# Bank capital and liquidity

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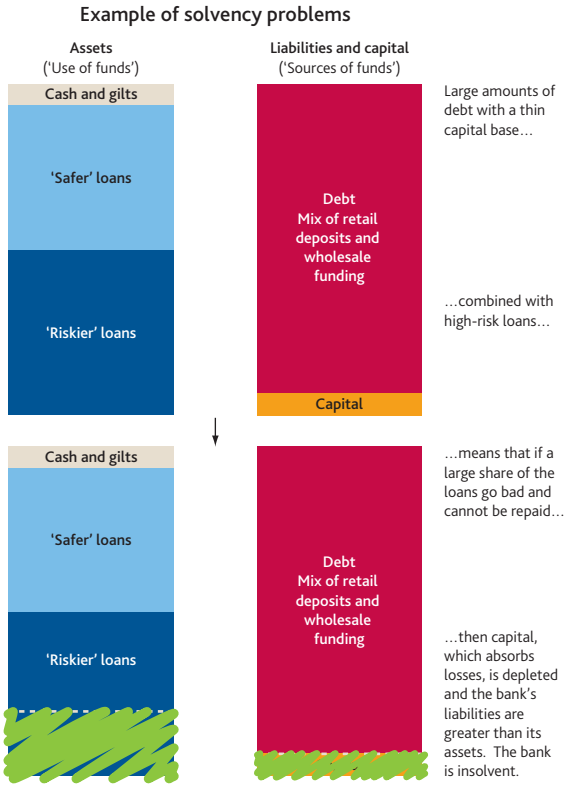
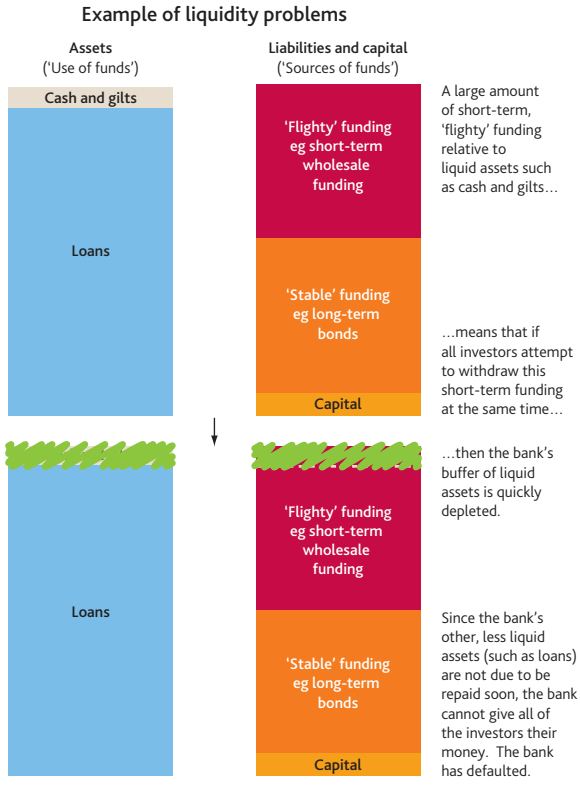
- Bank capital, and a bank's liquidity position, are concepts that are central to understanding what banks do, the risks they take and how best those risks should be mitigated. This article provides a primer on these concepts.
- It can be misleading to think of capital as 'held' or 'set aside' by banks; capital is not an asset. Rather, it is a form of funding — one that can absorb losses that could otherwise threaten a bank's solvency. Meanwhile, liquidity problems arise due to interactions between funding and the asset side of the balance sheet — when a bank does not hold sufficient cash (or assets that can easily be converted into cash) to repay depositors and other creditors.
- It is the role of bank prudential regulation to ensure the safety and soundness of banks, for example by ensuring that they have sufficient capital and liquidity resources to avoid a disruption to the critical services that banks provide to the economy.




**Implications**

Unlike other types of funding, capital, such as shareholder equity, can absorb losses:

- So to be resilient against failure, banks need a large enough buffer of capital.
- And the riskier a bank's assets, the more capital it needs.

**Implications**

To avoid liquidity problems banks need to have a combination of:

- Stable sources of funding that will not dry up during stressed market conditions.
- A buffer of liquid assets.

(1) The authors would like to thank Guy Benn, Stephen Bland and John Cunningham for their help in producing this article.

Bank capital, and a bank's liquidity position, are concepts that are central to understanding what banks do, the risks they take and how best those risks should be mitigated — by banks themselves, and by prudential regulators. As the recent financial crisis powerfully demonstrated, the instability that can result from banks having insufficient financial resources — capital or liquidity — can acutely undermine the vital economic functions they perform.

This article is split into three sections. The first section introduces the traditional business model for banks of taking deposits and making loans. The second section explains the key concepts necessary to understand bank capital and liquidity. This is intended as a primer on these topics: while some references are made to the recent financial crisis, the aim is to provide a general framework for thinking about bank capital and liquidity. The box on page 206 explains some of the accounting principles germane to understanding bank capital.

The final section gives an overview of capital and liquidity regulation. In April 2013, the Bank, through the Prudential Regulation Authority (PRA), assumed responsibility for the safety and soundness of individual firms, which involves the microprudential regulation of banks' capital and liquidity positions.(1) At the same time, the Financial Policy Committee (FPC) within the Bank was given legal powers and responsibilities(2) to identify and take actions to reduce risks to the financial system as a whole — macroprudential regulation — including by recommending changes in bank capital or liquidity requirements, or directing such changes in respect of certain capital requirements. The FPC has already made recommendations in 2013 on capital that the PRA have taken steps to implement.(3)

The box on pages 210–11 sets out the latest 'Basel III' international standards for capital requirements, including minimum requirements as well as a number of additional capital buffers. The box on page 213 explores some of the links between a bank's capital and liquidity positions.(4)

## The traditional banking business model

Understanding why capital and liquidity are important requires an overview of what banks do. This section sets out the traditional banking business model, using a simplified bank balance sheet as an organising framework and highlighting some of the risks inherent to a bank's business.

Banks play a number of crucial roles in the functioning of the economy. First, they provide payments services to households and companies, allowing them to settle transactions. Second, they provide credit to the real economy, for example by providing mortgages to households and loans to companies. And third, banks help households and businesses to manage the various risks they face in different states of the world. This includes offering depositors access to their current accounts 'on demand', as well as providing derivatives transactions or other financial insurance services for their broader customer base.(5)

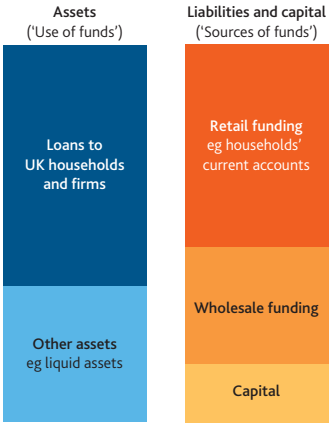
The focus for this article is the second function: providing credit to the real economy. Borrowers frequently need sizable longer-term loans to fund investments, but those with surplus funds may individually have smaller amounts and many want swifter access to some or all of their money. By accepting deposits from many customers, banks are able to funnel savers' funds to customers that wish to borrow. So, in effect, banks turn many small deposits of a short-term maturity into fewer longer-term loans. This 'maturity transformation' is therefore an inherent part of a bank's business model.

Banks profit from this activity by charging a higher interest rate on their loans than the rate they pay out on the deposits and other sources of funding used to fund those loans. In addition they may charge fees for arranging the loan.(6)

### Introducing a bank's balance sheet

A useful way to understand what banks do, how they make profits and the risks they take is to consider a stylised balance sheet, as shown in **Figure 1**. A bank's balance sheet provides a snapshot at a given point in time of the bank's financial position. It shows a bank's 'sources of funds' on one side (liabilities and capital) and its 'use of funds' (that is, its assets) on the other side. As an accounting rule, total liabilities plus capital must equal total assets.(7)

**Figure 1** A stylised bank balance sheet




(1) The PRA also supervises insurance companies. For more information see the article by Debbage and Dickinson on pages 216–22 of this edition of the *Bulletin*.
(2) The FPC had existed in interim form since February 2011. See, for example, Murphy and Senior (2013).
(3) The speech by Governor Carney on 28 August 2013 gives more details and also explores the links between capital and liquidity (Carney (2013)).
(4) A short **video** accompanying this article talks through the examples of bank solvency and liquidity problems illustrated on the front page of this article (these are also discussed in the following section). See www.youtube.com/watch?v=kAgNJNvDcu8.
(5) For more details on the economic role of banks, see, for example, Freixas and Rochet (2008).
(6) Of course, other banking activities will also generate income streams and profits. See DeYoung and Rice (2004) and Radecki (1999) for a discussion of some of these other sources of revenues.
(7) See also, for example, Mishkin (2007).

Like non-financial companies, banks need to fund their activities and do so by a mixture of borrowed funds ('liabilities') and their own funds ('capital'). **Liabilities** — what banks owe to others — include retail deposits from households and firms, such as current or savings accounts. Banks may also rely on wholesale funding: borrowing funds from institutional investors such as pension funds, typically by issuing bonds. In addition, they borrow from other banks in the wholesale markets, increasing their interconnectedness in the process. A bank's **capital** represents its own funds. It includes common shares (also known as common equity) and retained earnings. Capital is discussed in more detail in the following section.

Banks' **assets** include all financial, physical and intangible assets that banks currently hold — or are due to be paid at some agreed point in the future. They include loans to the real economy such as mortgages and personal loans to households, and business loans. They also include lending in the wholesale markets, including to other banks. Lending can be secured (where a bank takes collateral that can be sold in the event that the borrower is unable to repay) or unsecured (where no such collateral is taken). As well as loans, banks hold a number of other types of assets, including liquid assets such as cash, central bank reserves or government bonds;[1] the bank's buildings and other physical infrastructure; and 'intangible' assets such as the value of a brand. Finally, a bank may also have exposures which are considered to be 'off balance sheet', such as commitments to lend or notional amounts of derivative contracts.

### Credit risk, liquidity risk and banking crises

In transforming savers' deposits into loans for those that wish to borrow, the traditional banking business model entails the bank taking on credit risk and liquidity risk.[2] **Credit risk** is the risk of a borrower being unable to repay what he or she owes to a bank. This causes the bank to make a loss. This is reflected in a reduction in the size of the bank's assets shown on its balance sheet: the loan is wiped out, and an equivalent reduction must also be made to the other side of the balance sheet, by a reduction in the bank's capital. If a bank's capital is entirely depleted by such losses, then the bank becomes 'balance sheet insolvent' — illustrated on the left-hand column of the figure on the first page of this article — that is, its liabilities exceed its assets.

**Liquidity risk** takes on a number of forms. Primarily for a bank, it is the risk that a large number of depositors and investors may withdraw their savings — that is, the bank's funding — at once, leaving the bank short of funds. Such situations can force banks to sell off assets — most likely at an unfavourably low price — when they would not otherwise choose to. If a bank defaults, being unable to repay to depositors and other creditors what they are owed as these debts fall due, it is 'cash-flow insolvent'. This is illustrated on the right-hand column of the figure on the first page of this article. A bank 'run' — where many depositors seek to withdraw funds from the bank — is an extreme example of liquidity risk.

The failure of a bank can be a source of financial instability because of the disruption to critical economic services. Moreover, the failure of one bank can have spillover effects if it causes depositors and investors to assume that other banks will fail as well. This could be because other banks are considered to hold similar portfolios of loans — that might also fail to be repaid — or because they might have lent to the bank that has failed.

These risks and others need to be managed appropriately throughout the business cycle. The following section considers in more detail how bank capital can mitigate the risk of an insolvency crisis materialising and how a bank's mix of funding and buffer of liquid assets can help it to prevent or withstand liquidity stresses.

## Capital and liquidity

### The difference between capital and liquidity: an overview

As outlined in the previous section, a bank's capital base and its holdings of liquid assets are both important in helping a bank to withstand certain types of shocks. But, just as their natures as 'financial resources' differ, so does the nature of the shocks they mitigate against. Capital appears alongside liabilities as a ***source of funding***; but, while capital can absorb losses, this does not mean that those funds are locked away for a rainy day. Liquid assets (such as cash, central bank reserves or government bonds) appear on the other side of the balance sheet as a ***use of funding*** and a bank holds a buffer of liquid assets to mitigate against the risk of liquidity crises caused where other sources of funding dry up.

Importantly, both capital and liquidity provisioning and risk mitigation require a consideration of the details of both the 'source of funds' and the 'use of funds' sides of the balance sheet. It is useful to consider how the characteristics of various types of typical bank assets and liabilities differ. Some of these characteristics are summarised in **Table A**.

For instance, if a bank holds more risky assets (such as unsecured loans to households and firms) it is likely to need to hold more capital, to mitigate against the risk of losses in the event that such loans default. And if a bank relies on a high proportion of unstable or 'flighty' sources of funding for its

(1) Central bank reserves are effectively current accounts for banks. Whereas an individual places his or her deposits in a commercial bank, a commercial bank keeps its deposits (called reserves) with the central bank. See, for example, Bank of England (2013a).
(2) While the focus of this article is on credit risk and liquidity risk, other risks faced by banks include market risk and operational risk. These are discussed briefly in the box on pages 210–11.

**Table A** Key properties of different types of bank funding and assets

| Sources of funding (liabilities and capital) | |
|---|---|
| **Seniority:** | If a bank becomes insolvent, 'senior' liabilities are repaid before 'junior' ones. Common equity is the most junior and is the first to absorb any losses. |
| **Maturity:** | This refers to the date at which funding can be contractually withdrawn. Some funds can be withdrawn at any time by the borrower (such as current accounts). Others have a fixed term (a two-year bond, say) or are permanent (common shares). |
| **Cost:** | The cost is the expected rate of interest that a bank pays on its liabilities or capital. Typically, a bank would have to offer a higher yield to attract investors, the more credit risk or liquidity risk it takes. |
| **Use of funding (assets)** | |
| **Liquidity:** | This is a measure of the ease with which an asset can be converted into cash. Central bank reserves and 'safe' securities like government bonds are considered liquid, while loans to households and firms, or a bank's buildings, are relatively illiquid assets. |
| **Credit risk:** | This is the risk that a borrower will fail to pay what they owe on the due dates. Government bonds (with high credit ratings) are usually considered 'low-risk' assets. Loans carry credit risk, the amount varying for different types of borrower and loan product. |
| **Yield:** | This is the return (interest and fees) banks earn on their assets. For loans, it is reflected in the interest rate they charge, plus any fees. Typically, lending offers banks a higher yield (but also more risk) than they can get by holding a safer asset. |

activities, such as short-term wholesale funding, to avoid the risk of a liquidity crisis, then it will need to hold more liquid assets.

The following subsections explain the concepts of capital and liquidity in more detail. While they are considered separately, in practice, there is often likely to be considerable interplay between risks to a bank's capital and liquidity positions. Doubts surrounding a bank's capital adequacy, for example, can cause creditors to withdraw their deposits. Meanwhile, actions that a bank takes to remain liquid — such as 'fire sales' or paying more than it would normally expect for additional funds — can, in turn, reduce profits or cause losses which undermine its capital position. Some of the ways in which changes in a bank's capital position could affect its liquidity position, and *vice versa*, are discussed at the end of the article.

## Capital

As noted above, banks can make use of a number of different funding sources when financing their business activities. **Capital can be considered as a bank's 'own funds', rather than borrowed money such as deposits.** A bank's own funds are items such as its ordinary share capital and retained earnings — in other words, *not* money lent to the bank that has to be repaid. Taken together, these own funds are equivalent to the difference between the value of total assets and liabilities.

While it is common usage to refer to banks 'holding' capital, this can be misleading: unlike items such as loans or government bonds that banks may actually hold on the asset side of their balance sheet, capital is simply an alternative source of funding — albeit one with particular characteristics.

The key characteristic of capital is that it represents a bank's ability to absorb losses while it remains a 'going concern'. Much of a bank's activities are funded from customer deposits and other forms of borrowing by the bank that it must repay in full. If a bank funds itself purely from such borrowing, that is, with no capital, then if it incurred a loss in any period, it would not be able to repay those from whom it had borrowed — it would be balance sheet insolvent: its liabilities would be greater than its assets. But if a bank with capital makes a loss, it simply suffers a reduction in its capital base. It can remain balance sheet solvent.

There are two other important characteristics of capital. First, unlike a bank's liabilities, it is perpetual: as long as it continues in business, the bank is not obligated to repay the original investment to capital investors. They would only be paid any residue in the event that the bank is wound up, and all creditors had been repaid. And second, typically, distributions to capital investors (dividends to shareholders, for instance) are not obligatory and usually vary over time, depending on the bank's profitability. The flipside of these characteristics is that shareholders can generally expect to receive a higher return in the long run relative to debt investors.

### Expected and unexpected losses

Banks' lending activities always involve some risk of incurring losses. Losses vary from one period to another; and they vary depending on the type of borrower and type of loan product. For example, an unsecured business loan to a company in an industry with highly uncertain future earnings is riskier than a secured loan to a company whose future revenue streams are more predictable.

While it is not possible to forecast accurately the losses a bank will incur in any given period, banks can estimate the average level of credit losses that they expect to materialise over a longer time horizon. These are known as **expected losses**.

Banks can take account of their expected losses when they manage their loan books. Expected losses are effectively part of the cost of doing business — as such, they should be taken into account in the interest rate that the bank sets for a particular loan. Suppose, for example, a bank lends £1 to 100 individuals and it expects that 5% of its loans will default, and it will receive no money back. For simplicity, it is assumed that the bank has no operating costs and is not paying any interest itself on the £100 of funds that it is lending out. In this scenario, if the bank charges no interest on the loans then it would expect to receive £95 back from the borrowers. In order to (expect to) receive the full £100 back it would need to charge interest on each individual's loan. The required interest rate works out to be just fractionally more than the proportion of borrowers expected to default. In this example,

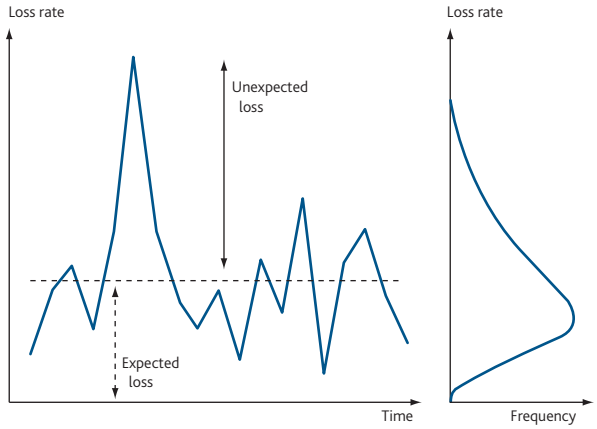
then, the bank would need to charge just above 5% on each of the £1 loans in order to (expect to) break even, taking account of expected losses.(1)

Of course, banks are not able to predict future events perfectly. Actual, realised losses will typically turn out higher or lower than losses that had been expected. Historical losses may prove poor predictors of future losses for a number of reasons. The magnitude and frequency of adverse shocks to the economy and financial system, and the riskiness of certain types of borrowers and loans, may change over time. For loans where borrowers have pledged collateral, banks may recover less than they had expected to in the event of default. In the case of mortgages, for example, this would occur if the value of the property falls between the time the loan was made and when the borrower defaults. Or banks may underestimate the likelihood that many borrowers default at the same time. When the economy is unexpectedly hit by a large, adverse shock, such as that experienced during the 2007–08 financial crisis, all of these factors may be at play.

Banks therefore need to take account of the risk that they incur **unexpected losses** over and above expected losses. It is these unexpected credit losses (the amount by which the realised loss exceeds the expected loss) that banks require a buffer of capital to absorb.

While expected losses can, arguably, be estimated when sufficient past data is available, unexpected losses, in contrast, are by their nature inherently hard to predict. They would include losses on banks' loan books associated with large, adverse shocks to the economy or financial system. **Figure 2** gives a stylised example of how actual, realised losses can be split into expected and unexpected components. The right-hand panel shows that for a given period, while the expected loss rate is the expected outcome, in reality losses may be higher or lower than that.

**Figure 2** Expected and unexpected losses




Source: Basel Committee on Banking Supervision (2005).

## Accounting for losses on the balance sheet

Usually, there is a period between when a borrower has defaulted and when the bank 'writes off' the bad debt. When losses on loans are incurred, banks set aside impairment provisions. Provisions appear on the *balance sheet* as a reduction in assets (in this case, loans) and a corresponding reduction in capital. Impairment provisions are based on losses identified as having been incurred by the end of the relevant period, but not yet written off. The box on page 206 discusses recent developments in the accounting treatment of provisions in more detail. It also explains other accounting principles relevant to understanding bank capital, such as how retained earnings feed into the capital base and the different ways of valuing financial assets.

## The leverage ratio

A useful indicator of the size of a bank's balance sheet — and hence potential future losses that a bank is exposed to — relative to its 'own funds' (capital) is the **leverage ratio**. In the context of regulatory requirements, it is usually expressed inversely, as the ratio of capital to total assets.(2) It reflects an aspect of the riskiness of a bank since capital absorbs any losses on the bank's assets: so high leverage (that is, a low ratio of capital to total assets) is riskier, all else equal, as a bank has less capital to absorb losses per unit of asset. This could increase the risk of the bank not being able to repay its liabilities. Different definitions of leverage can also include a bank's off balance sheet exposures. These include items such as derivatives, security lending and commitments. By capturing these items, the leverage ratio provides a relatively comprehensive overview of a bank's capital relative to its total exposures. Other metrics for gauging the capital adequacy of a bank, such as the **risk-based capital ratio**, are discussed in the section on capital regulation.

## Liquidity

The concept of liquidity is also intrinsically linked to both sides of a bank's balance sheet. It relates to the mix of assets a bank holds and the various sources of funding for the bank, in particular, the liabilities which must in due course be repaid. It is useful to distinguish between two types of liquidity risk faced by banks.(3) These are:

- **Funding liquidity risk**: this is the risk that a bank does not have sufficient cash or collateral to make payments to its counterparties and customers as they fall due (or can only do so by liquidating assets at excessive cost). In this case the bank has defaulted. This is sometimes referred to as the bank having become 'cash-flow insolvent'.

(1) There would of course also be a charge to generate the expected profit on the transaction. For more detail on how banks price loans, see Button, Pezzini and Rossiter (2010).
(2) For example, in June 2013 the PRA Board asked two firms to submit plans to reach a 3% common equity Tier 1 leverage ratio. See the June 2013 *Financial Stability Report*.
(3) See, for example, Brunnermeier and Pedersen (2008).

## 'Accounting principles 101' for understanding bank capital

The accounts of a bank are the building block of capital regulation as they present an audited view of its financial condition. This box describes some accounting concepts relevant to understanding bank capital, including how provisions and retained earnings feed into the balance sheet and the capital position.

### Balance sheets and income statements

A **balance sheet** shows a snapshot of the financial condition of a company at a given point in time. A simple example for a bank is shown in **Figure 1** in the main text. Assets are recorded in various categories (such as cash and central bank reserves; loans and advances to customers; and derivative financial instruments) as are liabilities (for instance, retail deposit accounts and debt securities in issue) and capital (such as ordinary share capital and retained earnings). A balance sheet must balance; resources (assets) must equal the funding provided for the resources (liabilities plus capital). A company's **income statement**, meanwhile, shows its revenues and expenses (and certain gains and losses) during a given period of time.

### Losses, provisions, retained earnings and capital

Accounting rules require that losses on assets such as loans are recognised in the form of **impairment provisions** as soon as they are incurred, but no earlier.(1) Provisions appear in two places in the accounts: on the income statement they appear as an expense, reducing net income; on the balance sheet they appear as a reduction in assets (in this case loans to customers) and a corresponding reduction in capital (specifically, shareholders' equity). The focus on losses arising from past loss events has led to concerns that banks' reported profitability and balance sheets may not reflect adequately the economics of lending. Specifically, a bank recognises the interest income that it receives from a loan as it is earned; but while some of this income will reflect expected future losses that have been 'priced in' to the loan (see main text for an example), these expected losses are not deducted elsewhere on the income statement; only incurred losses are deducted. This risks overstating the bank's profitability in the period before the losses are incurred.

A recent proposal from the International Accounting Standards Board (IASB) aims to respond to credit deterioration in a more timely fashion by requiring banks to build up provisions earlier in the cycle and in advance of the losses being incurred.(2) The proposal recommends a staged approach to establishing loan provisions: from the inception of a loan, provisions would be raised to cover expected losses arising from defaults expected in the next twelve months. This twelve-month loss estimate would be updated as the probability of default changes and, where there has been a significant credit deterioration since origination, the provision on the loan would be increased to cover the full lifetime expected loss.(3) This approach should result in a more prudent assessment of banks' profitability and capital. As with any forward-looking model, the new approach would rely on some combination of internal models and management's judgements about expected losses.

Along with shareholder equity, **retained earnings** form a part of a bank's capital base. They also show up on both the income statement and the balance sheet. A simple example helps to illustrate this. Suppose a bank makes a profit of £100 million in a given period, which would be recorded on the bank's income statement. As with other firms, the bank can then choose whether to distribute this money to shareholders (typically in the form of dividend payments) or retain it. If all of the £100 million is retained then this shows up as an increase in capital resources and — at least in the first instance — as an increase in cash (or central bank reserves) on the asset side of a bank's balance sheet.(4)

### Valuation of financial assets

Financial assets are those assets such as cash and deposits, loans and receivables, debt and equity securities and derivatives. The classification of a financial asset held by a bank determines how it is valued on the balance sheet and how it affects the income statement. The loans and receivables discussed above will generally be measured on an 'amortised cost' basis with income accrued over time, having deducted any provisions for credit impairment. This is the typical 'banking book' treatment. The 'trading book' treatment involves measuring assets on a current market price (that is, 'fair value') basis.

These classifications mean that the market value of a bank's assets may be lower (or, in some instances, higher) than the amount at which the asset is recorded in the accounts. This can be because there is no requirement to mark the assets to market although, where the market value is lower, it will also mean the bank has concluded that the fact that fair value is below amortised cost is not evidence that the asset is impaired. In such cases, the accounting equity would overstate the bank's true capital position and ability to absorb losses.

(1) Note that accountants also use the term 'provisions' to describe liabilities for *known* future expenditures where the exact amount and timing is uncertain, such as mis-selling compensation.
(2) In March the IASB — the body responsible for setting accounting standards in the United Kingdom — published its third set of proposals to reform the recognition, measurement and reporting of credit impairment losses ('provisions') on loans and other financial assets.
(3) This approach could also reduce procyclicality in the system that stems from the current, backward-looking approach, which tends to inflate banks' balance sheets in upswings and deflate them in downswings. For more details, see Box 4 on pages 56–57 of the June 2013 *Financial Stability Report*.
(4) In general, retained earnings will only count as capital for regulatory purposes once they have been audited.

- **Market liquidity risk**: this is the risk that an asset cannot be sold in the market quickly, or, if its sale is executed very rapidly, that this can only be achieved at a heavily discounted price. It is primarily a function of the market for an asset, and not the circumstances of an individual bank. Market liquidity risk can soon result in the bank facing a funding liquidity crisis. Alternatively, with a fire sale, it may result in the bank suffering losses which deplete its capital.

Banks can mitigate these liquidity risks in two ways. First, they can seek to attract stable sources of funding that are less likely to 'run' in the event of stressed market conditions. And second, banks can hold a buffer of highly liquid assets or cash that can be drawn down when their liabilities fall due. This buffer is particularly important if a bank is unable to roll over (renew) its existing sources of funding or if other assets are not easy to liquidate. This buffer mitigates both types of liquidity risk.

## Liquidity crises: 'runs' on banks

A bank 'run' is an acute crystallisation of funding liquidity risk and occurs when a significant number of depositors seek to withdraw funding at the same time. The reason this can happen relates to the 'maturity transformation' aspect inherent to traditional banking: short-term liabilities, including deposits, are used to fund long-term loans.

One trigger for a run on a bank is whether creditors have confidence that the bank is 'balance sheet insolvent' — that is, whether it has sufficient capital to absorb losses and to repay its deposits. In this case a depositor who withdraws their funds early will receive all of their money back immediately, while one who waits may only receive compensation up to the £85,000 limit from the Financial Services Compensation Scheme (FSCS) within a target of seven days.(1)

Liquidity risk can also arise for other reasons. For instance, 'contingent risk' arises from scenarios such as an increase in the number of customers drawing down pre-agreed credit lines. In this scenario the bank's liquid assets are used to meet the contingent commitments to such customers, so that the assets are transformed into loans.

## Mitigant (i): stable funding profiles

**A bank can adopt a stable funding profile to mitigate against funding liquidity risk and minimise the chances of a bank run happening.** Runs are caused by depositors reacting to a fear of losing their money and enforcing their contractual right to withdraw their funding. Stable funding is therefore typically:

- diversified across a range of sources;
- sourced from investors or depositors who are less likely to withdraw funds in the event that a bank makes losses;(2) and
- sourced via instruments that contractually lock in investors' savings for a long period of time.

Banks typically assess the stability of their depositors in three stages: they start with the borrower's contractual rights, then they assess their behaviour in normal times, and finally they predict behaviour in a stressed market scenario.

In the case of retail deposits (such as households' current accounts), while account holders may have the contractual right to withdraw on demand, these deposits in normal times may be very stable, not least because retail depositors have the protection of a deposit guarantee up to £85,000(3) and are thus less incentivised to monitor the credit quality of the bank. Retail depositors generally withdraw deposits as and when needed, to pay for the goods and services they want to buy. In a stressed environment, such depositors may seek to withdraw their funds to a greater extent due to wider uncertainties. For wholesale unsecured investors, short-term deposits typically have a fixed maturity date. In normal times they would be likely to roll over funding as it matures, but in a stressed market, these informed investors are very sensitive to the creditworthiness of the deposit-taking bank and may withdraw substantial volumes of funding.

One measure of a bank's funding profile is its loan to deposit ratio. A bank with a high ratio of loans (which tend to be long term and relatively illiquid) to retail deposits could imply a vulnerable funding profile. Although widely used, this is an imperfect assessment of a bank's structural funding profile since certain forms of stable funding — such as long-term debt funding — are excluded.

The recent financial crisis exposed a number of cases of liquidity and funding problems that resulted from a false assessment of funding stability — especially short-term wholesale funding. And while a maturity mismatch is inherent in the 'borrow short term, lend long term' banking business model which plays a vital role in providing credit to the economy, the resulting funding liquidity risk can lead to the failure of a bank. Liquidity regulation, as described later in this article, seeks to incentivise the use of stable funding structures and discourage maturity transformation using unstable funding sources.

## Mitigant (ii): buffer of liquid assets

The second line of defence against funding liquidity shocks is for banks to hold a buffer of liquid assets. **A bank's liquidity resources are cash or assets that the bank can convert into cash in a timely manner and at little cost.** They help a bank manage its liquidity risk in two ways. First, they provide a

(1) For more information see www.fscs.org.uk.
(2) Deposit protection for retail customers and secured wholesale borrowing are examples of depositors who may face limited losses if a bank fails.
(3) Per depositor per authorised deposit-taker.

source of liquidity to ensure the bank can meet payments that come due in a stress. But second, their very existence can provide reassurance that a bank will be able to continue to meet its obligations. This reduces incentives for its depositors to 'run'.

A bank can convert its buffer into cash either by selling the assets or pledging them to secure borrowing. In normal times this may be simple to execute, but banks face market liquidity risk so that, in order to be a reliable source of funds across a range of possible market conditions, the buffer should comprise assets that have the best chance of remaining liquid in stressed times. The Basel Committee on Banking Supervision (BCBS) outlines certain characteristics of assets and markets that maximise this chance.(1)

The most liquid assets in the financial system are on-demand deposits at the central bank, also called reserves. They are essentially credit risk-free and can be used to make payments to counterparties directly. However, they are also low yielding and as such have a significant opportunity cost (that is, representing the 'lost' opportunity for income from other, more profitable uses of funds).

Other securities that trade in active and sizable markets and exhibit low price volatility can also be liquid during a stress, for instance government bonds and corporate bonds issued by non-financial companies. While they may remain liquid, selling such assets during stressed market conditions could entail significant discounts and losses.(2)

A key role of the central bank is to provide liquidity insurance to the banking system to help banks cover unexpected or contingent liquidity shocks. Since the crisis, the Bank of England has significantly expanded its Sterling Monetary Framework facilities to ensure that it offers effective liquidity insurance to the banks. The Bank is currently considering further suggestions to improve the efficacy of its liquidity insurance facilities: see the report by Winters (2012).(3)

## Capital and liquidity regulation

The previous section explained capital and liquidity and why they are needed to help mitigate the risks that banks take. Building on that, this section provides an overview of the key concepts related to capital and liquidity regulation. It includes a summary of the latest international capital standards, which are set out in the box on pages 210–11.

The PRA requires banks to have adequate financial resources as a condition of authorisation. Regulation is designed to help correct market failures and the costs to society that these impose.(4) Specifically, the critical services that banks provide mean that public authorities will provide support in a crisis, for example by insuring deposits, acting as a lender of last resort, or bailing out banks directly. **Expectations of public support in stressed conditions lead to the problem of 'moral hazard' whereby banks take on excessive risk, funding their activities with lower levels of capital or liquidity than they would otherwise.** Moreover, these expectations mean that depositors and investors do not discipline banks sufficiently, which pushes down on banks' cost of funding and exacerbates the incentives for banks to take on more risk.

This is a problem because it gives rise to a 'negative externality': excessive risk-taking by banks leads to costs to other parties (the taxpayers that provide for public support). **Microprudential regulation** seeks to address this negative externality by ensuring that banks manage their activities with sufficient levels of capital and liquidity to reflect the risks that they take.(5)(6) The intention is not to stop banks taking risk — this is an essential part of the economic function that they play — but rather, to ensure that these risks are appropriately accounted for. Consistent with this, the PRA does not operate a 'zero-failure' regime: inevitably there will be cases where banks, like other types of firm, fail. In these cases, it is the regulator's responsibility to seek to ensure that a bank that fails does so in a way that avoids significant disruption to the supply of critical financial services.(7)

In addition to microprudential regulation, which is focused on the specific risks to individual banks, there is also a need to consider the risks stemming from the system as a whole. For example, a build-up in leverage across the system, or an increase in the magnitude of maturity transformation, may increase negative externalities and the riskiness of banks.(8) Examples of such externalities are contagion risks arising through the interconnectedness and common exposures of banks. Building on the microprudential regulatory framework, **macroprudential regulation** seeks to address such risks.(9)

The following sections provide a high-level overview of the frameworks for capital and liquidity regulation and illustrate how they relate to the risks banks take. Relatively more detail is given on capital regulation since more agreements have been reached regarding the international framework than is

(1) See BCBS (2013).
(2) See Holmström and Tirole (1998) for an exposition on the theory of private and public supply of liquidity.
(3) The Bank's response to the Court Reviews can be viewed at www.bankofengland.co.uk/publications/Documents/news/2013/nr051_courtreviews.pdf.
(4) Bailey, Breeden and Stevens (2012) describe the PRA's role and its supervisory approach.
(5) For further information on the rationale of prudential regulation, see, for example, Dewatripont and Tirole (1993, 1994) and Diamond and Rajan (2000).
(6) Tools for prudential regulation may affect directly the resilience of the financial system to withstand shocks. They may also affect resilience indirectly, through effects on the price and availability of credit; these effects are likely to vary over time and according to the state of the economy. See, for example, Tucker, Hall and Pattani (2013) on pages 192–200 of this edition of the *Bulletin*.
(7) See Bailey, Breeden and Stevens (2012).
(8) As discussed in Brunnermeier and Pedersen (2008) and Adrian and Shin (2010), for example.
(9) See Tucker, Hall and Pattani (2013) and Murphy and Senior (2013).

the case for liquidity regulation. Typically, regulation takes the form of a requirement specified as a ratio comparing the bank's financial resources with certain aspects of the bank's activities, so as to ensure the bank holds what it might conceivably need to stay liquid and solvent. For example, the ratio could be how much capital banks have relative to their total assets (the leverage ratio outlined above), or the amount of liquid assets that they hold relative to expected outflows as funding expires (a liquidity ratio).

## Capital regulation

This section sets out, at a high level, the regulatory framework for capital that is applied to banks in the United Kingdom. The framework is embodied in EU law based on internationally agreed 'Basel' standards. The EU law has recently been updated, reflecting the Basel III standards.

As mentioned above, certain key ratios are useful in thinking about how much capital a bank needs. The previous section defined the **leverage ratio** as a bank's capital divided by its total assets. But of course, some assets are riskier than others, and each asset class can be assigned a risk weight according to how risky it is judged to be. These weights are then applied to the bank's assets, resulting in risk-weighted assets (RWAs). This allows banks, investors and regulators to consider the risk-weighted **capital ratio**, which is a bank's capital as a share of its RWAs. Another way of thinking about this approach is to consider a different capital requirement for each asset, depending on its risk category.

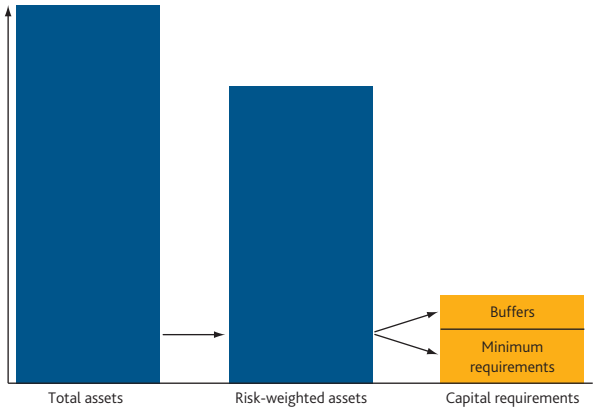
Banks can alter their ratios by either adjusting the numerator — their capital resources — or the denominator — the measure of risk. For example, they can improve their capital ratio either by increasing the amount of capital they are funded with, or reducing the riskiness or amount of their assets.(1) It is common to refer to shortfalls in required ratios in terms of the absolute amount of capital. But altering either the numerator or denominator will change the ratio and reduce this shortfall.

## How much of banks' funding must be sourced from capital?

According to internationally agreed standards (Basel III), banks must fund risk-weighted assets with at least a certain amount of capital, known as the '**minimum requirements**' of capital (**Figure 3**). In addition to the minimum requirements, banks will be required to have a number of **capital buffers**.(2) These are meant to ensure that banks can absorb losses in times of stress without necessarily being deemed to be in breach of their minimum capital requirements.

Regulatory capital standards comprise three parts or 'Pillars'. Pillar 1 sets out the capital requirements for specific risks that are quantifiable. Pillar 2 consists of the supervisory review process. It is intended to ensure that firms have adequate

**Figure 3** Total assets, risk-weighted assets and capital requirements

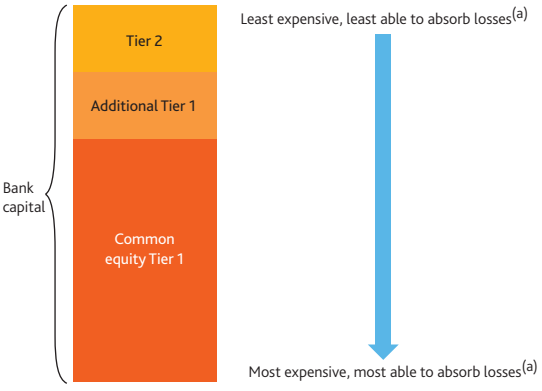



capital to support all relevant risks in their business. Pillar 3 complements the other two pillars and includes a set of disclosure requirements to promote market discipline. These standards are discussed in more detail in the box on pages 210–11.

## What counts as 'capital'?

Banks obtain funding by way of a variety of financial instruments. **Figure 4** sets out the components of eligible capital resources that correspond to Pillar 1 and Pillar 2 requirements. The main component of a bank's capital resources is equity — referred to as **common equity Tier 1 (CET1)**. The key aspects of CET1 are: it absorbs losses before any other tier of capital; its capital instruments are perpetual; and dividend payments are fully discretionary. Its main constituents are **ordinary shares** and **retained earnings**.(3) The box on page 206 explains how retained earnings feed into

**Figure 4** Forms of regulatory capital




(a) Refers to ability to absorb losses while the bank remains a going concern.

(1) See Tucker (2013).
(2) While in a general sense capital is said to act as a buffer to absorb unexpected losses, a 'capital buffer' may refer to a specific regulatory requirement for a bank to fund its activities with a buffer of capital over and above the minimum regulatory requirements.
(3) Capital is made up of ordinary shares and reserves. The latter mainly constitutes retained earnings but also includes the share premium account and sometimes other non-distributable reserves. Note that this use of 'reserves' as a component of bank capital is distinct from banks' holdings of central bank reserves (which feature on the asset side of a bank's balance sheet).

## Basel III: the latest international standards for capital requirements

International banking standards are set by the Basel Committee on Banking Supervision (BCBS), of which the Bank of England is a member. In the United Kingdom, these standards enter into force through European legislation. The Basel Accord is a set of international standards which sets out a framework for capital regulation for banks. The latest revisions to this Accord, Basel III, were recently finalised and are being introduced in the EU in 2014.(1) Basel standards specify how much capital and, in the future, liquidity(2) banks should be required to have. The Basel standards comprise three parts or 'Pillars':

- Pillar 1 standards specify **quantitative requirements for given risks**. These standards can be fixed, for example a given exposure may attract a certain capital charge. Alternatively, they may be derived using models of expected and unexpected losses.(3)

- In the Pillar 2 supervisory review, banks assess their **overall capital adequacy** in relation to their risk profile. Supervisors review this assessment and may impose capital requirements where additional risks are identified. These can be risks not captured in Pillar 1, or risks that are captured, but not sufficiently.

- Pillar 3 sets out standards of **information disclosure**. While there are a number of additional conditions for disclosure to be effective, the publication of key risk information allows market participants to monitor the capital adequacy of a bank.

### Basel 'Pillar 1' capital requirements

For traditional banks, credit risk — the risk that a borrower defaults — will usually lead to their largest capital requirements. They are calculated to reflect unexpected losses for a particular stress level. In addition, when banks' expected losses exceed their provisions — for example, because they are not fully captured by the accounting treatment applied — the difference is also included when determining capital ratios.

There are two approaches to calculating capital requirements for credit risk. Standardised approaches are designed to be broad-brush and relatively simple, while internal ratings-based (IRB) approaches are intended to be more complex, but also allow a greater degree of refinement and risk-sensitivity. Both approaches assign capital requirements that are intended to reflect a bank's credit risk based on its exposures to a wide range of counterparties, including sovereigns, other banks, corporates and retail customers. Capital requirements under the standardised approach are generally based on fixed risk weights or are a function of the counterparty's external credit rating. Under the IRB approach, capital charges are a function of a number of parameters that would affect how much the bank stands to lose should its counterparty default. These parameters include the size of the bank's exposure, the probability of default and the loss given default (which would be lower, all else equal, if the bank held collateral against its exposure). Some of these parameters are estimated by banks' internal models, subject to regulatory approval.

The Basel framework also includes a capital treatment for market risk, which aims to capture the risk of losses resulting from changes in market prices. Separately, banks are required to account for the risk of losses resulting from inadequate or failed internal processes — known as operational risk. As with the credit risk framework, the market and operational risk standards include a relatively simple standardised approach as well as an internal-model approach.

### Additional capital requirements

In addition to capital requirements that derive from Pillar 1, under Pillar 2, the supervisory review is used to address risks not captured (or fully captured) in Pillar 1. These could include, for example, the risk that changes in interest rates reduce a bank's net interest income and underlying economic value; and risks stemming from deficient systems and controls.

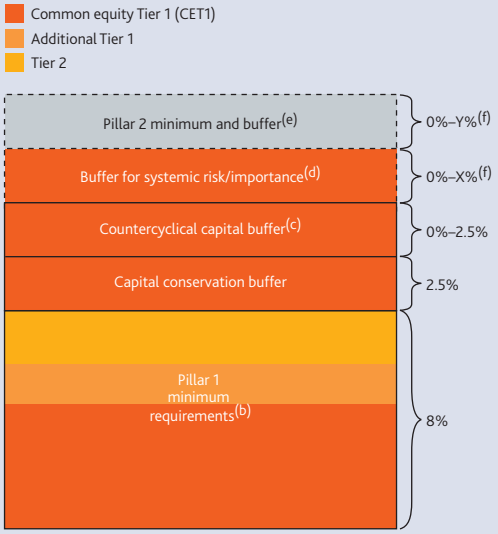
On top of these **minimum capital requirements** to cover the risks that banks are currently running, regulators also require banks to have **capital buffers**. The purpose of these buffers is to ensure that if the bank does experience significant losses, it will still have sufficient capital to retain the confidence of its counterparties and remain a going concern. So it is important that they are drawn down when they are most needed: without them, capital requirements calibrated to cover only expected and unexpected losses could lead to banks having no further capital if those losses crystallised.

The various minimum requirements and additional buffers that form part of the regulatory framework for bank capital are summarised in **Figure A**.

- In the United Kingdom, there are **Pillar 2 minimum capital requirements** for risks that are not (fully) captured under Pillar 1. There is also a **Pillar 2 buffer** to mitigate against external factors such as the business cycle, determined as part of the supervisory review process.

- The **capital conservation buffer** is set at a fixed rate and is intended to allow banks to absorb losses in stressed periods. Under the Basel III framework, banks would be allowed to

**Figure A** Summary of capital requirements under UK and European legislation[a]




Source: CRD IV/CRR.

(a) Expressed as a percentage of risk-weighted assets (RWAs).
(b) Within the 8% Pillar 1 minimum requirement for total capital, banks are subject to fund at least 6% of RWAs with Tier 1 capital, and at least 4.5% must be with CET1 capital.
(c) For a countercyclical capital buffer (CCB), up to 2.5%, mandatory international reciprocity provisions apply. This means that if the FPC, say, sets a rate between 0%–2.5% for the UK banking sector, overseas regulators would be bound to apply a CCB to banks in their jurisdiction for their UK exposures that is no less than the rate chosen by the FPC. Macroprudential regulators may apply a higher CCB, but the portion above 2.5% is not subject to mandatory international reciprocity provisions.
(d) For a given bank, this will be set equal to the highest of (i) the systemic risk buffer; (ii) the buffer for 'global systemically important institutions'; and (iii) the buffer for 'other systemically important institutions' that apply for that bank.
(e) The chart assumes that the Pillar 2 buffer requirement is net of the other buffers shown. The quality of capital eligible for Pillar 2 requirements is in the process of being finalised. See Bank of England (2013b) for the proposed eligibility.
(f) Specific level based on a policy decision.

draw down this buffer in times of stress. However, banks that do so will be subject to distribution restrictions — for example, how much they pay out in the form of dividends or bonuses — to ensure that the buffers are rebuilt in due course. As such, the capital conservation buffer assists in allowing banks to continue lending and providing other critical financial services during times of stress, while also promoting capital conservation in the banking sector.

- A time-varying **countercyclical capital buffer** can be built up when aggregate growth in credit and other asset classes is judged to be associated with a build-up of system-wide risk. When threats to resilience are judged to have receded or banks' capital buffers are judged to be more than sufficient to absorb future unexpected losses in the event of stressed conditions, this capital buffer might be reduced.

- Additional buffers exist for institutions that are deemed to be **systemically important** — that is, those whose failure is likely to be associated with negative externalities and wider spillover risks. In Europe, a so-called systemic risk buffer is available to prevent and mitigate long-term non-cyclical systemic or macroprudential risks not covered elsewhere in the regulatory framework.

The capital conservation buffer, countercyclical capital buffer and the buffers for systemically important institutions are being phased in over time and will be fully in place by 2019. It is worth noting that the requirements shown in **Figure A** are expressed in terms of ***total*** capital. Within these, in some cases there are minimum requirements for how much **equity** capital — specifically, so-called 'common equity Tier 1' (CET1) capital — banks must have compared to the other eligible forms of capital.[4] These are shown in dark orange. For example, 4.5 percentage points of the 8% Pillar 1 total minimum requirements are required to be in the form of CET1 capital. The 2.5% capital conservation buffer is required to be fully in CET1 capital so that, under the Basel III framework, banks will be required to fund 7% of their risk-weighted assets with CET1 capital (4.5% minimum + 2.5% capital conservation buffer). Reference is sometimes made to CET1 capital ratios — such as this 7% CET1 figure — instead of total capital ratios.[5] When other buffers are activated or applied, the total CET1 ratio may be higher.

(1) The reforms are being implemented in the EU by means of two pieces of legislation, the Capital Requirements Regulation and the Capital Requirements Directive IV, which are due to come into force in January 2014. In August, the PRA launched a consultation on its approach to implementing the CRD IV — see www.bankofengland.co.uk/pra/Documents/publications/policy/2013/implementingcrdivcp513.pdf.
(2) International liquidity standards are not yet in force; they will be imposed from 1 January 2015.
(3) Such models are subject to minimum standards and in general banks must obtain their supervisor's permission to use them.
(4) These different forms of capital are described in the main text in more detail.
(5) For example, the FPC recommended the PRA in March 2013 to take steps to ensure that, by the end of 2013, major UK banks and building societies hold capital resources equivalent to at least 7% of their risk-weighted assets (referring to the sum of the 4.5% CET1 minimum requirements and the 2.5% conservation buffer). See www.bankofengland.co.uk/publications/Documents/records/fpc/pdf/2013/record1304.pdf.

capital from an accounting perspective. For the purposes of capital requirements, to calculate the amount of CET1, adjustments are made to the accounting balance sheet. For example, items which would give rise to double counting of capital within the financial system, or which cannot absorb losses during stressed periods, are deducted.(1)

Banks can also count, to a limited extent, further instruments in their regulatory capital calculations. So-called additional Tier 1 (AT1) capital includes perpetual subordinated debt instruments. Basel III standards require that AT1 instruments must have a mechanism to absorb losses in a going concern, for example convertibility into ordinary shares or write-down of principal when capital ratios fall below a pre-specified trigger level.

A bank's regulatory capital resource also comprises 'gone concern' capital. Gone concern capital supports the resolution of banks and the position of other creditors such as the bank's deposit customers in bankruptcy proceedings. This includes Tier 2 capital, which is dated subordinated debt with a minimum maturity of five years. In addition, under Basel III, all additional Tier 1 and Tier 2 capital instruments must have a trigger so that they convert into ordinary shares or are written down when the authorities determine that a bank is no longer viable.(2)

## Liquidity regulation

Microprudential regulation seeks to mitigate a bank's funding liquidity risk — the risk that, under stressed market conditions, the bank would be unable to meet its obligations as they fall due. It aims to achieve this by incentivising — or requiring — banks to have sufficiently stable sources of funding and an adequate buffer of liquid assets. A useful analogy is the risk of a commercial building burning down: regulations require both that the building is built to minimise the risk of fire breaking out (stable funding) and that it has a sprinkler system to extinguish a fire should one occur (liquid asset buffer).(3) In other words: both to reduce the risk of the adverse event occurring and ensure that, if it does, the harm done is limited.

International liquidity standards have not yet been finalised and implemented. The Basel Committee has agreed the first of two liquidity standards, the Liquidity Coverage Ratio (LCR).(4) It is designed to ensure that banks hold a buffer of liquid assets to survive a short-term liquidity stress. A second standard, the Net Stable Funding Ratio, is designed to promote stable funding structures and is currently under review by the Basel Committee. The rest of this section characterises the approach of the regulator, although fundamentally this should be closely linked to a firm's own approach in managing its liquidity risk.

Prudential regulators need to consider how adequate a bank's liquidity position would be during a hypothetical stressed scenario. Such a scenario needs to consider the various identifiable sources of liquidity risk in the banking business model, for example: maturing deposits from retail and wholesale customers; triggers for a withdrawal of funds relating to the bank's credit rating; the amount of new lending to customers; and the impact of increased market volatility leading to margin calls and non-contractual obligations that mitigate reputational risk. The hypothetical stressed scenario is typically of short duration — one to three months — and is a period of time during which the regulator expects each bank to be able to survive with funding from the private markets, without needing central bank support.

Typically, for the stressed scenario, regulators first of all determine the **liquidity outflows** during the stress period. These depend on the mix of types and maturities of funding that make up the bank's liabilities. Depositors and counterparties are assumed to have varying degrees of sensitivity to the creditworthiness of the bank and behave accordingly. The assumption is that the most credit-sensitive depositors, such as other banks, withdraw funding at a quicker rate than less credit-sensitive ones, such as insured retail depositors. Other liquidity outflows may occur if adverse market movements in respect of derivative positions mean that a bank is obliged to post liquid assets as collateral.

The regulator then defines acceptable **liquidity resources**, which lie on the asset side of the bank's balance sheet. The regulatory definition of liquid assets stipulates the quality of the liquid assets that banks must hold. The definition in force in the UK regime comprises central bank reserves and high-quality supranational and government bonds. As one bank may lend to another, or hold securities it has issued (unsecured and secured bank debt), the liquid assets of one bank may be liabilities elsewhere in the banking system. These are known as 'inside liquidity'. In a financial market stress, selling the debt of another bank is likely to prove difficult. Therefore many regulatory regimes exclude 'inside liquidity' from the definition of liquid assets.

## The interaction of capital and liquidity regulation

There are a number of ways in which banks can alter their liquidity and capital positions. While there is no mechanical link between the two, there are a number of channels through which changes in liquidity metrics such as the LCR may impact a bank's capital position, and *vice versa*. The box on page 213 illustrates some simple balance sheet examples of how changes in one metric might affect the other.

(1) These include significant investments in the ordinary shares of other financial entities and goodwill.
(2) For more information on the definition of regulatory capital, see BCBS (2011).
(3) See Goodhart and Perotti (2012).
(4) See BCBS (2013) for more information on the LCR. The PRA confirmed in August 2013 that it will implement the Financial Policy Committee's recommendation that banks and building societies should adhere to a minimum requirement of an LCR of 80% until 1 January 2015. This requirement will then rise, reaching 100% on 1 January 2018. See www.bankofengland.co.uk/publications/Pages/news/2013/099.aspx.

## The relationship between a bank's capital and liquidity positions

There are a number of ways in which banks can alter their liquidity and capital positions and there is no mechanical link between them. Even so, under certain assumptions, changes in one might affect the other. The purpose of this box is to illustrate some of the ways in which this could happen: in reality, the ultimate impact of a change to one of these ratios will depend on a range of factors.

Two scenarios are considered in **Figure A**. Relative to the baseline case, in Scenario 1 the bank increases its **risk-based capital ratio** (capital as a share of risk-weighted assets). In Scenario 2, the bank increases its **liquidity coverage ratio** (liquid assets held to cover a period of stressed net cash outflows). For both the scenarios considered, changes in the relevant ratios come about via the mix of different types of assets and liabilities, leaving the total size of the bank's balance sheet unchanged:

- **Scenario 1**: the bank increases its risk-based capital ratio by retiring short-term, 'flighty' funding from wholesale investors and issuing new equity of the same amount. Its assets are unchanged.

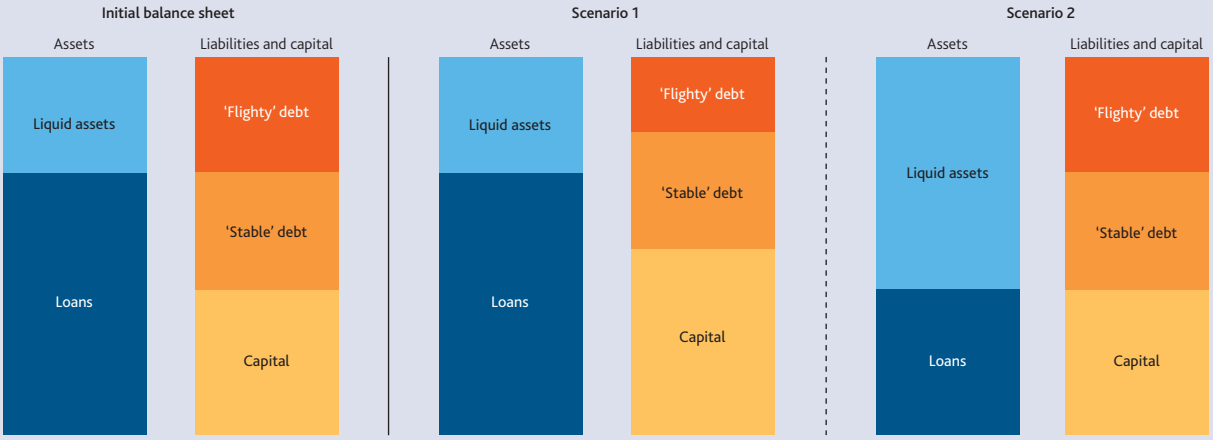
  *Impact on liquidity*: in this scenario, the bank's liquidity position is also improved, since it holds the same amount of liquid assets for a smaller amount of 'flighty' wholesale debt. Moreover, as Governor Carney has pointed out, higher levels of capital gives confidence to depositors and investors who provide funding to banks. With more long-term, stable funding assured, banks can safely hold fewer liquid assets.(1)

- **Scenario 2**: the bank increases its liquidity coverage ratio by keeping its liabilities unchanged and replacing illiquid loans (once these have been repaid) with liquid assets such as gilts.

  *Impact on capital*: the amount of capital is unchanged but, since the additional liquid assets it now holds are assumed to have a lower risk weight than the loans they are replacing, the capital ratio increases.

These examples are intended to be purely illustrative. As mentioned above, the actual impact of a change to one of these ratios will, in practice, depend on a number of factors. If a bank seeks to improve its capital or liquidity position then the total size of the balance sheet may not remain constant, as assumed here. In Scenario 1, for instance, if increased capital issuance is associated with a higher aggregate funding cost then the bank may choose to hold a different amount of loans, either in absolute terms or relative to safer assets. Similarly, Scenario 2 assumes that an increase in the liquidity coverage ratio gives rise to an improvement in the capital ratio but one possibility is that, by holding a greater share of low-yield liquid assets, the bank's future profits may be lower (all else equal) and so the potential for future increases in capital via retained earnings would be lower. In addition, the examples do not take account of other important factors such as changes in the perceived riskiness of a bank — hence its funding costs and profitability — in response to changes in its resilience as proxied by the capital and liquidity coverage ratios.

**Figure A** Stylised scenarios that represent changes in capital and liquidity ratios




(1) See Carney (2013).

## Conclusion

A key function of banks is to channel savers' deposits to people that wish to borrow. But lending is an inherently risky business. Understanding the concepts of a bank's capital and liquidity position helps shed light on the risks the bank takes and how these can be mitigated.

Capital can be thought of as a bank's own funds, in contrast to borrowed money such as customer deposits. Since capital can absorb losses, it can mitigate against credit risk. In order to prevent balance sheet insolvency, the more risky assets a bank is exposed to, the more capital it is likely to need. Meanwhile, in stressed market conditions, it is possible that banks find that they do not hold sufficient cash (or assets that can easily be converted into cash) to repay depositors and other creditors. This is known as liquidity risk. A stable funding profile and a buffer of highly liquid assets can help to mitigate this risk.

Banks may prefer to operate with lower levels of financial resources than is socially optimal. Prudential regulation seeks to address this problem by ensuring that credit and liquidity risks are properly accounted for, with the costs borne by the bank (and its customers) in the good times, rather than the public authorities in bad times.

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