



Liquidity levels and liquidity risk

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■ There have been a number of structural changes to market liquidity provision since the financial crisis. These include the scaling down of market-making activities by traditional liquidity providers, the increasing importance of the mutual fund industry and the arrival of new actors which may have a significant impact on market liquidity.

■ Recent evidence suggests that overall levels of market liquidity remain high, with only a few market segments showing signs of worsening liquidity.

■ At the same time, some of the structural changes observed in recent years may have increased liquidity risk. In particular, the October issue of the International Monetary Fund's Global Financial Stability Report (GFSR) finds that the resilience of market liquidity, i.e., the speed at which market liquidity recovers after a bad shock, may have declined significantly. On the other hand recent research by the Federal Reserve Bank of New York looking at alternative measures of liquidity risk, finds no evidence of an increase in risk.

■ A potential decline in the resilience of market liquidity is a concern at a time when the first interest rate hike by the Federal Reserve is approaching. Indeed it provides a channel through which a rise in U.S. interest rates, while largely anticipated, may still be accompanied by significant market disruptions when it actually occurs.

A number of structural changes are likely to have affected liquidity provision in key markets. Two distinct questions around these changes are whether they have affected the level of liquidity provision in certain markets and whether they have affected liquidity risk. While most recent studies find that liquidity levels remain high when compared to the levels attained before the crisis, there seems to be more disagreement about changes to liquidity risk. The International Monetary Fund has recently emphasized the notion that liquidity resilience, i.e., the speed at which market liquidity recovers after a bad shock, may have declined significantly due to structural changes. Such a decrease in liquidity resilience may pose a significant threat in an environment

■ U.S. primary dealer net bond inventories

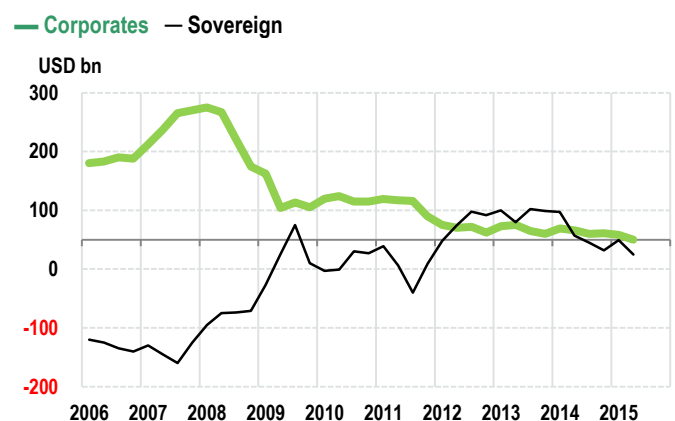


Chart 1

Source: BIS Annual Report 2015

■ Average transaction size of U.S. investment grade corporate bonds

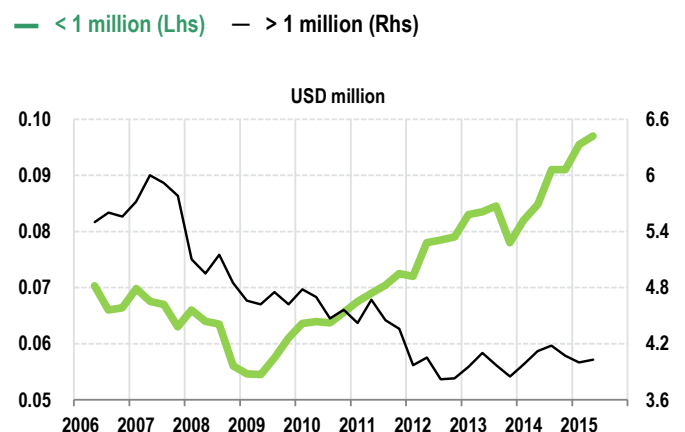


Chart 2

Source: BIS Annual Report 2015

where the first rate hiking cycle since 2004 by the Federal Reserve is approaching. In contrast, recent work by economists at the Federal Reserve Bank of New York, looking at alternative measures of liquidity risk, finds no evidence of an increase in risk. How should we interpret these alternative findings?



Liquidity provision: structural changes

There have been several structural changes to liquidity provision in markets since the financial crisis. First among these is the scaling down of market-making activities by traditional liquidity providers like broker-dealers in response to regulatory changes. Results from a 2014 survey conducted by the Committee on the Global Financial System suggested that globally active banks have been scaling down proprietary trading and market-making activities in the bond markets. Direct evidence from dealers' corporate bond holdings in the United States is consistent with these survey results.

As illustrated in Chart 1, which is provided by the Bank for International Settlements, these holdings have fallen dramatically since the crisis¹. Given that the total volume of corporate bonds has almost doubled since 2005, dealers' inventories today represent a much smaller fraction of the total corporate bond supply in the United States than they did before the crisis. It is also the case that trading volume has risen less rapidly than issuance of corporate bonds. This could be due to the low interest rate environment and the associated search for yield. In any case, turnover in the corporate bond market has fallen. Finally, average trade size has declined

Growth in bond funds

Assets under management of bond funds worldwide (\$bn)

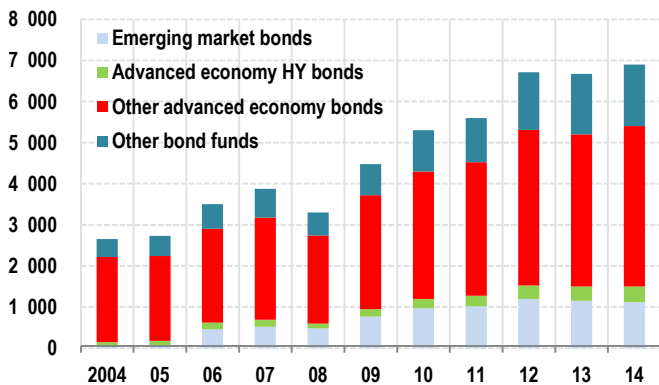


Chart 3

Source: IMF GFSR, April 2015

since the crisis for relatively large trades, as illustrated for instance in Chart 2 from the Bank for International Settlements.

While the evidence suggests that traditional liquidity providers have retreated somewhat, other actors have increased their presence. In some markets, notably the U.S. equity and Treasury markets, liquidity is increasingly provided by non-dealer entities, like hedge funds, often dealing at high frequencies. This development seems to have increased the level of liquidity in these markets but at the same time, it may have increased liquidity risk (more on this below).

¹ Net positions can be negative since dealers may short bonds, in particular to hedge their global interest rate risk. In absolute terms, net positions have fallen sharply since 2007.

The importance of mutual fund ownership

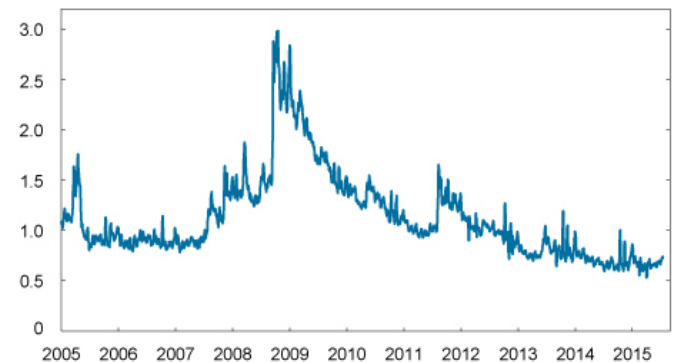
A second key structural change is the increasing importance of mutual funds. Looking more specifically at the bond markets, Chart 3 from the April 2015 issue of the International Monetary Fund's Global Financial Stability Report shows that the assets under management of bond funds worldwide have more than doubled since 2004. On a relative basis, the growth in emerging-market and high-yield bond funds has been particularly strong. There is also evidence that assets have become somewhat more concentrated among the largest actors.

Liquidity levels remain high

In spite of these structural changes, standard measures suggest that liquidity levels remain high in most markets. For instance, recent evidence by researchers at the Federal Reserve Bank of New York indicates that bid-ask spreads of corporate bonds are now lower than they were before the crisis (Chart 4). The same researchers also find that price impact, i.e., the impact that a trade has on the market price, is lower than in the pre-crisis period (Chart 5).

Decline in bid-ask spreads

Percent of par



Note: The chart shows the five-day moving average of effective bid-ask spreads. The spreads are computed daily for each investment-grade bond as the difference between the average dealer-to-client buy price and the average dealer-to-client sell price, and then averaged across bonds.

Chart 4

Source: Liberty Street Economics, based on TRACE data from the Financial Industry Regulatory Authority

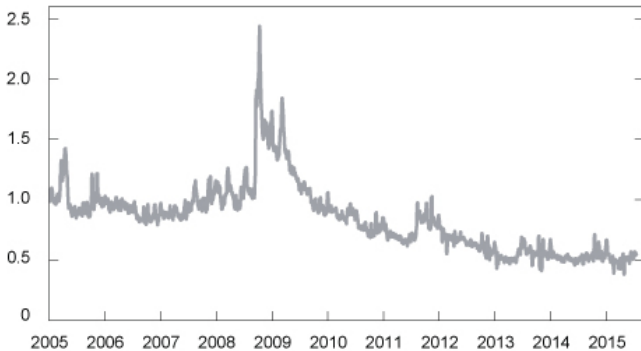
In the same vein, the October 2015 issue of the International Monetary Fund's Global Financial Stability Report finds that various measures indicate that market liquidity generally remains high. For instance, imputed round-trip costs in most bond markets around the world are below their 2007 levels.

Has liquidity risk increased?

The bigger concern therefore lies not with the overall level of liquidity but rather with liquidity risk. There are different ways of measuring liquidity risk and they do not all lead to the same conclusions.

■ Decline in price impact

Percent of par per 100 million U.S. dollars



Note: The chart shows the five-day moving average of price impact. Price impact is calculated daily for each investment-grade bond as the absolute price return divided by dollar volume, and then averaged across securities.

Chart 5 Source: Liberty Street Economics, based on TRACE data from the Financial Industry Regulatory Authority

Changes in the resilience of liquidity

The International Monetary Fund has been emphasizing the concept of resilience, i.e., the speed at which market liquidity is likely to recover following a bad shock. One might expect that the structural changes discussed previously may have had a negative impact on the resilience of liquidity.

For instance, it seems plausible that the number of market makers and the size of the inventories they can hold are likely to have a direct impact on the resilience of market liquidity. The October 2015 issue of the International Monetary Fund's Global Financial Stability Report presents empirical evidence related to the "taper tantrum" episode of 2013 which is consistent with this view. In particular, the analysis shows that, after controlling for other factors, corporate bonds covered by a smaller number of market makers were subject to significantly larger declines in liquidity during the taper tantrum.

The report also presents evidence that during the taper tantrum, resilience was greater among larger issues, everything else being held constant. Thus a second factor which is likely to have decreased the resilience of liquidity globally is the increase in smaller and riskier bond issuances.

Finally the increasing importance of mutual fund holdings may have had an effect on the resilience of liquidity. Hence the evidence in the April issue of the Global Financial Stability Report already indicated that mutual fund bond ownership concentration has increased somewhat since the financial crisis and that bonds with higher mutual fund concentration experienced larger increases in their credit spreads during periods of market stress in 2008 and 2013.

The October issue of the Global Financial Stability Report presents direct evidence of the effect of mutual fund holdings on the resilience of market liquidity. As illustrated in Chart 6 from the report, larger mutual fund holdings are associated with larger changes in round-trip costs during periods of stress (the financial crisis and the taper tantrum). The effect appears to be stronger for open-end mutual funds than for closed-end funds. The effect is not statistically significant for holdings by insurance companies.

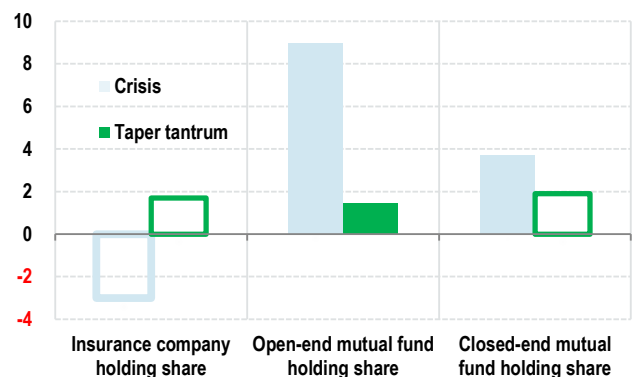
The report also finds that during these periods of stress, liquidity declines are larger for bonds with a concentrated ownership by institutional investors.

The report further presents direct estimates of the resilience of liquidity for investment-grade and high-yield U.S. corporate bonds. In this approach, the speed at which liquidity recovers following a shock is estimated using a regression framework. Some of the key results are summarized in Chart 7.

While the resilience of investment-grade bonds has recovered since the crisis, the resilience of high-yield bonds is still below pre-crisis levels and has actually fallen over the most recent period, in contrast to investment-grade bonds.

■ Ownership and market liquidity

Percent change in imputed round-trip cost



Note: The chart shows the estimated impact of ownership on imputed round-trip costs for corporate bonds traded in the United States. A positive value signifies a decline in liquidity. For instance, when bonds were more heavily held by mutual funds during these two crisis episodes, liquidity of these bonds tended to decline more during the event. Solid columns mean statistical significance at least at the 10 percent level.

Chart 6

Source: IMF GFSR, October 2015

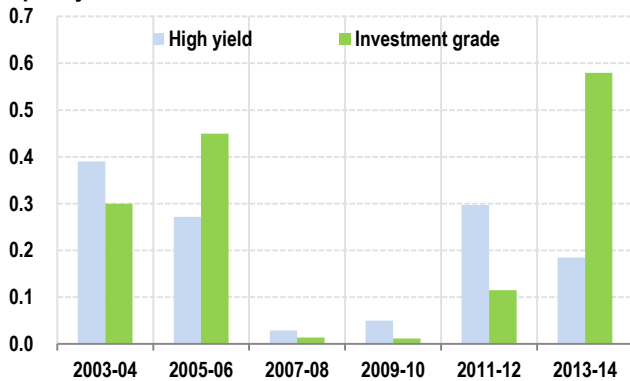
Other measures of liquidity risk

Researchers at the Federal Reserve Bank of New York have recently discussed alternative measures of liquidity risk on their *Liberty Street Economics* blog. They have focused in particular on two measures capturing the frequency of large day-to-day increases in illiquidity and price volatility where the size of the increases is defined relative to recent liquidity and volatility changes. They find that these risk measures have increased for the U.S. equity and Treasury markets but



Short-term resilience of liquidity

Liquidity mean reversion coefficient



Note: The figure shows the coefficients of mean reversion of a measure of market liquidity – imputed round-trip costs – for corporate bonds by credit rating. This is a measure of how quickly the round trip costs converge to the pre-shock level after a market shock has occurred.

Chart 7 Source: IMF GFSR, October 2015

surprisingly, that they have decreased for the U.S. corporate bond market.

They suggest an explanation along the following lines. Electronic trading and trading at high frequencies are much more prevalent in equity and Treasury markets than in corporate bond markets. Competition from hedge funds and principal trading firms may have increased short-term liquidity in these markets while at the same time increasing the risk of sudden withdrawals in liquidity. Liquidity provision in the corporate bond market on the other hand remains largely confined to traditional dealers, possibly implying lower liquidity in the short-term but also lower liquidity risk.

Related to this, the New York Fed researchers are also skeptical of the idea that the relative increase in the proportion of corporate bond holdings by mutual funds and the corresponding decrease in holdings by dealers could pose a significant “redemption risk” in times of stress. Their argument is based on regression results that show that net bond mutual fund flows are positively correlated with changes in dealer corporate bond positions. In other words, their regression results suggest that dealers are not contrarian: for instance they would tend to be net sellers of corporate bonds during the same time periods when mutual funds are net sellers. This leads the authors to conclude that there would be no reason to believe that a reduction in the ownership share of dealers would increase volatility in times of stress (e.g. in the case of large-scale redemptions by fund investors).

However this surprising result raises a number of questions. Of course all the usual disclaimers about regression results apply. In particular, the regression sample covers the period 2007-2014, characterized by exceptionally low interest rates and exceptionally high levels of monetary liquidity. Could the relationship have changed since the crisis? In particular, was the regression coefficient positive in the pre-crisis period? If not, this would be particularly alarming. Second, is omitted variable bias an issue? At a fundamental level the results beg the question of who buys when mutual funds sell if it is not

traditional dealers. What do we know about these other investors? In particular how much capacity for liquidity provision do they have and how are they likely to react in the face of a significant shock?

Another recent line of research by staff at the Bank of England (Baranova, Chen and Vause) includes holdings by other investors and comes to rather different conclusions. It should be noted from the outset however that the results are not directly comparable to the ones discussed in the previous paragraphs since they use a structural vector auto-regression approach which restricts the sign of the relationship between asset manager demand and dealer holdings to be negative. Still, comparing the pre-crisis with the post-crisis period, they find that in response to a negative demand shock by mutual funds, dealers increase their bond holdings by less and spreads respond more in the post-crisis period, suggesting an increase in liquidity risk.

Risks around the first FED rate hike

Market liquidity has remained high in large part due to extremely accommodative monetary policies by the world’s major central banks. This abundant monetary liquidity means there have not been any major crisis periods during which risk appetite would have dropped structurally. At the same time, recent evidence from the International Monetary Fund suggests that the resilience of liquidity, i.e., its ability to recover quickly following a negative shock is likely to have fallen significantly. This is particularly true in bond markets where mutual fund holdings have become larger and more concentrated. This decrease in the resilience of liquidity means that amplification mechanisms may well be stronger than in the past. The risk of a disruptive change to global market liquidity around the normalization of monetary policy therefore appears to be one of the more serious concerns for global financial stability in the current market environment.

References

Adrian T., M. Fleming, O. Shachar and E. Vogt (2015): “Has U.S. Corporate Bond Market Liquidity Deteriorated?”, Liberty Street Economics.

Adrian T., M. Fleming, O. Shachar, D. Stackman and E. Vogt (2015): “Has Liquidity Risk in the Corporate Bond Market Increased?”, Liberty Street Economics.

Adrian T., M. Fleming, O. Shachar, D. Stackman and E. Vogt (2015): “Has Liquidity Risk in the Treasury and Equity Markets Increased?”, Liberty Street Economics.

Adrian T., M. Fleming, O. Shachar and E. Vogt (2015): “Redemption Risk of Bond Mutual Funds and Dealer Positioning”, Liberty Street Economics.

Baranova Y., L. Chen and N. Vause (2015): “Has Corporate Bond Market Liquidity Fallen ?”, Bank of England. Annual Report 2015, Bank for International Settlements. Global Financial Stability Report, International Monetary Fund, April 2015 and October 2015.

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