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Senate Committee on Banking, Housing and Urban Affairs,
Subcommittee on Securities, Insurance and Investment and
Subcommittee on Economic Policy
"Examining Current Trends and Changes in the Fixed Income Markets"
April 14, 2016

Chairmen Crapo and Heller, Ranking Members Warner and Warren, and Members of both Subcommittees:

Thank you for inviting me to testify today on behalf of Treasury and alongside Governor Powell from the Federal Reserve Board (Fed). We have been partners with the Fed, and Governor Powell in particular, on several topics related to today's hearing. Thank you to both committees for choosing to hold a hearing on fixed income markets, which are at the heart of our financial system and are undergoing substantial change.

The primary markets for fixed income are functioning exceptionally well in the United States. Indeed, the past four years have seen record issuance of corporate bonds, as both domestic and foreign companies continue to rely on U.S. markets to raise capital.

By most traditional measures, U.S. secondary markets are also functioning well. There is no compelling evidence of a broad deterioration in liquidity. But financial markets, fixed income markets in particular, are undergoing structural changes, driven by technology, changing risk appetites and business models, much-needed financial reform, and changes in the investor base.

Moreover, these developments are occurring against a cyclical backdrop in which the United States is transitioning toward normalization from nearly a decade of unprecedented monetary policy, a transition long expected to be accompanied by volatility.

Policy makers are focused on enhancing financial stability and maintaining well-functioning markets through periods of stress. In this regard, reforms adopted in response to the crisis have demonstrably strengthened the core of the financial system. Markets have experienced several bouts of turbulence over the past few years—from the "taper tantrum" to European sovereign debt crises to the volatility last August and earlier this year. In each case, U.S. financial institutions have demonstrated resilience, instilling confidence in the broader system. This is no accident. Financial reform has built stronger, more stable institutions. And the stress tests every large bank undergoes annually are far more severe than anything experienced since the crisis. Financial reform has created a buffer for volatile times.

But the tests will surely become more difficult, and we cannot afford to become complacent. At Treasury, our focus is on understanding the transitions that are underway, and anticipating the demands of the new environment. Treasury is working with the other agencies with authorities in Treasury markets to undertake the most comprehensive review of the Treasury market since

1998. And U.S. market regulators continue to address potential operational risks associated with technological changes in their respective markets.

Record Issuance in Fixed Income Primary Markets

Fixed income markets play a central role in the U.S. economy, channeling savings into investment and providing credit to households, governments, and businesses. Well-functioning markets facilitate critical financing to federal, state, and local governments, to households for mortgage and automobile loans, and to businesses for investments, job creation, and innovation.

Capital markets play a larger role in the U.S. economy than in other large, developed economies. Roughly two thirds of credit is provided by capital markets in the United States, and one third through bank lending, compared to a roughly 50/50 split in the European Union (EU). The EU, in fact, is taking steps to develop a "capital markets union" to foster more dynamic markets and reduce reliance on bank funding, which proved costly in the crisis and has likely contributed to Europe's slower pace of recovery relative to the United States.

Primary markets for fixed income in the United States have performed exceptionally well for the past several years. Issuance has been strong—indeed, corporate bond issuance reached record levels over the past four years. Companies have taken advantage of low interest rates and strong investor demand to issue $7.8 trillion in bonds since the beginning of 2010. This funding is being used for investments in plants, equipment, software, research and development, and new workers, to return money to shareholders, or to build cash buffers to provide financial flexibility. Issuance has not been limited to U.S. companies—foreign corporations raised over a trillion dollars in debt in the U.S. market in the same period.

The market for private residential mortgage-backed securities has yet to recover. Investor confidence was badly damaged during the crisis and economic incentives for banks to securitize their non-agency mortgages remain weak. But the market for residential mortgage securities backed by Fannie Mae and Freddie Mac has remained strong, and mortgage rates remain near record lows, supporting the ongoing recovery in the U.S. housing market.

The Administration remains focused on expanding access to credit for creditworthy individuals and businesses who remain underserved. But for borrowers with access to the capital markets, the past several years have been a time of plenty.

Secondary Market Liquidity

For the most part, U.S. secondary markets are also functioning well, demonstrating resilience through recent periods of volatility that were driven by an uncertain global economic outlook.

Despite repeated claims to the contrary, there is no compelling evidence of a broad-based deterioration in liquidity. In fact, most traditional measures of liquidity across U.S. fixed income sectors are well within historical levels.

There is no standard definition of liquidity that encompasses all the variables that matter across products and investor categories. In the broadest sense, market liquidity refers to the ease with which buyers and sellers can meet in the marketplace and transact. Market participants point to a number of measures as proxies for liquidity, including bid-ask spreads, trading volume, market depth, and the price impact of trades. Each of these measures captures some aspect of liquidity, but none is comprehensive. Which measure of liquidity matters also depends on which element of liquidity you prioritize. For certain professional investors who trade frequently, low transaction costs and minimal impact on price may be important. For long-term investors, keeping costs down over time may matter more than short-term transaction costs. For large investors such as pensions or retirement funds, the ability to execute a large transaction may be most important. And these priorities will shift in response to changing market conditions.

In the Treasury market, bid-ask spreads and measures of the price impact of trades in the market for the most-recently issued Treasury securities are all well within historical ranges (Charts A and B). Market participants often cite as evidence of worsening liquidity conditions smaller trade sizes or recent declines in measures of depth—i.e., the amount available to be purchased or sold at the top levels in the order book. However, smaller trade sizes are consistent with the increasing predominance of electronic and algorithmic trading in the Treasury market. And while depth appears to have declined from recent high levels, it is well within historical ranges. The elevated levels from late 2011 into 2013 may have been due to investor conviction regarding a stable outlook for interest rates (Charts C and D).

There have, however, been isolated episodes in recent years of brief spikes in volatility, associated with deteriorating liquidity conditions during those spikes. The most extreme example was the October 15, 2014 "flash rally" in Treasuries, when the yield on 10-year notes experienced a 37-basis point roundtrip over a span of roughly 12 minutes. This episode raises the possibility that improved day-to-day liquidity, as measured by bid-ask spreads and price impact, may have come at the cost of rare but severe bouts of volatility and strains in liquidity.

If these episodes remain rare and fleeting, like October 15, the ultimate impact on the Treasury market will likely be minimal. But if the disruptions become more frequent, the effect could be more significant. We have seen similar episodes in U.S. equities, such as the May 2010 "flash crash," and foreign exchange markets—two other markets with significant levels of algorithmic trading. But we must be especially watchful when it comes to the world's risk-free benchmark, and this is why we initiated the first comprehensive review of the Treasury market since 1998.

Market participants also report challenges in the market for aged, or "off-the-run," Treasuries. The price differences between on- and off-the-run Treasuries do not indicate a great disparity in liquidity conditions (Chart E), but due to data limitations we do not have as granular a view into off-the-run markets. As discussed further below, we are working to address these data limitations.

In U.S. corporate bond markets, measures of transaction costs are also well within historical ranges, and perhaps even healthier than in the early 2000s (Chart F). Some have pointed to a decline in dealer inventories of corporate bonds since 2006 and 2007 as a harbinger of declining liquidity, because dealers would be less likely to act as "shock absorbers." But analysis by

Goldman Sachs and others shows that pre-crisis inventory levels were inflated by holdings of mortgage-backed securities and esoteric structured products that are no longer used. Actual corporate inventories have declined, but were not large in relation to the overall market to begin with. Moreover, the relationship between inventories and liquidity is far from clear. Research from the Federal Reserve Bank of New York shows that dealer positions tend to be *procyclical* (Chart G). In other words, rather than acting as shock absorbers, dealers have historically *reduced* their positions during periods of stress.

Overall, corporate bond trading volumes have increased (Chart H), a sign that there has been no broad withdrawal from the U.S. market. Average trade sizes have begun to decline, as well as the proportion of large "block" trades (Charts I and J). These data points are consistent with trends toward greater electronification and more "agency-based" intermediation, which are discussed below. As Fed Governor Lael Brainard recently pointed out, these data points are also consistent with reports by market participants of the need to break up large trades into smaller trades over time.

Financial Reform Strengthened the Core of the Financial System

Market liquidity is an important element in a well-functioning financial system. As we learned so painfully in the crisis, and less dramatically in many other instances, when secondary markets cease to function effectively, firms and households can lose access to the primary markets, cutting off their access to financing for investments, hiring, and home purchases.

But liquidity is also a function of market dynamics, and varies across markets and over cycles. Prior to the crisis, liquidity was abundant by almost any measure. However, this liquidity was a result of soaring financial sector leverage, an over-reliance on short-term funding, and financial activity driven by a proliferation of structured and synthetic vehicles, often held off-balance sheet. Some investment banks were leveraged 40- or 50-to1, while short-term wholesale funding had grown to over 30 percent of the largest banks' and investment banks' total assets. That apparent liquidity not only disappeared when it was needed most, but led to forced selling that greatly exacerbated financial distress.

Policy makers have taken significant steps following the crisis to strengthen the core of the financial system, to reduce the vulnerability of markets to those kinds of fire sale dynamics. In particular, financial reform has created more resilient financial intermediaries, more stable funding profiles, and sounder market structures. These steps have contributed to more resilient financial markets that are better prepared to continue to support the economy through periods of stress.

A major pillar of post-crisis reform has been to create more resilient financial institutions, most fundamentally by increasing capital requirements. Stronger market intermediaries are better able to absorb risks under stressed conditions, and reduce the risk of market disruptions. Policy reforms and changes in market practices following the crisis have also led to significant declines in leverage, as the largest banks have more than doubled their capital levels since 2009.

A second pillar of reform is more resilient funding structures. The largest financial institutions have more than doubled their holdings of high-quality liquid assets, increased their deposit base, and reduced their reliance on short-term funding by nearly half. Off-balance sheet funding vehicles have all but disappeared.

A third pillar in these efforts is building more fundamentally sound market structures. Financial reform required certain standardized derivatives to be centrally cleared and traded on transparent platforms, and all derivatives contracts to be reported to swap data repositories. According to CFTC Chairman Massad, 75 percent of interest rate swaps are now centrally cleared, compared to 15 percent in 2007. These reforms are enhancing resilience and transparency in one of the largest markets in the world, a market closely linked to other fixed income markets.

In the remainder of my testimony I will describe the changes underway in U.S. fixed income market structure, and the efforts by Treasury and other policy makers and market participants to respond to these changes.

Changes in Fixed Income Market Structure

The structure of fixed income markets is undergoing significant transition. This transition is driven by advances in technology, changes in business models and risk appetite, and much-needed regulatory reforms adopted in response to the crisis. Many of these changes are also contributing to a change in the way intermediaries match buyers and sellers in these markets. Shifts in the composition of asset owners are also playing an important role.

In a trend that pre-dates the crisis, technology is enabling the spread of electronic trading across fixed income markets. In markets for standardized, benchmark securities, algorithmic trading has become predominant. This transition began in the 1990s in equities, and then spread to futures and foreign exchange markets. Beginning just over a decade ago, the inter-dealer market for the most recently-issued Treasury securities—so-called "on-the-run" securities—began to transition toward algorithmic trading. Partly as a result of technology upgrades in recent years, algorithmic trading by principal trading firms (PTFs) now accounts for over half of trading volume in this market on most days, and up to 70 percent of volume during volatile trading.

In markets for securities with a greater degree of customization, like corporate bonds, algorithmic trading has not taken root, but more basic electronification has begun. In some cases, the old ways of doing business over the telephone—that is, customers requesting dealers to provide quotes—have simply migrated to the computer screen. There is also a small, but growing, portion of corporate bond trading happening on "all-to-all" venues—that is, trading directly between end investors without a dealer between them.

There is also a transition underway in how intermediaries match buyers and sellers. Fixed income securities markets have historically been a predominantly "principal-based" market. Intermediaries bought securities from investors looking to sell, and held them on their own balance sheet until a buyer could be found. The majority of fixed income securities markets remain principal-based, with dealers accounting for well over half of all volume in both Treasury and corporate bond markets. But "agency" intermediation, where intermediaries match buyers

and sellers for a commission, is increasingly prevalent in fixed income markets, especially markets for standardized, benchmark securities.

Changes in business models, competition from new entrants, and much-needed regulatory reforms adopted in response to the crisis have likely contributed to the shifts described above. Large banks and broker-dealers have significantly reduced their leverage, reined in their risk appetites, and sought more resilient sources of funding. Meanwhile, new entrants such as PTFs, previously active mostly in equities and futures markets, are increasingly competing with traditional dealers for market share in standardized products such as on-the-run Treasuries.

The composition of buyers and sellers is also changing. The growth of open-end mutual funds investing in corporate bonds has received significant attention—mutual funds now own over 20 percent, or over $2 trillion, of U.S. corporate bonds. There is concern that funds offering daily liquidity to investors but investing in less liquid assets may be forced sellers in a stressed environment, or may contribute to spillovers by selling more liquid assets to meet redemptions.

At the same time, large investors like pension funds, sovereign wealth funds, and insurance companies have continued to grow. These investors typically buy and hold large portfolios of bonds, as they seek to match their long-term liabilities with fixed income returns. In total, there are over $30 trillion of fixed income securities held by this diverse set of buyers, with differing investment objectives. These investors may ultimately be the buyers of last resort during periods of turbulence. Indeed, research shows that was likely the case during the 2013 "taper tantrum."

These shifts are all taking place against a backdrop in which the United States is transitioning to a path of normalization from nearly a decade of unprecedented monetary policy. Market participants have always expected this period of adjustment would be accompanied by turbulence as expectations for economic and financial conditions adjust. Indeed, volatility in Treasuries has typically preceded other recent rate hiking cycles.

In this regard, it is important to distinguish between re-pricing events, driven by fundamental factors, and breakdowns in market functioning that may be exacerbated by poor liquidity. As PIMCO noted in a recent op-ed, "[a]brupt changes in valuations are not necessarily liquidity events."

All of these shifts are changing the way buyers and sellers meet and transact in fixed income markets. The end-state for fixed income trading remains far from certain, but it is important to understand that economic and financial cycles, advances in technology, financial product innovations, and policy all play a role.

Policy Priorities to Build More Resilient Market Structures

At Treasury, we are engaged in several efforts to understand and respond to the changes underway in financial markets, and safeguard the resilience of the U.S. financial system. Most importantly, we are focused on completing and safeguarding financial reform. Nothing would do more to undermine the resilience of our markets than rolling back Wall Street Reform. The Administration is working with regulators to implement all remaining material elements of

Dodd-Frank by the end of the year. Internationally, Treasury is working to ensure other countries follow through on their commitments as well, to reduce risks that may emanate from abroad.

We are also working to address potential vulnerabilities in financial market structure. Most notably, Treasury is engaged, together with the Fed, Federal Reserve Bank of New York, CFTC and SEC, in the most comprehensive review of the Treasury market since 1998. As part of this review, in January Treasury issued a Request for Information (RFI) on the evolution of Treasury market structure seeking feedback on a series of detailed questions across four areas:

- The evolution of the Treasury market;
- Risk management practices and market conduct across the Treasury market;
- The types of data that should be made available to the official sector regarding Treasury cash market activity, and numerous practical considerations associated with gathering that data; and
- Potential additional reporting of Treasury market transactions to the public.

The comment deadline is April 22, and we look forward to reviewing all responses, and would be happy to report back to these Subcommittees with key findings.

At this point, the most immediate conclusion from our work is that the official sector needs access to more data, on a more timely basis, with more effective data sharing mechanisms. The RFI seeks comment on the most effective and efficient way to achieve these objectives, and by the end of the year we expect to have in place a comprehensive plan for reporting of transactions in the Treasury cash market to the official sector.

Separately, the Financial Stability Oversight Council, or FSOC, is closely examining potential vulnerabilities related to changes in market structure, which it highlighted in its most recent annual report. FSOC is analyzing potential risks along three dimensions, which dovetail with the themes identified in the Joint Staff Report on October 15th:

- First, risks related to operational resiliency and preparedness arising from the increase in electronification across several markets;
- Second, the need to coordinate, to the extent possible, prudential and supervisory standards across different venues for products that share similar risk characteristics; and
- Third, to look at ways to improve data collection and sharing in certain markets.

FSOC is also analyzing risks associated with asset management activities, including potential risks arising from mutual funds offering daily liquidity to investors while investing in less liquid underlying assets, particularly fixed income assets. Policy makers and market participants have increased their focus on these potential risks as the proportion of corporate bonds owned by mutual funds has more than doubled over the past several years.

A recent example of the potential risks associated with that liquidity mismatch occurred in December, when the Third Avenue Focused Credit Fund suspended redemptions because it could not sell assets quickly enough to meet large redemption requests. Third Avenue's actions

came in the midst of overall stress in the broader high-yield market, contributing to pressure that led investors to pull nearly $10 billion—four percent of assets under management—from high-yield funds during a three-week period in December.

FSOC is analyzing these and other risks related to asset management products and activities, and will be providing an update on its work this spring. The SEC has pending proposals in this area, and additional proposals are expected, including standards for stress testing by asset managers.

Finally, I should note the efforts by market regulators, the CFTC and SEC, to address risks related to evolving technology and market structures in their respective markets. Most recently, the CFTC proposed Reg AT to impose risk controls, transparency measures, and other safeguards to enhance the regulatory regime for algorithmic trading in futures. In addition, the SEC proposed rules related to alternative trading platforms in the equities market, and asked a series of questions related to the operation and regulation of similar platforms in fixed income markets. Treasury will continue to engage with both regulators in areas of common interest.

Conclusion

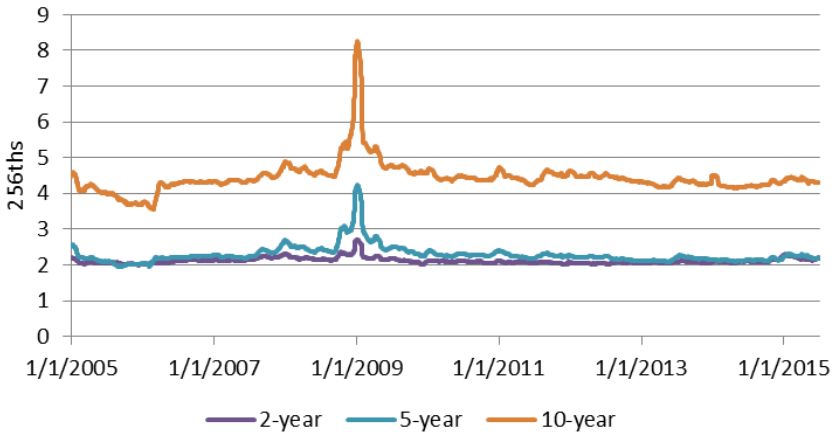
In the years since the crisis, primary market issuance has been robust, helping to support the economic recovery in the United States. But the structure of fixed income markets is undergoing a period of major transition, and the nature of liquidity provision in these markets is changing in parallel. Technology, changing risk appetites and business models, and policy changes are all contributing. One would expect the public and private sectors to make significant changes following the second largest financial crisis in 100 years.

The past nine months have seen a period of heightened volatility in financial markets, and the U.S. financial system demonstrated resilience. Financial reform has strengthened the core of our financial system, increasing confidence in volatile times. But inevitably the tests will become more difficult, and neither market participants nor policy makers can afford to become complacent.

In fixed income markets, it's clear we haven't reached an end state. At Treasury, we are in the midst of the first comprehensive review of the Treasury market in nearly two decades, and working with regulators to collect and share information more effectively. We are also working with FSOC member agencies to identify and address potential risks to financial stability arising from changing market structures and shifts in the composition of market participants. Internationally, we are working with our counterparts to analyze and monitor market liquidity trends in overseas markets. There is much left to do. But the progress made since the crisis is real, and the financial system is more resilient as a result. These efforts ultimately provide the foundation for deep, liquid, and resilient capital markets, and will provide ballast when the next period of market turbulence strikes.

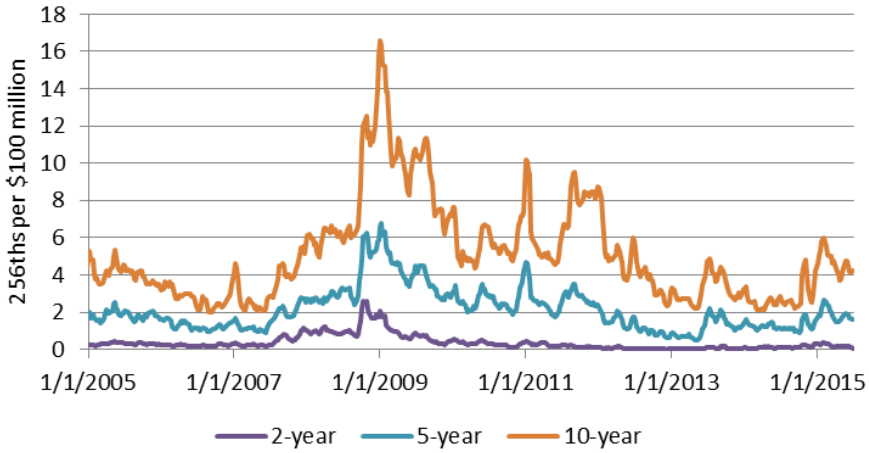
Appendix 1: Charts

Chart A: Treasury Market Bid/Ask Spread



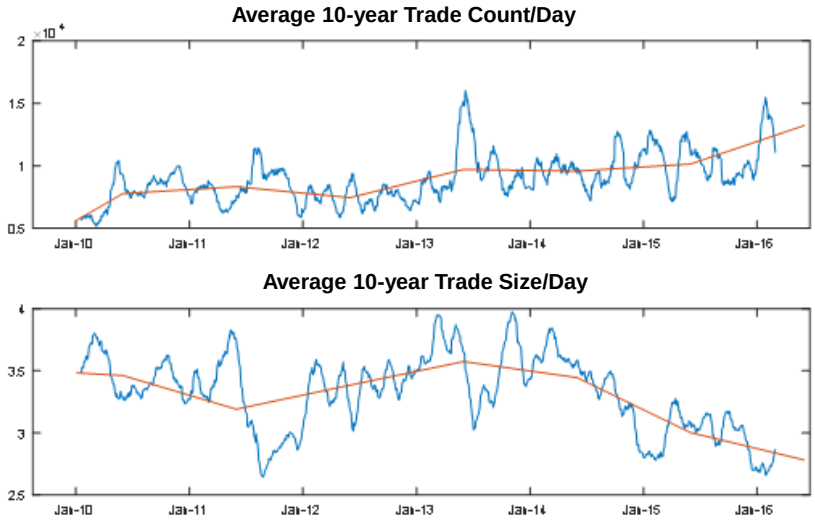
Source: Federal Reserve Bank of New York

Chart B: Price Impact of Treasury Trades



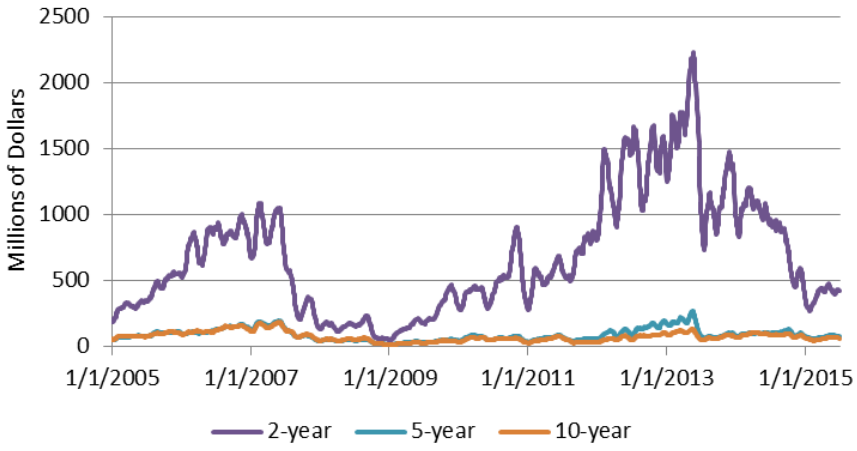
Source: Federal Reserve Bank of New York

Chart C: Treasury Trade Count and Trade Size



Source: Treasury, ICAP

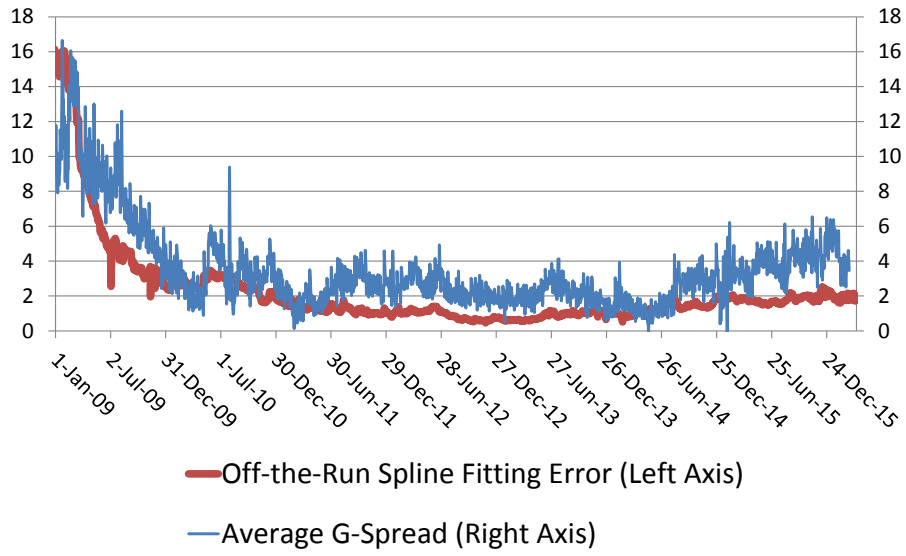
Chart D: Treasury Market Depth



Note: Top three bids and the top three offers in ICAP's Central Limit Order Book for Treasury securities.

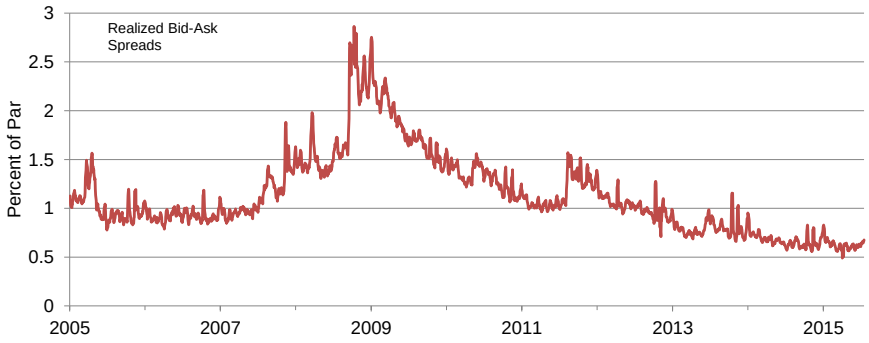
Source: Federal Reserve Bank of New York

Chart E: Treasury Off-the-Run Liquidity



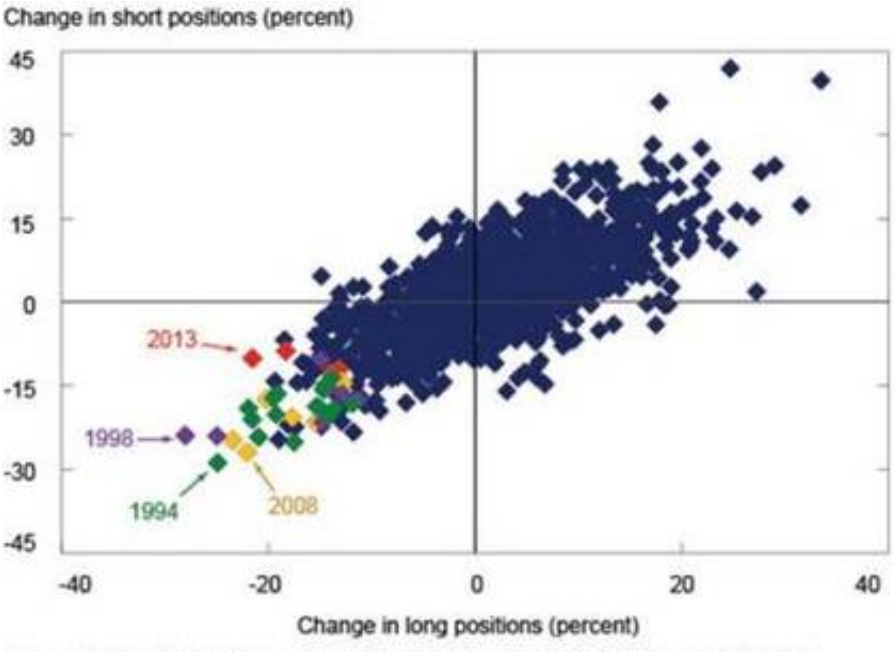
Source: Treasury

Chart F: Corporate Bid/Ask Spread



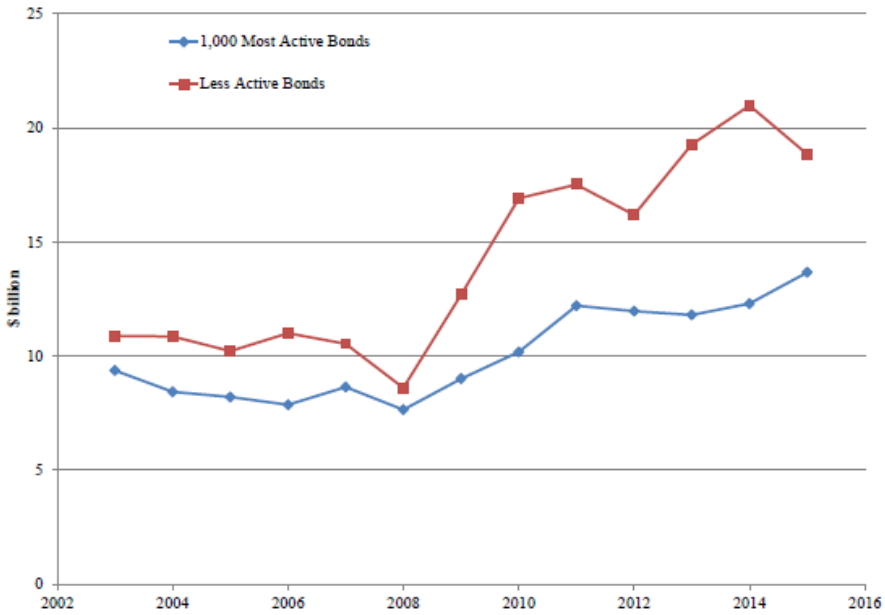
Source: Federal Reserve Bank of New York, FINRA

Chart G: Dealer Positions during Financial Stress



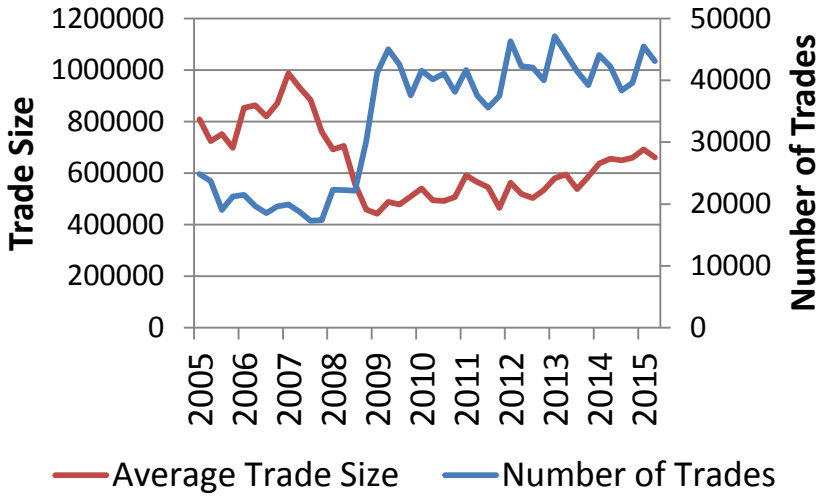
Source: Federal Reserve Bank of New York

Chart H: Daily Average Corporate Trading Volume



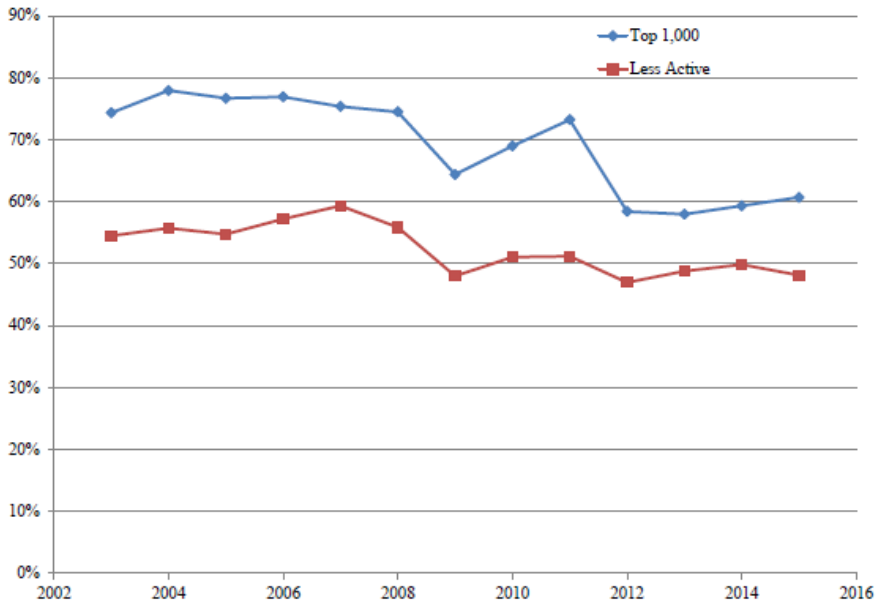
Source: Federal Reserve Bank of New York, FINRA

Chart I: Average Corporate Trade Size



Source: Federal Reserve Bank of New York, FINRA

Chart J: Proportion of Volume in Corporate Block Trades



Source: Federal Reserve Bank of New York, FINRA