through January 2005. The analysis concludes that trading costs for bonds with post-trade transparency were approximately 25% lower than similar-sized trades in bonds that were not TRACE reportable. The reduction for smaller size trades was particularly high, due to such trades' higher execution costs as a percentage of trade value. The analysis also found that total trading costs for a given bond dropped on average by 5 basis points (“bps”) when the TRACE system began to disseminate post-transaction data with respect to that bond.

Goldstein (2007)<sup>50</sup> assessed the effect of the public dissemination of TRACE data on the size of bid-ask spreads for bonds that are rated BBB. The researchers focused on BBB bonds because public dissemination of transaction data for such bonds became effective at staggered dates depending on transaction size, thus allowing the study to observe simultaneously bonds of the same credit rating, matched by characteristics such as issue size and trading activity, some of which were subject to public dissemination and some of which were not.<sup>51</sup> The study concludes that the introduction of public dissemination for BBB bonds reduced trading costs by amounts ranging from 60 bps for trades of 10 bonds or less per \$100 face value up to 17.4 bps for trades up to 1000 bonds per \$100 face value.

*ii. Longer-term analyses demonstrate that the positive effects of post-trade transparency persist*

A subsequent set of analyses conducted between the years 2015-2021 corroborate the conclusions of the initial analyses discussed above and show that the reductions to bid-ask spreads and trading costs persisted beyond the initial years after the introduction of TRACE reporting and public dissemination of TRACE data.

Adrian (2015)<sup>52</sup> reviewed U.S. corporate bond market price- and quantity-based liquidity measures, including volume, trade size, bid-ask spread, and price impact. The analysis concludes, among other things, based on TRACE data, that (1) average corporate bond bid-ask spreads narrowed from approximately 1% in 2005 to approximately 0.75% by the end of 2015, and (2) the average price impact (i.e., the difference between the best prevailing price for an asset and the average price at which a purchase or sale of a given quantity of the asset can be executed) went from approximately 1% to 0.5% per \$100 million over the same timeframe.

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<sup>49</sup> Amy Edwards et al., *Corporate Bond Market Transaction Costs and Transparency*, 62(3) J. OF FIN. 1421 (2007), <https://www.jstor.org/stable/4622305>.

<sup>50</sup> M.A. Goldstein et al., *Transparency and liquidity: A controlled experiment on corporate bonds*, 20(2) REV. OF FIN. STUD. 235 (2007), <https://faculty.babson.edu/sirri/research/BBB%20RFS.pdf>.

<sup>51</sup> See *id.* at 238.

<sup>52</sup> Tobias Adrian et al., FED. RSRV. BANK OF NEW YORK, *Has U.S. Corporate Bond Market Liquidity Deteriorated?* LIBERTY STREET ECON. (Oct. 5, 2015), <https://libertystreeteconomics.newyorkfed.org/2015/10/has-us-corporate-bond-market-liquidity-deteriorated/>.

A FINRA analysis conducted in 2015<sup>53</sup> analyzed the price impact of block trades of various sizes in corporate bonds and found an ongoing decline in price impact following the initiation of public dissemination of TRACE data in 2003. The authors report that a typical \$10 million block purchase in 2003 would move the market price about \$0.25 for a bond with a par value of \$100. Price impact has declined since then to approximately \$0.15 for a bond with a par value of \$100 at the time of the analysis. The price impact for blocks over \$25 million declined from approximately \$0.125 to less than \$0.05 for a bond with a par value of \$100 over the same period. The analysis also finds that corporate bond bid-ask spreads declined from about 70 bps to 30 bps for the more actively traded bonds and approximately 85 bps for less actively traded bonds to about 30 bps by 2015, which the authors note extends the results of Edwards (2007), which initially substantiated the same trend of declining bid-ask spreads over the 2003-2005 period. As noted above, under TRACE rules, the exact size of such block trades is only released six months following the trade, and the initial dissemination only notes that the trade exceeded the relevant threshold.

Jacobsen (2018)<sup>54</sup> studied the effect of post-trade transparency on trading activity, trade execution costs, and dealer behavior for Rule 144A corporate bonds that are primarily traded by institutional investors. The analysis concludes that transaction costs for trades in a given bond decreased following the implementation of mandatory TRACE reporting for that bond by approximately 10% on average, with the largest reductions occurring for larger block transactions and bonds with lower dealer competition. The analysis also found that following the introduction of post-trade transparency, small dealers gained market share and reduced the trading cost advantage enjoyed by large dealers. The results also provide evidence against often asserted potential negative effects of post-trade transparency. Specifically, the study concludes that the introduction of TRACE reporting with respect to a particular bond had no measurable impact on the bond's turnover, or dealers' willingness to hold inventory positions, participate in interdealer trades, or facilitate block transactions with respect to that bond.

Brugler (2021)<sup>55</sup> examined evidence that primary issuances of bonds experience reductions in issuing costs when trades in similar bonds in the secondary market are subject to mandatory post-trade transparency. The analysis finds that the introduction of TRACE reporting is associated with a 14-bps reduction in the average yield spread of a sample of newly issued bonds in the US corporate bond market, from a sample mean of 144bps which corresponds to a 1.1% increase in bond price. The analysis also finds a relationship between post-trade transparency and lower underpricing and explicit fees charged by intermediaries. The authors suggest that the reason for the beneficial effect of post-trade transparency on primary market issuance costs is that post-trade transparency lowers the expected transaction costs of acquiring or liquidating a position

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<sup>53</sup> BRUCE MIZRACH, FINRA OFFICE OF THE CHIEF ECONOMIST, ANALYSIS OF CORPORATE BOND LIQUIDITY (2015), [https://www.finra.org/sites/default/files/OCE\\_researchnote\\_liquidity\\_2015\\_12.pdf](https://www.finra.org/sites/default/files/OCE_researchnote_liquidity_2015_12.pdf).

<sup>54</sup> Stacey E. Jacobsen & Kumar Venkataraman, *Does Trade Reporting Improve Market Quality in an Institutional Market? Evidence from 144a Corporate Bonds* (2018), <https://ssrn.com/abstract=3171056> or <http://dx.doi.org/10.2139/ssrn.3171056>.

<sup>55</sup> James Brugler et al., *Secondary Market Transparency and Corporate Bond Issuing Costs*, 26(1) REV. OF FIN. 43 (2022), <https://academic.oup.com/rof/article/26/1/43/6321248?login=true>.

in the secondary market, such that investors may be willing to pay more for a newly issued security (i.e., accept a lower yield) in the primary market that is subject to post-trade transparency.

Gunduz (2021)<sup>56</sup> conducts an empirical comparison of liquidity in the German corporate bond market, which lacks post-trade transparency, with the US corporate bond market following the introduction of TRACE reporting, based on a regulatory dataset of transactions of German financial institutions from 2008-2014 and TRACE data. The authors find that observed trading activity is much lower in the German market: overall trading activity is about 5% lower in Germany for bonds issued by financial firms, and 25% lower for bonds issued by other firms, as compared to comparable U.S. corporate bonds. Gunduz (2021) provides further support for the view that market liquidity is generally higher in transparent markets.

*iii. Analyses of newly available TRACE data provide further corroboration of the positive effects of post-trade transparency on corporate bond markets and substantiate the existence of additional benefits.*

A more recent set of studies drawing on more detailed and previously unavailable TRACE data have continued to corroborate the beneficial effects of post-trade transparency on the U.S. corporate bond market and provide further explanation of the underlying reasons for the positive observed effects. They also suggest the existence of additional benefits, in particular that the introduction of post-trade transparency in the secondary market may reduce issuance costs in the primary market.

In Lewis (2021)<sup>57</sup> the authors analyzed the effects of mandatory TRACE reporting on the U.S. corporate bond markets. The analysis was based on newly released TRACE data that included anonymized dealer identifiers – previously available TRACE datasets did not include dealer identifiers. The analysis indicates that when post-trade transparency is introduced for a particular bond, dealers trade with a greater number of counterparties, and there is an average 13.5% increase in trading volume in the interdealer market.<sup>58</sup> The authors note that the expanded dealer networks indicated by their analysis is a potential explanation for the lower customer execution costs observed in Bessembinder (2006), Edwards (2007), Goldstein (2007), each of which is discussed above, and Asquith (2019), the updated 2022 version of which is discussed below.

Finally, Asquith (2022)<sup>59</sup> studies the effect of mandatory transparency on the U.S. corporate bond market using the newly released TRACE data including anonymized

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<sup>56</sup> Yalin Gunduz et al., *Lighting Up the Dark: Liquidity in the German Bond Market*, Deutsche Bundesbank Discussion Paper No. 21/2021 (2021), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3895495](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3895495).

<sup>57</sup> Ryan Lewis & Michael Stewart, *The Effects of Transparency on OTC Market-Making*, Jacobs Levy Equity Management Center for Quantitative Financial Research Paper (2021), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3286731](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3286731).

<sup>58</sup> *Id.* at 39.

<sup>59</sup> Paul Asquith et al., *The Effects of Mandatory Transparency in Financial Market Design: Evidence from the Corporate Bond Market*, NBER Working Paper No. w19417 (2022), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2325791](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2325791).

dealer identifiers. These identifiers allow the authors to determine the cost of “round trip” trades – that is, where a given quantity of a bond is bought and sold by the same dealer within a certain amount of time – and thus to better estimate reductions to total trading costs. The authors estimate that the introduction of TRACE reporting reduced trading costs to investors in U.S. corporate bond markets by approximately \$600 million per year.

*iv. Anecdotal evidence and theoretical analysis corroborate the empirical evidence.*

Bessembinder (2008)<sup>60</sup> reviews the empirical evidence with respect to the effect of mandatory post-trade transparency during the first years after the introduction of TRACE reporting for corporate bonds, including the results of the studies described in subsection (i) above, and also describes reports from market participants that provide further anecdotal support for the benefits of post-trade transparency. The authors note that reports in the financial and trade press quoting fixed-income research services and traders corroborate the conclusion suggested by the empirical research that pre-trade transparency reduced dealers’ information advantage and in turn reduced the implicit mark-up or “rent” that dealer firms extracted from investors in the process of executing their trades in corporate bonds.<sup>61</sup> The authors note that these findings are also consistent with the theoretical predictions as to the benefits of post-trade transparency that preceded the availability of TRACE data.<sup>62</sup>

Back (2018)<sup>63</sup> provides a theoretical model that supports the positive effects of post-trade transparency generally and specifically the differential effects thereof on investors versus dealers. According to the authors’ model, post-trade transparency in the corporate bond market via TRACE reporting should narrow bid-ask spreads and increase trading volume, thus benefiting investors. The study thus corroborates the results of the empirical analyses discussed above. The model also finds that dealers may gain from transparency despite lower spreads, because the increased trading volume effected by mandatory post-trade transparency offsets the smaller bid-ask spreads.

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<sup>60</sup> Hendrik Bessembinder & William Maxwell, *Markets: Transparency and the Corporate Bond Market* 22(2) J. OF ECON. PERSP. 217 (2008), <https://www.aeaweb.org/articles?id=10.1257/jep.22.2.217>.

<sup>61</sup> See *id.* at 227 (“[B]efore TRACE, it wouldn’t be unheard of for a trader to use the fact that there was no way of verifying the information that he gave about where a bond was trading to his advantage’ (as quoted in Bravo, 2003) . . . A bond trader (as quoted in Laughlin, 2005) stated ‘Increased transparency has clearly helped the small investor and the smaller funds . . .’”).

<sup>62</sup> See *id.* at 225 (“In theoretical models, costs of trading seem likely to decline in a more transparent market for three reasons. First, in an opaque market, well-informed dealers may be able to extract rents from less-informed customers (Pagano and Roell, 1996) . . . Second, increased transparency can facilitate enforcement of rules against excessive “mark-ups” . . . Third greater transparency can improve dealers’ ability to share risks, thereby decreasing dealers’ inventory carry costs, which could also reduce customers’ cost of trading, as in the model of Naik, Neuberger, and Viswanathan (1999).”).

<sup>63</sup> Kerry Back et al., *Signaling in OTC Markets: Benefits and Costs of Transparency* (2018), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2849630](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2849630).

## b. Municipal bonds

Since January 31, 2005, the Municipal Securities Rulemaking Board (“MSRB”) has required broker-dealers under its jurisdiction to report transactions in municipal securities issued in the US to the MSRB’s Electronic Municipal Market Access (“EMMA”) platform within 15 minutes of a transaction, and the data are thereafter promptly disseminated to the public.<sup>64</sup> From July 1997 until January 31, 2005, municipal bond transactions were required to be reported to EMMA within a day and were only publicly disseminated after 2 weeks, before the dissemination timeframe was shortened to one week in December 2002 and to one day in June 2003.

The reported data includes CUSIP, transaction date and time, par value traded, and transaction price, as well as whether the transaction is a dealer buy, dealer sell, or interdealer trade.<sup>65</sup> The reported data is publicly disseminated in real time, provided that for trades exceeding a notional amount of \$5 million, the initial public report notes only that the notional cap was exceeded, and the actual transaction amount is only published five business days later.

Empirical analyses find that mandatory post-trade transparency in the US municipal bond market has positive effects on market quality, including lowering transaction costs.

Harris (2006)<sup>66</sup> surveyed trades in the municipal bond market from November 1999 through October 2000, during which time EMMA released post-trade data one day after it was reported. The analysis indicates that municipal bonds had higher trading costs, in the form of larger bid-ask spreads, relative to similarly sized trades of equity securities: For retail-size trades, the authors estimate the average bid-ask spread for municipal bonds at 198 bps versus 40 bps for equity securities. The authors conclude that the best explanation for this large cost difference is the relatively lesser degree of post-trade transparency in the municipal bond market.

Chalmers (2021)<sup>67</sup> compared trading costs and trading volumes for municipal bonds before and after January 31, 2005, when MSRB began to require public dissemination of municipal bond transactions within 15 minutes, rather than within 1 day. The results support the conclusion suggested by Harris (2006), that increased post-trade transparency would reduce trading costs in the municipal bond market. The study found that both retail and institutional investors benefited from significant reductions in overall trading costs that corresponded to the shortening of the MSRB reporting timeframe. The study found that overall trading costs declined by an average of 43 bps (23%) following the introduction of the 15-minute reporting time frame. For retail investors, the reduction came primarily in the form of reduced intermediation costs: dealer markups declined after

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<sup>64</sup> See FINRA, Notice to Members 04-95 (2004), <https://www.finra.org/sites/default/files/NoticeDocument/p012856.pdf>.

<sup>65</sup> See *infra* note 67.

<sup>66</sup> Lawrence E. Harris & Michael S. Piwowar, *Secondary Trading Costs in the Municipal Bond Market*, 61(3) J. OF FIN. 1361 (2006), <http://www.jstor.org/stable/3699326>.

<sup>67</sup> John Chalmers et al., *The Difference a Day Makes: Timely Disclosure and Trading Efficiency in the Muni Market*, J. OF FIN. ECON. 10 (2021), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2786420](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2786420).

the implementation of 15-minute reporting by an average of 30 bps (14%). For institutional investors, the reduction came primarily in the form of reduced bargaining costs, which were reduced most for medium-sized trades (\$200,000 - \$1 million): 24-25 bps. The study also found that trading activity increased for municipal bonds of all liquidity levels following the implementation of 15-minute reporting. Moreover, intra-day price dispersion (i.e., the extent to which the price of a bond tends to vary over the course of a single trading day) decreased. High intra-day price dispersion suggests that information relevant to the price of a bond is disseminated in a less timely fashion among investors (i.e., there is a high degree of market segmentation). A narrower price dispersion thus suggests that investors are transacting at prices that more accurately reflect the bond's underlying value – that is, the conclusion indicates that public dissemination of transaction data enhanced price efficiency.

Schultz (2012)<sup>68</sup> analyzed the effect of increased post-trade transparency on prices investors pay in primary offerings and found that the shortened timeframe instituted in 2005 significantly reduced the dispersion of municipal bond purchase prices, which as noted above suggests that investors are transacting at more accurate prices. The study also detected a small reduction of primary market markups. Such markups consist of the excess of the price that an investor must pay to acquire a municipal bond in a primary offering.<sup>69</sup> Lower markups thus may suggest that an underwriter or dealer is less able to extract rent from investors by selling bonds at a price that is greater than their underlying value plus the true value of the underwriter's or dealer's services.

### c. Agency MBS

Agency mortgage-backed securities (“**agency MBS**”) are bonds issued or guaranteed by a U.S. government agency or U.S. government-sponsored enterprise and secured by a pool of home or other real estate loans. The “to be announced” (“**TBA**”) MBS market is a forward market in which buyer and seller agree on six parameters (issuer, maturity, coupon rate, par value, price, settlement date) and the seller may deliver any agency MBS consistent with those parameters. Since November 13, 2012, FINRA has required that dealers report transactions in TBA MBS to TRACE no more than 45 minutes after execution, and the reported data is then released by FINRA as promptly as possible.<sup>70</sup>

As instruments, agency MBS are like Treasuries in that they are issued or guaranteed by a government or government-related entity. The effect of post-trade transparency on agency MBS markets is thus likely to be a strong indicator of the potential effect of additional post-trade transparency in Treasuries markets.

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<sup>68</sup> Paul Schultz, *The Market for New Issues of Municipal Bonds: The Roles of Transparency and Limited Access to Retail Investors* (2012), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1988548](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1988548).

<sup>69</sup> Under U.S. tax law, the underwriter of a municipal bond offering is obligated to sell a “substantial” percentage (generally around 10%) of the initial offering at the reoffering price stipulated in the underwriting agreement. The underwriter is then free to sell the remainder of the bonds at prices above the reoffering price.

<sup>70</sup> See FINRA, TRACE: The Source for Real-Time Bond Market Transaction Data, [https://www.finra.org/sites/default/files/TRACE\\_Overview.pdf](https://www.finra.org/sites/default/files/TRACE_Overview.pdf).

Schultz (2018)<sup>71</sup> analyzed the effect of post-trade transparency in the TBA agency MBS market using a TRACE data set consisting of trades by institutional investors in such securities from September 2012 through January 2013, which straddles the date on which post-trade transparency for TBA MBS trades was implemented (November 13, 2012). The analysis concludes that trading costs fell for institutional investors following the introduction of post-trade reporting. For a \$1 million trade, round-trip trade costs decreased by about 0.87 bps, equivalent to 18% of the 4.72 bps average total cost that prevailed before post-trade transparency was implemented.

#### d. Derivatives

The Dodd-Frank Act requires reporting and public dissemination of post-trade data for trades of swaps, whether cleared or uncleared, and regardless of the identity of the swap participants. The information that must be reported includes, among other things, trade price, trade size, timestamp, whether the contract is standardized or bespoke, and whether the trade is centrally cleared, and the category of counterparty (end-user or dealer), but individual party identities are not publicly disclosed.<sup>72</sup> The reported data is disseminated in real-time, except that dissemination of block trades is delayed by 15 minutes to 2 hours (depending on the transaction type), and when block trades exceed certain notional caps, the public report includes only the notional cap rather than the actual amount of the transaction. The size at which a trade is considered a block trade is specific to the category of underlying asset and other contract specifications (e.g., tenor) and varies significantly. For example, the current notional cap for a USD-denominated interest rate swap is \$170 million for swaps with a tenor of 5 to 10 years and \$ 240 million for swaps with a tenor of 2 to 5 years.<sup>73</sup> The varying block trade thresholds are intended to take account of the varying degrees of liquidity in different swap markets, with less liquid markets generally having lower thresholds.<sup>74</sup>

As in the case of the asset classes noted above, empirical studies have substantiated the beneficial effects of the post-trade transparency requirements on derivative markets.

Loon (2015)<sup>75</sup> examines transaction costs and liquidity in the index credit default swap market by matching intraday quotes to real-time trade reports made available from transaction reports publicly disseminated under Dodd-Frank. The analysis found that

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<sup>71</sup> Paul Schultz & Zhaogang Song, *Transparency and Dealer Networks: Evidence from the Initiation of Post-trade Reporting in the Mortgage-Backed Security Market* (2018), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3062168](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3062168).

<sup>72</sup> See Real Time Public Reporting, 17 C.F.R. 1243 (2012).

<sup>73</sup> See Initial Appropriate Minimum Block Sizes by Asset Class for Block Trades and Large Notional Off-Facility Swaps, 17 C.F.R. 1243, Appendix F (2012).

<sup>74</sup> See Procedures to Establish Appropriate Minimum Block Sizes for Large Notional Off-Facility Swaps and Block Trades, 77 Fed. Reg. 15460 (May 31, 2013), <https://www.federalregister.gov/documents/2013/05/31/2013-12133/procedures-to-establish-appropriate-minimum-block-sizes-for-large-notional-off-facility-swaps-and>.

<sup>75</sup> Yee Cheng Loon & Zhaodong Zhong, *Does Dodd-Frank affect OTC transaction costs and liquidity? Evidence from real-time CDS trade reports* (2016), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2443654](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2443654).

trading costs were lowered by 45-81 bps across various categories of index swap trades, and price dispersion was reduced within a range of 19 to 55 bps following the introduction of mandatory post-trade transparency.

Benos (2017)<sup>76</sup> compared U.S. dollar swaps subject to post-trade transparency requirements and traded on a swap execution facility with contemporaneous transaction data for EU swaps that were not subject to those requirements. The study found that execution costs for U.S. dollar contracts subject to reporting under Dodd-Frank were reduced by \$3-4 million daily for end users relative to Euro contracts. The authors conclude that overall, increased transparency lowered transaction costs and substantially improved interest rate swap market liquidity.

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<sup>76</sup> Evengelos Benos et al., *Centralized Trading, Transparency, and Interest Rate Swap Market Liquidity: Evidence from Dodd-Frank Act*, Bank of England Working Paper No. 580 (Revised 2017), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2716066](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2716066).

## Part III: Conclusion

The March 2020 stress in cash Treasury markets and 2019 Treasury repo market spike made clear that Treasury markets can be subject to bouts of illiquidity that can impact the U.S. financial system. It is therefore prudent for U.S. policymakers to promptly evaluate reforms that could enhance the liquidity and stability of cash Treasury markets.

Part I of this report demonstrated that post-trade transparency in cash Treasury markets is lacking and Part II found that real-time post-trade transparency for other financial markets has consistently increased liquidity, reduced transaction costs and enhanced price efficiency in those markets. This report therefore concludes that U.S. policymakers should mandate comprehensive real-time post-trade transparency for cash Treasury markets.

Because detailed data on cash Treasury transactions are already reported to FINRA as part of the TRACE system, enhanced post-trade transparency could readily be achieved by publicly disseminating this data. Potential concerns associated with mandatory post-trade transparency could be addressed as they have been in other markets, such as the market for corporate bonds, with time delays and the reporting of capped notional amounts for certain block trades. Post-trade transparency rules could also be phased in over time, for example by initially requiring public dissemination only for transactions in the relatively more liquid market for on-the-run Treasuries.

The benefits of post-trade transparency extend beyond increased market liquidity and financial stability. For example, the dealer-to-customer market currently provides essentially no post-trade transparency, so customers in the dealer-to-customer market are generally at an informational disadvantage relative to their dealers. Increased post-trade transparency could therefore be particularly beneficial to customers because it would better enable them to assess the quality of execution thereby facilitating competition among dealers and lowering transaction costs.

Lowering transactions costs in cash Treasury markets also has the potential to create a liquidity premium with respect to the issuance of Treasuries.<sup>77</sup> Such a premium could result in lower issuance costs of Treasuries and thereby benefit the U.S. government and taxpayers by in effect allowing the Federal government to borrow at a lower interest rate, and in turn potentially lowering the amount of revenue that must be raised through taxes.

The empirical literature convincingly finds that mandatory post-trade transparency has substantial benefits to issuers and investors and we therefore recommend that U.S. policymakers act now, so these benefits can accrue to the cash Treasury markets that underpin the U.S. and global financial system.

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<sup>77</sup> See Pat Parkinson, *Time to Deliver Public Transparency the U.S. Treasury Market*, BANK POL'Y INST. (Apr. 5, 2022).

## Appendix A: State of Pre- and Post-Trade Transparency in Cash Treasury Markets

<b>Pre-Trade Transparency</b>	
<i>Trading venue</i>	<i>Scope of transparency</i>
Automated electronic platform	Pre-trade data available to participants and subscribers.
RFQ platforms	Dealer quotes typically available to all platform participants who request a quote.
OTC trading	Limited to parties to transaction.

<b>Post-Trade Transparency</b>	
<i>Trading venue</i>	<i>Scope of transparency</i>
Automated electronic platforms	Post-trade data potentially available to participants and subscribers. FINRA weekly aggregated volume data available to public
RFQ platforms	FINRA weekly aggregated volume data only
OTC trading	FINRA weekly aggregated volume data only

## Appendix B: Mandatory Post-Trade Transparency in Other U.S. Markets

Asset class	Year implemented; information reported	Reporting timeframe	Dissemination timeframe	Exceptions/exclusions
Corporate bonds	2002  CUSIP; timestamp, price; quantity; ATS identifier (if applicable); counterparty (name not disseminated)	15 minutes	Real time	For trades over \$5M (investment grade)/\$1M (high yield) initial report only indicates relevant threshold was exceeded, and exact size released 6 months later.
Municipal bonds	1997  CUSIP; timestamp; price; amount; counterparty (name not disseminated)	15 minutes (changed from 1 day in 2005)	Real time (changed from 2 weeks in 2005, 1 week in 2002, and 1 day in 2003)	For trades exceeding \$5M, initial report only indicates that the threshold was exceeded, and exact size released 5 business days later.
Agency MBS	2012  CUSIP; timestamp; price; amount; settlement date; TBA/specified pool; counterparty (name not disseminated)	15 minutes (trades for good delivery (i.e., underlying assets meet minimum standards)); 45 minutes (not traded for good delivery)	Real time	For trades of specified pools, corporate bond thresholds apply; for TBA trades exceeding \$25M (for good delivery)/ \$10M (not for good delivery), the public report notes only that the relevant threshold was exceeded; actual trade amount disclosed 6 months later.
Swaps	2012  Timestamp; price; size; standardized/bespoke; whether trade centrally cleared; category of counterparty (end-user or dealer)	As soon as technically practicable	Real time (block trades delayed by 15 minutes to 2 hours)	For trades exceeding a notional cap (varying depending on instrument – e.g., \$170 million for swaps with a tenor of 5 to 10 years), report indicates only that the relevant threshold was exceeded.

## Appendix C: Summary of Studies of the Effects of Post-Trade Transparency

Author & year	Asset class	Event/comparison	Effect of post-trade transparency	Magnitude
<b>Corporate Bonds</b>				
<i>Analyses of initial impacts of TRACE reporting</i>				
Bessembinder (2006)	Corporate bonds	Comparing samples of institutional trades during 6 months immediately before and 6 months immediately after implementation of TRACE reporting and public dissemination in 2002.	Reduced effective bid-ask spreads for both bonds subject and not subject to TRACE reporting.	50% bid-ask spread reduction for TRACE-reportable bonds and 20% for non-TRACE-reportable bonds.
Edwards (2007)	Corporate bonds	Comparing trades of TRACE-reportable vs. non-TRACE-reportable bonds from Jan. 2003 through Jan. 2005.	Reduced effective bid-ask spreads.	Bid-ask spreads 25% lower for bonds subject to post-trade transparency; bid-ask spreads dropped by 5 bps when TRACE post-trade transparency implemented for a bond.
Goldstein (2007)	Corporate bonds	Comparison of trades of TRACE-reportable BBB-rated bonds subject to public dissemination and those not subject to public dissemination.	Reduced effective bid-ask spreads.	Bid-ask spreads narrowed by 60 bps-17.4 bps (depending on trade size).

Author & year	Asset class	Event/comparison	Effect of post-trade transparency	Magnitude
<i>Analyses of longer-term impacts of TRACE reporting</i>				
Adrian (2015)	Corporate bonds	Time series analysis of trades of bonds subject to TRACE reporting and public dissemination (2005 to 2015).	Reduced effective bid-ask spreads.  Reduced price impact.	Bid-ask spread narrowed from 1% in 2005 to 0.75% by end of 2015  Average price impact reduced from 1% to 0.5%
Mizrach/FINRA (2015)	Corporate bonds	Time series analysis of trades of bonds subject to TRACE reporting and public dissemination (2003 through 2015).	Reduced effective bid-ask spreads.  Reduced price impact.  For both actively traded bonds and less liquid bonds, and for block trades (the precise amounts of which are exempt from immediate public dissemination).	Bid-ask spreads declined from ca. 70 bps to 30 bps (more actively traded bonds) and from ca. 85 bps to ca. 30 bps (less actively traded bonds).  Average price impact declined from 25 cents to 15 cents per \$100 par value for \$10 million block trade, and from \$0.125 to less than \$0.05 per \$100 par value for blocks over \$25 million
Jacobsen (2018)	Corporate bonds (Rule 144A)	Comparison of sample of trades of Rule 144A bonds during year immediately preceding and year immediately following	Reduced effective bid-ask spreads.  Increased small dealer market share.	10% average bid-ask spread reduction.

Author & year	Asset class	Event/comparison	Effect of post-trade transparency	Magnitude
		implementation of TRACE reporting and public dissemination for Rule 144A bonds in June 2014.	No measurable impact on turnover or dealers' willingness to hold inventory positions, participate in dealer trades, or facilitate block transactions.	
Brugler (2021)	Corporate bonds	Comparison of trades of TRACE reportable bonds subject to public dissemination with trades of bonds not subject to public dissemination.	Reduced issuance costs.	Average 14 bps reduction in average yield spread (1.1% increase in price received by issuer).
Gunduz (2021)	Corporate bonds	Comparison of trades of TRACE-reportable U.S. bonds to trades of German bonds not subject to post-trade transparency.	Increased trading activity (as measured by the frequency with which a given bond is traded).	5% greater for financial issuers 25% greater for non-financial issuers.
<i>Analyses of newly available TRACE data</i>				
Lewis (2021)	Corporate bonds	Comparison of trades of TRACE reportable bonds subject to public dissemination with trades of bonds not subject to public dissemination.	Increased trading volume.  Dealers trade with greater number of counterparties.	13.5% average increase in trading volume.
Asquith (2022)	Corporate bonds	Comparison of trades of TRACE reportable bonds subject to public dissemination with trades of bonds not subject to public dissemination.	Reduced effective bid-ask spreads.	\$600 million per year.

Author & year	Asset class	Event/comparison	Effect of post-trade transparency	Magnitude
<i>Theoretical/anecdotal analyses</i>				
Bessembinder (2008)	Corporate bonds	Reports from market participants concerning the effect of the implementation of TRACE reporting and public dissemination.	Reduced dealers' information advantage and dealer mark-up.	-
Back (2018)	Corporate bonds	Implementation of TRACE reporting and public dissemination (theoretical/model-based analysis).	<p>Reduced effective bid-ask spreads.</p> <p>Increased trading volume.</p> <p>Dealers may benefit on net despite lower bid-ask spreads because of higher trading volume.</p>	-
<b>Municipal Bonds</b>				
Harris (2006)	Municipal bonds/equity securities	Comparison of pre-2005 (i.e., non-transparent) muni bond trades with equity trades subject to TRACE reporting.	Reduced effective bid-ask spreads .	Average trading cost of 198bps for muni bonds versus 40bps for equity securities.
Schultz (2012)	Municipal bonds	Shortening of reporting and dissemination timeframe to 15 minutes.	Reduced purchase price dispersion and increased price efficiency.	Mean standard deviation of purchase prices for small purchases on offer day reduced from 0.14 to 0.09 and from 0.10 to 0.08 for large purchases.

Author & year	Asset class	Event/comparison	Effect of post-trade transparency	Magnitude
Chalmers (2021)	Municipal bonds	Shortening of reporting and dissemination timeframe from 1 day to 15 minutes.	Reduced effective bid-ask spreads.  Increased liquidity.	43bps (23%)
<b>Agency MBS</b>				
Schultz (2018)	Agency MBS	Comparison of samples of trades occurring during 3 months immediately before and 3 months immediately after implementation of TRACE reporting and public dissemination.	Reduced effective bid-ask spreads.	Ca. 0.87bps (18%) (for \$1 million trade)
<b>Derivatives</b>				
Loon (2015)	Index swaps	Comparison of trades subject to mandatory post-trade transparency with trades not subject to public dissemination.	Reduced effective bid-ask spreads.  Reduced price dispersion (greater price efficiency).	45-81 bps 19-55 bps
Benos (2017)	Interest rate swaps.	Comparison of USD contracts subject to post-trade transparency and EUR contracts not subject to post-trade transparency.	Reduced effective bid-ask spreads.  Higher liquidity.	\$3-4 million/day.



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