

**NOTHING BUT THE FACTS: U.S. BOND MARKET LIQUIDITY**

This Nothing But the Facts statement by the Committee on Capital Markets Regulation seeks to provide clarity regarding recent changes in the liquidity of the market for U.S. Treasuries and U.S. corporate bonds. Although there is no single definition, liquidity generally refers to the ability of buyers and sellers of bonds to transact quickly, efficiently and without causing a significant change in the market price of a bond.<sup>1</sup> Liquid markets are generally associated with lower transaction costs for investors and lower financing costs for borrowers.

This Nothing But the Facts statement does not reach any conclusions regarding the risk of an acute shortage of liquidity in these markets. However, we note that market participants and some in the academic and policy community are concerned that these markets are particularly vulnerable to future liquidity shocks.<sup>2</sup> This may be because traditional dealers are not as willing or able to take these assets onto their balance sheets,<sup>3</sup> due in part to regulatory changes that are already underway and those that are yet to come. For example, the liquidity coverage ratio, supplementary leverage ratio and “Volcker” rule collectively make it more costly for traditional dealers to hold large positions in certain asset classes, particularly U.S. corporate bonds. Other pending regulations, like the “Total Loss Absorbing Capacity” rule, also increase costs.

On the other hand, experts have also noted that recent reforms have enabled non-bank market participants to compete as new liquidity providers in the market for U.S. Treasuries, potentially counteracting some of the lost liquidity from traditional dealers.<sup>4</sup> However, we note that these new entrants generally maintain small positions in U.S. Treasuries for very short periods of time, whereas traditional dealers would hold larger positions for longer periods of time.

Non-bank market makers have not emerged to a similar extent in U.S. corporate bonds, where the role of traditional broker-dealers is particularly important for two reasons. First, due to the range and diversity of these securities, most corporate bonds lack fungibility, which makes order matching more difficult.<sup>5</sup> Second, investors in corporate bonds traditionally buy and hold these bonds for income. For both reasons, when investors seek to exit their positions in corporate bonds it can take more time to find a buyer and so an intermediary has traditionally held the bond on its balance sheet for some time. Thus, if investor sentiment in corporate bonds were to suddenly shift,

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<sup>1</sup> Douglas J. Elliott, *Market Liquidity: A Primer (2015)*, available at <http://www.brookings.edu/~media/research/files/papers/2015/06/market-liquidity/market-liquidity.pdf> edu/blogs/up-front/posts/2015/06/16-problem-with-liquidity-financial-markets-elliott

<sup>2</sup> IMF Global Financial Stability Report, *Navigating Monetary Policy Challenges and Managing Risks*, Chapter 1: Enhancing Policy Traction and Reducing Risks (April 2015), at 33.

<sup>3</sup> JPMorgan, *Living in a less liquid world: The Dos and Don'ts for Bond Market Investors*, (June 11, 2015)

<sup>4</sup> See, e.g., Ken Griffin, “Overlooking the Other Sources of Liquidity,” *The Wall St. Journal* (Jul. 26, 2015), available at: <http://www.wsj.com/articles/overlooking-the-other-sources-of-liquidity-1437950015>.

<sup>5</sup> See, e.g., BlackRock “Addressing Market Liquidity,” July 2015. Exhibit 4 shows that the top ten largest issuers in the U.S. and Europe collectively have over 18,000 different bonds outstanding.

some are concerned that the decreased role of traditional broker-dealers could exacerbate any declines in bond prices.

In the first section of this statement, we describe the recent increase in size of the markets for U.S. Treasuries and U.S. corporate bonds. In the second section, we describe the recent shift in the holdings of U.S. Treasuries and U.S. corporate bonds away from traditional broker-dealers and towards bond investment funds. In the third section, we present relevant measures of U.S. Treasury and U.S. corporate bond market liquidity. It is important to look at a range of measures and proxies for liquidity, because there is no single metric that captures bond market liquidity entirely.<sup>6</sup>

Certain of the measures of liquidity that we review show that the liquidity of these markets has stayed the same or improved in recent years, whereas other measures indicate that the liquidity of these markets has deteriorated. Although the measures that we review are a useful proxy for liquidity at this time, they are not predictive of the likelihood of a future liquidity shock.

### *U.S. Treasuries and U.S. Corporate Bonds: Market Size*

The \$39 trillion U.S. bond market is composed of several different asset classes, each of which has its own unique liquidity characteristics.<sup>7</sup> U.S. Treasuries are the largest asset class and are issued at maturities ranging from less than 1 year to as long as 30 years.<sup>8</sup> As of November 2015, there were \$13.1 trillion in marketable U.S. Treasuries outstanding.<sup>9</sup> This represents an almost three-fold increase from 2007 levels and a 47% increase from 2010 levels.<sup>10</sup>

U.S. corporate bonds are issued at maturities ranging from less than 1 year to as long as 50 years, although the bulk of the issuance is in the 5- to 10-year sector. U.S. corporate bonds pay a higher interest rate than U.S. Treasuries of comparable maturity, reflecting additional risk premia for credit and liquidity risk. As compared to 2007 levels, U.S. corporate debt has increased by approximately 55%, with over \$8.1 trillion outstanding as of the second quarter of 2015.<sup>11</sup> The two important sub-classes of corporate debt are investment grade debt and high-yield debt. The majority of the growth in the market has been in investment grade debt, which has grown from approximately \$4.6 trillion in 2007 to \$6.8 trillion outstanding as of the second quarter of 2015.<sup>12</sup> As of

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<sup>6</sup> Much of the discussion concerning liquidity measurements references a report by the Federal Reserve Bank of New York entitled "Measuring Treasury Market Liquidity," available at: <http://www.newyorkfed.org/research/epr/03v09n3/0309flem.pdf>.

<sup>7</sup> SIFMA US Bond Market Issuance and Outstanding Statistics, as of June 2015, ("SIFMA statistics") available at: <http://www.sifma.org/research/statistics.aspx>.

<sup>8</sup> Treasuries are regarded as the safe haven for capital preservation during turbulent economic and geopolitical periods and generally outperform other bonds when bond market volatility is high, the economy is weakening and stock prices are falling.

<sup>9</sup> November 30, 2015, Monthly Statement of the Public Debt of the United States.

<sup>10</sup> See SIFMA Statistics, supra note 7. In 2010, there was \$8.9 trillion in U.S. Treasuries and in 2007, \$4.5 trillion.

<sup>11</sup> SIFMA Statistics, supra note 7. In 2007, there was \$5.3 trillion in U.S. corporate debt.

<sup>12</sup> SIFMA Statistics, supra note 7. And Stone Harbor Investment Partners, The Globalization of the High Yield Market: Why Diversification is an Increasingly Important Consideration in High Yield Investing (2015), available at: <http://www.shiplp.com/wp-content/uploads/Globalization-of-the-HY-Market-March-2015.pdf> (citing Bank of America Merrill Lynch data).

the second quarter of 2015, the size of the high-yield bond market is approximately \$1.35 trillion, as compared to \$709 billion in 2007.<sup>13</sup>

### *Broker-Dealer and Bond Investment Fund Holdings*

Broker-dealer holdings of U.S. Treasuries have declined since 2007, in both absolute terms and relative to total outstanding U.S. Treasuries.<sup>14</sup> In 2007, broker-dealers held upwards of \$800 billion in U.S. Treasuries; they currently hold less than \$600 billion in these securities.<sup>15</sup> And while their holdings represented roughly 18% of outstanding U.S. Treasuries in 2007, they currently represent less than 5%.<sup>16</sup> The drop in holdings of U.S. Treasuries by broker-dealers, who are typically more active daily traders of the securities, has been countered by an increase in holdings by bond investment funds, depository institutions, and the Federal Reserve and other foreign public sector institutions.

Bond investment funds have increased their U.S. Treasury holdings from \$172 billion in 2007 to \$844 billion in 2015.<sup>17</sup> Depository institutions have increased their U.S. Treasury holdings from \$123 billion in 2007 to \$506 billion in 2015.<sup>18</sup> Most importantly, the Federal Reserve has increased its share of U.S. Treasury holdings from \$779 billion in 2007 to \$2.46 trillion in 2015, reflecting its various large-scale asset purchase programs.<sup>19</sup> It is notable that foreign official institutions currently hold approximately \$4.37 trillion in U.S. Treasuries and thus the public sector holds 52% of the stock of outstanding U.S. Treasuries.<sup>20</sup>

Primary dealer inventory of corporate bonds has dropped from \$300 billion in 2007 to \$5.3 billion in November 2015.<sup>21</sup> On the other hand, there has been \$750 billion in net inflows to U.S.-domiciled funds that invest in corporate bonds over the past five

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<sup>13</sup> Stone Harbor Investment Partners, *The Globalization of the High Yield Market: Why Diversification is an Increasingly Important Consideration in High Yield Investing* (2015), <http://www.shiplp.com/wp-content/uploads/Globalization-of-the-HY-Market-March-2015.pdf> (citing Bank of America Merrill Lynch data).

<sup>14</sup> See Figure 4.3 Gross Treasury Positions of Primary Dealers of the U.S. 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, *Joint Staff Report: The U.S. Treasury Market on October 15, 2014* (July 13, 2015), [hereinafter *Joint Staff Report*], available at: [http://www.treasury.gov/press-center/press-releases/Documents/Joint\\_Staff\\_Report\\_Treasury\\_10-15-2015.pdf](http://www.treasury.gov/press-center/press-releases/Documents/Joint_Staff_Report_Treasury_10-15-2015.pdf); see also Peter Hooper, *Is the U.S. Economy Vulnerable to a Volatility Shock?* Seventh Annual Volatility Institute Conference at NYU Stern School of Business (April 24, 2015), available at: <https://www.stern.nyu.edu/sites/default/files/assets/documents/Hooper%20Presentation%20for%20Volatility%20conference%20Final%2004%2022%2015%20Compatibility%20Mode.pdf> (providing similar data for general broker-dealers).

<sup>15</sup> This refers to broker-dealers as a general category. See Hooper, *supra* note 13, at 21 (graphing share of Treasury securities held on balance sheets of broker-dealers). Primary dealer gross holdings have been relatively constant. See Figure 4.3 in the *Joint Staff Report*, *supra* note 14, at 67.

<sup>16</sup> *Id.*

<sup>17</sup> *Joint Staff Report*, *supra* note 14, at 40 and Figure 4.5 Ownership of U.S. Treasury Debt By Investment Group. In 2007, there was \$4.3 trillion U.S. Treasuries outstanding as of June 30, 2007, and \$12.6 trillion as of April 30, 2015. Note that the term “mutual fund” here includes closed-end funds and exchange-traded funds.

<sup>18</sup> Federal Reserve Statistical Release, Z.1 Financial Accounts of the United States, Historical Annual Tables 2005-2014, available at <http://www.federalreserve.gov/releases/z1/Current/annuals/a2005-2014.pdf>; Federal Reserve Statistical Release, Z.1 Financial Accounts of the United States, Second Quarter 2015, available at <http://www.federalreserve.gov/releases/z1/Current/z1.pdf>.

<sup>19</sup> See H.4.1 Factors Affecting Reserve Balances (Jan. 4, 2007), <http://www.federalreserve.gov/releases/h41/20070104/>. See H.4.1 Factors Affecting Reserve Balances (Nov. 12, 2015), <http://www.federalreserve.gov/releases/h41/Current/>.

<sup>20</sup> Institute of International Finance, “Assessing Liquidity Risk Across Asset Classes in the New “Hybrid” Model of Liquidity Provision,” December 3, 2015 at Page 2.

<sup>21</sup> New York Federal Reserve Bank data on Primary Dealer holdings: <https://www.newyorkfed.org/markets/statrel.html>

years.<sup>22</sup> More specifically, U.S.-domiciled funds that hold investment-grade corporate debt had \$1.525 trillion in assets under management (“AUM”) at the end of 2014, which is twice the \$760 billion in AUM that such funds held at the end of 2007.<sup>23</sup> Similarly, the AUM at high-yield bond investment funds has risen from \$176 billion in 2007 to \$378 billion at the end of 2014.<sup>24</sup>

### *Measures of Bond Market Liquidity*

The *bid-ask spread* calculates the cost of executing a trade by measuring the difference between the best bid to buy and offer to sell a bond. Thus, tight bid-ask spreads are one indicator of a relatively liquid market. Certain studies have shown that bid-ask spreads are an especially useful measure of liquidity across instruments in government and corporate bond markets.<sup>25</sup> Current bid-ask spreads for U.S. Treasuries are comparable to 2007 levels,<sup>26</sup> in part reflecting the fact that the Federal Reserve has held its policy rate at effectively zero from 2007 to 2015. The Federal Reserve’s guidance during this time reduced uncertainty regarding rates, which generally reduces bond price volatility and supports tight spreads. Bid-ask spreads for U.S. corporate bonds are also generally consistent with 2007 levels.<sup>27</sup> However, research also shows that the bid-ask spread for the index containing 1,000 of the most actively traded U.S. investment grade bonds is at a historically low level.<sup>28</sup>

A complementary measure to the bid-ask spread looks at market depth or the quantity of securities that can be traded at the bid and offer prices. *Market depth* for U.S. Treasuries is generally consistent with levels from 2007.<sup>29</sup> Similar market depth data for corporate bonds is not readily available.

Measures for *price impact* calculate the change in the price of a bond in response to a sizable trade. A more significant price impact for a trade is associated with lower liquidity and generally means that executing large trades will be more costly. The estimated price impact coefficient for 10-year U.S. Treasuries is generally consistent with

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<sup>22</sup> See Graph II.12, Bank for International Settlements, *85th Annual Report 39* (2015), available at <http://www.bis.org/publ/arpdf/ar2015e.pdf>.

<sup>23</sup> See Table 4 Total Assets of the Mutual Fund Industry by Composite Investment Objective, Investment Company Institute, 2015 Investment Company FactBook (2015), available at: <http://www.icifactbook.org/>.

<sup>24</sup> See Table 4 Total Assets of the Mutual Fund Industry by Composite Investment Objective, Investment Company Institute, 2015 Investment Company FactBook (2015), available at: <http://www.icifactbook.org/>.

<sup>25</sup> See PwC’s Global Financial Markets Liquidity Study 18 (August 2015), available at: <http://www.pwc.com/gx/en/financial-services/publications/assets/global-financial-market-liquidity-study.pdf>, (quoting Fleming, M. (2003), “Measuring Treasury Market Liquidity,” Federal Reserve Bank of New York Economic Policy Review, Vol 9, pp. 83-108; Gabrielsen, A., Marzo, M. and Zagaglia, P. (2011), “Measuring market liquidity: An introductory survey,” available at: [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1976149](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1976149)).

<sup>26</sup> See Figure 4.7 of the Joint Staff Report, *supra* note 14, at 68. Note that sudden spikes in these spreads occurred during the recent financial crisis.

<sup>27</sup> Deutsche Bank, Corporate Bonds—The Hidden Depths of Liquidity 31 (2015), available at: [https://www.dbresearch.com/PROD/DBR\\_INTERNET\\_EN-PROD/PROD000000000349119/Konzept+Issue+02.pdf](https://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD000000000349119/Konzept+Issue+02.pdf). The report notes that spreads were in the .2-.3 (median) range for investment grade corporate bonds in mid-2007 and were around .4 as of early 2015.

<sup>28</sup> PwC, *supra* note 25, at 66, citing MarketAxess.

<sup>29</sup> [Figure 4.14](#) of the Joint Staff Report, *supra* note 14, at 68.

2007 levels at under 20 cents per \$1 billion net order flow.<sup>30</sup> The price impact for investment grade U.S. corporate bonds is at a record low.<sup>31</sup>

*Trading volume* measures the absolute amount of trading activity. Trading volumes of U.S. Treasuries are consistent with levels over the last decade.<sup>32</sup> Trading volume for corporate bonds has been trending upward since 2008, with daily average trading volume rising from \$14 billion before 2008 to around \$20 billion in 2014.<sup>33</sup>

Other measures of bond market liquidity show a potential decline. *Trading depth* measures trading volume as a share of the outstanding stock of an asset class. U.S. Treasuries have lost 70% of their trading depth since 2007.<sup>34</sup> During this time, U.S. investment grade debt has lost 50% of its trading depth, and U.S. high-yield debt has lost 30%.<sup>35</sup> This is due to the dramatic increase in the outstanding amount of U.S. Treasuries and U.S. corporate debt without a commensurate increase in trading volumes.

Average *trade sizes* (an ex-post measure indicating the dollar value of securities traded in an individual trade) in U.S. Treasuries have decreased from \$3.7 million in 2007 to \$1.7 million since 2010.<sup>36</sup> Average trade sizes of U.S. corporate bonds also began to fall significantly in 2007 before making a partial recovery.<sup>37</sup> Monthly average trade sizes of investment grade bonds have not exceeded \$1.75 million since 2011.<sup>38</sup> Although small trade sizes can mean that it is difficult to execute large trades quickly, the recent increase in the number of daily trades has also likely driven this decline.<sup>39</sup>

## Conclusion

This Nothing But the Facts statement shows that in recent years there have been significant changes in the market for U.S. Treasuries and U.S. corporate bonds, including an increase in the size of these markets and the relative holdings of bond investment funds. For U.S. Treasuries, the relative holdings of depository institutions, and the public sector have also increased, as compared to broker-dealers. Certain of the measures of liquidity reviewed herein suggest that at this time the liquidity of these markets is strong. These include bid-ask spreads, and measures for price impact. Other measures indicate that the liquidity of these markets has decreased. These include trading depth and average

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<sup>30</sup> See Graph 1 of Bank for International Settlements, Quarterly Review: International Banking and Financial Market Developments 101 (March 2015), available at: [http://www.bis.org/publ/qtrpdf/r\\_qt1503.pdf](http://www.bis.org/publ/qtrpdf/r_qt1503.pdf). Figures represent estimated price change per \$1 billion net order flow.

<sup>31</sup> Tobias Adrian, Michael Fleming, Or Shachar, and Erik Vogt, Has U.S. Corporate Bond Market Liquidity Deteriorated? Federal Reserve Bank of New York Liberty Street Economics (Oct. 5, 2015), available at: [http://libertystreeteconomics.newyorkfed.org/2015/10/has-us-corporate-bond-market-liquidity-deteriorated.html#\\_Vh1egbRVhBc](http://libertystreeteconomics.newyorkfed.org/2015/10/has-us-corporate-bond-market-liquidity-deteriorated.html#_Vh1egbRVhBc)

<sup>32</sup> Figure 4.10 Treasury Benchmark Volume (Cash) Joint Staff Report, supra note 14, at 68.

<sup>33</sup> Deutsche Bank, The Changing Shape of Liquidity 29 (Jan. 19 2015), available at:

[https://www.dbresearch.com/PROD/DBR\\_INTERNET\\_EN-PROD/PROD000000000349119/Konzept+Issue+02.pdf](https://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD000000000349119/Konzept+Issue+02.pdf)

<sup>34</sup> See Figure 4.7: US Treasury turnover – Average daily volumes to amount outstanding, PwC, supra note 25, at 54.

<sup>35</sup> Tracy Alloway, Everyone's Been Worried About Liquidity in the Wrong Bond Market, Bloomberg, (June 1, 2015), available at: <http://www.bloomberg.com/news/articles/2015-06-01/everyone-s-been-worried-about-liquidity-in-the-wrong-bond-market> (citing research from Deutsche Bank, Trace).

<sup>36</sup> Note that there has been a slight increase from 2014 levels in 2015. See Figure 4.8 Average trade size in US Treasuries, PwC, supra note 25, at 54.

<sup>37</sup> Alloway, supra note 35 (citing research from FINRA TRACE and J.P. Morgan).

<sup>38</sup> PwC, supra note 25, at 63 (citing MarketAxess).

<sup>39</sup> See Figure 4.6 Average Daily Trading Volumes in U.S. Treasuries and Figure 4.5 U.S. Treasury Turnover – Average daily volumes to amount outstanding of PwC, supra note 25, at 54.

trade sizes. However, if the demand for daily liquidity changes in the future, it is unclear based on current metrics that there will be sufficient liquidity to accommodate such a shift.

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Should you have any questions or concerns regarding this statement, please do not hesitate to contact the Committee's Director, Prof. Hal S. Scott ([hscott@law.harvard.edu](mailto:hscott@law.harvard.edu)), or the Executive Director of Research, John Gulliver ([jgulliver@capmksreg.org](mailto:jgulliver@capmksreg.org)), at your convenience.