Economic Analysis

Heightened Bond Liquidity Risk is the New Normal

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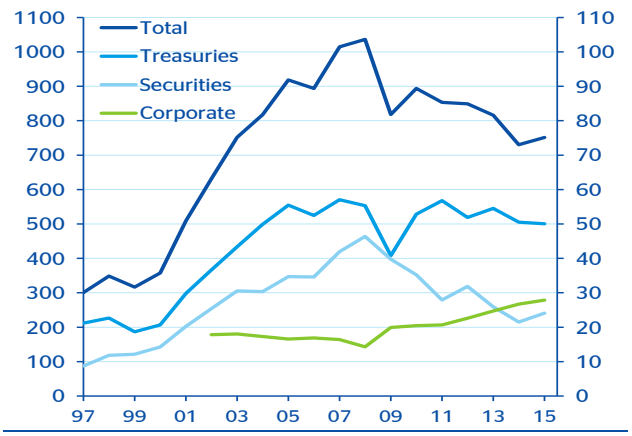
- **Regulations and high frequency trading are the culprits of new liquidity dynamics**
- **Banks' role as market-makers is challenged by buy-side investors**
- **Fed normalization will ease but not eliminate existing limitations on liquidity**
- **E-trading distorts reliability of common liquidity measures**

The signs of weakened liquidity are evident across fixed income markets. Caused by supply and demand imbalances, the most visible changes of the post-recession liquidity conditions are buy-side dominance in price setting, increased transactions costs, and smaller trade sizes. The diverse trading profiles across different bond market instruments have also resulted in liquidity bifurcation, with liquidity increasing in the most liquid instruments and deteriorating in the less liquid ones. However, even in the deepest government bond market, the U.S. Treasury market, the frequency of market depth deterioration incidents and stress on transaction costs has increased. Overall, the erosion of liquidity is more of a concern in the secondary markets than in the primary markets, where an increase in bond issuance has masked some of the problems.

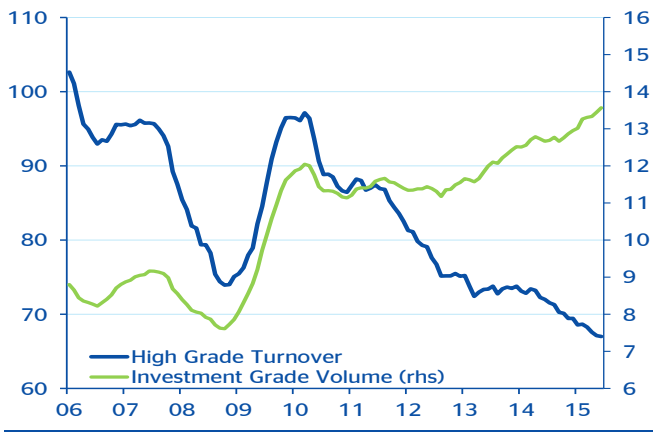
Post-crisis regulatory oversight and technological advancements in trading platforms are two structural factors that have had a crucial effect on market dynamics. The new regulatory environment has affected equally both high liquidity and low liquidity markets. Surveys indicate that a majority of corporate bond investors expect liquidity deterioration to continue due to the phased-in implementation of post-crisis regulations.[1] At the same time, electronic trading took off in the high liquid instruments prior to the recession but is still lagging in lower-liquidity corporate bonds market. Cyclical economic factors such as the low interest rate environment and unconventional monetary policies are only minor temporary contributors to the new bond liquidity dynamics. Thus, the Fed's policy normalization will not reduce the magnitude of existing issues.

Chart 1
U.S. Bond Market Trading Volume (Avr. Daily, Bn $)



Source: SIFMA, BBVA Research

Chart 2
Corporate Bond Market (%, Avg. Mil $)



Source: TRACE, MarketAxess & BBVA Research

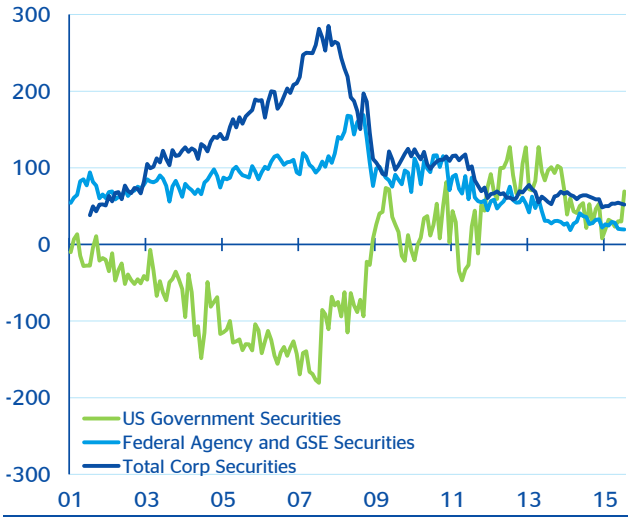
[1] Source McKinsey & Company and Greenwich Associates (2013)

New Regulatory Environment

Regulatory reforms have resulted in a change in the market structure of how bonds are traded and in the reinvention of business models for large investment firms who are in search of liquidity. The new regulatory environment has made it costly for banks as market-makers to provide "immediacy services" and to facilitate exchange between investment firms and inter-dealers. The banks have decreased their inventory holdings as the corporate bonds have to be supported by high levels of capital, and the assets held for trading are more costly on Fed Stress tests. Additionally, the Volker rule has made it harder for banks to redistribute risky positions.[2] It is estimated that wholesale banking balances sheets that support traded markets have contracted by 20% since 2010, and are expected to shrink by another 10% to 15% over the next two years due to tighter regulatory requirements.[3]

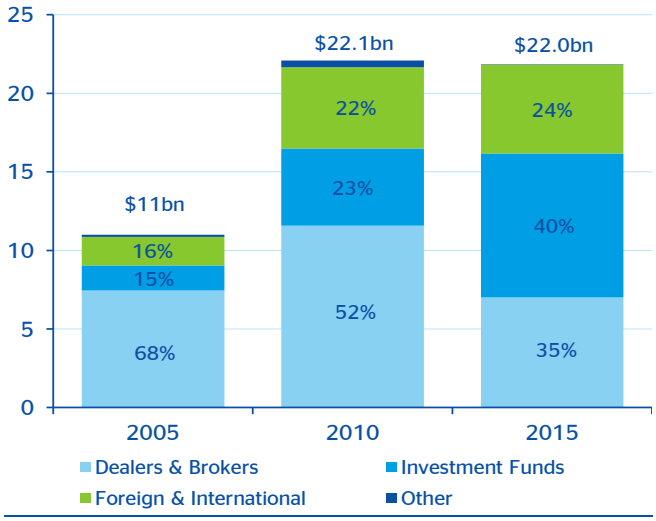
The retrenchment of banks from fixed-income trading has transferred both buy-side power and liquidity risks to large investors. To find alternative sources of liquidity, some of the large asset management groups have led the pack to initiate trades directly with inter-dealer brokers.[4] The result is a growing power of the buy-side investors who control large portions of new bond deals and account for a larger share of fixed-income trading. The dominance of buy-side investors has expanded further with the decline in the share of corporate bonds held by broker-dealers who have cut their net inventories in response to rising capital requirements. The U.S. Department of Treasury estimated that a 10 basis point increase in the leverage ratio can be offset by raising $2.5bn in capital or by reducing assets by $50bn. Bank for International Settlements (BIS) reports that U.S. broker-dealers have seen their holdings as a share of the total bond market decline from 3.6% to 1.2%.

Chart 3
Primary Dealers Positions (EOP, Mil $)



Source: FRB & BBVA Research

Chart 4
Auction Allotments for 10-Year Treasury Note (%, Bn $)



Source: FRB & BBVA Research

[2] The Volker Rule, part of the Dodd-Frank Wall Street Reform and Consumer Protection Act, is aimed at restricting U.S. banks from engaging in proprietary trading that does not benefit their customers. It is a structural reform that adds compliance costs. The market participants' survey has assessed the Volker Rule to have "adverse impact on desks where banks see risks of failing to prove near-term client demand for market-making activities." Source Committee on the Global Financial System (CGFS, 2014)

[3] Source Morgan Stanley and Oliver Wyman (2015)

[4] Source U.S. Department of Treasury (2013)

Regulations and Monetary Policy

Regulations coupled with monetary policy have had a two-fold effect on the Treasury market liquidity. Regulations, such as Basel risk weightings, swaps clearing, and Liquidity Coverage Ratio (LCR) requirements, have created multiple constraints that have mostly moved liquidity away from risky assets and towards Treasury securities.[5] At the same time, unconventional monetary policy has resulted in suppressed risk premium across markets and, together with risky assets, has also increased demand for fixed income assets. Overall, the change in liquidity demand composition is comprised of an increase in the Treasury debt ownership by foreign investors and an increase in the concentration of holdings among money managers. Treasury ownership by foreign investors, including foreign central banks and sovereign wealth funds, increased from 35% in 2001 to 48% in 1Q15. This shift to foreign ownership likely reduced market-making services due to longer horizon investment needs with buy-and-hold positions. Furthermore, the large scale asset purchase programs have been shown to reduce liquidity premiums in the Treasury market. However, the reduction lasted only for the duration of the purchase programs.

Penetration of Electronic Trading

The penetration of technology in trading greatly diverges across different markets. The level of electronic penetration by volume within high-liquidity instruments like Treasury futures and cash equities is 90% and 70-80% respectively. It is around 30% in U.S. Treasuries and short-term interest rate trading, and only 10% and 15-20% in high yield corporate bonds and investment grade corporate bonds respectively.[6]

The corporate bond market is less liquid than the equities and Treasuries markets because of its much different trading profile and thus it has a much smaller share of electronic trading. The obstacles to e-trading in the corporate bond market are high heterogeneity of liquidity among corporate bond instruments, in frequent trading throughout the day, and much larger trade sizes. There are thousands of corporate bond issues that rarely or never trade, while a group of the U.S.'s most liquid investment grade and high yield bonds' have a trading frequency per day of around 45-times and 58-times less than that of U.S. stocks respectively.[7] Additionally, corporate bond trade sizes, while slowly declining, have a higher inherent cost which makes them harder to break-down into smaller trades.

For a further increase in the share of e-trading in lower liquidity markets, trade sizes will need to be smaller. As a result, studies find that there is a scarcity of desktop "real estate" on the buy side of lower liquidity fixed income markets and conclude that "the winning e-market models will accommodate only a few centralized platforms as a proliferation of platforms would likely result in harmful liquidity fragmentation."[8]

The growing role of electronic trading, in particular high-frequency trading (HFT), stands out as the driving force behind the change in liquidity supply composition and heightened volatility in the Treasury market. It has resulted in an increase of Principal Trading Firms (PTFs), which deploy proprietary automated trading strategies,

[5] Basel III is designed by the Basel Committee on Banking and Supervision (an addition to the Basel I and Basel II documents) to enhance the resilience of the banking sector by strengthening bank capital requirements - increasing bank liquidity and decreasing bank leverage. The key Basel III reform is an implementation of LCR which ensures that banks have an adequate stock of high-quality liquid assets (HQLA) that can be quickly liquidated to meet liquidity needs over a short period of time. The market participants' survey has indicated that these liquidity constraints cause "reallocation of inventory in favor of eligible HQLA at the expense of non-eligible assets." Source Committee on the Global Financial System (CGFS, 2014)

[6] Source McKinsey & Company and Greenwich Associates, *op. cit.*

[7] *Ibidem*

[8] *Ibidem*

accounting for the majority of trading and providing the vast majority of market depth. Bank-dealer activity in the inter-dealer market is less than 50% of trading and quoting activity. This decline in the bank-dealer activity in the Treasury market has been prompted by increasing costs and competitive pressures in the market. Specifically, there has been competition from HFT firms who are known to lead to a progressive shift in the composition of market participants away from traditional-manual or slower automated traders towards HFTs. Altogether, similar to the corporate bonds markets, trading volume in Treasury markets is concentrated among the top 10 trading firms for both PTFs and bank-dealers.[9]

The increasing share of automated trading in Treasury markets has significantly changed the trade sizes. Trade size in the Treasury markets has persistently declined since 2007 both in the futures and cash market, with a more drastic change in the futures market. E-trading has also led to distortions in the accurate depiction of liquidity measured by the commonly used statistics of market volume, bid-ask spread, and trade size. Additionally, the assessment of market liquidity has become more complicated due to both an increased occurrence of dark pools, proprietary trading sites housed inside broker-dealers, and a higher incidence of "self-trading," both of which have the potential to disturb price discovery in the market.

Table 1
Firm Concentration in 10-Year Treasury (control days)

	Futures		Cash	
	Bank/Dealer	PTF	Bank/Dealer	PTF
Number of Participants	21	65	45	40
Top 10 Volume Share	91%	86%	77%	93%

Source: Joint Report[10] & BBVA Research

Risks of New Market-Dynamics

The recent survey indicates that many market participants find it more and more difficult to trade large amounts of corporate bonds and that they have to change both the way they trade as well as their portfolio allocations.[11] Investors are trading less of their portfolio than normal, feeding trades into the market more slowly and in smaller sizes to deal with the heightened liquidity risk, and have become more active in buying companies' newly issued bonds, which are easier to get hold of in large amounts than bonds trading in illiquid secondary markets.

The sell-side is concerned with: 1) the market exits by some bulge bracket dealers which have further reduced balance sheet capacity and competition; 2) a decline in the appetite of bulge-bracket dealers to facilitate trading – primarily as a function of the rising price of risk weighted assets; 3) the increasing difficultly to get quotes on block trades, which forces the seller to break their blocks into smaller trades and trade electronically where possible; and 4) a drop-off in proprietary trading, which has hurt liquidity in "off the run" issues.

The major buy-side concern is the increasing share of investors who are adopting a buy-and-hold stance. At the same time, investor strategies are converging as other strategies exit the market. As a result, during the fixed income markets' sell-off episodes, investors move in lockstep and create a liquidity-challenged one-way market in which it is hard to find sellers.

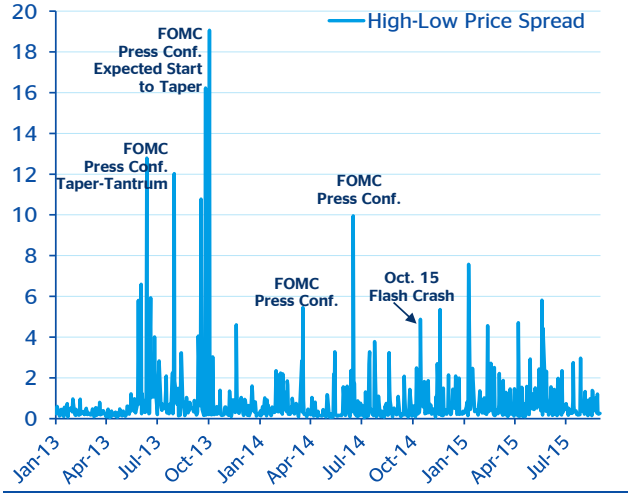
[9] U.S. Department of the Treasury, et al. (2015)
[10] *Ibidem*
[11] Source McKinsey & Company and Greenwich Associates, *op. cit.*

These market dynamics changes once again result in shifting of liquidity risks to fixed-income investors, and market dependence on the portfolio allocation decisions of only a few large institutions. The increased ownership concentration within the money management industry leads to more concentrated demand for liquidity and to portfolio allocation that is dependent on the portfolio allocation decisions of a small number of large financial institutions. A recent BIS report[12] warns that large financial institutions may be poorly prepared for big market swings in the absence of robust market-making by the banks.

Treasury market dynamics are not much different from that of the rest of the fixed income markets. A shortage of liquidity at the time of stress in the Treasuries markets also arises from an imbalance between the volume of buyer-initiated trades and the volume of seller-initiated trades, where a comparatively lower volume of seller-initiated trades causes strains on market depth. At the same time, the sellers' withdrawal from the market, which leads to deterioration of market depth, is more likely to occur during periods of low or negative term premium when the dealers' risk appetite has shrunk. For example, a Fed study concludes that the May-July 2013 "taper-tantrum" episode of increased yields was likely caused by a broad re-pricing of duration risk.[13] Overall, Treasury market volatility spikes and market depth disappears immediately before significant economic announcements, while both trading frequency and volatility jump immediately after announcements with a surge in price uncertainty. In most cases, the time required to process incoming orders – latency - increases prior to the period of increased volatility and price uncertainty.

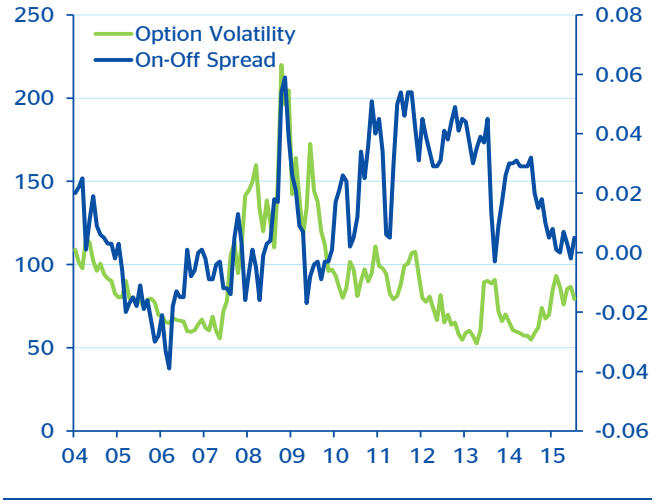
The liquidity providers in the Treasury market do monitor the market closely on the flight days and do not passively supply liquidity. It is documented that on the flight to safety days, when liquidity is needed in the Treasury market, and when there is a high level of trading activity and elevated price uncertainty, the liquidity supply is substantially lower. As a result, spikes in Treasury market volatility and market depth deterioration with no apparent significant announcements - "flash crashes" - coincide with times when investors are particularly sensitive to global economic conditions and to news that support a negative global growth outlook.

Chart 5
10-Year Treasury Note Futures Volatility Index ($)



Source: CBOE & BBVA Research

Chart 6
Option Volatility Index and 10-Year Treasury Note On/Off the Run Yield (1M Avg. bps, %)



Source: BofA Merrill Lynch, Fed & BBVA Research

[12] Fender, Ingo and Lewrick, Ulf (2015)
[13] Adrian et al. (2013)

Changes in Treasury market dynamics have led to more persistent changes in market depth and volatility during periods of stress. The main risks arise from the "liquidity-volatility feedback loop" when shocks to liquidity and volatility feed on each other and intensify a negative market shock despite whether the shock originated from the liquidity side or the volatility side. The risks are intensified as the presence of PTFs, and specifically HFT firms, increases in the Treasury market. These risks are related to HFT firms using automated trading strategies that can potentially decrease latency by overloading exchanges with trade-messaging activity, distorting price discovery by positioning themselves in front of incoming order flow, and withdrawing their participation when liquidity is needed the most.

Policy Implications

Market participants in the less-liquid fixed income markets find the new regulatory environment as the main driver of the sharp decline in liquidity. At the same time, the possibility of a global financial impact caused by widespread redemptions has policy makers' attention focused on investors who are powerful buy-side traders. Thus large investors are likely to face greater regulatory scrutiny where asset managers will have to shoulder more regulatory burden.

Regulators have also recently been alarmed by unusually sharp price swings in the Treasury market. The recent joint study issued by the Department of Treasury, the Fed and others has addressed the "flash crash" of 2014 - the episode of Treasury market depth deterioration on October 15th 2014.[14] The study recommends considering the introduction of regulatory requirements that would be applicable to modern-day high-speed automated trading. The recommendations are comprised of 1) a review of current regulatory requirements applicable to the government securities market and its participants; 2) registration requirements for firms conducting certain types of automated trading in the Treasury markets and for government securities trading venues; 3) market conduct oversight for voice and automated trading in cash and futures markets; and 4) continuous review of policies and risk management practices at Treasury trading venues to assess risks posed to trading, risk transfer, and price discovery as well as clearing and settlement risks associated with the increased speed of automation.

Fed Governor Powell in his recent speech has also referred to a number of studies that suggested reforms in the Treasury markets that would lead to greater liquidity. While not taking sides on any particular reform, the Governor called on market participants and regulators "to collectively consider whether current market structures can be improved for the benefit of all."

> *"And one can certainly question how socially useful it is to build optic fiber or microwave networks just to trade at microseconds or nanoseconds rather than milliseconds. The cost of these technologies, among other factors, may also be driving greater concentration in markets, which could threaten their resilience. The type of internalization now done by dealers is only really profitable if done on a large scale, and that too has led to greater market concentration."*
>
> *Governor Jerome H. Powell, August 3, 2015*

[14] U.S. Department of the Treasury, et al. (2015)

Bottom Line

The post-great-recession risk perception by traders, new and tighter regulations, and the rise of high-speed electronic trading are the main structural changes that have transformed the dynamics of fixed income markets' liquidity. While a tight regulatory environment is the main driving force behind new market dynamics in lower-liquidity instruments in the bond market, the dominance of HFT firms is believed to drive Treasury markets' frequent depth deterioration incidents. Both technology and regulations have led to large buy-side investor firms' dominance in the bond markets and to relocation of liquidity risk from market-makers to buy-side investors. The restrained liquidity in the corporate bond market has also resulted in business model adjustments by the large asset management groups' that are bypassing banks and initiating trades directly with inter-dealer brokers.

The reshuffling of liquidity risk from banks to large investors has, as intended, lowered the systemic risk of regulated financial institutions. At the same time, it also increased volatility and the frequency of flash-crash episodes in the market. Thus, it is likely that the focus of future regulatory action will shift towards regulation of funds and asset managers. Policy makers are also in search of modified trade models that will improve pricing and liquidity conditions and/or provide additional liquidity during times of stress. The introduction of new regulatory requirements for high-speed automated trading is also on the radar. Overall, the Fed's gradual increase in the fed funds rate will not significantly affect bond liquidity. However, the new liquidity dynamics will prompt massive sell-off episodes such as the "taper-tantrum," at times when market expectations are misaligned with Fed announcements.

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