

LIQUIDITY REGULATION AND MONETARY POLICY IMPLEMENTATION

ARTICLES

Liquidity regulation and monetary policy implementation

In December 2010, the Basel Committee on Banking Supervision (BCBS) published the Basel III framework for liquidity risk regulation, which sets out two separate but complementary minimum standards for banks' funding risk – the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR). These standards aim at ensuring a higher stock of liquid assets and lower asset/liability maturity mismatches than there were prior to the financial crisis, thereby reducing the risk of an individual bank running into liquidity problems. The proposed regulation framework represents minimum standards to be applied to internationally active banks in a uniform manner, while national regulators may apply more stringent requirements to individual institutions based on their liquidity risk profile. In January 2013, as a result of a careful assessment of the impact of the regulation framework, the BCBS agreed on a revised LCR. The Basel III liquidity standards, and in particular the LCR, are expected to interact with monetary policy implementation.

I INTRODUCTION

There is broad agreement that the Basel III liquidity standards constitute an important step in terms of financial regulation. While their objectives are mainly microprudential in nature, some of their characteristics also have macroprudential foundations. It is expected that the liquidity regulation framework will increase banks' liquidity buffers and lower maturity transformation, reducing excessive interconnectedness in the financial system and mitigating systemic liquidity risk. In addition, the liquidity standards are expected to improve the overall efficiency of money markets by reducing information asymmetries concerning banks' risks, including liquidity risk exposure and liquidity risk-bearing capacity.¹ Moreover, a more harmonised international framework (compared with the current heterogeneous liquidity risk rules) should help to achieve a level playing field across banks. Overall, the new liquidity standards are likely to have a welfare-enhancing effect on the real economy.

There are three main reasons why there is a relationship between liquidity risk regulation and monetary policy implementation. First, liquidity regulation may have an impact on the environment in which monetary policy is implemented, including in particular on the functioning of money markets. Second, in most jurisdictions the central bank implements monetary policy by providing liquidity to, and withdrawing liquidity from, the banking system. Thus, an interaction between liquidity requirements and central bank liquidity provision and absorption is evident. Third, central banks act as lenders of last resort (LOLR) in financial crises by providing liquidity to banks which are solvent but temporarily illiquid. Central banks' operations therefore play a key role as a liquidity source for banks under liquidity stress. For these three reasons, liquidity risk regulation and the central bank's monetary policy framework cannot be treated in isolation, and their interaction merits careful attention.

This article is structured as follows. Section 2 explains the Basel III liquidity requirements, in particular the LCR, and outlines the features which are of particular relevance for the Eurosystem. Section 3 talks about why the liquidity standards are relevant for central banks and discusses the relationship between the liquidity standards and monetary policy. It suggests that, at the current juncture, it is not easy to be conclusive about the interaction between liquidity regulation and monetary policy implementation, as a number of different factors affect banks' balance sheets and funding models. Section 4 briefly touches upon the features of a monitoring framework established by the Eurosystem to assess the impact of the liquidity standards on central bank operations. Section 5 concludes.

1 See "Liquidity regulation as a prudential tool", Special Feature B, *Financial Stability Review*, ECB, Frankfurt am Main, 2012, pp. 116-124.

2 EXPLAINING THE BASEL III LIQUIDITY REQUIREMENTS

During the financial crisis, the inadequacies of banks' liquidity management became strikingly apparent when significant liquidity risk materialised on banks' balance sheets. In the midst of the crisis, banks faced substantial liquidity outflows and shortages owing to their excessive reliance on volatile funding sources, excessive holdings of assets which suddenly turned illiquid, improper asset-liability maturity mismatches and excessive liquidity risks embedded in banks' off-balance-sheet positions (including committed credit and liquidity lines and derivative positions).² As a consequence, banks hoarded liquidity for precautionary reasons, curtailing their liquidity provision to other financial intermediaries and to the real economy. This contributed to the failure of a number of banks when they became unable to roll over the short-term funding of long-term, illiquid assets or to meet their obligations when they became due.³ More importantly, the significant ensuing uncertainty led to the drying-up of liquidity in a number of key markets, such as the unsecured interbank market, which contributed to the build-up of systemic risk. Ultimately, this led to an unprecedented provision of central bank liquidity and government guarantees on bank debt.⁴

In the light of this experience, the BCBS issued a proposal for liquidity risk regulation in December 2010. This proposal was part of a wider revision of the regulatory framework. In particular, it was intended to complement the revised framework for capital adequacy regulation. The objective of the liquidity regulation framework is to reduce the shortcomings of liquidity risk management observed during the financial crisis and the likelihood of another systemic liquidity crisis by ensuring that banks can rely more on their own liquidity resources.

To achieve this objective, the BCBS introduced two regulatory measures for liquidity which address different aspects of liquidity risk in banks' balance sheets: the LCR and the NSFR. The LCR aims at limiting the risks of severe cash outflows owing to an over-reliance on volatile funding sources and certain lending commitments. Under the LCR, banks are required to hold a minimum level of unencumbered high-quality liquid assets (HQLA) to withstand an acute stress scenario lasting 30 days. The LCR is specifically designed to improve the short-term resilience of banks against liquidity shocks. By contrast, the NSFR is designed to limit the risks emanating from excessive maturity mismatches over the medium to long term. More specifically, the NSFR requires banks to fund illiquid assets with a minimum amount of stable liabilities over a horizon of one year.

The Basel III liquidity standards constitute an important step in terms of financial regulation. It is expected that the liquidity regulation framework will increase banks' liquidity buffers and lower maturity transformation, reducing excessive interconnectedness in the financial system and mitigating systemic liquidity risk. The liquidity standards are also expected to improve the overall efficiency of money markets by reducing information asymmetries concerning banks' risks, including liquidity risk exposure and liquidity risk-bearing capacity. By reducing liquidity risk, they may lead to lower liquidity risk premia in money markets. Moreover, a more harmonised international framework – rather than the current heterogeneous liquidity risk rules – should help to achieve a level playing field across banks. Overall, the new liquidity standards are likely to have a welfare-enhancing effect on the real economy.

2 See Strahan P.E., "Liquidity Risk and Credit in the Financial Crisis", *FRBSF Economic Letter*, 2012-15, May 2012.

3 See, for instance, "Causes and Consequences of Recent Bank Failures", *United States Government Accountability Office*, January 2013.

4 See Stolz, S.M. and Wedow, M., "Extraordinary measures in extraordinary times – Public measures in support of the financial sector in the EU and the United States", *Occasional Paper Series*, No 117, ECB, Frankfurt am Main, July 2010.

The focus of this article is on the LCR, given that it will be introduced earlier than the NSFR. The regulatory rules for the LCR are far more developed than for the NSFR. However, both ratios are still subject to possible revisions before their final implementation.

The main features of the LCR are set out in Box 1. In January 2013, the BCBS agreed on a revised LCR and a revised implementation schedule for it, which was subsequently endorsed by the Governors and Heads of Supervision, i.e. the body to which the BCBS reports, on 6 January 2013. These changes to the LCR are also set out in Box 1.

In the EU context, the liquidity regulation framework will be applied in Member States via the Capital Requirements Regulation (CRR) and the Capital Requirement Directive IV.⁵ Liquidity regulation will be applied directly to EU banks upon the adoption of the CRR. The CRR is currently under negotiation in the trialogues between the European Commission, Council and Parliament. At the time of writing, an agreement is still pending.

Before the implementation of the LCR as a binding regulatory minimum standard, its implementation process is being preceded by an observation period, which started in December 2011. In the EU context, the draft legislation⁶ requires the European Banking Authority (EBA) to monitor and evaluate liquidity reports received from banks across currencies and business models. Based on this reporting, the EBA is requested to report to the Commission by 31 December 2013 on the impact of the LCR on the business and risk profiles of EU institutions, on financial markets, the economy and bank lending.

5 See "Proposal for a Regulation of the European Parliament and of the Council on prudential requirements for credit institutions and investment firms", European Commission, Brussels, July 2011.

6 See Articles 403 and 481 (1) and (2) of the CRR.

Box 1

THE BASEL III LIQUIDITY STANDARDS

The Liquidity Coverage Ratio (LCR)

The objective of the LCR is to increase the short-term resilience of a bank's liquidity profile by ensuring that it has sufficient high-quality liquid resources to withstand an acute stress scenario lasting for 30 days. Given the balance sheet and the firm's activities, this stress scenario defines the potential net cash drain. To determine the cash flow drain, every source of liquidity risk has to be carefully analysed. The LCR standard is defined as:

$$\frac{\text{Stock of high-quality liquid assets}}{\text{Total net cash outflows over the next 30 calendar days}} \geq 100\%$$

The Net Stable Funding Ratio (NSFR)

The objective of the NSFR is to promote resilience over a longer-term horizon and to incentivise banks to more closely match the maturity of their funding with the maturity of assets. In contrast to the LCR, the NSFR is designed as a medium to long-term measure intended to provide a

sustainable maturity structure of assets and liabilities, aiming to limit over-reliance on short-term wholesale funding. The NSFR standard is defined as:

$$\frac{\text{Available amount of stable funding}}{\text{Required amount of stable funding}} > 100\%$$

The features of the LCR (as agreed upon in January 2013) which are of relevance to the Eurosystem

High-quality liquid assets (HQLA) need to meet certain criteria, broadly speaking:

- Cash, withdrawable central bank reserves, securities issued by governments, public sector entities or guaranteed by governments with 0% risk weight under Basel II are considered level 1 liquid assets, which qualify in their entirety.
- Certain other assets, named level 2 HQLA, are subject to a haircut and can be taken into account up to a maximum ratio of 40% of liquid assets (after haircuts). They consist of:
 - Level 2A: government bonds with a 20% risk weight under Basel II, covered and non-financial corporate bonds (rated at least AA-). A 15% haircut applies.
 - Level 2B: residential mortgage-backed securities (RMBS) rated at least AA are subject to a 25% haircut, corporate debt securities (including commercial paper) (rated at least BBB-) to a 50% haircut and certain equities subject to a 50% haircut.
- Net cash outflows equal cash outflows minus cash inflows, where cash inflows are capped at 75% of outflows, thus limiting a bank's reliance on anticipated inflows to meet liquidity requirements. Weightings are given to different types of inflows and outflows to reflect the speed at which they are expected to become available or to be withdrawn in times of stress. In this connection, the following rollover rates are assigned to maturing transactions:

LCR rollover rates for central bank and interbank funding

(percentages)

Type of funding	Central bank funding, backed by HQLA or non-HQLA	Interbank funding backed by level 1 assets	Interbank funding, backed by level 2A assets	Interbank funding backed by RMBS (level 2B assets)	Interbank funding backed by other level 2B assets	Unsecured interbank funding or backed by non-HQLA
Rollover rate	100	100	85	75	50	0

The LCR and the Eurosystem's monetary policy framework differ as regards the definition of qualifying assets. The stock of HQLA accepted in the LCR is narrower than the stock of assets which are eligible as collateral for the Eurosystem's monetary policy credit operations. In addition, the LCR and the Eurosystem's collateral framework differ as regards haircuts that are applied to specific categories of assets. Level 1 assets are entirely taken into account in the LCR (no haircut) and thus benefit from a more beneficial treatment in the LCR than in the Eurosystem's collateral framework, while level 2 assets generally enjoy lower haircuts in the Eurosystem's collateral framework than in the LCR. These differences, which reflect the different objectives of the LCR and the Eurosystem's collateral framework, are further discussed in Sections 3 and 4 of this article.

The LCR is to be complied with on an ongoing basis. The frequency of disclosure is not as yet defined.

Revisions to the LCR decided upon in January 2013

In January 2013, it was decided that the LCR will be phased in progressively starting in 2015. The initial minimum required level will be 60%. This level will subsequently rise by 10 percentage points annually until it reaches 100% in 2019. The intention of this revision is to allow for a more graduated approach that avoids disruptions to the financial system and to the financing of economic activity. In addition, the revised text also grants individual countries receiving support for macroeconomic adjustment processes the option to implement the LCR at a pace that is consistent with their adjustment processes. Moreover, a number of further revisions to the LCR were decided in 2013. These changes, which are reflected in the above text, include a broader definition of HQLA and a less conservative stress scenario for outflows than in the December 2010 proposal. Finally, the Basel Committee on Banking Supervision also agreed to conduct further work to assess the interaction between the LCR and monetary policy.

3 THE RELATIONSHIP BETWEEN THE BASEL III LIQUIDITY REQUIREMENTS AND MONETARY POLICY IMPLEMENTATION

3.1 GENERAL REMARKS

There are three main reasons why there is a relationship between liquidity risk regulation and monetary policy implementation.

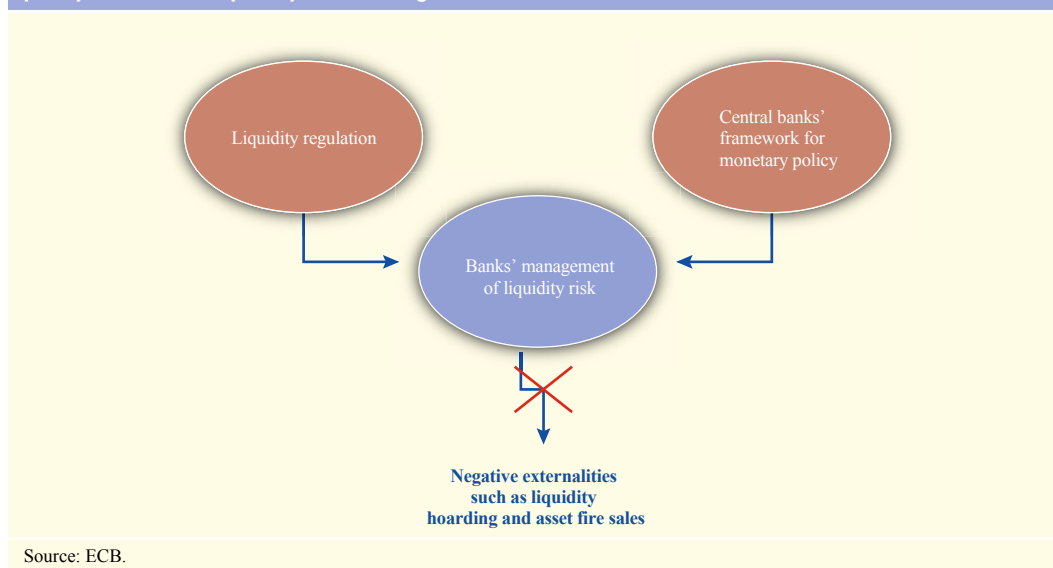
First, liquidity regulation may have an impact on the environment in which monetary policy is implemented, including in particular on the functioning of money markets.

Second, in most jurisdictions the central bank implements monetary policy by providing liquidity to, and withdrawing liquidity from, the banking system. Thus, an interaction between liquidity requirements and central bank liquidity provision and absorption is evident. In the euro area, monetary policy is implemented by design in an environment of liquidity deficit, i.e. banks need to go to the central bank in order to fulfil their liquidity needs. Therefore, a certain reliance on central bank funding is unavoidable. The extent to which banks' reliance on the central bank is influenced by liquidity regulation needs to be explored and taken into account.

Third, central banks act as LOLR in financial crises, by providing liquidity to banks which are solvent but temporarily illiquid. Thus, central banks' operations play a key role as liquidity sources for banks under liquidity stress.

For these three reasons, liquidity risk regulation and the central banks' monetary policy framework cannot be treated in isolation, and their interaction merits careful attention. In view of this, it is relevant for central banks in general, and for the Eurosystem in particular, to assess the impact of liquidity regulation on their currency area.

Chart I The influence of liquidity regulation and the central banks' framework for monetary policy on banks' liquidity risk management



Against this background, the remainder of this section discusses the relationship between the Basel III requirements and monetary policy implementation, considering each of the three above-mentioned aspects in turn. The focus is on the LCR, the implementation details (calibration and implementation process) of which are more advanced than those of the NSFR.

3.2 MONEY MARKETS

The Eurosystem implements monetary policy by steering short-term money market rates in line with the ECB's monetary policy stance. In this connection, it is essential to understand the interaction between the LCR and the money market.

UNSECURED SEGMENT

The LCR's objective is to increase short-term resilience of a bank's liquidity profile by ensuring that it has sufficient high-quality liquid resources to withstand an acute stress scenario lasting for 30 days. It includes a zero rollover assumption for short-term unsecured interbank funding (see Box 1), implying that within the 30-day horizon, unsecured interbank funding is assumed to fully evaporate. This assumption largely reflects the actual experience made during the financial crisis.

Unsecured short-term money market transactions within the 30-day horizon can be expected to affect banks' LCR in different ways depending on the initial level of the LCR. However, if banks operate at the margin of the LCR (i.e. with an LCR=1), then the effect of transactions with a maturity of less than 30 days is similar for the denominator and numerator of the LCR and has no effect on the ratio. For example, when bank A lends bank B an amount in the unsecured money market with a maturity of one week, bank A experiences a decrease in its liquid assets (i.e. a decrease in the numerator of the LCR), while net outflows (the denominator of the LCR) also decrease owing to the contractual inflow within the 30-day horizon (as long as the 75% cap has not yet been reached). Similarly, the LCR of bank B will remain unaffected: bank B's liquid assets increase by the amount borrowed while its net outflows also increase owing to the contractual outflow within the 30-day horizon.

If banks have an LCR of below 1, in order to comply with the LCR requirement they will need to substitute short-term funding for longer-term funding (or, alternatively, illiquid assets for liquid assets). Box 2 discusses illustrative examples of different adjustment strategies that banks could pursue to fulfil the LCR. If the LCR is constraining, i.e. if a bank has an LCR of below 1, it can be assumed that the proportion of short-term funding on bank balance sheets will decrease if the holdings of HQLA remain unchanged (see Box 2, adjustment strategy (b)(i) and (b)(ii)). In particular, a lengthening of funding maturity, e.g. as a result of the LCR, could mean that the volume in the short-term unsecured interbank market would decrease. Still, banks will probably continue to engage in significant short-term unsecured trading for daily liquidity management purposes, as the constraint of fulfilling reserve requirements will still hold.

When it comes to unsecured transactions with a maturity exceeding 30 days, there is a different impact on the LCR's numerator and denominator, and thus on the LCR as a whole. For example, when bank A lends on an unsecured basis to bank B in a six-month transaction, its LCR numerator declines by the amount lent; at the same time, its LCR denominator remains unchanged as the contractual inflow is expected beyond the 30-day horizon, leading to a decline in the LCR. This is mirrored by a similar increase in the LCR of bank B, which experiences an inflow of liquid assets while there is no outflow within the 30-day horizon.

The overall effect on activity in the longer-term unsecured money market is difficult to assess with certainty, as several countervailing forces are in place. In principle, the LCR may discourage banks on the lending side to engage in unsecured long-term transactions, given the adverse effect that such lending would have on their LCR. However, trading in the longer-term money market could still increase. For instance, banks with a relatively high LCR could engage in trading over longer maturities with banks seeking to improve their LCR whenever the yield is sufficiently attractive. In a way, the longer-term unsecured money market could become an LCR market in which LCR-qualifying liquidity is traded. As long as the system as a whole does not experience any liquidity shortfall, banks could offset liquidity shocks with each other in the longer-term money market, so that each individual bank remains within the LCR requirement. Moreover, as the liquidity regulation framework is expected to reduce information asymmetries and fears that a lender does not receive money back from the borrower because the latter runs into liquidity risk, one could see an increased willingness of banks to lend over longer maturities. Still, for unsecured lending to happen at the longer end, the following two conditions need to be fulfilled: (i) the perceived high degree of credit risk and information asymmetry which currently prevails is eradicated; and (ii) there are a sufficient number of banks which are able to meet the LCR by a margin. In the current situation in which markets are highly dysfunctional, an increase in trading over longer maturities is highly unlikely. On the other hand, the recently agreed phase-in period starting in 2015 provides more time and flexibility to build up liquidity buffers, particularly for banks in countries undergoing macroeconomic adjustment programmes. Moreover, many banks already meet LCR requirements, which, in some cases, is partly due to the substantial recent revisions.

Thus, overall, while a reduction in the reliance on short-term unsecured funding is an intended consequence of the LCR, it is currently unclear whether the implementation of the LCR will lead to an overall decline in money market activity, which could happen in the event that activity in the longer-term unsecured money market does not increase correspondingly. The potential further decrease in depth of the unsecured interbank market, in particular at the shorter end, could then impair its (pre-crisis) functions of allocating and distributing liquidity in the euro area. Furthermore, as the LCR is expected to be fulfilled on a continuous basis, a higher volatility in interest rates at the shorter end may be generated since no averaging mechanism is in place. As the frequency of disclosure is not as yet

defined, some volatility in interest rates could also be observed at the longer end based on the disclosure frequency. Such volatility could interfere with the smooth transmission of monetary impulses along the entire yield curve. A decreased depth or heightened volatility in the unsecured money market could have implications on a smooth implementation of monetary policy and thus need to be considered in monetary policy implementation and in the assessment of monetary policy transmission.

With regard to prices, the Basel III liquidity risk regulation framework may induce an additional term premium in the unsecured money market (as demand might not be fully matched by supply) and a segmentation in the market between maturities exceeding the 30-day horizon and those within this horizon. The increased value of longer-term funding as an instrument to fulfil the LCR might tend to increase the slope of the unsecured yield curve, with liquidity premia at the longer end probably increasing. At the same time, by reducing liquidity risk, the LCR may lead to lower liquidity risk premia. The overall effect of these two countervailing forces is unclear. Nonetheless, while there could be an overall impact on the difference between short and longer-term rates, this does not necessarily complicate monetary policy implementation – to assess the impact on the monetary policy transmission mechanism, one would need to see whether the transmission from short to longer-term rates would be affected.

SECURED SEGMENT

In contrast to short-term unsecured transactions, short-term secured transactions below the 30-day maturity in the interbank market are not necessarily LCR-neutral. The impact of short-term secured transactions on the LCR depends on a range of factors, including the initial level of the LCR, the nature of the collateral that is mobilised (e.g. HQLA levels 1, 2 or other collateral), haircuts applied in the market, and the extent to which some LCR constraints are binding (such as the 75% cap on inflows).

Longer-term secured transactions beyond the 30-day horizon also have an impact on the LCR, not only when the haircuts used are unequal to the haircuts applied in the Basel proposal. For instance, when a bank substitutes liquid with illiquid assets when entering into a reverse repo based on non-HQLA collateral, the LCR numerator changes while the denominator does not change. This is because the contractual inflow from the deal is expected beyond the 30-day horizon and as such is not included in the 30-day net outflows, while the encumbrance of the non-HQLA collateral is LCR-neutral. Therefore, banks engaging in longer-term secured lending backed by non-eligible LCR collateral will experience a reduction of their LCR. For banks on the borrowing side, the opposite holds. Again, this discussion holds for a bank with an initial LCR of 1. Owing to the ratio nature of the LCR, the overall impact may differ depending on the LCR's starting point.⁷ In addition, there is an impact from the haircuts applied on longer-term repo transactions involving LCR-eligible collateral. If the haircut applied in the secured transaction is higher than the haircut defined in the Basel proposal, the collateral taker will improve its LCR while the collateral giver will experience a deterioration of the LCR.

With regard to the overall impact on the longer-term secured money market, Basel III liquidity standards might exacerbate the shift in demand from unsecured to secured funding (a feature that has already been ongoing since the beginning of the crisis in 2007 and is thus, as yet, unrelated to liquidity regulation), thereby widening the spreads between secured and unsecured interest rates. In particular, this would be the case if (many) LCR-constrained banks were to engage in longer-term repo transactions involving illiquid assets, where the effect on the LCR is similar to

⁷ This is valid for the observation period only. Indeed, the LCR is the minimum binding requirement and should be at 100% as of 2019.

that of unsecured longer-term lending. Even if these transactions are conducted against very high haircuts they could still significantly improve the LCR of the collateral giver, as explained above. Banks or other institutions supplying LCR liquidity could, at a relatively low risk (high haircut) and attractive yield, transfer that surplus to LCR-constrained banks. These deficit banks would incur some additional credit risk resulting from the high haircuts applied to their assets, but if the concerned bank were really LCR-constrained and faced a relatively creditworthy counterparty, it would probably be prepared to accept that. Secured transactions backed by level 1 and level 2 HQLA will not have a significant impact on the LCR, regardless of the maturity, as their market haircuts will probably be relatively close to the Basel III haircuts. Such transactions will, however, remain attractive from a cash and risk management perspective, partly for the same reasons given for unsecured short-term transactions. From a central bank perspective, a shift in market activity from the unsecured to the secured money market, which has in any case been ongoing since the beginning of the crisis and could be further enhanced by the introduction of the LCR, would naturally impinge on monetary policy implementation and transmission.

3.3 EUROSISTEM MONETARY POLICY INSTRUMENTS

Whenever adjustments are needed for banks to fulfil the LCR, banks have two options at their disposal: either to increase the stock of highly liquid assets, thereby working on the numerator of the LCR (and thus on the assets' side of banks' balance sheets), or to reduce the net cash outflow, thereby working on the denominator of the LCR (and on the liability side of banks' balance sheets) – see also Box 2. Banks may decide to combine the two options. In this context, participation in central bank operations can actually impact the LCR in several ways.

Central bank refinancing would not count as an outflow as it always benefits from a 100% rollover rate. If non-HQLA are used as collateral, there would be no reduction in the numerator and therefore an overall increase in the LCR. If HQLA are used as collateral, the positive effect on the LCR numerator stemming from the cash inflow would be (partly, in the case of level 2 assets) neutralised by the corresponding loss of level 1 (level 2) HQLA. A 100% rollover rate ensures equal treatment between central banks implementing monetary policy through repo operations and central banks implementing monetary policy through outright purchases of assets. However, it increases the difference in treatment between repo transactions with central banks and interbank repo transactions not backed by level 1 HQLA (see Box 1).

Likewise, recourse to the marginal lending facility or main refinancing operations using non-liquid assets – particularly in order to comply with the requirements on reporting dates – could be used by banks to improve their LCR.⁸ Certainly, recourse to standing facilities is, in general, costly compared with: (i) market rates, at least when monetary markets function smoothly; and (ii) normal monetary policy operations, depending on the width of the corridor. It might thus only occur in extreme cases.

Deposits with an overnight maturity (deposit facility or excess reserves⁹) qualify as HQLA and have broadly the same effect as an interbank deposit (although recourse to the deposit facility improves the numerator while an interbank deposit reduces the denominator). Therefore, the LCR does not imply

⁸ The BCBS introduces a set of intraday monitoring tools which will allow supervisors to monitor banks' intraday management and to detect gaming of the standards at the reporting date. The monitoring tools will be implemented by 2015.

⁹ It is the view of the ECB that central bank reserves held for minimum requirement purposes should not count towards HQLA. Instead, only excess reserves (reserves held in excess of minimum reserve requirements) should count.

a specific preference for banks to hold liquidity with the central bank rather than with other banks (subject to the restriction that cash inflows are not allowed to exceed 75% of the gross cash outflow).

Overall, one way to achieve larger cash reserves could be to increase reliance on central bank refinancing with non-HQLA as collateral. The use of HQLA would not improve the LCR. The potential increase in demand for central bank liquidity would depend on the opportunity cost of obtaining liquidity funding from the Eurosystem. Some banks' bidding behaviour, however, may be independent of opportunity costs. In particular, there may be a number of banks with large amounts of collateral that are not classified as liquid under Basel III but that are eligible for ECB market operations. Where such banks have no access to market repos using this collateral, owing to counterparty/country concerns or to the collateral itself, it will remain likely that these counterparties will bid in the tenders using this collateral in order to obtain cash to meet their funding needs ratios as a first stage, and then their LCR thereafter.

All in all, one may therefore expect a general increase in bid rates in tender operations, for example compared with short-term market rates. This may give rise to certain challenges with regard to the controllability of short-term money market rates, which are important as they are the first step in the transmission of monetary policy. It remains to be seen how the post-crisis monetary policy framework will be shaped and thus how a general increase in bid rates in tender operations will affect monetary policy implementation.

It also remains to be seen whether the Basel III liquidity risk regulation framework will actually have such a strong impact on tender rates and on the collateral pledged with the Eurosystem that counteracting measures may be needed. The Eurosystem, like any other central bank, has at its disposal a list of theoretically possible means to address unintended consequences of the liquidity regulation framework on the monetary policy framework (e.g. narrowing the collateral set eligible for central bank operations, imposing limits on central bank financing, imposing limits on the use of certain asset types). These are not discussed here.

Box 2

BANKS' ADJUSTMENT STRATEGIES TO FULFIL THE LIQUIDITY COVERAGE RATIO

This box focuses on different adjustment strategies that banks could pursue to fulfil the Liquidity Coverage Ratio (LCR).

While most banks in the euro area would already fulfil the LCR requirements, some banks have an LCR below 100% at the current juncture. To increase their LCR, such banks can:

- (a) restructure the asset side of the balance sheet:
 - (i) increase holdings of level 1 high-quality liquid assets (HQLA) (e.g. high-rated or domestic government bonds) or level 2 HQLA (e.g. corporate bonds, covered bonds, residential mortgage-backed securities (RMBS) or shares that fulfil the criteria) by selling other assets; or
 - (ii) increase central bank reserves by increasing central bank borrowing, using non-HQLA as collateral;

(b) restructure the liability side of the balance sheet:

- (i) decrease net outflows over a 30-day period by shifting short-term market funding to longer-term market funding; or
- (ii) decrease net outflows over a 30-day period by shifting short-term market funding to central bank funding.

These adjustment strategies are shown in Tables A, B, D and E. They represent four distinct ways of adjusting to the regulatory requirements. Of course, employing a combination of these or other, similar strategies is also possible.

For the two strategies (a)(ii) and (b)(ii) involving the central bank, the strategy has an impact on the central bank's balance sheet. This is shown in Tables C and F.

As a starting point, a stylised bank balance sheet of a bank that has an LCR below 100% is considered. The stylised balance sheet focuses on items that are of relevance for the LCR, either because they would form part of HQLA or because they enter the calculation of net outflows over a 30-day period. Stylised assumptions are made regarding the composition of the balance sheet items and the resulting aggregate treatment in the LCR.¹ Furthermore, outflows stemming from off-balance-sheet commitments are added. The LCR is then calculated as the amount of HQLA divided by the net outflows over a 30-day period. Under the stylised assumptions, the LCR of the bank would be 91.2%.²

Restructuring the asset side of the balance sheet

Adjustment strategy (a)(i) consists of increasing the holdings of HQLA. It is assumed that the bank sells one unit of other assets and buys one unit of level 1 HQLA, e.g. government securities (see Table A). With this strategy, the bank reaches an LCR of 100.4%. Of course, the bank could also increase its holdings of level 2 HQLA – in this instance, the volumes would have to be slightly larger owing to the haircuts applied in the calculation of the LCR.

1 The stylised balance sheet and the assumptions made are inspired by aggregate balance sheet items data and the results of the Basel III monitoring exercise conducted by the Basel Committee on Banking Supervision (Quantitative Impact Study), with the perspective of constructing a balance sheet that shows an LCR shortfall. It is assumed that:

- the average LCR haircut for level 2 HQLA held by the bank is 25%;
- all central bank reserves can be counted towards the LCR;
- 100% of unsecured loans to (deposits from) financial institutions with a remaining maturity below 30 days can be considered as inflows (outflows);
- 30% of secured loans to (deposits from) financial institutions with a remaining maturity below 30 days can be considered as inflows (outflows). This assumption is motivated by the fact that loans/deposits secured against level 1 HQLA would not be counted as inflows or outflows, while those secured against level 2 HQLA would receive a reduced percentage, and only those secured against non-HQLA would have to be counted fully;
- 1% of other loans can be considered as inflows and 18% of other deposits can be considered as outflows over a 30-day period.

The discrepancy stems from the fact that run-off rates are applied to deposits under the LCR, simulating a stressed scenario. These assumptions simplify the picture considerably – in particular as regards inflows and outflows, the true calculation of the LCR is considerably more complicated. Inclusion of all details is not possible based on a stylised bank balance sheet alone.

2 Based on the numbers given in Table A and in footnote 1, the LCR of 91.2% is calculated as follows: the amount of HQLA is the sum of level 1 HQLA (5 units), central bank reserves and cash (2 units) and level 2 HQLA taking into account the average haircut that applies to these assets ((1-25%)*4 units). Thus, the amount of HQLA is 10 units. The outflows over a 30-day period are equal to the sum of four components: 100% of the unsecured deposits of financial institutions with a remaining maturity of below 30 days (100%*7 units), 30% of the secured deposits of financial institutions with a remaining maturity of below 30 days (30%*7 units), 18% of other deposits (18%*32 units) and outflows from off-balance-sheet commitments (3 units). This amounts to 17.86 units. The inflows over a 30-day period are equal to the sum of three components: 100% of the unsecured loans to financial institutions with a remaining maturity of below 30 days (100%*5 units), 30% of the secured loans to financial institutions with a remaining maturity of below 30 days (30%*5 units) and 1% of other loans (1%*40 units). This amounts to 6.9 units. Thus, the net outflows (outflows minus inflows) are 10.96 units. Overall, the LCR is equal to 10 units divided by 10.96 units, i.e. to 91.2%.

Table A Adjustment strategy (a)(i): increasing level 1 HQLA by selling other assets

Assets		Liabilities	
<i>Loans</i>		<i>Deposits</i>	
Loans to financial institutions, < 30 days, unsecured	5	Deposits of financial institutions, < 30 days, unsecured	7
Loans to financial institutions, < 30 days, secured	5	Deposits of financial institutions, < 30 days, secured	7
Loans to financial institutions, > 30 days	5	Deposits of financial institutions, > 30 days	5
Other loans	40	Other deposits	32
<i>HQLA</i>		<i>Eurosystem liabilities</i>	
Level 1 HQLA	5 + 1	Eurosystem borrowing	7
Central bank reserves and cash	2		
Level 2 HQLA	4		
<i>Other</i>		<i>Other</i>	
Other assets	34 - 1	Other liabilities	42
Total	100	Total	100
		<i>Outflows from off-balance-sheet commitments</i>	3

Source: ECB.

Note: The size of the balance sheet is normalised to 100 (before adjustment).

Adjustment strategy: sell one unit of other assets, buy one unit of level 1 HQLA (e.g. government securities).

Original LCR (under stylised assumptions): 91.2%.

Resulting LCR (under stylised assumptions): 100.4%.

Table B Adjustment strategy (a)(ii): increasing central bank reserves by increasing central bank borrowing

Assets		Liabilities	
<i>Loans</i>		<i>Deposits</i>	
Loans to financial institutions, < 30 days, unsecured	5	Deposits of financial institutions, < 30 days, unsecured	7
Loans to financial institutions, < 30 days, secured	5	Deposits of financial institutions, < 30 days, secured	7
Loans to financial institutions, > 30 days	5	Deposits of financial institutions, > 30 days	5
Other loans	40	Other deposits	32
<i>HQLA</i>		<i>Eurosystem liabilities</i>	
Level 1 HQLA	5	Eurosystem borrowing	7 + 1
Central bank reserves and cash	2 + 1		
Level 2 HQLA	4		
<i>Other</i>		<i>Other</i>	
Other assets	34	Other liabilities	42
Total	101	Total	101
		<i>Outflows from off-balance-sheet commitments</i>	3

Source: ECB.

Note: The size of the balance sheet is normalised to 100 (before adjustment).

Adjustment strategy: increase central bank borrowing by one unit and hold as reserves/place in deposit facility.

Original LCR (under stylised assumptions): 91.2%.

Resulting LCR (under stylised assumptions): 100.4%.

Adjustment strategy (a)(ii) consists of increasing the amount of central bank reserves by increasing central bank borrowing³, using non-HQLA as collateral.⁴ It is assumed that the bank increases central bank borrowing by one unit and holds the resulting liquidity as central bank reserves, placing it in the deposit facility of the central bank (see Table B). This strategy lengthens the balance sheet of the bank by one unit. With this strategy, the bank reaches an LCR of 100.4%.

3 Note that the maturity of the central bank refinancing operation does not play a role, as the recent changes to the LCR (as of January 2013) introduced a 0% run-off rate for all central bank funding. Thus, the LCR does not provide an incentive to use a central bank refinancing operation of a particular maturity.

4 The Eurosystem collateral framework is wider than the range of HQLA accepted in the calculation of the LCR. For example, uncovered bank bonds, asset-backed securities (non-RMBS) and credit claims are not part of the definition of HQLA, but are accepted as collateral by the Eurosystem. It is assumed that the bank has enough non-HQLA collateral (after haircuts) to satisfy its additional Eurosystem borrowing needs.

Table C Impact of adjustment strategy (a)(ii) on the central bank

(EUR billions)

Assets	Eurosystem		Liabilities
<i>Autonomous factors</i>			
Net foreign assets	555	Banknotes in circulation	822
Net assets denominated in euros	461	Government deposits	83
		Other autonomous factors (net)	380
<i>Monetary policy instruments</i>			
Main refinancing operations	89 + 1	Current accounts	206
Longer term refinancing operations	343	Absorbing operations	78
Marginal lending facility	3	Deposit facility	19 + 1
Monetary policy assets portfolio	137		
Total	1,589	Total	1,589

Source: ECB.

Note: For illustrational simplicity, we assume that the size of the bank's balance sheet is €100 billion, such that a one unit increase corresponds to €1 billion.

For the central bank, this would imply an increase in the central bank refinancing operations and in the deposit facility (see Table C). In the current environment of unlimited provision of central bank funding, an increase in the main refinancing operations would be likely. Alternatively, the marginal lending facility could be used.

Restructuring the liability side of the balance sheet

Adjustment strategy (b) consists of decreasing the amount of net outflows over a 30-day period. Under adjustment strategy (b)(i), it is assumed that the bank lengthens the maturity structure of its liabilities by shifting one unit of unsecured wholesale borrowing with a remaining maturity of below 30 days into wholesale borrowing with a remaining maturity of above 30 days (see Table D). With this strategy, the bank reaches an LCR of 100.4%.

Table D Adjustment strategy (b)(i): reducing net outflows by shifting short-term market funding to longer-term market funding

Assets	Liabilities		
<i>Loans</i>			
Loans to financial institutions, < 30 days, unsecured	5	Deposits of financial institutions, < 30 days, unsecured	7 - 1
Loans to financial institutions, < 30 days, secured	5	Deposits of financial institutions, < 30 days, secured	7
Loans to financial institutions, > 30 days	5	Deposits of financial institutions, > 30 days	5 + 1
Other loans	40	Other deposits	32
<i>HQLA</i>			
Level 1 HQLA	5	Eurosystem liabilities	
Central bank reserves and cash	2	Eurosystem borrowing	7
Level 2 HQLA	4		
<i>Other</i>			
Other assets	34	Other liabilities	42
Total	100	Total	100
		<i>Outflows from off-balance-sheet commitments</i>	3

Source: ECB.

Note: The size of the balance sheet is normalised to 100 (before adjustment).

Adjustment strategy: shift one unit of unsecured wholesale borrowing <30 days to wholesale borrowing >30 days.

Original LCR (under stylised assumptions): 91.2%.**Resulting LCR (under stylised assumptions): 100.4%.**

Table E Adjustment strategy (b)(ii): reducing net outflows by shifting short-term market funding to central bank funding

Assets		Liabilities	
<i>Loans</i>		<i>Deposits</i>	
Loans to financial institutions, < 30 days, unsecured	5	Deposits of financial institutions, < 30 days, unsecured	7 - 1
Loans to financial institutions, < 30 days, secured	5	Deposits of financial institutions, < 30 days, secured	7
Loans to financial institutions, > 30 days	5	Deposits of financial institutions, > 30 days	5
Other loans	40	Other deposits	32
<i>HQLA</i>		<i>Eurosystem liabilities</i>	
Level 1 HQLA	5	Eurosystem borrowing	7 + 1
Central bank reserves and cash	2		
Level 2 HQLA	4		
<i>Other</i>		<i>Other</i>	
Other assets	34	Other liabilities	42
Total	100	Total	100
		<i>Outflows from off-balance-sheet commitments</i>	3

Source: ECB.

Note: The size of the balance sheet is normalised to 100 (before adjustment).

Adjustment strategy: shift one unit of unsecured wholesale borrowing <30 days to central bank borrowing.

Original LCR (under stylised assumptions): 91.2%.

Resulting LCR (under stylised assumptions): 100.4%.

Table F Impact of adjustment strategy (b)(ii) on the central bank

(EUR billions)

Assets	Eurosystem		Liabilities
<i>Autonomous factors</i>			
Net foreign assets	555	Banknotes in circulation	822
Net assets denominated in euros	461	Government deposits	83
		Other autonomous factors (net)	380 + 1
<i>Monetary policy instruments</i>			
Main refinancing operations	89 + 1	Current accounts	206
Longer term refinancing operations	343	Absorbing operations	78
Marginal lending facility	3	Deposit facility	19
Monetary policy assets portfolio	137		
Total	1,589	Total	1,589

Source: ECB.

Note: For illustrational simplicity, we assume that the size of the bank's balance sheet is €100 billion, such that a one unit increase corresponds to €1 billion.

Under adjustment strategy (b)(ii), it is assumed that the bank shifts one unit of unsecured wholesale borrowing with a remaining maturity of below 30 days to central bank funding against non-HQLA collateral (see Table E).⁵ With this strategy, the bank also reaches an LCR of 100.4%.

For the central bank, this implies that main refinancing operations increase by one unit. In this example, it is assumed that this increase is matched by an increase in other autonomous factors (net) (see Table F).

⁵ As for adjustment strategy (a)(ii), it is assumed that the bank has enough non-HQLA collateral (after haircuts) to satisfy its additional Eurosystem borrowing needs.

Conclusion

Overall, the banking system has a number of alternative strategies to achieve an LCR that is compliant with the proposed Basel III liquidity risk regulation framework. The choice of strategy depends on a bank's business model as well as on the adjustment costs resulting from the corresponding actions. For instance, it might not be easy to shift the maturity of wholesale funding (strategy (b)(i)), as the choice of maturity is determined by factors other than LCR considerations. In fact, it follows from the above that the most straightforward strategy would be to rely on central bank funding using non-HQLA as collateral. Thus, the demand for central bank funding would increase.

3.4 LENDER OF LAST RESORT FUNCTION

Liquidity regulation is aimed at encouraging banks to better self-insure against liquidity shocks (so that they remain liquid in a stress situation) in order to avoid the negative externalities, at macro level, of liquidity hoarding and asset fire sales. This is an important safeguard against moral hazard and the reduced market discipline that could otherwise result, and reflects the LCR principle that the central bank should remain the LOLR and not become the lender of first resort. To some extent, one could say that the LOLR function and liquidity regulation share similar objectives to ultimately avoid the materialisation of negative externalities. They also interact in the sense that banks will factor in both liquidity regulation and the LOLR function in the optimisation of their business activities. At the same time, they function differently: while liquidity regulation aims at changing banks' behaviour in the longer term and providing a more stable financial environment in general, the LOLR function can be used by the central bank to address specific emergency situations. In this connection, it is the view of the ECB that in the calibration of the LCR the rollover rate assigned to central bank funding provided in the form of emergency liquidity assistance should be zero. Ideally, liquidity regulation should lead to a situation where the central bank needs to resort to its LOLR function less often than would otherwise be the case. At the same time, if liquidity regulation is implemented in a way that strongly favours recourse to the central bank, the dependency of the banking system may increase. In the worst case, the central bank could then indeed be considered as a lender of first resort. In the case of the Eurosystem, the current calibration of the LCR might contribute to an increased demand for central bank financing. This is mainly related to the fact that the collateral set eligible for central bank funding is larger than the definition of HQLA under Basel III and that repo transactions with the central bank, backed by non-HQLA, benefit from more favourable treatment than similar interbank transactions.

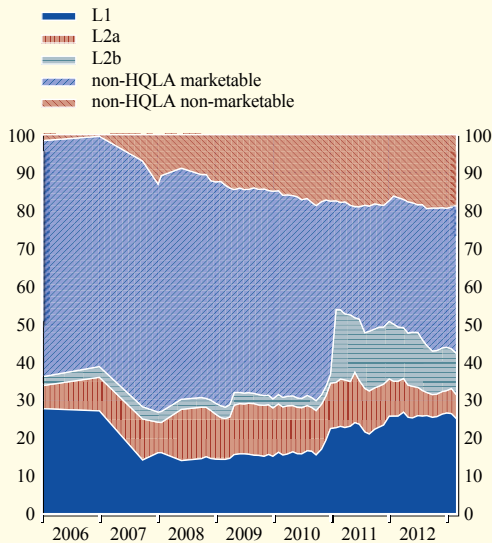
4 MONITORING THE IMPACT OF THE LIQUIDITY REGULATION FRAMEWORK

Owing to its relevance for monetary policy implementation, the Eurosystem has established a framework to monitor the impact of liquidity risk regulation on participation in central bank operations and on the functioning of relevant market segments, including the money market. To this end, the monitoring framework focuses in particular on a set of key indicators which cover three areas in which convergence processes towards the LCR can potentially be observed: indicators on central bank operations; bank-based indicators; and market-based indicators.

The first findings of the Eurosystem's monitoring work are briefly touched upon below. One important caveat is as follows. It is extremely difficult to disentangle, at the current juncture, the effects stemming from the ongoing crisis from the effects stemming from the frontloading by some banks of compliance with the liquidity regulation framework.

Chart 2 HQLA in posted collateral

(contributions by asset groups; percentages)



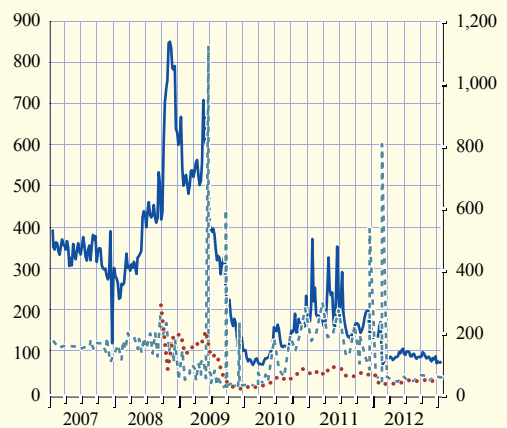
Source: ECB.

First, with respect to collateral, the need to keep HQLA unencumbered for it to count in the LCR numerator should *ceteris paribus* increase the share of non-HQLA collateral used with the Eurosystem. This becomes possible owing to the fact that the set of Eurosystem eligible collateral is wider than the LCR's set of HQLA. The effect is further accentuated by level 2 collateral being subject to a haircut of at least 15% under the LCR rules, while the corresponding Eurosystem haircuts are in some cases lower. Therefore, in particular, level 1 collateral posted with the Eurosystem should decline when banks adjust to the LCR. So far, as shown in Chart 2, this expected effect cannot be observed at the aggregate level.

Second, the expected effects on interest rates, i.e. an increased demand for central bank refinancing by LCR-constrained banks driving up rates via aggressive bidding, cannot currently be observed. However, this is due to the current regime of fixed rate full allotment and not to the absence of a strong need for central bank liquidity. Once a return to normal tender procedures has occurred,

Chart 3 Number of bidders

— main refinancing operations
 - - - special term refinancing operations
 - - - longer-term refinancing operations

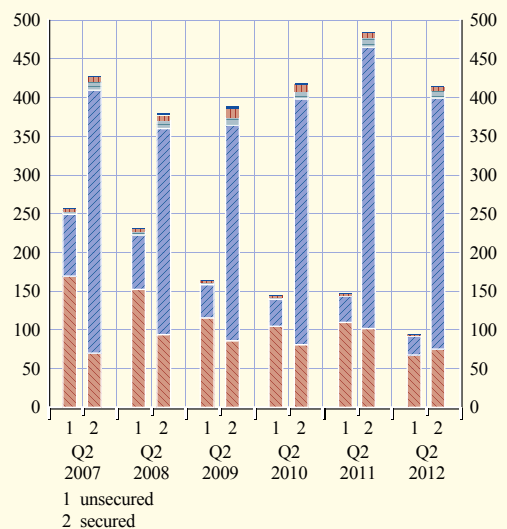


Source: ECB.

Chart 4 Money market turnover by secured/unsecured segment and maturity

(EUR billions)

— more than one year
 - - - three months to one year
 - - - one month to three months
 - - - tomorrow/next day to one month
 - - - overnight



Source: ECB.

a monitoring of bidding behaviour and of resulting price effects will again become possible. Likewise, as shown in Chart 3, a sustained increase in the number of bidders cannot be observed.

Finally, given the differences in run-off rates between unsecured and secured interbank lending affecting the denominator of the LCR, banks should be incentivised by the liquidity rules to shift from the unsecured to the secured market segment. While the shift is clearly visible in the data, as also shown by Chart 4, it is difficult to isolate the effects of the liquidity regulation framework from other effects. In this respect, the LCR regulation will probably reinforce the pattern of a progressive shift of market activity away from the unsecured segment and towards the secured segment. This has already been observed over a number of years, as documented for example in the ECB's annual Euro Money Market Survey.

5 CONCLUSION

The Basel III framework for liquidity risk regulation, which encompasses two ratios – the LCR and the NSFR – is a major development which will have an impact on banks' management of their business activities. The regulation framework is expected to have an overall positive effect on the functioning of the money market by internalising the negative externalities for financial stability and monetary policy, i.e. reducing information asymmetries concerning banks' liquidity risk exposure and their liquidity risk-bearing capacity, and thus reducing the risk premia. In turn, it is expected to impact money markets as well as banks' demand for central bank funding. This article explains the Basel III liquidity requirements, in particular the LCR, and outlines the features which are of particular relevance for the Eurosystem. Furthermore, it illustrates why the liquidity standards are relevant for central banks, discussing in detail the relationship between the liquidity standards and monetary policy operations. The findings show that a possible strategy by which euro area banks could increase their LCR would be for them to rely more than they would otherwise on central bank funding by using non-HQLA collateral. Finally, the article briefly touches upon the first findings of a monitoring framework established by the Eurosystem to assess the impact of the liquidity standards on central bank operations.