

III. Market liquidity: a cause for concern?

The issue of whether there has been a decline in market liquidity (the ease with which financial assets can be bought and sold without a large impact on price), and whether this is due to regulatory reforms introduced after the global financial crisis, has been one of the most hotly debated topics in finance in recent times. In the euro area, low market liquidity was thought to be one of the factors behind the volatility in some sovereign debt markets in the spring and summer of 2015 and there may be grounds for thinking that episodes of volatility will occur more frequently than in the past. This article shows that assessing whether market liquidity has declined across asset classes is difficult, in part because market liquidity is typically gauged according to various criteria which may not always point in the same direction. Neither is it easy to ascribe a clear role to regulation in driving any reduction in liquidity, as other important cyclical and structural factors have also been at play. Nevertheless, market liquidity matters enormously for well-functioning financial markets that can support the economy by allocating capital efficiently. As market structures are constantly evolving, it is essential that we deepen our understanding of developments in market liquidity, including by gathering more data and improving the analysis of recent liquidity dynamics. ⁽⁹⁰⁾

III.1. Introduction

One of the most hotly debated financial market issues in recent months has been whether the *market liquidity* of financial securities has declined in the wake of the global financial crisis (GFC) as a result of new regulatory reforms, such as the stricter capital and liquidity requirements imposed on financial institutions. Market liquidity may be broadly defined as the ability to trade securities in sufficiently large quantities, over sufficiently short periods, without a significant effect on their prices. If market liquidity has declined, this could impair efficient market functioning and thus limit the ability of financial markets to allocate capital efficiently and thereby support the real economy. Lower market liquidity may also contribute to financial market instability, especially as it is often associated with greater volatility in the prices of securities and greater spill-overs from one asset class to another.

This issue is especially important from the euro-area perspective, given that diminished market liquidity in some euro area government bond markets was a concern during the euro crisis. For example, Cœuré (2012) has noted that market liquidity in these markets ‘threatened to completely dry up’ at times. ⁽⁹¹⁾

Large fluctuations in liquidity in various financial markets are a key element of the uncertainty channel through which financial shocks can be transmitted to the real economy. These shocks can work through borrowers’ and lenders’ balance sheets and precautionary reductions in investment and consumption. The rise in uncertainty in the euro area during the GFC has been linked to the significant decline in investment there from the start of the crisis. ⁽⁹²⁾

From a financial market policy perspective, considerable attention is now being devoted to the topic of market liquidity in the EU. Adequate market liquidity is seen as essential for the EU’s objective of creating a Capital Markets Union (CMU), with the capacity to promote private risk-sharing in the euro area and beyond in support of growth and job creation, notably by promoting the development of corporate bond markets. ⁽⁹³⁾ In line with the CMU Action Plan, the Commission is reviewing the functioning of corporate bond markets, and has established an Expert Group to assess whether liquidity in these markets can be improved. And market liquidity was one of the main themes in the recent Call for Evidence exercise launched by the EU to assess whether legislation passed during the crisis is working as intended and is as ‘growth-friendly’ as possible.

⁽⁹⁰⁾ The section was prepared by Nigel Nagarajan, Adviser in the Commission’s Directorate-General for Financial Stability, Financial Services and Capital Markets Union (DG FISMA). It is based on the work of DG FISMA’s market liquidity project team.

⁽⁹¹⁾ Benoît Cœuré (2012), ‘Global liquidity and risk appetite: a re-interpretation of the recent crises’, speech at the BIS-ECB

workshop on global liquidity and its international repercussions, ECB (6 February 2012).

⁽⁹²⁾ For more details, see Balta, N. and B. Vašíček (2016), ‘Financial channels and economic activity in the euro area’, Quarterly Report on the Euro Area, Vol. 15, No 2.

⁽⁹³⁾ See more in Nikolov P. (2016), ‘Cross-border risk sharing after asymmetric shocks: evidence from the euro area and the United States’, Quarterly Report on the Euro Area, Vol. 15, No 2.

Low market liquidity has been cited as a contributing factor in several recent episodes of volatility in various securities markets, including:

(i) the summer 2013 ‘*taper tantrum*’, in which long-term US bond yields and the value of the dollar rose substantially following the US Federal Reserve’s announcement that it would begin to slow the pace of its asset purchases;

(ii) the ‘*flash rally*’ of 15 October 2014, in which US Treasuries experienced one of their largest intraday changes in yields in the past quarter century, in apparent response to only a moderately poor data release; and

(iii) the high volatility in some *euro-area sovereign bond markets* in the spring and early summer of 2015.

In relation to (iii), ECB President Mario Draghi referred to low market liquidity as a factor in the rise in several euro area government bond yields (including Bunds) in April and May 2015. He also suggested that we should ‘get used’ to periods of higher volatility.⁽⁹⁴⁾ It should be stressed that none of the above short-duration events had significant lasting impacts on either the financial system or the real economy.

For some commentators, these episodes nevertheless provide a foretaste of what may happen on a wider scale when global central banks eventually begin to unwind the highly accommodative monetary policies put in place in response to the crisis. For the ECB (2015), they ‘demonstrate [that] investor behaviour has become increasingly correlated, sentiment is fickle and market liquidity is prone to insufficiency during episodes of market tension’.⁽⁹⁵⁾ In line with this, the IMF (2015) has argued that benign cyclical conditions, notably investor risk appetite and macroeconomic and monetary conditions, could be masking underlying liquidity risks.⁽⁹⁶⁾ In other words, it is not just the *level* of market liquidity that matters, but also its *resilience*.

⁽⁹⁴⁾ See ECB press conference and Q&A of 3 June 2015; <http://www.ecb.europa.eu/press/pressconf/2015/html/is150603.en.html#qa>

⁽⁹⁵⁾ ECB (2015), ‘Financial stability review’, (November 2015), p. 48.

⁽⁹⁶⁾ IMF (2015), ‘Global financial stability report: vulnerabilities, legacies and policy challenges’ (October 2015).

A frequent complaint is that new regulations adopted in the wake of the financial crisis are to blame for the decline in market liquidity.⁽⁹⁷⁾ In particular, market participants and many commentators allege that the decline can be traced to factors such as higher capital and liquidity requirements that make it harder for banks to play their role as ‘market-makers’. Market participants have raised concerns that recent regulatory reforms may have reduced market liquidity *inter alia* by raising the cost to banks of warehousing assets (warehoused assets are bought in the secondary market and held for a period of time as inventories on the market-makers’ balance sheets). We will examine this claim below.⁽⁹⁸⁾

III.2. The dimensions of market liquidity

While it is easy to define market liquidity, measuring it is anything but. This is because liquidity is typically gauged according to several different criteria:

- *price* – to capture this aspect of liquidity, one can look at transaction costs, which are often proxied by the difference or ‘tightness’ between the buying price and the selling price (known as the bid-ask spread), or at the price impact of a trade (usually captured by measuring roundtrip trading costs);
- *immediacy* – this refers to the availability of speedy execution and settlement in the market;

⁽⁹⁷⁾ Perhaps most famously, Jamie Dimon (CEO of JPMorgan) warned in his April 2015 letter to JPMorgan shareholders that there is ‘far less liquidity in the general marketplace’ and assigned a key explanatory role for this to the impact of ‘myriad new regulations’. See ‘Jamie Dimon warns next crisis could see “more volatile” markets’, Financial Times (8 April 2015).

⁽⁹⁸⁾ Market-makers aim to fill client orders in one of two ways. In agency-based market-making, they match a buyer and a seller of an asset. If no match can readily be found, the market-maker will itself step in as buyer or seller – a practice known as principal-based market-making. This allows market-makers to provide ‘immediacy’ services to their clients, which supports market liquidity and price discovery.

The market-maker function has been particularly critical to the efficient functioning of certain secondary markets, such as that for corporate bonds, where it is often difficult to match buyers and sellers of the same bond at a given time, due to the high degree of heterogeneity of individual bond issuances. Specialised market-makers who can step in to absorb temporary order flow imbalances can therefore contribute to efficient market functioning. They can also act as shock absorbers during periods of market stress, which should help to dampen volatility.

- *market depth* – this is reflected in the number of orders above and below the price at which securities are traded;
- *market breadth* – this refers to the size of orders in the market; and
- *resilience* – i.e. the speed at which price fluctuations caused by trading abate, or at which imbalances in order flows are adjusted.

Not all of the above are directly measurable and they do not always send the same signals. For example, bid-ask spreads for many categories of securities are currently quite low by historical standards, suggesting that market liquidity may not be impaired at all, but other aspects of market liquidity, such as immediacy and market depth, appear to have declined. A weakness of the bid-ask spread as a measure of liquidity is that it is often derived from quoted, rather than actual, transactions and so may not reflect the actual costs of trades. Furthermore, low bid-ask spreads may be sending misleading signals about market liquidity, since they may rather be a reflection of the low interest rate environment and investors' consequent 'search for yield', or an indication that banks have scaled back their market-making activities and moved from a principal-based to an agency-based model, in which they require less compensation for the smaller amount of capital they devote to their inventories of securities. ⁽⁹⁹⁾

In the current environment, measures of market depth may tell us more than price-based measures, such as the bid-ask spread, about what is really happening to market liquidity. Market depth addresses the quantity-based dimension of market liquidity, i.e. the ease with which one can trade large numbers of securities. The interest in this aspect of market liquidity may be partly explained by the fact that, as market-making activity has declined, it has become more difficult and expensive to execute larger transactions. For dealer-intermediated markets, such as corporate bonds, there is evidence that the average size of large trades has fallen in recent years. So far, this reduction does not appear to be overly problematic – it does not give rise to higher liquidity premia. However, while smaller trade sizes may reduce dealers' exposure to risk, investors run the risk that

prices will move against them while the set of smaller transactions is still in the process of being completed. This could be detrimental to transactional efficiency, but the scale of this problem is not yet fully clear. Understanding better what is happening to the market depth dimension of liquidity is therefore of key importance.

III.3. Cyclical factors and market liquidity

In this section we consider three important cyclical factors that are likely to have affected market liquidity:

(i) *risk appetite* – market liquidity is thought to be strongly influenced by the willingness of investors to bear risk, but risk appetite is itself also dependent on market liquidity. If investors have easy access to liquid instruments that can be easily transformed into other securities without significant loss of value, they are likely to become more willing to take on risk. If market liquidity was under-priced in the run-up to the GFC, then the reduction in risk appetite in the immediate crisis period can be seen, at least partly, as a natural correction. Indeed, among market-makers there are grounds for thinking that the crisis may have given rise to a more fundamental reappraisal of risk tolerance. For example, one study links the shrinking of inventories on dealer banks' trading books to diminished risk appetite on the part of bank shareholders, who wish to see lower volatility in earnings. ⁽¹⁰⁰⁾ Still, the relative importance of risk appetite and other factors such as regulation in explaining market liquidity developments remains disputed. Looking at market volatility in US Treasuries associated with the 2013 'taper tantrum' event, there is evidence that dealers facing tighter balance sheet constraints before the sell-off did not reduce their net positions more than other dealers during the sell-off. This could be an indication that dealer behaviour was driven more by differences in risk appetite than by regulatory constraints on banks' market-making capacity. ⁽¹⁰¹⁾

(ii) *monetary policy* – this can affect market liquidity in various ways. Adrian and Shin (2008) show how banks manage their leverage pro-cyclically, increasing it during asset price booms

⁽⁹⁹⁾ PwC, 'Global financial markets liquidity study', August 2015.

⁽¹⁰⁰⁾ Committee on the Global Financial System, 'Fixed income market liquidity', CGFS Papers, No. 55 (January 2016), BIS.

⁽¹⁰¹⁾ T. Adrian, M. Fleming, O. Shachar and E. Vogt (2015), 'Has US corporate bond market liquidity deteriorated?', Liberty Street Economics, Federal Reserve Bank of New York.

and reducing it during busts,⁽¹⁰²⁾ primarily through collateralised borrowing and lending – in particular, repurchase agreements (repos) and reverse repurchase agreements (reverse repos), transactions in which the borrower of funds provides securities as collateral. This leads the authors to suggest that financial market liquidity can be thought of as synonymous with the growth rate of aggregate bank balance sheets. That growth reduces banks' funding constraints, making it easier for them to finance their inventories of securities, and thereby supports market liquidity. Indirectly, banks' greater funding liquidity (see below) also allows them to increase margin funding to traders or lending to other market-makers, with positive effects on the liquidity of securities markets. Low interest rates may support asset valuations and increase the value of collateral, which can also improve market liquidity. The above considerations are unambiguously positive for market liquidity. However, as global central banks' monetary policies have taken an increasingly 'unconventional' turn, through large-scale asset purchases ('quantitative easing') and forward guidance, the picture may be becoming more complicated. For example, quantitative easing is likely to improve market functioning and liquidity by increasing demand for the securities that the central bank purchases, thus reducing search frictions that prevent investors from finding potential counterparties and the downside risk of holding the targeted securities. However, some commentators worry that large-scale asset purchases may also lead to shortages of the securities in question, resulting in a potentially thinner market in the future. It has also been claimed that persistently low interest rates may distort investor behaviour. By reducing the return that investors can expect on safe assets, such a policy may encourage them to increase their exposure to riskier, less liquid assets and to crowd into trades. This may result in markets that trend strongly, but which are characterised by lower market liquidity and a vulnerability to sharp corrections.⁽¹⁰³⁾

(iii) *funding liquidity* – this refers to the ease with which banks and other financial intermediaries can settle their obligations with immediacy. While it is

conceptually distinct from market liquidity, the two concepts are closely related. The relationship has been explored extensively and margin requirements are now thought to play a key role in transmitting shocks from one type of liquidity to the other, since a dealer's margin requirements depend on the ease with which it can sell the securities it holds. For example, in a now well-known model, if banks and financial intermediaries suffer an initial shock to their funding (possibly triggered by a loss on their securities positions), they may reduce their trading activity, which, in turn, causes market liquidity to fall.⁽¹⁰⁴⁾ This makes lenders more nervous and they raise margin requirements, which further exacerbates financial intermediaries' funding problems. Similarly, Brunnermeier (2009) demonstrates how runs on financial institutions, such as that which occurred at Lehman Brothers, can cause a sudden erosion of bank capital that can also give rise to a negative feedback loop between funding and market liquidity.⁽¹⁰⁵⁾

The role of funding liquidity in explaining developments in market liquidity is potentially very important. The run-up to the GFC was characterised by banks' excessive reliance on short-term wholesale funding (used to finance longer-term assets) and by the opening-up of new avenues of funding, such as the 'originate to distribute' securitisation model. This funding pattern experienced significant dislocations during the GFC and banks have moved towards a greater reliance on longer-term and more stable funding sources, notably deposits. This seems to be at least partly due to market pressures and the realisation that wholesale funding was under-priced pre-crisis. In any event, these far-reaching changes in banks' funding patterns would have had significant implications for funding and market liquidity. Indeed, if wholesale funding was under-priced in the run-up to the crisis, it could be argued that 'excessive' funding liquidity was used to support a level of market liquidity that was ultimately unsustainable.

⁽¹⁰²⁾ Tobias A. and Hyun Song Shin (2008), 'Liquidity, monetary policy and financial cycles', Federal Reserve Bank of New York, Current issues in economics and finance, vol. 14(1).

⁽¹⁰³⁾ Matt King, 'The liquidity paradox', Citi research note (4 May 2015).

⁽¹⁰⁴⁾ Brunnermeier M. K. and L. H. Pedersen (2007), 'Market liquidity and funding liquidity', National Bureau of Economic Research, Working papers, No. 12939.

⁽¹⁰⁵⁾ Brunnermeier M. K. (2009), 'Deciphering the liquidity and credit crunch 2007-2008', Journal of Economic Perspectives 23(1).

III.4. Structural factors and market liquidity

This section examines three key structural factors that can be considered to have influenced market liquidity:

(i) *changes in banks' business models* – bank business models have undergone significant changes since the financial crisis. In particular, deleveraging (the downsizing and de-risking of bank balance sheets) has been a key theme for the banking sector and can be expected to have had important implications for market liquidity. As seen above, some researchers see aggregate growth in bank balance sheets as synonymous with market liquidity. Another important development is that retail banking has gained ground since the crisis, reversing a pre-crisis trend. This may partly reflect the fact that banks that focus more on commercial banking activities have lower costs and more stable profits than those more heavily involved in capital market activities, mainly trading.⁽¹⁰⁶⁾ It may be tempting to assume that the post-crisis changes in bank business models can be explained solely by reference to regulatory reforms, as the more stringent capital requirements under the Basel III accord would probably have resulted in banks considering changes to their balance sheet mix and perhaps prompted many to adopt de-risking strategies. On the other hand, de-risking, deleveraging and the relative rise of retail banking can also be seen as a way for banks to respond to their shareholders' desire for less volatile earnings in the wake of the crisis.⁽¹⁰⁷⁾ The decline in banks' trading activities since the crisis may therefore be, at least partly, a natural correction. Boot and Ratnovski (2012) argue that the deepening of financial markets in the 10 or so years preceding the financial crisis may have fundamentally destabilised banks by inducing them to use their franchise value to engage in risky trading activities at the expense of lending.⁽¹⁰⁸⁾ This over-reliance on trading may also have compromised their ability to act as liquidity providers during economic slowdowns.

(ii) *changes in market structure* – these may also have affected banks' ability to act as market-makers

by reducing their oligopolistic power and hence their ability to pass on to the market/counterparties the higher costs of holding large inventories of securities. The rise of the asset management industry is one such change. Asset managers and other non-bank players, such as pension funds and insurance companies, may lack some of the advantages of banks when it comes to acting as market-makers, e.g. banks' larger balance sheets, their combination of bundled services, their research capacities, etc. However, they may still be able to compensate partially for the reduction in market-making activity by banks through liquidity provision. Another structural factor worth emphasising is the increased concentration of bond holdings. This is examined in a recent study by BIS researchers which suggests that market liquidity may, as a result, increasingly come to depend on the portfolio allocation decisions of only a few large institutions.⁽¹⁰⁹⁾ In line with this, the IMF has found that bonds where ownership was more concentrated displayed less resilient market liquidity.⁽¹¹⁰⁾

(iii) *technological developments* – these have had huge implications for financial markets and have helped to reshape the whole trading process. For example, new trading protocols appear to have fostered innovation and increased competition among platform providers, which in turn have created efficiencies for many market participants.⁽¹¹¹⁾ In addition, technological change has allowed professional traders to develop electronic trading strategies (algorithmic or high-frequency trading). These use sophisticated computer programmes to generate, route and execute orders, and rely on extremely rapid transmission of orders to the trading platforms.⁽¹¹²⁾ At least for equity markets, there is evidence that algorithmic trading improves market liquidity by lowering adverse selection and decreasing the extent of price discovery associated with trading.⁽¹¹³⁾ Automation may also help

⁽¹⁰⁶⁾ Roengpitya R., N. Tarashev and K. Tsatsaronis, 'Bank business models', BIS quarterly review, BIS (December 2014).

⁽¹⁰⁷⁾ Committee on the Global Financial System, 'Fixed income market liquidity', CGFS Papers No. 5 (5 January 2016), BIS.

⁽¹⁰⁸⁾ Boot A. W.A. and L. Ratnovski, 'Banking and trading', IMF working paper, WP/12/238 (2012).

⁽¹⁰⁹⁾ I. Fender and U. Lewrick, 'Shifting tides – market liquidity and market-making in fixed income instruments', BIS quarterly review, BIS (March 2015).

⁽¹¹⁰⁾ IMF (October 2015), 'Global financial stability report: vulnerabilities, legacies and policy challenges'.

⁽¹¹¹⁾ See 'Electronic trading in fixed income markets', BIS (January 2016).

⁽¹¹²⁾ This discussion draws on Foucault T., M. Pagano and A. Röell (2013), 'Market liquidity – theory, evidence and policy', Oxford University Press, 37-44.

⁽¹¹³⁾ Hendershott T., C. M. Jones and A. J. Menkveld, 'Does algorithmic trading improve liquidity?', *The Journal of Finance*, Vol. 66(1), February 2011.

trading firms to manage inventory risk by allowing them to take a position in one market and hedge it almost instantaneously in another. However, the rise of algorithmic trading also gives rise to a number of issues. For example, it may lead to a reduction in average trade sizes (although this should not necessarily be taken as evidence of reduced market liquidity). Also, algorithmic traders tend to resemble one another, so their trades can often be highly correlated. Simultaneous movements into and out of specific securities may lead to sharp variations in liquidity supply and demand, thus increasing price volatility. Peaks in algorithmic trading activity in reaction to the same event may strain the capacity of trading systems and cause severe market disruption.⁽¹¹⁴⁾ Indeed, algorithmic trading was centrally implicated in the flash rally episode of extreme volatility in US Treasury securities in October 2014.⁽¹¹⁵⁾

III.5. Regulation in the spotlight

Since the crisis, regulators have taken important steps to strengthen the financial system, notably by enhancing *bank prudential requirements*, i.e. requiring banks to strengthen their balance sheets and improve the resilience of their funding models. Other key financial system reforms have been implemented, or are in the pipeline, include:

- *bank structural reform*, which attempts to address the systemic risk associated with the largest, most complex and interconnected financial institutions that engage in significant market-based trading, and notably the risks associated with 'proprietary trading' (e.g. the Volcker Rule in the US and the EU proposal for bank structural reform);
- the *leverage ratio*, which aims to complement the risk-based capital framework by restricting the build-up of leverage in the banking sector; and
- regulations aimed at improving *market infrastructure and transparency*, such as the Markets in Financial Instruments Directive II (MiFID II) and

⁽¹¹⁴⁾ Treasury Market Practices Group, 'Automated trading in treasury market and proposed best practice guidance', consultative white paper (April 2015).

⁽¹¹⁵⁾ US Department of the Treasury, Board of Governors of the Federal Reserve System, Federal Reserve Bank of New York, US Securities and Exchange Commission, US Commodity Futures Trading Commission, 'Joint staff report: the US treasury market on 15 October 2014' (13 July 2015).

the Markets in Financial Instruments Regulation (MiFIR).⁽¹¹⁶⁾

In principle, these reforms should help to protect the financial system, including by reducing the likelihood of banks and other financial institutions suffering liquidity crises or of such crises leading to contagion between institutions. We have seen in the context of bank prudential requirements that regulation may have been a factor making it more capital-intensive for market-makers to hold inventories of securities, which, in turn, seems to have reduced their capacity to use their balance sheet for market-making purposes. Many market commentators see this as a significant negative development as regards market liquidity.⁽¹¹⁷⁾ The response of policymakers to such claims has been quite interesting. For example, Carney (2015) concedes that 'while the core of the system has been made more resilient, the combination of new prudential requirements on dealers and structural changes in markets has reduced market depth and increased potential volatility'. Still, 'more expensive liquidity is a price well worth paying for making the core of the system more robust' and 'much of the pre-crisis market-making capacity among dealers was ephemeral'.⁽¹¹⁸⁾ A similar view has been taken by Fischer (2016), who argues that even regulatory changes 'that may have reduced market liquidity, likely have enhanced financial stability on balance'.⁽¹¹⁹⁾ In this view, the crisis clearly showed that risks were not efficiently priced in many parts of the financial system and that the regulatory reforms enacted after the crisis were needed to address this deficiency.

If pre-crisis liquidity levels were unsustainable, some sort of correction was always going to happen. Also, despite a wealth of studies on this topic, there remains a lack of clear evidence that singles out the role of regulation from the other factors at play. For example, the decline in banks' performance metrics since the crisis has been

⁽¹¹⁶⁾ Assessing the impact of these other reforms is beyond the scope of this short article.

⁽¹¹⁷⁾ See, for example, PWC, 'Global financial markets liquidity study' (August 2015).

⁽¹¹⁸⁾ See 'Building real markets for the good of the people', speech at the Lord Mayor's Banquet for Bankers and Merchants of the City of London at the Mansion House, London (10 June 2015); <http://www.bankofengland.co.uk/publications/Pages/speeches/2015/821.aspx>

⁽¹¹⁹⁾ See 'Do we have a liquidity problem post-crisis?', remarks delivered at a conference sponsored by the Initiative on Business and Public Policy at the Brookings Institution, Washington, D.C. (15 November 2016);

shown to be widespread and not limited to those banks with significant trading activity.⁽¹²⁰⁾ Moreover, while most banks have reduced their stock of trading assets since the crisis, others have maintained or increased them. There is evidence that banks that had high risk-weighted capital ratios in 2009 and those that increased their capital ratios subsequently were more likely to increase their trading portfolios.⁽¹²¹⁾ In other words, it is by no means clear that the reduction in banks' market-making activity is due solely, or even mainly, to higher capital requirements as a result of post-crisis regulatory reforms. Still, it is appropriate that the exact role that regulation may have played as a factor shaping market liquidity should continue to be investigated, especially given the concerns that have been expressed about the possible decline in some dimensions of liquidity, such as market depth and resilience.

III.6. Conclusion

Market liquidity has been one of the most hotly debated financial topics in recent times. Market participants typically assign a key role to post-crisis regulatory reforms, but so far it has not been clearly established that there has been a general reduction in market liquidity across asset classes in the aftermath of the GFC. Price-based measures of market liquidity (notably bid-ask spreads) are generally very low for many securities. On the other hand, indicators of market depth, breadth and immediacy do appear to have declined.

At the same time, the role that regulation may have played in these developments has been difficult to pin down. A central concern related to regulation is that, since the height of the crisis, dealer banks seem to have less capacity to hold inventory on their balance sheets. There are grounds for thinking that this is related to the shift from principal-based to agency-based market-making, with dealers passing on risk more quickly, rather than warehousing it on their balance sheets. This shift would arguably have taken place anyway, but post-crisis reforms have also made it more capital-intensive for dealers to hold large inventories of securities. The reforms help to ensure that banks

are appropriately capitalised for the risks that they are taking and the core of the financial system is now safer as a result. However, policymakers need to stay mindful of the impact of reduced market-making capacity on overall market liquidity. In line with this, initiatives such as the EU's CMU Action Plan and the Call for Evidence demonstrate a willingness of policymakers to address concerns that have been raised about market liquidity, with a view to enhancing market functioning and ensuring that there is adequate funding to the wider economy.

As market structures continue to adapt, other liquidity providers may step into the gap created by the decline in dealer banks' activity. Indeed, this already seems to be happening to some extent. The trend whereby large asset managers are building up their internal trading teams and preparing to become price-setters, rather than just price-takers, is one example. Furthermore, moves towards more electronic and all-to-all trading, and other developments that facilitate greater and more efficient connectivity between buyers and sellers should mitigate some of the previous reliance on market-makers. The regulatory changes should also provide opportunities for more efficient market designs and structures to develop and evolve over time. There have recently been some signs of increased electronic trading, but given the current heterogeneity of many markets, particularly in corporate bonds, it seems that this probably has its limits. The question remains as to what extent, and where, market-making will be important in the future.

One key issue for further analysis will be the resilience of market liquidity in the transition to a new steady state. Even if it is not yet fully clear that market liquidity has actually declined across asset classes, there are genuine concerns about the systemic risks that could be triggered, followed by an adverse shock. If episodes of market illiquidity and heightened volatility are set to occur more frequently than in the past, policymakers must think about what this means and consider how to mitigate potential systemic risks. A related concern is that temporary factors may currently be masking an underlying lack of resilience of market liquidity. Perhaps most importantly, it is critical that policymakers understand better how the financial system will cope with the eventual normalisation of accommodating policies by global central banks.

⁽¹²⁰⁾ Roengpitya R., N. Tarashev and K. Tsatsaronis, 'Bank business models', BIS quarterly review, December 2014.

⁽¹²¹⁾ B. H. Cohen, 'How have banks adjusted to higher capital requirements?', BIS quarterly review September 2013; B. H. Cohen and M. Scatigna, 'Banks and capital requirements: channels of adjustment', BIS working papers, No. 443.

This section has shown that regulation has been only one of several factors influencing market liquidity in recent years. Other important cyclical and structural forces at play at more or less the same time have probably interacted with each other in complex ways and market participants are no doubt still adapting to them. Reaching definitive conclusions about the role of regulation is thus inherently difficult. Post-crisis regulatory reforms have strengthened the core of the financial system in the euro area and beyond, and improved the resilience of the banking sector. While some of

them may have had unintended consequences for market liquidity, this does not in itself suggest that they should be unwound. A key difficulty we face is that it is difficult to know what the ‘optimal’ level of liquidity is, in part because market structures are continually evolving. At the current juncture, the best strategy would be to deepen our understanding of developments in market liquidity, including by gathering more data and improving analysis of recent liquidity dynamics. Work is ongoing in the European Commission to do exactly that.