

Market Liquidity: A Primer

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Introduction

US financial markets are critical to the functioning of our entire economy, providing more credit, for example, than banks do. Our unusually large financial markets have been an American competitive advantage for years, providing a cost-effective means of matching investors with worthy companies and projects. Therefore, the current debate about whether market liquidity is drying up is an important one, since the ability to buy and sell securities is central to market functioning. This primer provides an introduction to the issues by addressing the following questions.

- What is market liquidity?
- Why do we care about it?
- Has it actually declined?
- What do the recent bouts of market volatility mean?
- Why would we expect market liquidity to be down?
- Will market liquidity decline further?
- What factors might offset tightening liquidity?
- What should be changed to improve market liquidity?

Before going systematically through these questions, the following section provides an overview and recommendations.

Overview and recommendations

Market liquidity refers to the ability of buyers and sellers of securities to transact efficiently and is measured by the speed with which large purchases and sales can be executed and the transaction costs incurred in doing so. These

costs include both the explicit commission or bid/ask spread and the, often larger, loss from moving the market price by the act of making the bid or offer for a large block. This latter effect ties market liquidity to price volatility, as transaction volumes lead to bigger price movements when markets are illiquid.

We care about market liquidity because it affects the returns for investors, such as those saving for retirement or college, and the costs to corporations, governments, and other borrowers. Further, illiquid markets are more volatile. At the extreme, volatility can help trigger or exacerbate financial crises. Even the average level of volatility matters, as it is factored into the interest rates demanded by investors and paid by borrowers.

Market liquidity is a complicated issue in part because it is not clear what is happening to underlying liquidity. Pretty much everyone agrees that markets are less liquid than they were in the run-up to the financial crisis, but it is not clear that this is a problem, since those liquidity levels were unsustainable and evaporated quickly under stress. The harder parts are to compare liquidity to an optimal sustainable level and to project liquidity into the future. There is no agreement on either the optimum level or the future course of market liquidity.

Despite the uncertainties, policymakers are right to take this issue seriously and to worry about the risks. There appears to have been a decline in underlying liquidity in the markets and this seems highly likely to worsen to some extent. There are numerous factors at work, including the evolution of the structure of financial markets and the effects of unusual economic conditions, especially extremely loose monetary policies and massive direct central bank purchases of bonds. I also believe we have overshot in our regulations in a way that will cramp market liquidity excessively, producing more social costs than the benefits of greater financial stability. To be clear, most of what has been done is positive; it is a matter of recalibrating the details to reduce the social costs while keeping the core benefits. Unfortunately, this cost-benefit analysis is complex and still subjective at this point, in part because so much of what is happening to liquidity remains ambiguous and the largest effects are likely to be in the future.

Whatever the overall conclusions about regulation, it is clear that the cumulative effects of a series of regulations have made it more difficult and expensive for banks and large securities dealers to act as market makers. (These rules include the liquidity coverage ratio, the net stable funding ratio, the supplementary leverage ratio, various changes to the capital rules under the Basel capital accords, the Volcker Rule, and others.) Smaller dealers, hedge funds, and similar firms will pick up some of the slack as the large dealers pull back, but there are real limitations on their ability to do so cost-effectively. The markets can also adapt, such as by moving to agency rather than principal models and by embracing electronic markets, but, again, there are some serious limits on how far these moves can go.

The net result should logically be decreased liquidity and we have already seen much lower securities inventories held for market-making purposes by dealers along with some other signs of lessened liquidity. There have also been

at least four incidents in the last couple of years in which markets showed extreme volatility that may have been exaggerated by lower liquidity, such as the “taper tantrum” in the bond markets. It is difficult to know if these are isolated incidents or the tip of a dangerous iceberg. On the other hand, there are a number of indicators, such as average bid/ask spread, that do not show signs of a less liquid market, so while there appears to have been an overall decrease in liquidity, the evidence is ambiguous.

Thus, the effects we have seen already are not deeply worrisome on their own. The bigger issue is the probability that market liquidity will considerably worsen going forward. First, the very loose monetary policies of central banks around the world appear to have provided considerable support for market liquidity while also holding down price volatility. When monetary policies eventually tighten, market liquidity is likely to be more of a problem. Second, banks and large dealers are almost certain to cut back further on their liquidity provision and to raise their prices over the next couple of years. Many of the rules that increase their costs are only now being finalized or are being phased in over time. Further, dealers know they will lose customers if they make one big move, rather than spreading the pain over multiple years, especially if their competitors take smaller steps.

In sum, there are good reasons to worry about market liquidity and to believe that policymakers may have unintentionally overshot. However, the disaster scenarios that some suggest do not seem plausible, nor does any regulatory overshoot mean that we have to redo financial reform in major ways. This is a matter of taking the issue seriously and recalibrating a series of technical measures to reduce the damage to market liquidity without increasing the risks to financial stability in any significant way. At this point, the key is to revisit the various key regulations and to seriously

review the costs and benefits of the choices that were made about the details.

What is market liquidity?

In financial terms, the “liquidity” of any asset refers to the combination of the degree of ease with which it can be sold (or bought) in a timely manner and the level of costs associated with that sale, either in terms of transactions costs or the acceptance of a lower price in order to find a buyer in a reasonable time. Houses are relatively illiquid assets, since they can take months to sell, there are quite substantial transaction costs, and, depending on market conditions, the seller may have to take a hit to move the house in a reasonable time period. On the other hand, a US Treasury bond is highly liquid. It can easily be sold within hours, transaction costs are minimal, and there are many potential buyers who are willing to pay roughly the bond’s theoretical market value.

Recent concerns about “market liquidity” refer to the functioning of markets for purely financial assets, particularly bonds issued by both governments and corporations, also known as “fixed income” instruments since they promise a fixed set of payments to the owner. Sometimes these discussions have broadened out to reference derivatives based on these bonds or the related markets in foreign currencies and commodities.

It is important to understand that the fixed income market is quite different from the stock markets with which most people are more familiar. There is usually one type of common stock for each public company (occasionally two); whereas firms and governments issue many distinct bonds each. They differ in maturity, interest rate, and other material features, so that they are not inter-changeable, even though they are affected by some common factors, particularly those related to the creditworthiness of the issuer.

One of the major effects of this market structure is that the great majority of bonds are bought and sold through dealers rather than traded on exchanges, since there is not enough transaction volume to support exchange trading of each of the individual bonds. These dealers do not normally charge a commission, but are paid through their expected profits from bidding for bonds at one price and offering to sell them at a higher one. The “bid/ask” spread between the two quotes can be viewed as consisting of two parts. A portion is the equivalent of a commission and is necessary to cover expenses and provide a reasonable profit for helping customers to execute transactions. The second part compensates dealers for the risk that they will lose money on a transaction by buying too high or selling too low, as well as covering the costs of holding a securities inventory to facilitate transactions, including the necessary levels of capital and liquidity to back their inventories. Therefore, one of the significant measures of market liquidity is the average bid/ask spread, since it represents an important transaction cost.

Why do we care about it?

Most of the credit provided to businesses and households in this country is ultimately supplied through financial markets. (This is a contrast with the rest of the world, where credit primarily ends up on bank balance sheets). The suppliers of credit are insurers, pension funds, mutual funds, individual investors, and others. The ultimate sources of all these funds are households who rely on their returns from these securities to provide funding for retirement, educational expenses, and other needs. So the functioning of these markets has significant impacts on the economy as a whole. When liquidity declines, there are a series of effects:

Direct transaction costs for investors rise. In some cases, external factors, such as increases in regulatory requirements for trading, directly push bid/ask spreads higher, which raises transactions costs for investors, which is one aspect of liquidity. Further indirect effects result from cutting transaction volumes, which may also lengthen the time necessary to complete a transaction.

In other cases, the causality runs in the other direction, and markets initially become less liquid in some other way, such as through a rise in the volatility of price movements. Bid/ask spreads would then usually increase as well, for several reasons. Transaction volumes would tend to fall, so the dealer's fixed costs would be spread over fewer transactions, raising the cost per transaction. Further, risk premiums would rise as well to cover the higher price volatility, as may also be true of the capital and liquidity charges, at least if illiquidity persists.

Whatever the derivation of the higher transaction costs, they flow through to lower returns for investors when they buy or sell the instrument.

Volatility of prices increases. The biggest factors moving securities prices are those that affect perceptions of their fundamental value, such as good or bad news about a firm's creditworthiness or an overall move in interest rates. However, the rapidity and extent of price movements is also influenced by market liquidity. If there are many potential buyers and sellers and they can transact quickly, easily, and cheaply, then price movements tend to be smoother as news events are factored into prices quickly based on the market consensus about their significance. Similarly, if a market participant wants to buy or sell a large block of bonds, they can do so without greatly moving the price.

As with transaction costs, sometimes volatility directly changes, perhaps due to higher uncertainty about economic or monetary policy

conditions. At other times, volatility is affected by changes in bid/ask spreads or other elements of liquidity. When it is more expensive or harder to trade, then fewer traders are willing or able to step in when prices move out of line by modest amounts, allowing prices to swing more widely.

Whatever the cause of increased volatility, it generally reduces the return for investors who are buying or selling in any significant size, as their initial purchases or sales will move the market price further in the wrong direction for them.

There is greater potential for financial crises. Illiquidity in financial markets can help trigger or exacerbate a financial crisis by creating actual or paper losses at banks or other financial institutions. If a bank needs to raise cash quickly, perhaps to meet deposit outflows in the event of a loss of confidence in that institution, they will likely need to sell securities, especially if they have an excessive mismatch between the maturities of their assets and liabilities. In illiquid markets, this would require "fire sales" in which the seller accepts a significantly lower price in order to get cash quickly. In addition to the direct loss to the troubled institution, which may threaten its solvency, rapid declines in securities prices can affect other institutions, either because they too need to sell or because they use "mark to market" accounting for their assets and therefore paper losses directly affect their capital positions.

Bond prices fall as Investors demand higher liquidity risk premiums. When investors decide the minimum interest rate they will accept on a bond, they take account of multiple factors. First, they need a base return that compensates them for giving up the use of their funds until the maturity of the bond, often known as the "time value of money." Second, they need to be compensated for credit risk, the possibility that they will not be repaid in full. Third, they may charge an interest rate risk premium to reflect

the potential for a decline in value if interest rates rise. Fourth, they will charge a “liquidity premium” based on the degree of difficulty or cost they will encounter if they decide to sell their investment early. (On top of these basic elements, there may be others, such as foreign exchange risk premiums, depending on circumstances.)

If markets become less liquid, then investors over time should increase the liquidity risk premium that they demand, raising their overall required interest rate. This would cause the price of existing bonds to fall, since lower prices are needed to raise the effective interest rate on the amount invested.

Capital raising becomes more expensive. Similarly, an increased liquidity risk premium means investors would demand higher interest rates when businesses and governments issue new bonds. This would directly flow through as a cost to borrowers, including households whose borrowing is financed indirectly through financial markets, such as is true for most mortgages.

Has market liquidity actually declined?

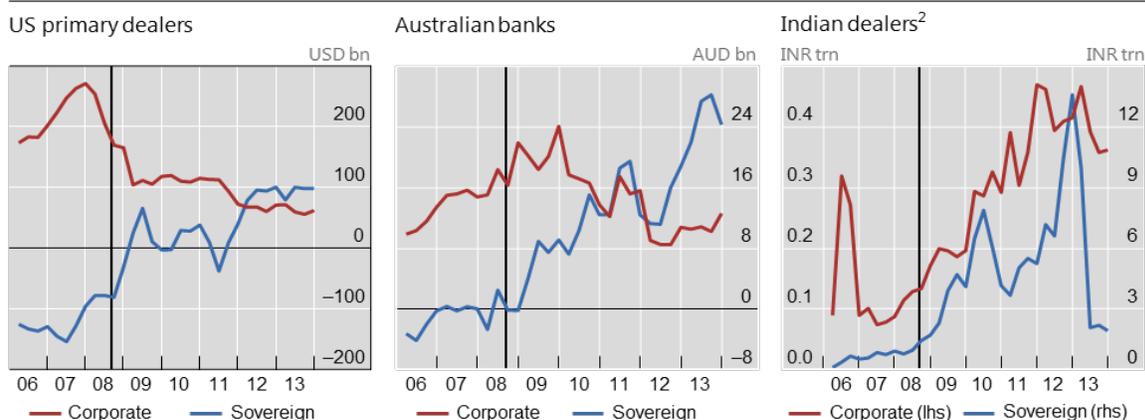
Almost everyone believes that market liquidity has fallen overall since the period prior to the

global financial crisis of 2007-9. However, there is a great deal of controversy about the extent to which this has occurred and whether it represents a bad thing or a return to normal conditions after an unsustainably high degree of liquidity in markets. (Fender et. al., 2015, provides a good overview of the changes since the crisis.)

The picture looks different depending on which aspect of liquidity one focuses on and which markets one considers.

Level of dealer inventories. This is not a direct measure of liquidity, but rather an indicator of the potential for dealers to provide liquidity. Large inventories make it easier for a dealer to supply bonds if customers desire them. They also tend to be an indicator of the willingness and desire of dealers to make markets. With the exception of government bonds at that national level, dealer inventories are down pretty much across the board in the last few years. The decline was very substantial in many types of bonds, particularly corporate bonds. Sovereign bonds have shown little decline, but a large part of this is likely due to new regulatory requirements and other pressures to hold large volumes of government bonds at the banks and major dealers. The chart below provides some data on inventories from Fender, et. al., 2015.

Dealer inventory¹ – low tide for corporate bonds?

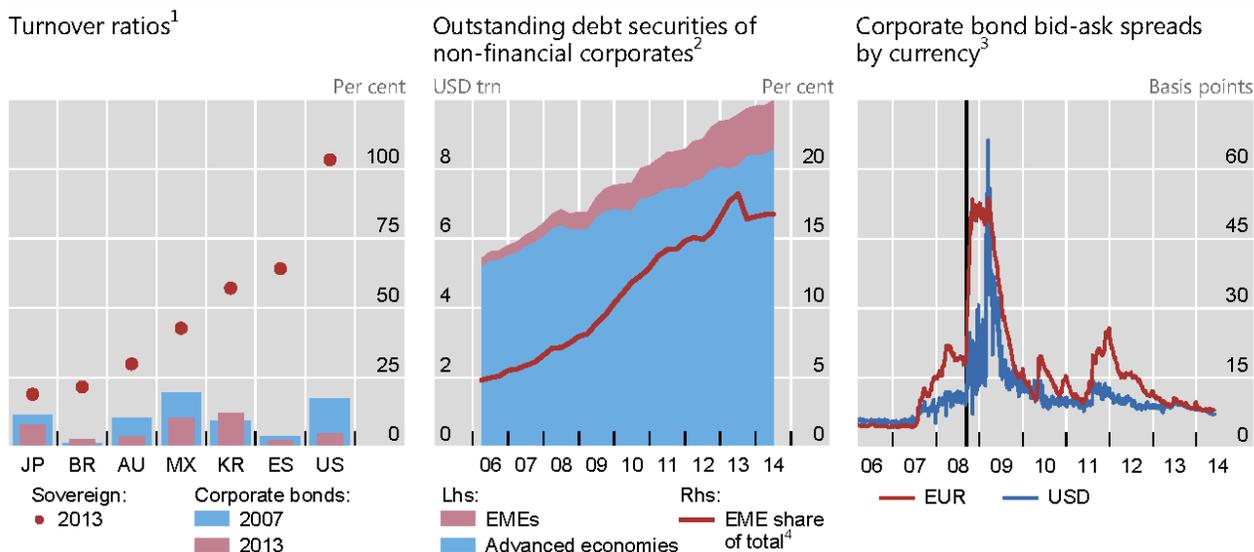


The black vertical lines correspond to 15 September 2008 (the date of the Lehman Brothers bankruptcy).

¹ Net dealer positions of corporate and domestic sovereign bonds. ² Sample of 10 primary dealers and banks.

Sources: CGFS Study Group member contributions based on national data; BIS calculations.

Corporate bond market liquidity: back to (not so) normal?



The black vertical line in the right-hand panel corresponds to 15 September 2008 (the date of the Lehman Brothers bankruptcy). AU = Australia; BR = Brazil; ES = Spain; JP = Japan; KR = Korea; MX = Mexico; US = United States.

¹ Turnover ratios are calculated by dividing the monthly aggregate trading volume by the amount of outstanding issues; yearly average of monthly ratios. ² Comprises only BIS reporting countries for which data on total debt securities are available. ³ Based on Markit iBoxx indices. Includes bonds issued by domestic and foreign issuers denominated in US dollars and euros, respectively. ⁴ Share of outstanding debt securities issued by emerging market economy (EME) non-financial corporates, by residence of the issuer.

Sources: CGFS Study Group member contributions based on national data; Markit iBoxx; BIS debt securities statistics; BIS calculations.

Bid/ask spreads. On the other hand, there has been much less of a movement in bid/ask spreads. On this basis, one would not presume there were any concerns about a decline in market liquidity, except in certain market segments which were already less liquid. The chart above, also from Fender, shows corporate bid/ask spreads over time.

Volatility on “normal” days. Price movements have been relatively calm for the most part, again not indicative of a current problem with liquidity.

Bouts of extreme volatility. On the other hand, there have been a few incidents, described in the next section, in which price movements have been extreme enough to trigger fears that markets have indeed become less liquid.

Average size of transactions. There has generally been a decrease in the size of

transactions in many market segments, which may indicate that investors have found the need to break up their transactions due to the inability or high cost of moving large blocks in a single transaction. However, there could be other factors leading to this reduction in size, including the rise of trading strategies employing frequent trades in smaller sizes to try to profit from fleeting arbitrage opportunities.

Time to completion of transactions. Although there do not appear to be good measures, anecdotal evidence suggests some slowing down of the disposition or acquisition of large positions. This would be consistent with smaller average transaction sizes.

Overall, the decline in liquidity has been most marked in riskier market segments, as demonstrated above in the charts from Fender, which showed little or no decline in the liquidity of government bond markets of developed

economies, but noticeable declines in liquidity of corporate bond markets. This results both from factors specific to such markets (including changes in regulatory requirements that raise the required level of capital for banks and dealers holding some instruments) and as a reflection of an overall “flight to quality” by many bond investors after the financial crisis, as well as from various other factors.

Similarly, the IMF’s Global Financial Stability Review of October 2014 highlighted concerns about market liquidity particularly in the high yield bond and emerging market bond areas.

What do the recent bouts of market volatility mean?

There have been at least four occasions in the last several years that may indicate a greater vulnerability of fixed income markets to periods of excessive volatility as a result of regulatory and other market changes¹. As noted below, however, each of the episodes were associated with major news events, often related to central bank activities, that make it difficult to pin down what portion of the volatility was “excessive” and what was a reasonable response to fundamentals. These are:

The “taper tantrum”. When then-Chairman Bernanke testified before Congress in May 2013 that the Fed might “taper” off its purchases of bonds in the markets more quickly than some in the markets had expected, there was a quick movement down in government bond prices, which carried over to most other categories of bonds, which generally price on the basis of an interest rate spread over the government bond rates. The 10-year Treasury bond saw its market price fall about 3% in the course of two days, with most of this occurring in the first few hours

¹ Some analysts who have reviewed this paper in draft format have nominated additional examples, such as sharp price movements in Japan connected with the announcement of changes in the investment strategy of the government pension plan.

after the testimony. This may not seem large, but is quite a sharp move for a government bond market.

October 15, 2014 Treasury market rally. This incident is so complex, and the causes so unclear, that it still does not have a single nickname. A variety of factors led to a rise in Treasury market prices roughly equal to the entirety of the taper tantrum within about one hour, with prices subsequently gyrating strongly over the remainder of the day. US authorities will soon conclude a study of this episode that may shed more light on the underlying causes.

Swiss Franc revaluation. For several years, the Swiss central bank held down the value of the Swiss franc versus the euro, in order to mitigate a loss of competitive position by Swiss exporters versus those in the eurozone. This required the Swiss to buy large sums of euros in exchange for francs. Eventually, the holdings of euros grew very large, as did the likelihood that the central bank would eventually have to take a loss on these holdings, in part due to the anticipated advent of Quantitative Easing by the European Central Bank. As a result, in January of 2015, the Swiss National Bank gave up and allowed the Swiss franc to rise, switching to a policy of intervening sporadically if market forces appeared to be excessive. This retreat by the central bank caused the Swiss franc to rise 30% in the first 13 minutes, with knock-on effects in other foreign exchange markets. (The franc gave back some of these gains over the course of the day, but most of the initial impact remained.) Some observers believe that the speed and extent of the initial price movement would have been considerably less in more liquid markets. This is hard to judge as developed economies rarely undertake this kind of capping of foreign exchange rates anymore and therefore it is difficult to compare with other instances where such a cap was unexpectedly withdrawn.

Volatility of European government bonds in early 2015. Prices of government bonds in the core of Europe fluctuated sharply in the first half of 2015, with a cumulative move in German 10-year government bond prices of 7-8% from peak to trough. Within this overall trend, there were fairly rapid moves on some days. Some ascribe the sharpness of the moves to underlying liquidity problems, although the argument is less strong than in the case of the two incidents involving US Treasury bonds.

Outside these markets, there was also the “flash crash” in the stock markets in May 2010 and smaller versions since.

At the end of the day, it is difficult to tell how much meaning to ascribe to these events. It is certainly possible that they represent the tip of the iceberg and that once we return to more normal economic and monetary conditions, these types of volatility events will be more frequent and potentially much more painful. However, it is also dangerous to generalize too much from a few data points. One could certainly argue that at least some of the events merely showed the market reacting sensibly and swiftly to new economic news, such as the withdrawal of the Swiss central bank as a provider of massive artificial support to the euro or the news about the Fed’s intentions for its future bond purchases.

It is probably best to view these incidents as red flags, and indicators of the degree to which volatility might become more normal, rather than drawing stronger conclusions from this limited set of data points.

Why would we expect market liquidity to be down?

There are two broad and compelling reasons to expect market liquidity to have declined, especially for securities that were already less liquid. In addition, there are a number of other factors at work that are of lesser significance or

which can push liquidity in either direction depending on the particular circumstances.

The first compelling reason is that market liquidity in the US was greater in the run-up to the financial crisis than it had ever been, quite substantially so in many markets. In part, there was clearly a self-reinforcing cycle of increased liquidity leading to lower liquidity risk premiums demanded by dealers and investors, leading to still more liquidity. A second major component was a belief in the “great moderation,” that central banks had determined how to substantially reduce volatility in the economy and consequently in financial markets. Lower volatility begets greater liquidity as dealers and investors become more willing to take positions without fear of excessive losses. Both of these factors have vanished or reversed, helping to explain the lower liquidity levels today.

The second compelling reason is that the dealers who have dominated fixed income market making are virtually all subject to a whole set of new regulations that make it more difficult and more expensive to provide that service. It would be surprising if such a distinct deterioration in their business position did not lead to a significant retrenchment and repricing of their liquidity provision to the markets. As noted earlier, dealer inventories in most markets have come down quite markedly, in line with this expectation.

There are quite a number of new regulations that have a significant impact on the cost of doing business as a market maker:

Basel III capital accord. The Basel Committee on Banking Supervision is the global coordinating body for bank regulators. Although it cannot directly bind national governments, its rules are virtually always adopted, sometimes with modifications. The Basel Committee promulgated the third version of the Basel Capital Accords after the financial crisis and they are well along the phase-in process today. The latest version significantly raises the

amount of capital required by banks and major securities dealers, which makes it more expensive for them to do business. (See Elliott, 2010 for a primer on bank capital.)

Basel 2.5. The capital required for assets held in a bank's "trading book" was considerably lower under Basel II than was the case for other assets, such as securities that were intended to be held to maturity. After the financial crisis, there was such a strong consensus that these capital levels needed to be raised sharply, that new rules were put in place to modify Basel II in this area even before the Basel III accord was agreed. (Hence, the nickname of Basel 2.5.) Trading book assets now require multiples of the capital previously mandated, representing one of the sharpest percentage changes in capital requirements. In addition, the Basel Committee is currently conducting a review of these requirements and there is an expectation of still further increases.

Leverage ratio. The Basel Committee also concluded that its core approach, which uses risk weightings so that more capital is required for riskier assets and less for safer ones, was too subject to gaming or error when used on a stand-alone basis. Therefore, a "leverage ratio" has been adopted as well which, in essence, requires the same level of capital for all assets, regardless of risk. Banks must meet the higher of the capital levels required by the risk-weighted approach and that calculated by the leverage ratio. In the US, regulators went further and established a "Supplementary Leverage Ratio" (SLR) for the largest banks that is higher still. The SLR has particular impact on trading, since most of the instruments that are traded, or are used to hedge trading positions, involve securities with very low credit risk. These have correspondingly low capital requirements under the risk-based rules, but do not receive any benefit under the leverage ratio.

Liquidity coverage ratio. Basel III also includes two completely new requirements that are

intended to ensure that banks and major dealers have high levels of liquid assets to meet potential demands for funds in a crisis and that their overall business models do not have an excessively large mismatch between the maturity of their assets and their liabilities. (See Elliott, 2014, for a primer on bank liquidity requirements, which also apply to the major dealers.) The Liquidity Coverage Ratio (LCR) is a stylized stress test to ensure that a bank has the ability to handle a 30-day liquidity crisis in the markets. Under this test, assets which are longer-term or less liquid effectively need to be funded by longer-term liabilities, which tend to be more expensive. This raises the cost of holding inventories of most bonds.

Net stable funding ratio. The second liquidity-related requirement in Basel III is a rule intended to ensure that banks and major dealers do not have an excessive mismatch between the maturity of their liabilities and that of their funding. This produces a similar effect to the LCR, by raising the cost of funding for longer-term instruments, such as most bonds.

Single counterparty credit limits. The Dodd-Frank Act required that the rules be tightened on the amount of credit exposure that the largest banks and their affiliates could take to any one counterparty. Bonds in dealer inventories count against this limit as do many of the instruments used by dealers to hedge their risk of holding those inventories. The tighter requirements mean that the largest banks have to ration their credit exposures more than they did, which adds an opportunity cost when dealing activity uses up some of this room under the exposure limits.

The Volcker Rule. Banks and their affiliates are now prohibited from engaging in "proprietary trading". As I, and others, have written about extensively, there is no clear meaning to the term and therefore dealers have a strong incentive to cut back on some of their market making that might be misinterpreted as proprietary trading. In particular, dealer

inventories that rise too much or too quickly, may be viewed as constituting the taking of a position, rather than being a valid response to changes in customer demand or the anticipation of such changes. The natural response is to hold lower inventory levels. It is too early in the implementation process to judge the degree of this impact.

There are a number of factors besides a reversion to normal after the boom conditions prior to the crisis and the important regulatory changes just described. These include:

Strong bond issuance. The total volume of bonds outstanding has risen as governments have had to issue to cover rising deficits and corporates have taken advantage of very low interest rates, as well as being pushed away from bank loans by changes in that sector. There was also a movement by many companies to reduce reliance on commercial paper and to lock in the longer maturity of bonds. The absolute growth in the size of bond markets magnifies the impact of any declines in liquidity provision by dealers.

Tighter risk management by dealers and other liquidity providers. Not all of the pullback by dealers is the result of regulation. Some of it is a purely market-driven response to the lessons of the financial crisis and other changes that have occurred in recent years.

Bifurcation of markets. The Bank for International Settlements and other analysts have noted an increasing differential between liquidity levels in government bond and other liquid markets for highly creditworthy bonds and all other fixed income markets. This helps explain one reason for the arguments about whether liquidity levels have changed – it depends to a considerable extent on which markets are considered.

Restructuring of liquidity provision within markets. As discussed below, there are a number of ways that market players have been

responding to the changes, and potential changes, in liquidity. The cumulative impact of these on liquidity levels is substantial and growing.

Will market liquidity decline further?

There is a realistic and serious concern that market liquidity levels will fall further, for several reasons, but there are countervailing factors that will partially offset these effects. Estimating the net result is quite difficult at this point, although it seems likely that liquidity will in fact decline.

The regulatory factors inducing the major dealers to withdraw liquidity support and to price it higher are almost certain to have greater impacts over the next few years than they have thus far. Some of the rules have not yet been written in final form and some of the measures are being phased in over a number of years, meaning in each case that the full effects have not been felt yet. Liquidity levels in particular can be altered relatively quickly and therefore there has been little incentive for dealers to fully implement rules in advance of their taking full effect. Management teams have also been heavily pre-occupied with shorter-term regulatory implementation, leading them to defer some of their decisions on measures that are medium-term in nature. Adding to this delay, dealers, and the consultants and academics to whom they look for assistance, have not yet figured out how they ought to balance all of the new constraints in theory, much less in practice. They are reluctant to make major changes to their business models until they have a better understanding of how they ought to make those decisions.

There is also a competitive dynamic that is slowing reactions further. It is fairly clear to much of the dealer community that there will ultimately need to be significantly greater repricing and rationing of liquidity provision by

the major dealers than has taken place so far. However, any dealer that attempts to jump all the way to the ultimate terms of trade will anger a customer base that is not yet ready to accept this need. Since some competitors will surely attempt to gain market share by moving more slowly, there is a risk of permanent loss of many customer relationships if a dealer is bold enough to fully implement the necessary changes. Instead, industry leaders have been, and will continue, to take this one step at a time. They will make a partial, but still significant, change in the terms and then watch to see how customers and competitors respond. In addition to the question of whether competitors will move in the same way, it is also likely that some of them will drop out of certain markets over time. The overall effect is to spread the changes over several years and we are only partway through this period.

There is also a high probability that more normal monetary policy will return, which means that central banks will pull back on the extraordinary levels of liquidity that they have provided to banks and markets and that interest rates will rise. The very loose monetary conditions of the last few years have likely temporarily inflated market liquidity. There has been evidence in the academic literature for some time that loose monetary policy in general increases market liquidity in both the stock and bond markets. (See Fernandez-Amador et. al. (2013) and Chordia et. al. (2003), for example.) Very recently, researchers at the Federal Reserve Bank of San Francisco showed that Quantitative Easing has a very direct effect of reducing liquidity risk premiums in markets where central banks are buying bonds. (Christensen et. al. (2015).) They argue that this is due to the central bank taking away the serious downside risks of price volatility by being a large committed buyer that is averse to allowing significant price declines in these bonds, but is happy with gains, and has the firepower to affect those price movements.

When monetary policy tightens, therefore, market liquidity should be expected to fall. Further, there is a risk that the adjustment to higher interest rates, after such a long period of low rates, could be bumpy, increasing volatility in its own right. This is partly because the long period of steady and low rates may have lured some participants into taking excessive risk in a “search for yield”, which may backfire on them as rates finally rise. In addition, the simple fact of moving to a less predictable monetary policy would increase risks and therefore volatility.

What factors might offset tightening liquidity?

There are a number of factors that could work to increase market liquidity levels and partially offset the expected declines.

Expansion of smaller dealers. Most of the regulatory constraints apply only to the larger dealers and those that are part of banking groups. This provides a substantial competitive advantage for the mid-sized dealers and for potential new entrants. They appear to have gained market share already as a result and will likely gain more. However, they have a number of disadvantages versus their still-dominant competitors, such as weaker credit ratings and consequent higher funding costs, along with the inability to provide a wide range of integrated services such as many customers demand. This likely limits their potential market share gains.

Increased activity by hedge funds and similar managers of pools of money. In addition to smaller dealers, hedge funds and similar managers of pools of money² will step in to provide liquidity and even something close to market making, without formally taking on the obligations to stand ready to make markets. There is no question that as dealers reduce

² This would include those managers at family offices, sovereign wealth funds, and other entities who operate similarly to hedge funds. Of course, many managers at such entities do not take such an approach.

their liquidity provision and charge more for it, some hedge funds will fill in part of the gap. There is a concern, however, that these firms will step out of markets when serious bouts of instability occur. Dealers do this to some extent too, of course, but they have profitable and long-established customer relationships that militate against a total pullout.

Growth of electronic markets. The role of market makers acting as principals is not the only way to provide liquidity to financial markets. There will be improvements, usually through “electronification” of markets, to make it easier for buyers and sellers to match up without requiring a principal to stand in between them. (Some of this has already occurred.) This will reduce the need for dealer inventories and the capital and liquidity to back them up. However, these markets only work for securities for which there is a fair amount of demand. Many buyers and sellers are willing to pay a significant amount to execute transactions quickly, in part because they worry that prices may move against them. It is also difficult to move large blocks of securities this way, as it is unlikely that there is a party on the other side who happens to be interested in that large a transaction at the same time. Breaking up the deal into a series of smaller trades is likely to start moving market prices and may signal to others that there is a large buyer or seller with more to do.

Adjustments by various market participants. There are various ways that each of the main categories of market participants could alter their behavior in response to scarcer and more expensive liquidity. Issuers could choose to sell securities that are more standardized and perhaps are issued in larger sizes. Such a move would increase liquidity and allow them to borrow at a lower rate, all else equal, but it would also mean issuing at times, in amounts, or with conditions that are not as favorable to them. Their existing level of customization is probably worth considerably more than they would gain from the reduced liquidity premium,

so it is likely to be only the largest and most frequent issuers who take this route. For their part, investors are already moving to some extent to take credit positions through standardized credit default swaps rather than owning bonds outright.

What should be changed to improve market liquidity?

One of the toughest questions is what policymakers should do if they are concerned about market liquidity. Although it is impossible to prove at this point, it appears to me that the regulatory pendulum has swung too far in this area and that the social costs of decreased market liquidity outweigh the social gains from greater financial stability produced by some portion of the new regulations. It is easy to see why this would have occurred. First, the natural reaction to a huge financial crisis is a regulatory “flight to safety” where concerns about market efficiency do not receive their full due. Second, bank regulators have a strong incentive to ensure that banks, and affiliated securities dealers, reduce their level of securities risks. However, there is no regulatory authority with the responsibility to ensure that the negative effects on market liquidity do not outweigh the gains from making banks as a class safer. The Securities and Exchange Commission is tasked to take market functioning into account in its own regulations, but it does not have the power to determine what the bank regulators do. Ideally, the Financial Stability Oversight Council would coordinate such trade-offs, but in practice, its focus has been to look for financial stability risks, rather than to determine when some regulators may have unintentionally overshot by creating costs to society that fall outside their own direct responsibility.

It was already clear that there needs to be at least some modest recalibration of the different regulatory reforms, including required levels of capital and liquidity, to take account of their combined effects now that we have a clearer

idea of what the total picture looks like. The concerns about market liquidity add to this need for an integrated review. It is not yet clear, however, what specific actions should be taken as part of that recalibration. The core of any recalibration will have to be a serious review of the costs and benefits of the details of the regulatory actions. It seems highly likely that the level of conservatism in certain of the new regulations could be trimmed back modestly and selectively to reduce the harm to market liquidity without sacrificing any significant improvement to systemic safety.

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