Introduction

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The 2007–9 financial crisis constituted the largest shock to the world financial system since the Great Depression in the 1930s. Financial crises tend to have common factors but also unique elements (see, for example, Reinhart and Rogoff 2008, 2009). Most financial crises are preceded by asset and credit booms, which, in turn, are fostered by accommodative monetary policy (see, for example, Bordo and Wheelock 2007a, b; Allen and Gale 2007; Allen et al. 2009; Claessens and Kose 2013). The most severe crises seem to arise when favourable financial market conditions coincide with rapid expansion in financial innovation (Calomiris 1998).

Similar to many other crises, the 2007–9 financial crisis has its origins in the real estate market. Making a historical comparison, Calomiris (2009) argues that, just as in previous real estate-related crises, the 2007–9 financial crisis was the result of government policies incentivising excessive real estate risk-taking. According to (among others) Brunnermeier (2009), this was supported by low interest rates caused by the fear of deflation after the bursting of the Internet bubble.

Apart from these policy-related factors, two financial industry trends laid the foundations of the lending boom and housing market frenzy that eventually led to the financial crisis: banks’ increased issuance of asset-backed securities (ABS) and the reliance on short-term funding from institutional investors (see Brunnermeier 2009).

Securitisations allow banks to distribute the credit risk from issuing mortgages over different investor groups that wish to bear it. Brunnermeier (2009) argues that this led to lower mortgage and
corporate lending rates. Additionally, as shown by Keys et al (2010), securitisations led to reduced lending standards. Since a bank only faces the risk of holding issued loans for some months, its incentives to screen properly are reduced. However, large amounts of securitisations never left the banking system, and therefore, rather than leading to better risk diversification, securitisations increased the interconnectedness among banks. Additionally, sponsoring banks usually grant credit lines ("liquidity backstop") to ensure that the special purpose vehicle (SPV) has sufficient liquidity in case investors stop buying short-term paper.

Since there were insufficient retail deposits to finance the housing boom, banks became dependent on short-term wholesale funding, especially asset-backed commercial paper (ABCP) and repurchase agreements (repos) (see Demirgüç-Kunt and Huizinga 2010; Perotti and Suarez 2011; Acharya et al 2013). Both of these trends were directly related to the rise of ABS.\(^1\) The marketability of ABS created a large pool of assets that banks could use as collateral for secured financing transactions. At the same time, non-financial corporations and institutional investors looked for options to place their growing cash reserves. Gorton (2009) argues that ABCP and repos were ideal instruments because they showed characteristics similar to deposits. They could be withdrawn on short notice, were secured by high-quality collateral and offered market return.

The period preceding the 2007–9 financial crisis was characterised by low interest rates spurred by accommodative monetary policy, government subsidies related to real estate, financial innovation in the form of securitisations, reduced lending standards, increased reliance on short-term wholesale funding and a credit boom. On top of that, and in contrast to initial expectations, securitisations did not transfer risks out of the banking system but rather increased the interconnectedness among financial institutions. Most of these factors have also been present prior to previous financial crises (see, for example, Calomiris 1998; Reinhart and Rogoff 2009; Claessens and Kose 2013). But what triggered the 2007–9 financial crisis?\(^2\)

Prior to the crisis, a significant number of mortgages were granted on the assumption of continuously increasing house prices, implying that borrowers could refinance loans with the increased value of their houses. When house prices stagnated and even dropped, default rates on subprime mortgages increased.

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In early 2007, the ABX index, the only observable market in the nexus of derivatives and structured finance, revealed the shock to the subprime mortgage market. This index is based on the price of credit default swaps, referencing 20 equally weighted securities containing subprime mortgages. The index reflects the costs of insuring a basket of mortgages against default.

The deterioration of the ABX index led to a drop in the prices of mortgage-related products. Brunnermeier (2009), for instance, shows that concerns about subprime mortgages led the market for ABCP to dry up. Most other asset classes, on the other hand, did not show increasing spreads until in August 2007, when the spread of the London Interbank Offered Rate and the Overnight Indexed Swap (Libor–OIS) sharply increased. Only the increase in the Libor–OIS spread led the value of other securitised asset classes to deteriorate. Gorton (2009) argues that the reason for the shock in the subprime market being transmitted to other parts of the banking system was asymmetric information. With a number of institutions reportedly being in difficulty in July 2007, investors got nervous. Similarly to previous crises, depositors “ran” on banks because it was not clear which banks were most exposed to subprime-related assets and investors did not trust banks’ equity cushions.

The flight to quality in repo markets – all firms wanted to hold cash or government bonds – reduced the demand for banks’ collateral and therefore their price. An increase in haircuts in the repo market is akin to a withdrawal. If haircuts rise, the banking system has to shrink, has to borrow elsewhere or needs an equity injection. However, after some first equity injections in the autumn of 2007, this source dried up, and so did the possibility to borrow. The only option was to deleverage through asset sales. However, if everyone wants to sell, prices have to fall. Gorton (2009) argues that the developments in repo markets were the force behind the transmission of the turmoil in the relatively small subprime market to the entire banking system. An additional difficulty was that market participants lost their trust in securitisations and thus tried to obtain more information. However, most market participants could not cope with the sudden need to understand, value and trade these new products. Securitisations turned illiquid.

Similarly to previous crises, the 2007–9 financial crisis was caused by a shock to the housing market. Being unsure about which

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counterparties were at risk, investors requested more collateral from all banks. Eventually, this forced most institutions into severe fire sales and a significant number of them into failure, with adverse consequences for the entire financial system.

There were many factors that led to the outbreak of the global financial crisis, and observers differ on the relative importance of each individual factor. There is, however, wide agreement that liquidity risks and lapses in liquidity risk management were key factors in the outbreak of this crisis, and especially its rapid expansion. The crisis also showed that capital regulation does not (fully) mitigate liquidity risks. To better understand why this is the case, it is useful to classify liquidity into two categories: market liquidity and funding liquidity (see Drehmann and Nikolaou 2009; Brunnermeier 2009).

Funding liquidity refers to the ease with which an institution can attract funding. An institution’s funding liquidity is high if it can easily raise money at reasonable costs. When financial institutions purchase an asset, they often use it as collateral for short-term borrowing. The haircut – the difference between the value of an asset and the amount that can be borrowed against it – needs to be financed by the institution’s equity. Funding liquidity risk can take three forms:

1. changes in margins and haircuts;
2. cost increases or the impossibility of rolling over short-term borrowing; and
3. withdrawal of funding.

The three sources of funding liquidity risk have a severe adverse impact if assets can only be sold at fire-sale prices. Funding liquidity is therefore closely linked to market liquidity (see Brunnermeier and Pedersen 2009).

Market liquidity is high when it is easy for institutions to raise money by selling the asset instead of borrowing against it. If market liquidity is low, selling the asset would depress its price. Kyle (1985) distinguishes three forms of market liquidity:

1. the bid–ask spread, which measures the price difference between buying and selling the same asset at the same time;
2. market depth, referring to the amount that can be sold without causing the price of an asset to move; and

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3. market resilience, describing the time it takes for prices that have temporarily fallen to bounce back.

The shock in the subprime market had a direct impact on banks’ funding liquidity risk. Being unsure about their quality, investors increased the haircuts on securitisations used in secured borrowing transactions. Since banks were already highly leveraged, they could not finance the increasing haircuts with their equity. As a consequence, many banks needed to sell their assets at the same time. These sales depressed prices even further, which in turn led to more sales and hence to a downward spiral. The risk and magnitude of downward spirals are larger for assets with lower market liquidity. By definition, sales of less liquid assets cause larger price drops than sales of more liquid assets.

Another issue directly related to banks’ funding risk were the credit lines banks granted to SPVs. When the markets for ABS and ABCP dried up, it became clear that many SPVs would be drawing on their credit lines, increasing banks’ concerns about their own funding needs. Since there was uncertainty about whether other banks faced the same issues, banks hoarded liquidity, with adverse consequences for the functioning of interbank money markets.

The global financial crisis showed how quickly liquidity can evaporate and how rapidly this can transmit stress in one market to other markets. Banks held too few market liquid assets to compensate for their increased funding liquidity risks. In such circumstances, Cifuentes et al (2005) argue that liquidity buffers may be a useful instrument. During severe crises, even well capitalised banks are forced into fire sales, which reduce the value of other banks’ assets. Apart from reducing the risk of fire sales, requiring institutions to increase their liquidity buffers can be expected to restore investors’ confidence (and therefore reduce the likelihood of bank runs), reduce banks’ reliance on central banks and give supervisors time to react in case institutions experience difficulties (see Adrian and Shin 2009, 2010).

In response to this crisis, the Basel Committee on Banking Supervision (BCBS) drafted a new regulatory framework with the aim of improving the banking system’s resilience. In addition to new rules for capital and leverage, the framework also specifies short-term and long-term liquidity requirements as key concepts in order to
reinforce the resilience of banks against liquidity risks. The liquidity coverage ratio (LCR) is a short-term ratio that requires financial institutions to hold high-quality liquid assets at least equal to their net cash outflows over a 30-day stress scenario. The second measure, the net stable funding ratio (NSFR) aims to improve banks’ longer-term, structural funding. The BCBS recommended national regulators implement the LCR and NSFR by 2015 and 2018, respectively. At the time of writing, regulators around the world are either in the process of or have just finished implementing the proposals of the LCR and NSFR in national regulation.

The introduction of globally harmonised liquidity standards is a unique step in supervision. However, this is only the beginning of a long process of ensuring sound liquidity risk management and supervision. Apart from the technical set-up of the reporting framework, banks and regulators need to familiarise themselves with operational matters related to LCR compliance.

There is also wide agreement that compliance with the LCR and NSFR is insufficient to ensure sound liquidity risk management. It is commonly accepted that banks are expected to:

- have a clear liquidity and funding risk management strategy and tolerance,
- have a complete view on their liquidity buffer and counterbalancing capacity,
- run periodic liquidity stress tests with different assumptions and over different time horizons, and
- have realistic and easily executable contingency funding plans, liquidity and funds transfer pricing mechanisms as well as sound intraday liquidity risk management frameworks.

To this end, banks need an internal process that combines these elements in an efficient management tool and allows them to report it to the regulator. This process is commonly referred to as the internal liquidity adequacy assessment process (ILAAP). The documentation package of the ILAAP should include general explanations regarding an institution’s risk management processes, the governance around ILAAP as well as the most important risks that the institution is facing or expects to emerge in the future.

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An essential part of ILAAP is that an institution begins with a description of its organisational structure in relation to liquidity and funding risks. Ideally, particular attention is paid to outlining the functions involved, and their responsibilities in relation to the first, second and third lines of defence (e.g., front office, risk management, management body, internal audit). On top of that, it is useful to describe how the institution clearly segregates risk-taking and risk management functions with regard to liquidity risk management.

Other essential parts of an ILAAP are a clear description of the institution’s liquidity and funding risk management strategies and of the review process of the liquidity risk management strategy as well as an overview of the strategies that have been put forward in response to the institution’s liquidity risk profile and the liquidity risks identified. Finally, it is recommended to provide a detailed description of the organisational structure of the management that is in charge of the application of the strategy.

For a continuous improvement, regulators may also ask institutions to describe the processes around updating their liquidity risk management frameworks and how the outcome of the ILAAP is embedded in the decision-making, business planning and risk management processes and substantiate their description with appropriate examples.

In addition to these general descriptions, aimed at putting ILAAP into a wider context, and the ILAAP’s key items, a fair assessment of liquidity management would also include quantitative information (maturity ladders, asset encumbrance, compliance with Pillar 1 requirements, concentration) including a description of the processes to guarantee reliable data as well as the results of the internal review process and internal audit.

Similarly, regulators need a process that allows them to evaluate institutions’ ILAAP and to form a complete view on institutions’ liquidity risk management. This process is usually called the supervisory review and evaluation process (SREP).

While many banks and regulators already have these systems in place for capital, similar frameworks for liquidity only exist in some countries. The aim of this book is to discuss all the aspects relevant to implementing a solid and comprehensive liquidity risk management process.

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STRUCTURE OF THE BOOK

Chapter 2, by Clemens Bonner and Paul Hilbers, analyses the discussions of the Basel Committee on Banking Supervision from 1975 to 2014, specifically focusing on the development and the role of BCBS “sound principles” and the role the 2007–9 financial crisis played in overcoming previous obstacles that hampered the introduction of quantitative liquidity requirements such as the LCR and NSFR. Chapter 3, by John Pogach, reviews the academic literature pertaining to liquidity stresses, pointing out the major sources of liquidity risk.

Chapters 4 and 5 should be read in conjunction as they discuss the process of liquidity supervision and management from a regulator’s and an institution’s point of view, respectively. Specifically, Chapter 4, by Patrick de Neef, provides insights into the process around liquidity management and supervision. It provides tips and tricks, as well as key issues to keep in mind when designing, reviewing or updating the overall processes around liquidity risk management. Chapter 5, by Agaath Nijboer, describes how Rabobank implemented ILAAP, and gives recommendations and suggestions. Chapter 6 is written by Emrah Arbak; its aim is to provide a more complete picture of how an ideal liquidity risk management strategy framework may look once the institution’s particularities and the market conditions are taken into consideration. To that extent, the objective is not to better describe the international standard but to flesh out some of the aspects that are open for interpretation and, where necessary, to go further than the common minimum denominator. Chapter 7, by Jill Cetina and Katherine Gleason, discusses the key operational decisions banks are facing in determining and managing their liquidity buffer. They use the LCR as a starting point for discussing banks’ operational decisions by outlining the analytical process banks should use to determine which assets to include in their high-quality liquid assets (HQLA) buffers. However, they also stress the need for banks to move beyond a “one size fits all” LCR approach to a tailored approach to internal liquidity risk management. Chapter 8 is by Clemens Bonner, Andreas Katteneder and Iman van Lelyveld, and provides insights into bank-level liquidity stress-testing. It provides guidance to banks on how to design stress tests and how to use stress-test results in liquidity risk management frameworks. Related to liquidity stress-testing, Chapter 9, by Diana

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Bonfim and Sandra Pinheiro, deals with contingency funding plans. It discusses the key elements for plan design, the role of early warning indicators and the interaction of contingency funding plans and liquidity stress-testing. Chapter 10 is by Joel Grant and explains how to implement liquidity transfer pricing; it focuses in particular on the functioning of banks’ liquidity transfer pricing (LTP) processes in practice, the role of LTP in helping banks to achieve their strategic objectives and the governance of LTP. Chapter 11 deals with intraday liquidity management and is written by Alan Ball and Gamal Bemath. They set out the challenges that banks face in managing their intraday liquidity positions and how they approach this task. They also consider the response by the regulatory authorities to the intraday risk management failures that were exposed in the global financial crisis.

Prudent liquidity risk management and supervision, however, does not stop with the individual bank. Therefore, Chapter 12, by Jan Willem van den End, Iman van Lelyveld and Stefan Schmitz, analyses the relationship of liquidity risk management and supervision with the financial system and the balance of payments as a whole. It discusses how liquidity risk can be a driving force of systemic risk, by connecting macro- and microprudential liquidity risk, thereby highlighting the need to take into account the wider context both in banks’ internal frameworks of liquidity risk management and in supervision. Chapter 13, by Stefan Schmitz, deals with macroprudential liquidity stress tests; he discusses what distinguishes the macroprudential from the microprudential variant presented in Chapter 8 and discusses the main challenges, as well as the design and calibration of macroprudential liquidity stress tests. Finally, in Chapter 14, Daniel Hardy and Philipp Hochreiter outline a proposal for a macroprudential liquidity buffer.

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This chapter expands upon Bonner (2014).

9

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LIQUIDITY RISK MANAGEMENT AND SUPERVISION: A GUIDE TO BETTER PRACTICE

1 The rise of ABS has commonly been associated with four driving forces. (1) Regulatory arbitrage: moving a pool of assets off-balance-sheet to the SPV reduces banks’ capital requirement. (2) Banks’ increased need for collateral to finance the housing boom with short-term secured wholesale funding. (3) Minimisation of bankruptcy costs due to off-balance-sheet financing. (4) Favourable ratings compared with bonds with similar yields or risk characteristics (see Gorton 2009; Calomiris 2009; Kowalik 2013).

2 The chronology of the 2007–9 financial crisis is outlined in many papers. The following paragraphs mainly draw on Brunnermeier (2009), Gorton (2009) and Gorton and Metrick (2012).

3 Well-known institutions in difficulty were BNP Paribas in France, IKB in Germany and the Home Mortgage Investment Corp in the US.

4 Note that this was not a classic retail bank run, as described by Diamond and Dybvig (1983). Instead of cash withdrawals by retail clients, this crisis was reflected by haircut increases in repo markets.

5 Due to several downgrades, some banks also experienced large margin calls from their derivative positions.

6 Gorton (2009) explains this problem (also referred to as the “lemons problem”) as follows: “[t]hink of it as like electricity. Millions of people turn their lights on and off every day without knowing how electricity really works or where it comes from. The idea is for it to work without every consumer having to be an electrician…. [However,] when the shock hits, suddenly the electricity stops working. When that happens, an event no one really contemplated, it is too late for everyone to become an electrician”.

7 See, for instance, Hilbers et al (2008) for more details on the relevance of the housing market for financial stability.

8 See Brunnermeier (2009) or Franklin and Carletti (2008) for overviews regarding the role of liquidity during the financial crisis.

9 Any views expressed in this book are the individual authors’ personal opinions and do not necessarily reflect those of the affiliated institutions.

REFERENCES


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