

# Report on impact assessment for liquidity measures under Article 509(1) of the CRR



Throughout the global financial crisis, which began in mid-2007, many banks struggled to maintain adequate liquidity. Unprecedented levels of liquidity support were required from central banks in order to sustain the financial system. However, even with such extensive support, a number of banks failed, were forced into mergers or required resolution.

The crisis has illustrated how quickly and severely liquidity risks can crystallise and certain sources of funding can evaporate, compounding concerns related to the valuation of assets and capital adequacy.

In particular, the main observable features of the crisis were the following:

- The liquidity position of banks was seriously hit;
- The funding structures are inappropriate and availability of liquidity buffers is insufficient;
- Liquidity stress situations have led, on occasions, to public interventions;
- Liquidity stress situations have proved lasting over time.

This situation created clear evidence for the need to intervene through further liquidity regulation.

Some international regulatory steps on liquidity have been taken:

In December 2010, the Basel Committee on Banking Supervision (BCBS) announced the introduction of a Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), to be put in place in 2015 and 2018, respectively (liquidity requirements being part of the Basel III new regulatory framework). The LCR promotes short-term resilience of a bank's liquidity risk profile by ensuring that it has sufficient high-quality liquid assets (HQLA) to survive a significant stress scenario of one-month's duration. It basically sets the minimum liquidity buffer to bridge liquidity mismatches for a one-month crisis scenario. The NSFR has a time horizon of one year and is being developed to provide a sustainable maturity structure of assets and liabilities.

In January 2013, the LCR was updated particularly on the definition of HQLA and on the implementation timetable (2015 – 2019) while the NSFR remains under development.

Further, regulatory steps on liquidity have been taken at the European level through the Capital Requirements Regulation (the 'CRR') and the Capital Requirements Directive (the 'CRD IV').

In June 2013, the European Union published Regulation (EU) No 575/2013 (CRR) and Directive 2013/36/EU (CRD IV) which seek to apply the Basel III framework in the EU. They incorporate the above-mentioned liquidity coverage requirements, adapted to the European context, and empower the European Commission to adopt a delegated act to set out the related details.

The CRR contains specific mandates for the EBA to develop draft Regulatory or Implementing Technical Standards as well as Guidelines and Reports related to Liquidity in order to enhance regulatory harmonisation in Europe through the Single Rule Book.

In particular, the CRR tasks the EBA with advising on appropriate uniform definitions of liquid assets for the abovementioned liquidity buffer, and for this purpose defines two categories of transferable assets: assets of 'extremely high' and of 'high' liquidity and credit quality (*please refer to EBA's separate report on the definition of uniform definition of high and extremely liquid assets under Article 509(3) of the CRR*).

Article 509(1) of the CRR specifically tasks the EBA with advising on the impact of the liquidity coverage requirements, on the business and risk profile of institutions established in the Union, on the stability of financial markets, on the economy and on the stability of the supply of bank lending. These latter topics are the focus of this report.

Two reports have to be prepared on these issues and have to be submitted to the European Commission by 31 December 2013.

When preparing the present report, as required by the CRR, the EBA consulted the ESRB, the non-financial end-users, the banking industry, competent authorities and the ESCB central banks. In particular, the consultation of the non-financial end users and the banking industry was done through a public hearing, held on 23 October 2013, a consultation of the EBA's Banking Stakeholder Group (BSG), multiple bilateral meetings with diverse stakeholders, as well as an informal roundtable with the banking industry organised under the aegis of the BSG.<sup>1</sup>

The consultation with the ESRB and the ESCB central banks has been formally organised during the second week of November.

The ESRB input has been provided to the European Commission as an accompanying document to this report. In substance, the ESRB shared the methodological and empirical foundations of the report even if in their view systemic relevance of liquidity risk could have been stronger emphasized. Regarding the cost estimation, the ESRB agreed with EBA's approach while pointing out that low interest rates are not a policy objective. On the proposed derogation mechanism from the 75% inflow cap, the ESRB supported strict and objective criteria for such derogations and recommended that such derogations should be limited to banks which only specialise in certain business models.

With a view to the scenarios tested for different compositions of HQLA, the ESRB pointed out that, only assets that are liquid should be allowed as HQLA in order to effectively address the shortcomings of banks' pre-crisis liquidity risk management, to improve banks' funding structure and their ability to withstand stress.

The opinion from the ESCB central banks was not available at the time when the report was finalised. As soon as available, it will be transmitted to the European Commission, together with an analysis from the EBA, as far as necessary.

This report is structured in four parts:

- A detailed presentation of the mandate
- An Executive Summary
- The Main findings
- A Technical appendix

---

<sup>1</sup> In addition, the Banking Stakeholder Group (2012) opinion on the LCR is taken into consideration in this report.

## List of abbreviations

ASF: Available stable funding

BCBS: Basel Committee on Banking Supervision

BIS: Bank for International Settlements

bps: basis points

BSG: Banking Stakeholder Group

BRRD: Bank Recovery and Resolution Directive

CLF: Committed Liquidity Facilities

CET1: Common Equity Tier 1

CCP: Central Counterparty

CIU: Collective investment undertaking

CRD: Capital Requirements Directive

CRR: Capital Requirements Regulation

DGS: Deposit guarantee scheme

ECB: European Central Bank

ECAI: External credit assessment institution

EEA: European Economic Area

FINMA: Eidgenössische Finanzmarktaufsicht

EONIA: Euro overnight index average

ESCB: European System of Central Banks

ESRB: European Systemic Risk Board

EU: European Union

EUR: Euro

FSA: Financial Services Authority

GDP: Gross domestic product

GHOS: Group of Governors and Heads of Supervision (oversight body of the Basel Committee on Banking Supervision)

HQLA: High-quality liquid assets

ILG: Individual liquidity guidance

IMF: International Monetary Fund

L1/2: Level 1/2 (HQLA)

LCR: Liquidity Coverage Ratio

LR: Leverage ratio

LTV: loan to value

MMMF: Money market mutual funds

NAMA: National Asset Management Agency

NCA: National Competent Authority

NCB : National central bank

NFC: Non-financial corporations

NSFR: Net Stable Funding Ratio

OLS: Ordinary least squares

PRA: Prudential Regulation Authority

QIS: Quantitative Impact Study

RGLA – Regional Governments and Local Authorities with tax authority

RoE: Return on equity

RRE: Residential real estate

RSF: Required stable funding

RWA – Risk-Weighted Assets

SME: Small and medium enterprises

SNB: Swiss National Bank

(v)LTRO: (very) long-term refinancing operation

## 1 Detailed presentation of the mandate

According to Articles 509(1), 509(2) and 509(5) of the CRR, the EBA is mandated to monitor and evaluate the reports made in accordance with Article 415(1) of the CRR:

**‘Article 509(1).** EBA shall monitor and evaluate the reports made in accordance with Article 415(1), across currencies and across different business models.

The report referred to in the first subparagraph shall take due account of markets and international regulatory developments as well as of the interactions of the liquidity coverage requirement with other prudential requirements under this Regulation such as the risk based capital ratios as set out in Article 92 and the leverage ratio.

The European Parliament and the Council shall be given the opportunity to state their views on the report referred to in the first subparagraph.

**Article 509(2).** EBA shall in the report referred to in paragraph 1 assess the following in particular:

(a) the provision of mechanisms restricting the value of liquidity inflows, in particular with a view to determining an appropriate inflow cap and the conditions for its application, taking into account different business models including pass through financing, factoring, leasing, covered bonds, mortgages, issuance of covered bonds, and the extent to which that cap should be amended or removed to cater for the specificities of specialised financing;

(b) the calibration of inflows and outflows referred to in Part Six, Title II, in particular under Article 422(7) and Article 425(2) ;

(c) the provision of mechanisms restricting the coverage of liquidity requirements by certain categories of liquid assets, in particular assessing the appropriate minimum percentage for liquid assets referred to in points (a), (b) and (c) of Article 416(1) to the total of liquid assets, testing a threshold of 60 % and taking into account international regulatory developments. (j) the definition of circumstances of stress, including principles for the use of the stock of liquid assets and the necessary supervisory reactions under which institutions would be able to use their liquid assets to meet liquidity outflows and how to address non-compliance;

(k) the definition of established operational relationship for non-financial customer as referred to in Article 422(3)(c);

(l) the calibration of the outflow rate applicable to correspondent banking and prime brokerage services as referred to in the first subparagraph of Article 422(4);

(m) mechanisms for the grandfathering of government guaranteed bonds issued to credit institutions as part of Government support measures with Union State aid approval, such as bonds issued by the National Asset Management Agency (NAMA) in Ireland and by the Spanish Asset Management Company in Spain, designed to remove problem assets from the balance sheets of credit institutions, as assets of extremely high liquidity and credit quality until at least December 2023.

**Article 509(5).** By 31 January 2014, EBA shall furthermore report on the following:

(a) uniform definitions of high and extremely high liquidity and credit quality;

(b) the possible unintended consequences of the definition of liquid assets on the conduct of monetary policy operation and the extent to which:

(i) a list of liquid assets that is disconnected from the list of central bank eligible assets may incentivise institutions to submit eligible assets which are not included in the definition of liquid assets in refinancing operations;

(ii) regulation of liquidity may disincentivise institutions to lend or borrow on the unsecured money market and whether this may lead to question the targeting of EONIA in monetary policy implementation;

(iii) the introduction of the liquidity coverage requirement may make it more difficult for central banks to ensure price stability by using the existing monetary policy framework and instruments;'

Each aspect of the mandate is presented in the following section together with EBA findings and policy recommendations.

## 2. Executive Summary: assessment and policy recommendations

### Data sample and collection process

This report pursuant to Article 509(1) of the CRR aims at evaluating and assessing the reports made under Article 415(1) of the CRR. However, due to the delay in the introduction of the CRD IV and the CRR, mandatory reporting in accordance with Article 415(1) of the CRR has not yet commenced for European banks. In the meantime, a sample of European banks reports on a voluntary basis to competent authorities which then communicate these data to the EBA. The first observation point for the analysis is Q2 2011. The sample changed over time as national competent authorities (NCAs) were invited to expand the sample of banks. In addition, the reported data have been changing over time. Initially, the voluntary data collection exercise only covered the LCR and subsequently has been subsequently expanded to also cover the Leverage Ratio and the Net Stable Funding Ratio (NSFR). Where necessary, the data obtained through the voluntary data collection exercise has been complemented by the data collected by the EBA in order to feed the reports of the Basel III monitoring exercise on the European banking system (European QIS) as regularly published on the EBA public website. Given that the CRR does not define a specific liquidity coverage ratio (LCR), the analysis is based on the LCR calibration defined by Governors and Heads of Supervisors (GHOS) on 6 January 2013.

### The methodology

The methodology combines a number of complementary approaches to the evaluation and assessment of the data, spanning from quantitative to qualitative analysis of the dataset. More specifically, the methodology involved the following:

- univariate and multivariate analysis of LCR and QIS data;
- scenario analysis of alternative calibrations of the LCR in accordance with the mandate;
- an analysis of the impact of the LCR on bank profitability and/or loan margins through the definition of a set of bank adjustment strategies based on an extensive data analysis and the available literature;
- a simulation of the macroeconomic impact of the changes in loan margins based on two different macro models and a comprehensive set of sensitivity analysis;
- an assessment of the impact on 13 different business models based on peer group analysis;
- seven case studies on assess the potential impact of introducing a quantitative liquidity regulation into the economy;
- the following aspects of our mandate (Article 509(2)(f), (g), (i), (j), (k), (m) of the CRR)) are not based on quantitative analysis only, but on a separate qualitative assessment, including supervisory experience, expert judgement, the available literature and consultations with stakeholders. The section pursuant to Article 509(5) of the CRR draws mostly on the opinions of the international community of central banks as reflected in the published and unpublished literature on the related topics.

When considering the above-mentioned methodology, the following caveats have to be taken into consideration:

- The sample consists of 357 European banks with total assets of EUR 33 000 billion covering about 2/3 of the total assets of European banks.
- ***The liquidity shortfall has been calculated for the whole sample (i.e. both for consolidated and solo reports) and at consolidated level; the results exhibited a small difference.*** Both consolidated and sub-consolidated reports are used for the analysis; double counting of gross liquidity shortfalls is possible when foreign subsidiaries of banking groups separately report to the competent authority. This may specifically affect data analysis for some countries where data are

solo data and excess liquidity is in most cases not invested in liquid assets at a local level but is rather channelled to the group outside the Member State and therefore increases the estimate. To address the issue the analysis is also conducted on a smaller sample which consists of consolidated data only.

- **Competent authorities were ultimately responsible for the sample selection as they selected the national samples.** Individual national samples were not challenged; only the representativeness of the sample at the European level has been considered relevant for the analysis. Hence, there may be a low/absence of representativeness of some particular business models very specific to some countries for which no quantitative analysis was possible. In the same vein, the quantitative analysis of some more common business models may have been limited by the low number of banks representing this business model in the sample.
- **The macroeconomic impact assessment is based on Q4 2012 data** and highlights business models, as well as the features and impact at national level. Since large EU banking groups operate at the international level, they will not only reprice domestic loans but also international loans within and beyond the EU. The analysis in the report could not attempt to anticipate supervisory decisions regarding waivers or preferential treatment of certain intragroup exposures which can have a strong impact on the distribution of liquidity shortfalls across countries.
- Further empirical analysis is based on historical data (Q2 2011 to Q4 2012) and covers a period of severe banking crisis, government bank rescue packages, and central bank unconventional monetary policy (i.e. QE, vLTRO). **The data analysis assumes that all central bank (CB) exposure is rolled over by central banks and receives a 0 per cent run-off rate.** The question of how the withdrawal of government support and central bank unconventional monetary policy will impact on the European banking system is beyond the scope of this report. Nevertheless, an analysis of the impact on EU bank LCRs of the discontinuation of government support has been included. Furthermore, the EBA will separately report to the Commission on the benefits of the LTRO and similar long-term liquidity-providing operations, by 1 July 2014 and its mandate as set out in Article 161(9) of the CRD.
- **The analysis of the impact during the phase-in period is based on the assumption that banks can phase in the LCR over time,** disregarding potential market pressure stemming, inter alia, from potential future disclosure requirements.
- **Potential adjustment costs before Q2 2011 are not discussed in the report.** Furthermore, adjustments of liquidity risk management driven by market pressure and the experience of the recent liquidity crisis cannot be separated from those driven by expectations regarding future regulation. The simulations take account of the spill-over effects within the EU, but disregard those affecting the rest of the world (e.g. USA, Japan).
- A longer time series and a broader sample might have an impact on the results presented in this report (more data will be available for some but not all LCR data due to the GHOS 2013 recalibration).
- **The report provides a comprehensive literature review on the potential benefits but does not provide a quantitative assessment based on the proposed calibration.** The benefits arise from banks internalising liquidity risk, reducing moral hazard, and reducing implicit public sector balance sheet support. The report focuses on the gross social costs of the LCR which would have to be interpreted in the light of the gross social benefits of regulation to derive the net social costs/benefits; which may appear to be different from the EU Commission's impact assessment published in 2011 which focused on net social costs/benefits. In terms of gross social costs, both reports arrive at very similar results, while the EBA report also notes the benefits to the real economy achieved by liquidity regulation.

- **Social costs are overestimated.** The main sources of the overestimation of social costs are the following: the cost analysis in the macroeconomic simulations assumes that tax subsidies on leverage and the implicit government guarantee are not removed. As such, some of the private costs to banks consist of foregone tax subsidies. This does not represent social costs but a redistribution of costs within society. Similarly, the assumption that liquidity is not redistributed across banks and countries, overestimates the liquidity shortfall and thus the social costs of the LCR.
- **In the process of elaborating this report, the EBA has been made aware by external stakeholders on their concerns that the implementation of the LCR could lead to a disruption in the supply of credit.** We have duly considered this aspect; **however, neither the data nor case studies, nor the empirical literature, have confirmed this view.**

## Policy recommendations

According to the mandate contained in Article 509(1) of the CRR

*1. EBA shall monitor and evaluate the reports made in accordance with Article 415(1), across currencies and across different business models. EBA shall, after consulting the ESRB, non-financial end-users, the banking industry, competent authorities and the ESCB central banks annually and for the first time by 31 December 2013 report to the Commission on whether a specification of the general liquidity coverage requirement in Part Six based on the items to be reported in accordance with Part Six, Title II and Annex III, considered either individually or cumulatively, is likely to have a material detrimental impact on the business and risk profile of institutions established in the Union or on the stability and orderly functioning of financial markets or on the economy and the stability of the supply of bank lending, with a particular focus on lending to SMEs and on trade financing, including lending under official export credit insurance schemes.*

CRR, the EBA shall report on whether a specification of the general liquidity coverage requirement is likely to have a material detrimental impact on the business and risk profile of institutions established in the Union or on the stability and orderly functioning of financial markets or on the economy and the stability of the supply of bank lending, with a particular focus on lending to SMEs and on trade financing, including lending under official export credit insurance schemes.

On the basis of the sample analysis and the methodology described in the previous parts, the main findings are the following:

*The report referred to in the first subparagraph shall take due account of markets and international regulatory developments as well as of the interactions of the liquidity coverage requirement with other prudential requirements under this Regulation such as the risk based capital ratios as set out in Article 92 and the leverage ratio.*

- Overall, the data analysis shows that **the specification of the general liquidity requirement is not likely to have a material detrimental impact** on the stability and orderly functioning of financial markets or on the economy and the stability of the supply of bank lending, with a particular focus on lending to SMEs and on trade financing, including lending under official export credit insurance schemes. The overall impact in terms of costs on EU GDP is estimated to be negligible in the order of 3 basis points in the long-term; i.e. in relation to a baseline without the LCR, the level of real GDP would be 3 basis points lower in the long run. This is mainly due to the fact that EU banks have an average LCR of 115%. The gross liquidity shortfall under a 100% LCR is low in relation to the total assets of the banks in the sample (0.8%). In relation to the size of EU HQLA markets the shortfalls are very low (1 to 2%), though only estimates of the exact size of the market are available.
- **Diversified business models tend to be more adapted to the LCR than specialised banks.** Indeed, the LCR of specialised banks are very heterogeneous. LCRs of mortgage banks, building societies, CCPs, securities trading house and custodian institutions are relatively high. Despite a strong HQLA portfolio, private banks are penalised by a significant short-term liquidity gap, but the required adjustment looks critical for auto, consumer credit banks and pass-through financing banks (i.e. payments on assets are passed through to holders of the liabilities of the bank), as they hardly

hold any HQLA. Specific derogations could be introduced for some specialised business models under stringent and objective conditions detailed in the following part.

- Therefore, **derogations from the cap (Article 425 of the CRR) or exemption from the cap or a higher cap than the 75% are suggested** based on the results of Scenario 1. The EBA suggests two possibilities: (i) only institutions specialised in the above business models (pass-through, auto/consumer finance business model) can apply a higher than 75% cap. Specialisation could be measured by a certain percentage of inflows stemming from specific activities, e.g. pass-through financing, auto loans, consumer credit, leasing, factoring. (ii) All institutions may apply a higher than 75% cap for such derogation, but only for particular business lines which perform the above activities.
- **The EBA has a preference for option (i) above**, due to its less complex implementation and the potential impact on the LCR of the whole institution, i.e. including all business lines, in case of option (ii). Furthermore, for well-diversified banks the LCR is less of a constraint, thus reducing the need for such derogation. If however the specialised institution under consideration for a derogation is part of a (diversified) banking group, this would not prevent applying for a derogation.
- To ensure harmonised implementation of the derogation across Member States and to avoid regulatory arbitrage, **such derogations should be subject to stringent conditions and objective criteria**. Such conditions may include, but may not be limited to the following:
  - The institution exhibits a low liquidity risk profile, taking into account the following factors:
    - The securitised assets (the cover-pool) can be assigned to the issued securities and are not reported as liquid assets;
    - The bank is neither contractually nor non-contractually obliged to redeem the issued securities during the 30 days stress horizon. It is unlikely that the bank will buy back the issued securities in the interest of mitigating reputational risk;
    - Payments on covered bonds are based on (and do not exceed) payments on the underlying assets, i.e. the bank does not bear any interest, market volatility or default risk;
    - The timing of inflows matches the timing of outflows;
    - The bank does not retain credit risk, i.e. it is only obliged to pass through amounts received to the bondholders;
  - The institution is not internationally active and/or the institution's total assets do not exceed a size threshold, to be determined by further calibration;
  - Derogations are disclosed in annual reports;
  - In addition, competent authorities need to notify the EBA on their decision to permit such derogation and provide the supporting documentation.
- There is heterogeneity across countries, banks, and business models. At the country-level **there are still four countries which have average LCRs of below 100%**; their gross liquidity shortfall ranges from 0.8% of total assets to 2.713% of total assets.
- **Regarding in particular the impact of the introduction of the LCR on lending to SMEs**, the assessment is based on empirical information. Disruptions on the supply-side of SME lending are not specifically covered in the macroeconomic analysis. However, **the data analysis shows evidence that:**
  - **banks that became compliant did not do so through a reduction in lending to SMEs,**
  - **banks with larger SME exposures do not necessarily have lower LCRs, and**
  - **banks in the sample (Q2 2011 to Q4 2012) did not restrict lending to SMEs.**
- the empirical assessment builds on three different approaches, namely the two approaches to the multivariate analysis of changes in the LCR and the business model analysis. The findings of additional case studies and a literature review were the following:

- **The case studies do not suggest that the implementation of liquidity regimes has weighed on the volume of lending to SMEs.**
- **Similarly, the comprehensive literature on banks' potential adjustment does not provide evidence for a reduction in SME lending in order to improve the LCR.**
- **The EBA voluntary data collection exercise does not indicate that other prudential requirements constitute constraints on banks' adjustment to the LCR.** The conceptual analysis of the interaction with other prudential requirements – i.e. Common Equity Tier 1 ratio (CET 1), net stable funding ratio (NSFR), and leverage ratio (LR) – demonstrates that there can be positive complementarities between the prudential requirements in the CRR.

**The EBA finds that the calibration of the liquidity coverage requirements defined by the Basel Committee on Banking Supervision (BCBS) and endorsed by Governors and Heads of Supervisors (GHOS) is generally appropriate** and that there are no EU specificities which should justify for significant deviations from this internationally agreed framework.

Finally, there are a few areas where further work is needed. In particular, this is the case for the specification of inflow/outflow rates for intragroup flows and in the area of the ongoing work of the international community of central banks regarding the interaction between the introduction of the liquidity coverage ratio and the monetary policy.

- **For information, this report also provides a short overview of the proposed implementation of the LCR in the US in section 3.7.2.**

The detailed findings of the analysis are presented below. Each requirement stemming from the CRR provisions has been recalled (in italics), and for each of these requirements the main outcome and policy recommendations are detailed.

*2. In the report referred to in paragraph 1, EBA shall assess the following in particular:*

*(a) the provision of mechanisms restricting the value of liquidity inflows, in particular with a view to determining an appropriate inflow cap and the conditions for its application, taking into account different business models including pass-through financing, factoring, leasing, covered bonds, mortgages, issuance of covered bonds, and the extent to which that cap should be amended or removed to cater for the specificities of specialised financing;*

The inflow cap, as introduced in the Basel rules text, aims at ensuring that banks hold a minimum of HQLA in relation to their outflows, and has the following rationale:

- To increase banks' resilience against unexpected loss of contractual inflows due to liquidity/solvency problems of the counterparty.
- To reduce contagion risk by curbing the room for "domino effects" in stress situations, thus contributing to stabilising money markets and EU banks' access to funding sources.
- To account for maturity mismatches between inflows and outflows within the 30-day stress horizon, i.e. liquid assets may cover cash outflows in case the inflows materialise later than the outflows.

On the other hand, imposing a cap increases indirect liquidity costs (i.e. opportunity costs from holding a liquidity buffer) for the banks for which the inflows exceed 75% of the outflows, i.e. banks for which the cap is binding.

**An inflow cap of 75% was tested versus removal of the cap:**

- **The aggregate impact in terms of increased LCRs was modest;**
  - **two structural features of banks' balance sheets explained whether some banks would over-proportionately benefit from cap removal** as compared with others:

- banks which do not hold sufficient HQLA, and
- banks which predominantly manage liquidity risk by reducing maturity mismatches between assets and liabilities.
- **Two business models in our sample predominantly feature such characteristics:**
  - pass-through financing and
  - automotive and consumer credit banks.
- Article 425(1) of the CRR allows for the exemption of inflows from deposits placed with institutions qualifying for the treatment set out in Article 113(6) and (7) of the CRR from the inflow cap, without prior approval. On this point, the EBA is in favour of legal clarity: either these flows are exempt or they are not. All other inflows from parent or subsidiary institutions can be exempt subject to prior approval by the competent authority. Regarding the first point, Regarding this second point, the EBA suggests two options:
  - either the European Commission defines objective criteria for the approval process, or
  - there is no formal approval process required (such as in the case of inflows from deposits). This could lead to differences in the implementation of the LCR across Member States.

The final decision regarding both points above should be consistent with that on the preferential treatment of intra-group flows according to (d) below. The EBA intends to carry out additional empirical work on this issue, until March 2014, before specific policy recommendations are made.

- In addition, Article 425(2)(b) and (d) of the CRR provides for further exemptions for trade finance and collateralised transactions. The entire paragraph (2) could be read as containing both exemptions from the inflow cap and/or specifications of inflow rates for certain categories of flows. As such the paragraph is difficult to interpret, more legal clarity is recommended.

*(b) the calibration of inflows and outflows referred to in Part Six, Title II, in particular under Article 422(7) and Article 425(2);*

The calibration of inflows and outflows (in particular, roll-over rates on loans to non-financial customers and run-off rates on other liabilities, such as unsecured wholesale funding) stemming from the Basel rules text, as detailed in the baseline scenario, has the following rationale:

- Non-zero roll-over and run-off rates differentiated across asset and liability classes are intended to improve banks' ability (i.e. by the build-up of liquidity buffers) to fulfil their payment obligations under stress without curtailing lending to the real economy. Assuming zero roll-over rates on loans or zero run-off rates on maturing liabilities would very likely lead to a substantial underestimation of liquidity risk, thus falling short on the main regulatory objective of the Liquidity Coverage Requirement.

**A reduction of the roll-over rates for loans defined in accordance with Article 425(2)(a) of the CRR from 50 to 0% has been tested:**

- While such a measure would entail a non-negligible gross shortfall reduction, the assumption on which it is based (i.e. loans to non-financial corporates can be cut by 100% in times of stress) is unrealistic and not empirically founded.
- Positive roll-over rates for outstanding loans better reflect the banks' desire to maintain franchise value and retain customers even under stress. Furthermore, positive roll-over rates have an impact on the banks' transfer pricing systems and may induce a better pricing of liquidity risk.

**A reduction of the run-off rates on other liabilities defined in accordance with Article 422(7) of the CRR from 100 to 0% has been tested:**

- As in the above case, notwithstanding a sizeable benefit in terms of shortfall decrease a reduction of the run-off rates seems unjustified from the recent evidence and inconsistent with the notion of “stress conditions” which frames the entire regulation.

**Based on the above considerations, it is best to avoid any departure from the calibrations proposed by the GHOS in January 2013.** Substantial reductions in the roll-over and run-off rates would penalise the achievement of the regulatory objectives, thus rendering the standard largely ineffective and outweighing the estimated compliance costs.

*(c) the provision of mechanisms restricting the coverage of liquidity requirements by certain categories of liquid assets, in particular by assessing the appropriate minimum percentage for liquid assets referred to in points (a), (b) and (c) of Article 416(1) to the total of liquid assets, testing a threshold of 60% and taking into account international regulatory developments. Assets owed and due or callable within 30 calendar days should not count towards the limit unless the assets have been obtained against collateral that also qualifies under points (a), (b) and (c) of Article 416(1);*

The rationale for imposing quantitative limitations to the recognition of L2A/B assets<sup>2</sup> as HQLA is based on the observation that the lower opportunity costs of holding L2A/B vs. L1 assets would incentivise banks to largely rely on the firsts to cover net cash outflows.

The removal of the cap has been assessed, also on quantitative grounds, and it is deemed not desirable based on the following arguments:

- L2A/B assets feature higher price volatility and higher haircut variability in the repo market as compared with L1 assets. Since the liquidity which can be generated by repoing/selling these assets is subject to higher uncertainty, their unlimited recognition as HQLAs would weaken the effectiveness of the buffer in improving banks’ resilience against idiosyncratic and market shocks and liquidity risk pricing.
- Quantitative analysis shows that the envisaged levels of 40% cap on Level 2 assets in total and 15% on Level 2B assets do not pose an impediment for EU banks (in the case of some non-Eurozone countries, this depends on the final definition of HQLAs and on the assumption that the derogations would be provided should these countries face constraints).
- Maintaining the cap would ensure full compliance with the standard agreed upon at the Basel Committee level, avoiding level playing field concerns across jurisdictions.

However, the EBA also acknowledges that:

- If, as recommended, caps on Level 2A/B assets, are introduced, the CRR should also envisage the derogation from the Level 2A/B caps, where the supply of HQLA falls short of the justified demand.
- The cap on Level 2 assets does not address concentration risk within Level 1 assets.

*(d) the provision of specific lower outflow and/or higher inflow rates for intragroup flows, specifying under which conditions such specific in or outflow rates would be justified from a prudential point of view and setting out the high level outline of a methodology using objective criteria and parameters in order to determine specific levels of inflows and outflows between the institution and the counterparty when they are not established in the same Member State;*

- The option to apply specific preferential treatment on intra-group liquidity flows is aimed at recognising that intragroup liquidity, all the necessary safeguards being in place, is likely to be more stable than third party flows within the defined stress scenario. On the other hand, excessive reliance on intragroup commitments increases the complexity and interconnection within the banking system and might be conducive to the propagation of shocks within cross-border banking groups, generating negative externalities.

---

<sup>2</sup> Cf. para 26 et seqq. of the Basel rules text.

- The quantitative analysis does not show at this stage that lower outflow and/or higher inflow rates of cross-border intra-group flows would have a substantial effect on the gross liquidity shortfall compared to the baseline.
- In this regard, three alternative calibration options (one asymmetric treatment, two symmetric treatments) have been tested so far vs. the baseline scenario (0% inflows and 40% outflows on undrawn committed credit lines) yielding very similar results in terms of shortfall reduction (i.e. most of the banks reporting intra-group flows data were already compliant and the analysis disregards variations in liquidity surpluses). More comprehensive analysis is to be carried out once reporting data become available, to overcome data availability and data quality issues.
- No conclusive evidence has been achieved so far on whether symmetric or asymmetric treatment is preferable:
  - On the one hand, the baseline scenario or any scenarios involving the same level of asymmetry appear more conservative as opposed to symmetric treatment and disincentives dependent on a source of funding that in some cases proved unreliable during the past crisis (e.g. Icelandic banks, Lehman US versus Lehman UK). Such treatment would also reflect i) the high complexity of committed lines covenants, which make their timely enforceability uncertain and ii) the intention to limit the possibility that liquidity risk exposures could be shifted from one jurisdiction to others. These arguments can apply to scenarios involving the same level of asymmetry.
  - On the other hand, symmetric treatment appears more consistent with the ultimate aim of a "preferential" treatment, i.e. recognising that a liquidity provider will honour first its commitments to intra-group entities. Such treatment is also more aligned with the aims of the single market, while asymmetric treatment would seem to advocate trapped pools of liquidity within Member States.

*(e) the calibration of the draw-down rates applicable to the undrawn committed credit and liquidity facilities that fall under Article 424(3) and (5). In particular, EBA shall test a draw-down rate of 100 %;*

A draw-down rate of 100% has been assessed vs. the baseline scenario (10% outflow rate) and deemed unfeasible on the following grounds:

- The proposed recalibration would entail an almost fourfold increase in the gross liquidity shortfall. A similar shift would entail substantial costs to the real economy.
- Based on the available empirical literature a 100% outflow rate would seriously overestimate the drawing of committed lines to non-financials.
- Such a substantial divergence from the Basel rules text would create an unlevel playing field in the competition for non-financial corporate customers, strongly penalising EU banks.

*(f) the definition of retail deposit in point (2) of Article 411, in particular the appropriateness of introducing a threshold on deposits of natural persons;*

- In Article 421(3) of the CRR, the EBA is required, taking into account the behaviour of local depositors as advised by competent authorities, to issue guidelines by 1 January 2014 on the criteria for the application of Article 421(1) and (2) in relation to the identification of retail deposits subject to different outflows and the definitions of those products for purposes of liquidity reporting.
- High value depositors of both natural persons and SMEs are deemed more responsive to market-wide and idiosyncratic stress than regular retail depositors and should therefore be subject to higher outflow rates. Therefore the EBA guidelines on retail deposits subject to different outflow rates should be taken into consideration in the delegated act.

*(g) the need to introduce a new retail deposit category with a lower outflow in the light of the specific characteristics of such deposits that could justify a lower outflow rate and taking into account international developments;*

- The EBA agrees on the merits of a specific outflow category for deposits insured by a Deposit Guarantee Scheme (DGS) which fulfils the criteria defined for that purpose in the GHOS recalibration of January 2013. The adoption of the legislative package on DGS would move EU DGS into the direction of fulfilling these criteria, as required by the BCBS. Once the preconditions for new retail deposit category with lower outflow rates are likely to be fulfilled, the benefits and costs of its introduction should be investigated by the EBA. However, the 5% outflow category mentioned in Article 421(1) of the CRR already requires that the respective deposits are covered by an effective DGS. Further reductions of the outflow rate would result in lower outflows in the regulation than applied by some banks internally.

*(h) derogations from requirements on the composition of the liquid assets institutions will be required to hold, where in a given currency the institutions' collective justified needs for liquid assets are exceeding the availability of those liquid assets and conditions to which such derogations should be subject;*

- If, as recommended in the above section discussing Article 509(2)(c), caps on Level 2A/B assets, are introduced, the CRR should also envisage the derogation from the Level 2A/B caps, where the supply of HQLA falls short of the justified demand.

*(i) the definition of Shari'ah-compliant financial products as an alternative to assets that would qualify as liquid assets for the purposes of Article 416, for the use of Shari'ah-compliant banks;*

- There are specific problems in the case of banks which can only invest in Shari'ah compliant assets. They stem from the fact that Shari'ah compliant assets do not meet some of the requirements for HQLA due to the low number of issuers, issuances exclusively in USD and non-central bank eligibility.
- The EBA suggests the possibility of waiving certain requirements for the holding of such assets under conditions clearly defined in the delegated act. Such conditions might include central bank eligibility for the purpose of standard operations, listing on a recognised exchange, prices which are generally agreed or easily observed in the market. However, the resulting regime should not constitute a competitive advantage for such banks vis-à-vis non-Shari'ah compliant banks.
- Alternatively, a provision could be included in the delegated act to provide discretion for competent authorities to waive the LCR and/or requirements for HQLA on a case-by-case basis for Shari'ah compliant banks. However, these alternatives are less favourable due to level playing field issues and comparability of banks' LCR positions.

*(j) the definition of circumstances of stress, including principles for the use of the stock of liquid assets and the necessary supervisory reactions under which institutions would be able to use their liquid assets to meet liquidity outflows and how to address non-compliance;*

- The report contains general principles to guide competent authorities on how to address using the liquid assets buffer by institutions and how to assess circumstances of stress. Consequently, such guidance, while conscious of moral hazard implications, indirectly clarifies for banks the conditions under which use of their liquidity buffer may be appropriate, and what are their obligations towards competent authorities.

*(k) the definition of established operational relationship for non-financial customer as referred to in Article 422(3)(c);*

Basel III contains general criteria regarding the definition of established operational relationship for non-financial customers (i.e. these deposits have to be by-products to the underlying services provided by the banking organisation, not sought out in the wholesale market in the sole interest of interest income; without the respective deposit balance the clients would lose access to services that are vital for their operation). This part of the report aims at operationalising and specifying these criteria in more detail for deposits other

than those generated for clearing, custody or cash management. The EBA recommends the following definition for: To identify the respective deposits and clients, for which the following criteria must be fulfilled:

- The relationship with the client has persisted for at least 24 months.
- The deposits are highly liquid, i.e. only current/transaction accounts can be included. Time deposits, savings deposits, brokered deposits are excluded.
- The bank shall present evidence to the competent authority upon request that the deposit is vital for the client's operations, i.e. the client has a substantive dependency with the bank and the deposit is required for its activities.
- The client is unable to withdraw amounts legally due over a 30-day horizon, without compromising its operational functioning. Evidence shall be presented at any time upon request of the NCAs based on data spanning at least 24 months.
- Only the deposit base is treated as operational balance. It is defined as the balance necessary to make use of the service to which the deposit is a by-product. Excess funds are treated as non-operational. Non-operational balances are considered to be all balances in excess of the average 5-day rolling cumulative net-cash outflow over the preceding 90 days. The deposit is held in specifically designated accounts and priced without giving an economic incentive to the customer to leave any excess funds on these accounts.
- These services include: direct or indirect access to national and international payment services, security trading/depository services.

Further, banks should exclude the following deposits:

- Deposits that are collected on the wholesale market in the sole interest of offering interest income, i.e. The deposits pay interest rates that are at least 5 basis points (bps) below the prevailing rate for wholesale deposits with comparable characteristics (maturity and other deposit contract features).
- Price sensitive deposits, i.e. deposit balances that display significant co-movements with interest rates are excluded.
- Deposits when a significant portion of the deposits are provided by a small proportion of customers (i.e. concentration risk).

*(l) the calibration of the outflow rate applicable to correspondent banking and prime brokerage services as referred to in the first subparagraph of Article 422(4);*

- The outflow rates on corresponding banking and prime brokerage should not be recalibrated to 0% outflows. The recalibration of the outflow rate applicable to correspondent banking and prime brokerage services would lead to a reduction of the gross liquidity shortfall by 5% or EUR 14 billion. The recalibration would have a negligible impact.

*(m) mechanisms for the grandfathering of government guaranteed bonds issued to credit institutions as part of Government support measures with Union State aid approval, such as bonds issued by the National Asset Management Agency (NAMA) in Ireland and by the Spanish Asset Management Company in Spain, designed to remove problem assets from the balance sheets of credit institutions, as assets of extremely high liquidity and credit quality until at least December 2023.*

- Senior bonds issued by the National Asset Management Agency (NAMA) in Ireland, by the Spanish Asset Management Company (SAREB) in Spain and by other legal entities, similar to NAMA or SAREB, subject to meeting the criteria described in Article xx of the CRR, shall be grandfathered as assets of extremely high liquidity and credit quality until the bonds are fully repaid in accordance with the relevant legal entities redemption plan. The value of these bonds to be reported as liquid assets

shall be subject to an appropriate haircut, to reflect the haircut assigned to the securities as collateral in liquidity operations of ESCB central banks.

5. By 31 January 2014, EBA shall furthermore report on the following:

(b) the possible unintended consequences of the definition of liquid assets on the conduct of monetary policy operation and the extent to which:

(i) a list of liquid assets that is disconnected from the list of central bank eligible assets may incentivise institutions to submit eligible assets which are not included in the definition of liquid assets in refinancing operations;

- Recent literature (Coeure 2013, ACP/BdF 2012, ECC 2012, LR-MPO 2012, Bech, Keister 2013, Bindseil, Lamoot 2011, ECB 2012b, Schmitz 2013) regarding the interaction between the LCR and monetary policy suggests that the current calibration of the LCR as agreed by GHOS in January 2013 might have an impact on monetary policy implementation, allowing for regulatory arbitrage via central bank operations. Nevertheless, the very purpose of the LCR will prompt beneficial implications for central bank operations: e.g. sufficient liquidity buffers ensure that central banks are not called upon to act as lenders of first resort, if banks face liquidity problems. While a 100% roll-over rate on central bank repos ensures equal treatment between central banks implementing monetary policy through repo operations and central banks implementing monetary policy through outright purchases of assets (Coeure 2013), in combination with a broad collateral framework (e.g. Eurosystem), it may incentivise banks to arbitrage the LCR by relying more than otherwise on central bank funding using non-HQLA.
- These incentives for regulatory arbitrage could be minimised if central bank operations were treated consistently with other market repos. In particular, the following calibration could be analysed: operations with the central bank up to the bank's minimum reserve requirements (and autonomous factors) could receive a 0% run-off in cash outflows. Beyond minimum reserve requirements (plus autonomous factors), the run-off rates for repos with the central bank could be treated like all other collateralised operations with other market participants based on the underlying collateral. On the one hand, this could reduce incentives for LCR arbitrage via central bank facilities and help ensuring a level playing field between banks operating in jurisdictions with different monetary environments (neutral liquidity balance, liquidity surplus and liquidity deficit). The US Fed, the OCC, and FDIC propose a run-off rate for all central bank repos that is equal to that for repos with other market participants. On the other hand, if central banks buy Level 2A and Level 2B assets, a non-zero run-off rate of central bank operations beyond minimum reserve requirements could pose a significant disadvantage for banks operating where monetary policy is implemented through repo operations (e.g. Eurosystem) rather than through outright purchases of assets (e.g. US). It may also be argued that in stress times a non-zero roll-over rate against non-HQLA would bind institutions to hold additional unencumbered HQLA to meet their LCR requirement, eventually tightening the liquidity conditions for banks at a time when monetary authorities are willing to ease them, therefore hampering the effectiveness of monetary policy decisions.
- For these reasons, the impact of this recalibration on central banks' monetary policy operations (i.e. interplay with current central bank haircuts and collateral management systems) needs to be thoroughly analysed and will proceed from the joint work relying on the matching of the prudential and monetary data.
- A very broad range of eligible liquid assets in the LCR (e.g. allowing central bank eligibility as sufficient criterion for eligibility as HQLA) corresponds to the assumption of a committed liquidity line of the central bank. Without limiting these quasi-committed lines appropriately, either in terms of price or of the share of HQLA they can account for, regulation would be ineffective. For liquidity regulation to bind at the margin, either only assets that are expected to be liquid on private markets should be eligible under the LCR or, alternatively, irrevocably committed central bank liquidity lines, with appropriate restrictions, could be included in HQLA.

- In January 2013 the BCBS set up a dedicated Task Force (TFL) to study the role of central bank committed liquidity facilities (CLFs) in the LCR. The operationalisation of CLF involves a large number of complex choices (e.g. whether a CLF should be available i.e. at all times, only stressed times or not at all). The characteristics should be set in a way that avoids undue reliance on central bank liquidity funding of banks' balance sheets (e.g. due to the 0% run-off rate of central bank funding). The inclusion of a restricted CLF (RCLF) into the LCR framework as an optional tool was agreed. The availability of the CLF is not restricted to situations of stress. However, the RCLF proposal is not yet final. A final agreement is expected for the GHOS in January 2014. With regard to the terms of the CLF, the current proposal in Basel foresees (i.) a low/moderate price for the commitment fee, which must be greater than 75 basis points, or the difference in yields on the assets used to secure the RCLF (normally non-HQLA) and the yield on a representative portfolio of HQLA (as envisaged in Article 5(5) to (7) of the draft RTS on derogations for currencies with constraints on the availability of liquid assets under Article 419(5) CRR<sup>3</sup> and in section 3.4 above), (ii.) that the drawing fee, the type of collateral and haircuts will be determined by national authorities, and (iii.) that the limit will be provided by treating the committed liquidity obtained under the RCLF as Level 2B assets (which can be a maximum of 15% of the total HQLA, within a 40% cap on Level 2 assets). The EBA will further follow the BCBS' deliberations.

*(ii) regulation of liquidity may disincentivise institutions to lend or borrow on the unsecured money market and whether this may lead to question the targeting of EONIA in monetary policy implementation;*

- The European and, especially, the Euro unsecured money markets feature much lower volumes and significantly shorter maturities than before the crisis. This is due to a number of factors. Banks decrease their reliance on unsecured, short-term funding and shift towards secured funding, the European central banks provide ample liquidity and do so over longer periods (through outright asset purchases and vLTROs), the main lenders on the unsecured money market become more risk aware and cut their unsecured exposure to European banks (e.g. US money market funds). It is unlikely that the LCR contributes much to the explanation of the current situation on European unsecured money markets.

Nevertheless, the LCR aims at disincentivising banks' reliance on unstable funding sources like unsecured money market funding with tenors below one month. At the same time, it provides incentives for banks to lend over tenors below one month. The probable implication is that the relative size of funding markets for different sources and maturities will change. Its functioning might be largely determined by the behaviour of non-bank market participants (e.g. insurance companies, money market funds), which in turn will be a function of the confidence in the European banking sector. A more stringent LCR can help restore confidence in EU banks.

*(iii) the introduction of the liquidity coverage requirement may make it more difficult for central banks to ensure price stability by using the existing monetary policy framework and instruments;*

- In 2011, the Eurosystem created a specific structure to analyse the impact of the Basel III liquidity risk regulation on the recourse of banks to Eurosystem monetary policy recommendations and related effects on financial markets. The main recommendations included, inter alia, that minimum reserve requirements should not be considered HQLA, as these cannot be drawn in times of stress. Instead, only central bank reserves in excess of minimum reserves should count towards HQLA which is also the case in the US proposal.
- Subsequently, in July 2012, a monitoring group was set up to monitor the impact of the LCR (and the NSFR) on the implementation of monetary policy in the Euro area. The preliminary findings of the

<sup>3</sup> Consultation paper published on the EBA website on 22 October 2013:  
<http://www.eba.europa.eu/documents/10180/455312/EBA+CP+2013+39+%28Draft+CP+on+RTS+for+the+use+of+derogations%29.pdf>

group were that “the majority of the remaining [all 16 NCAs/NCBs in the sample except 1] supervisors replied that no impact from the introduction of liquidity regulation has been observed. The replies were unanimous with regard to the impact on the implementation of monetary policy: all responses were negative’. The group also noted that the use of aggregate data makes it very difficult to disentangle the impact of the liquidity rules on banks’ behaviour and on Eurosystem monetary policy operations from the effects stemming from the crisis, the conduct of the vLTROs and increased market discipline in banks’ liquidity risk management. Going forward, the group will analyse granular bank data in order to generate firmer and more useful results to guide policy-making.

- The univariate and the multivariate analysis conducted suggest that excess reserves play an important role as HQLA for EU and Euro area banks. This poses the question about how a return to pre-crisis liquidity conditions would impact on EU banks’ LCR compliance. This assessment has to take into account the impact of the LCR on the demand for central bank money, the composition of collateral, and the distribution across banks’ excess liquidity versus their remaining exposure to central bank long-term liquidity provision.
- Under pre-crisis liquidity conditions, central banks estimated the expected demand for central bank reserves at their target policy rate. These estimates together with the estimates of autonomous factors (e.g. changes in banknote circulation) formed the basis for fixing the allotment volume for open market operations. While before the crisis the demand for excess reserves was fairly marginal, since the beginning of the crisis it is significant. How a return to pre-crisis monetary policy implementation, rationed central bank funding, and the introduction of the LCR will affect the demand schedule for central bank reserves is crucial for analysing the impact on changes of central banks’ liquidity policies on LCR compliance. It is also central for an assessment of potential future challenges for the implementation of monetary policy.
- At this stage reliable estimates by the international community of central banks regarding the impact of a potential return to pre-crisis liquidity policy on banks’ LCR compliance or regarding the impact of the introduction of the LCR on the demand schedule for central bank reserves are not available. As long as the calibration of the LCR offers opportunities for arbitrage via central banks, demand for central bank reserves is likely to exceed the structural liquidity deficit. It is also likely to be more volatile and more sensitive to interest rate changes and market conditions than pre-crisis, which might complicate the implementation of monetary policy. The final results of these reflections will be considered by the EBA in further reports.

**CONTENTS**

**1 DETAILED PRESENTATION OF THE MANDATE ..... 6**  
**2. EXECUTIVE SUMMARY: ASSESSMENT AND POLICY RECOMMENDATIONS ..... 8**

**MAIN REPORT**

**1. THE BENEFITS OF QUANTITATIVE LIQUIDITY REGULATION – A SURVEY OF THE THEORETICAL AND THE EMPIRICAL LITERATURE ..... 24**  
**2. THE LCR OF THE EU BANKING SECTOR AS OF Q4 2012..... 25**  
**3. ASSESSING ALTERNATIVE CALIBRATIONS OF THE LCR ..... 33**  
**4. THE LCR ACROSS BANK BUSINESS MODELS ..... 52**  
**5. THE INTERACTION BETWEEN THE LCR, LEVERAGE RATIO, CAPITAL ADEQUACY RATIOS, AND THE NSFR ..... 59**  
**6. CASE STUDIES: THE IMPACT OF QUANTITATIVE LIQUIDITY REQUIREMENTS IN COUNTRIES THAT HAVE ACTUALLY IMPLEMENTED QUANTITATIVE LIQUIDITY REGULATION..... 59**  
**7. THE INTERACTION BETWEEN THE LCR AND MONETARY POLICY IMPLEMENTATION ... 60**  
**8. THE DEFINITION OF ESTABLISHED OPERATIONAL DEPOSITS, OF RETAIL DEPOSIT IN ARTICLE 411(2) OF THE CRR, IN PARTICULAR THE APPROPRIATENESS OF INTRODUCING A THRESHOLD ON DEPOSITS OF NATURAL PERSONS ..... 65**

**TECHNICAL APPENDIX**

**TECHNICAL APPENDIX 1: THE BENEFITS OF QUANTITATIVE LIQUIDITY REGULATION – A SURVEY OF THE THEORETICAL AND THE EMPIRICAL LITERATURE ..... 68**  
**TECHNICAL APPENDIX 2: EVALUATION OF LCR DATA MADE IN ACCORDANCE WITH THE VOLUNTARY LCR MONITORING EXERCISE ..... 75**  
**TECHNICAL APPENDIX 3: ASSESSING ALTERNATIVE CALIBRATIONS OF THE LCR: RATIONALE AND COSTS..... 97**  
**TECHNICAL APPENDIX 4: THE LCR AND BANKS’ BUSINESS MODELS..... 148**  
**TECHNICAL APPENDIX 5: THE INTERACTION BETWEEN THE LCR AND CAPITAL REGULATION, THE LEVERAGE RATIO AND THE NSFR..... 167**  
**TECHNICAL APPENDIX 6: CASE STUDIES ..... 182**  
**TECHNICAL APPENDIX 7: ASSESSING POTENTIAL QUANTITATIVE CONSTRAINTS OF EU BANKS’ LONG-TERM FUNDING CAPACITY ..... 217**  
**TECHNICAL APPENDIX 8: THE INTERACTION BETWEEN THE LCR AND MONETARY POLICY IMPLEMENTATION ..... 218**  
**TECHNICAL APPENDIX 9: THE DEFINITION OF ESTABLISHED OPERATIONAL RELATIONSHIP, OF RETAIL DEPOSITS IN POINT (2) OF ARTICLE 411, IN PARTICULAR THE APPROPRIATENESS OF INTRODUCING A THRESHOLD ON DEPOSITS OF NATURAL PERSONS ..... 235**  
**TECHNICAL APPENDIX 10: MECHANISMS FOR THE GRANDFATHERING OF GOVERNMENT GUARANTEED BONDS ISSUED TO CREDIT INSTITUTIONS AS PART OF GOVERNMENT SUPPORT MEASURES WITH EU STATE AID APPROVAL..... 241**  
**TECHNICAL APPENDIX 11: DEFINITION OF SHARI’AH-COMPLIANT FINANCIAL PRODUCTS AS AN ALTERNATIVE TO ASSETS THAT WOULD QUALIFY AS LIQUID ASSETS FOR THE PURPOSES OF ARTICLE 416, FOR THE USE OF SHARI’AH-COMPLIANT BANKS..... 246**

**TECHNICAL APPENDIX 12: CROSS-BORDER INTRA-GROUP LIQUIDITY FLOWS..... 254**  
**TECHNICAL APPENDIX 13: DEFINITION OF STRESS ..... 265**

**DATA APPENDIX**

**DATA APPENDIX 1: CAN PUBLICLY AVAILABLE BLS DATA CONTRIBUTE TO THE ANALYSIS OF THE IMPACT OF THE LCR ON SME LENDING? ..... 280**

**DATA APPENDIX 2: FULL LIST OF BANKS IN THE LOAN PRICING CORPORATION’S DEALSCAN (LPC) USED IN TECHNICAL APPENDIX 3.4.1. PART C. .... 284**

**DATA APPENDIX 3: BUSINESS MODEL DATA – IMPACT OF THE SCENARIOS ON GROSS LIQUIDITY SHORTFALL RELATIVE TO BASELINE..... 291**

# Main Report

## 1. The benefits of quantitative liquidity regulation – a survey of the theoretical and the empirical literature

The survey of the theoretical and empirical literature on the benefits of quantitative liquidity regulation (see Technical Appendix 1 for the full survey) can be summarised along the following lines: **Liquidity regulation increases economic welfare** by internalising the externality of individual bank's liquidity problems, by reducing the moral hazard in banks' liquidity risk management, and by reducing the likelihood of shifting liquidity risk to the public balance sheet. Lengthening the maturity of funding and holding liquidity buffers are costly. Banks have incentives to shift some of these costs to the public (e.g. central banks). Due to information asymmetries, external monitoring of liquidity risk management is very difficult. Prudent liquidity risk management requires lots of internal and complex information which makes its verification very challenging for external auditors and market participants. However, without an adequate external verification, banks could underestimate their liquidity risk exposure. **Liquidity shocks are low probability, high impact events and statistical models tend to underestimate liquidity risk, as they are calibrated to relatively short time series.**

The theoretical literature suggests that internationally harmonised quantitative liquidity regulation will have the following benefits: **coupled with capital regulation, liquidity regulation will significantly improve the soundness of the banking sector.** Especially, by minimising the impact of liquidity shortages, liquidity buffers will reduce potential losses from asset fire sales and will help to bolster bank solvency under liquidity stress. Holding high quality liquid assets will reduce asymmetries of information regarding banks' liquidity risk. If markets are aware that banks hold a sufficient buffer of high quality liquid assets, it will inspire more confidence within the banking sector. In the medium-term, ceteris paribus, this will have a positive impact on banks' funding costs. Liquidity buffers can also protect banks against bank runs and prevents asset fire-sale externalities and other forms of financial contagion (e.g. losses of confidence in the banking system). Finally, liquidity regulation can reduce the interconnectivity of the banking system which facilitates the restructuring and resolution of insolvent institutions according to the forthcoming EU Bank Recovery and Resolution Directive.

**The empirical literature shows that under-pricing of liquidity (and credit and other) risks is a common feature of credit booms and was particularly prevalent in the build-up of the current crisis.** Setting a floor for liquidity risk costs in loan pricing is, thus, an essential function of liquidity regulation. As such it contributes to avoiding excessive loan growth and the ensuing misallocation of capital. The empirical literature confirms that quantitative liquidity regulation contributes to reducing the likelihood of excessive credit growth, the emergence of bubbles, and subsequent banking crisis. It does so by providing incentives for banks to better price liquidity and by limiting credit growth based on excessive liquidity risk. If risks in the banking sector materialise, liquidity regulation increases the resilience of the banking system. Lower exposure to short-term funding, less repricing pressure of formerly underpriced liquidity risk, reduces the volume and price impact of a potential crisis on loan supply. As such quantitative liquidity regulation contributes to avoiding a credit crunch. In addition, the empirical literature provides evidence for the theoretical results discussed above: lower liquidity risk exposure (maturity mismatch) and/or high liquidity risk bearing capacity (liquidity buffers) reduce the potential for panic driven wholesale- or retail-bank runs.

**For liquidity regulation to achieve its objectives the literature review suggests that it should have some basic characteristics, such as:**

- Be a binding constraint for banks; i.e. it needs to actually affect banks' funding structure and the pricing of their liabilities and assets,
- Be forward looking (rather than backward looking as in traditional stock approaches), i.e. it enables banks and supervisors to detect excessive liquidity risk,
- Be risk sensitive,
- all material sources of liquidity risk on- and off-balance-sheet
- Be applicable under business as usual as well as under stressed conditions, while ensuring the usability of the liquidity buffer under stress.

**The harmonization of quantitative liquidity regulation could yield cost savings due to the harmonisation of reporting templates, of legal frameworks, of regulatory requirements and of liquid asset definitions.** Harmonisation reduces the likelihood of trapped pools of liquidity and inefficient uses of liquidity across the EU.

## 2. The LCR of the EU banking sector as of Q4 2012

### 2.1. The sample

The descriptive analysis of LCR data under the voluntary EBA LCR monitoring exercise (Technical appendix 2.1.) analyses the **LCR of a sample of 357 EU banks**. The analysis is based on the **GHOS 2013 recalibration of the standard**, as the CRR contains reporting requirements only and does not contain an LCR calibration. In addition to the aggregate data for the sample, the report investigates the distribution across large and small banks, across business models, and across countries. The first annual report pursuant to Article 509(1) of the CRR is based on **2012q4 data**. Due to the delay of the CRD IV and the CRR, regular reporting of LCR, NSFR, and Leverage Ratio data will commence only after the first annual report pursuant to Article 509(1) of the CRR is due. In 2011, the EBA has on its own initiative started to collect data based on a voluntary LCR data collection exercise. In 2013, the exercise was extended to include NSFR and LR data. Furthermore, the templates had to be adapted to the GHOS 2013 recalibration of the LCR and the final version of the CRD IV/CRR. This section of the report is based on 2012q4 data for a total of 357 EU banks.

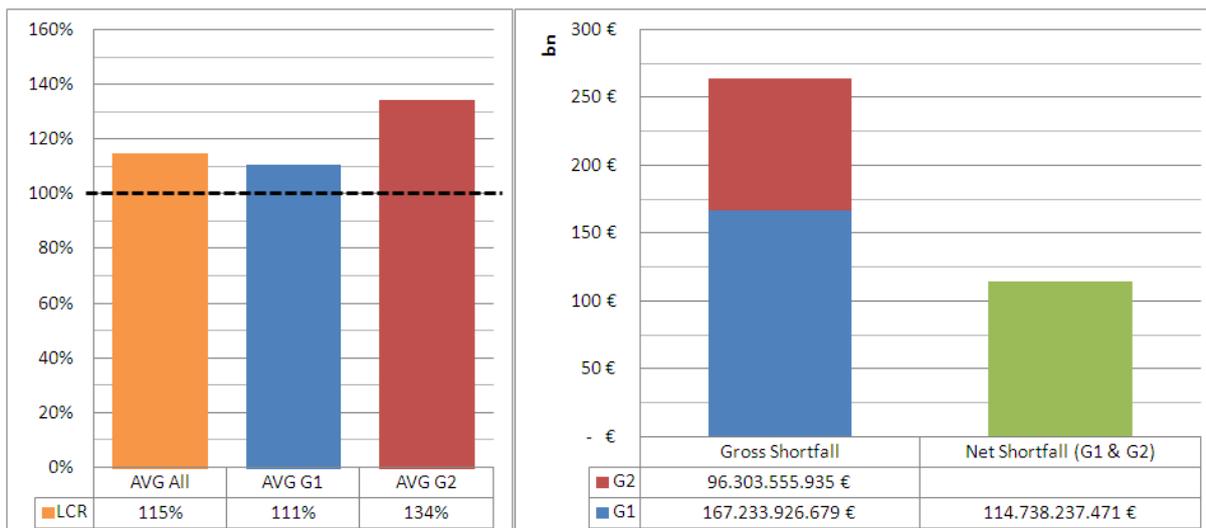
Why does the report not analyse more recent data? Given that the first annual report has to be presented to the EU COM on 31 December 2013, the first draft had to be submitted to the relevant EBA decision making bodies beginning in early September 2013. Data for 2012q4 was submitted by NSAs by April 2013. Data for 2013q1 was submitted by July 2013. Given the comprehensive data quality checks carried out, the final data set would have been available only after the data analysis session in July 2013. This would have been too late for launching the first draft on EBA's decision-making process in September 2013.

Why is the sample on which this report draws smaller than the number of reporting banks? **Comprehensive data quality checks** were conducted in May 2013. All NSAs, submitting data in the EBA LCR monitoring exercise, received detailed country-specific feedback error log files including information on each of the cells containing (i) abnormally small/large values, (ii) extreme results/outliers, (iii) missing values. NSAs were also sent clear and detailed instructions on (i) the General information to be lacking, (ii) additional LCR checks, and (iii) the QIS 1307 Data quality checks. NSAs were given time to resubmit final data until 15 May 2013. The final sample consists only of those banks for which data quality is assured by the respective NSAs. While this reduces the size of the sample, it increases the reliability of the quantitative analysis. In some analyses the sample is further reduced because banks have not submitted the necessary data, e.g. NSFR or Leverage Ratio data. The final sample was communicated to NSAs at the end of June 2013. The NSAs had full information regarding the banks that cannot be included in the analysis of the first annual report.

### 2.2. Descriptive data analysis

The univariate LCR data analysis (see Technical Appendix 2.1. for details) is based on the reports of 357 banks from 21 member states regarding the latest data point (2012q4) and the latest calibration of the LCR (GHOS 2013). The data is collected under the voluntary EU LCR monitoring exercise. The EBA ITS and RTS on insufficient liquid assets and the respective derogations (Article 419(4) and (5) of the CRR) are well advanced currently (September 2013). Thus, Norway and Denmark are treated as countries with insufficient liquid assets for the purpose of the analysis. (The cap on Level 2A and Level 2B assets is removed. The two options for derogation in the respective RTS cannot be operationalised in the data analysis based on the EBA voluntary monitoring exercise data.) There are 50 Group 1 banks and 307 Group 2 banks in the sample. **Total balance sheet assets of banks in the sample amount to EUR 33 trillion (EUR 33 000 billion). The total sample of banks report an aggregated stock of liquid assets amounting to EUR 3 739 billion and net cash outflows of EUR 3 251 billion.**

Diagram 1: LCR and total shortfall (gross vs. net) 2012q4



Source: EBA voluntary LCR monitoring exercise. The weighted average at the EU level and at the country level is calculated as in the BIS QIS reports by summing across net cash-flows as well as HQLA for the respective banks.

For the whole sample and on the country-level, we calculate the LCR as weighted average across banks. **The LCR for the sample of 357 banks is on average 115%** (diagram 1Diagram 2, left hand panel). **The gross liquidity shortfall amounts to EUR 264 billion across all banks of all countries in the sample** (diagram 1Diagram 2, right hand panel).

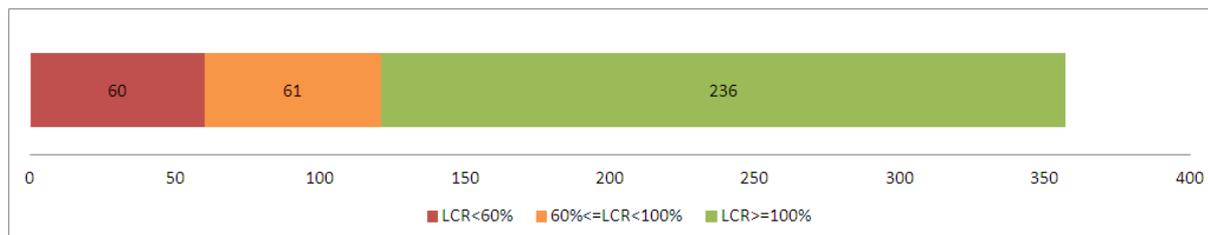
The gross liquidity shortfall equals the sum of liquidity shortfalls across non-compliant banks only, i.e. liquidity surpluses are not taken into account. This is akin to the assumption that liquidity surpluses are not redistributed across banks. The difference between the gross and the net liquidity shortfall are substantial: As the right hand panel of diagram 1Diagram 2 shows, if the re-distribution of liquid assets across banks is taken into account, the shortfall of liquid assets decreases from EUR 264 to EUR 115 billion. Taking into account the EUR 45 billion of HQLA on the banks' balance-sheets, that will become eligible with the introduction of the LCR (see section 2.4 below), the liquidity shortfall in the entire sample drops to EUR 71 billion.

How does the gross shortfall of EUR 264 billion relate to the size of financial markets in the EU? According to Eurostat the outstanding stock of EU government debt in the form of securities amounts to about EUR 9 000 billion in 2013q1. The aggregate outstanding stock of agency debt (e.g. EIB, KfW, but excluding ESFS and EU) in the EU 27 amounts to about EUR 1 500 billion. The aggregate sizes of the non-financial corporate debt and the covered bond market in the Euro area is about EUR 1 000 billion and EUR 2 500 billion, respectively. The aggregate capitalisation of EU 27 stock markets stands at about EUR 8 400 billion (2013q1). Across asset classes, which are in principle HQLA eligible, the outstanding volume in the EU is around EUR 22 000 billion (not taking into account issuances in international currencies which might eligible to cover net cash outflows in non-domestic currencies). However, the volume that is actually eligible depends on ratings, operational criteria, and haircuts under the LCR. Assuming that half of the assets are not eligible due to these criteria, we operate with a total universe of EUR 11 000 billion to put the gross liquidity shortfall into perspective: it amounts to 2.4% of the outstanding stock. In relation to flows it amounts to slightly more than one month's government gross debt issuance in the Euro area denominated in Euro, according to ECB statistics (average for January to June 2013). Taking into account the reallocation of liquidity across banks and HQLA holdings on banks' balance sheets that will be eligible when the LCR is introduced, additional demand for HQLA in the EU is in the vicinity of 0.6% of the outstanding stock or about one third of monthly government debt issuance. The additional amounts withdrawn from markets due to EU central bank outright purchases substantially exceed the additional demand due to the LCR (Bank of England about EUR 450 billion, Eurosystem about EUR 250 billion). Thus, **it is unlikely that the additional demand for HQLA (even without any reduction of net cash outflows) will lead to a destabilisation of financial markets in the EU.**

Nevertheless, in the following analysis we primarily look at gross liquidity shortfalls.

With 134% Group 2 banks tend to have a higher LCR than Group 1 banks (111%, Diagram 2, left hand panel). The major share of the shortfall is due to Group 1 banks (63%).

Diagram 2: Number of compliant banks 2012q4



Source: EBA voluntary LCR monitoring exercise.

More than 66% of European banks are already LCR compliant (LCR >= 100%) by 2012q4. Another 17% reach a LCR of between 60 and 100%. Thus considering the phase-in-period (during which the required minimum LCR increases from 60% in 2015 to 100% in 2018) **more than 83% of the banks in the sample would fulfill the regulation for 2015 by now** (Diagram 2).

Table 1 provides a summary of the LCR data per country. It shows that **most countries are already compliant, but that for some of them there are pronounced differences across banks** (see Table 1, right-hand tables Min and Max values). Some banks still feature single digit LCRs, while others have adjusted their balance-sheets to exceed the regulatory minimum by more than ten times. Thus, even for countries that feature high aggregate LCRs, reallocation of liquidity between banks might be necessary.

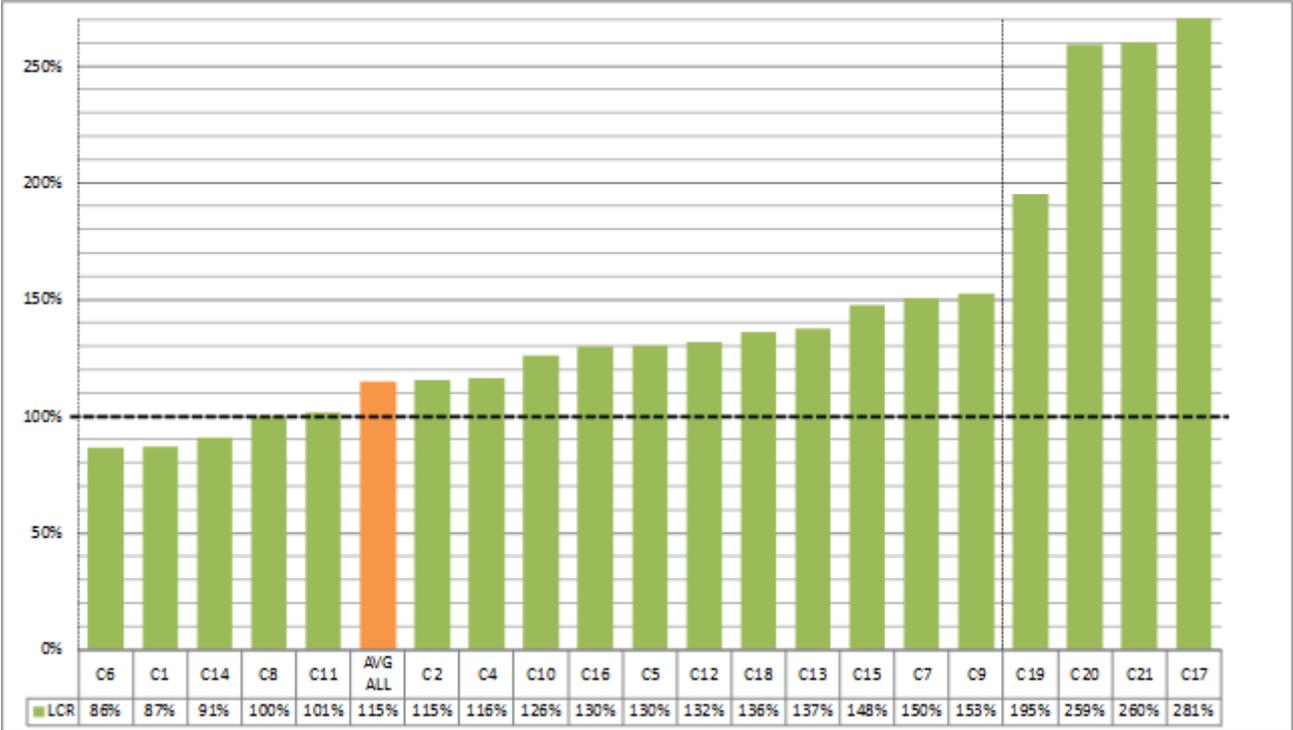
Table 1: LCR and shortfall by country 2012q4

Total							Group 1				Group 2								
Country	number	LCR	Shortfall (bn €)		LCR < 60%	60% <= LCR < 100%	LCR >= 100%	country	number	LCR			Shortfall (bn €)						
			gross	net						AVG	MIN	MAX							
C1		87.1%	103.45	86.28	5	4	2	C1		85%	73%	104%	98.72	C1		134%	0%	175%	4.73
C2		110.8%	38.68	-	15	15	60	C2		99%	88%	134%	20.92	C2		146%	0%	3310%	17.75
C4		116.2%	27.50	-	3	3	43	C4		112%	82%	248%	27.05	C4		165%	0%	489642%	0.45
C5		130.1%	11.91	-	5	9	20	C5		140%	140%	141%	-	C5		118%	0%	694%	11.91
C6		86.5%	10.67	4.99	5	3	5	C6		95%	75%	231%	4.20	C6		69%	0%	257%	6.47
C7		150.3%	9.13	-	2	2	15	C7		148%	89%	225%	5.45	C7		195%	40%	1290%	3.89
C8		99.8%	8.38	0.19	2	5	11	C8		103%	103%	103%	-	C8		97%	7%	1672%	8.38
C9		152.6%	8.09	-	2	0	9	C9		129%	56%	250%	7.82	C9		302%	38%	1075%	0.27
C10		125.9%	3.88	-	2	3	7	C10		125%	107%	142%	-	C10		127%	2%	2680%	3.88
C11		101.4%	3.10	-	10	2	3	C11					-	C11		101%	9%	1342%	3.10
C12		131.8%	2.88	-	1	2	3	C12		124%	85%	325%	2.19	C12		166%	56%	249%	0.69
C13		137.5%	1.54	-	0	2	8	C13		138%	126%	144%	-	C13		135%	85%	189%	1.54
C14		91.1%	1.04	0.83	0	2	1	C14		86%	86%	86%	0.88	C14		136%	73%	572%	0.16
C15		151.2%	0.32	-	1	3	6	C15		152%	152%	152%	-	C15		146%	4%	279%	0.32
C16		129.7%	0.27	-	0	1	4	C16					-	C16		130%	72%	198%	0.27
C17		281.1%	0.02	-	1	0	14	C17					-	C17		281%	3%	4127%	0.02
C18		135.9%	0.00	-	3	0	9	C18		132%	124%	160%	-	C18		302%	0%	387%	0.00
C19		195.3%	-	-	0	0	4	C19					-	C19		195%	157%	212%	-
C20		259.3%	-	-	0	0	2	C20					-	C20		259%	252%	265%	-
C21		260.1%	-	-	0	0	5	C21					-	C21		260%	170%	325%	-
ALL	357	115.0%	263.54	114.74	60	61	236	ALL	50	111%	56%	325%	167.23	ALL	307	134%	-204%	489642%	96.30

Source: EBA voluntary LCR monitoring exercise. One country deleted from diagram.

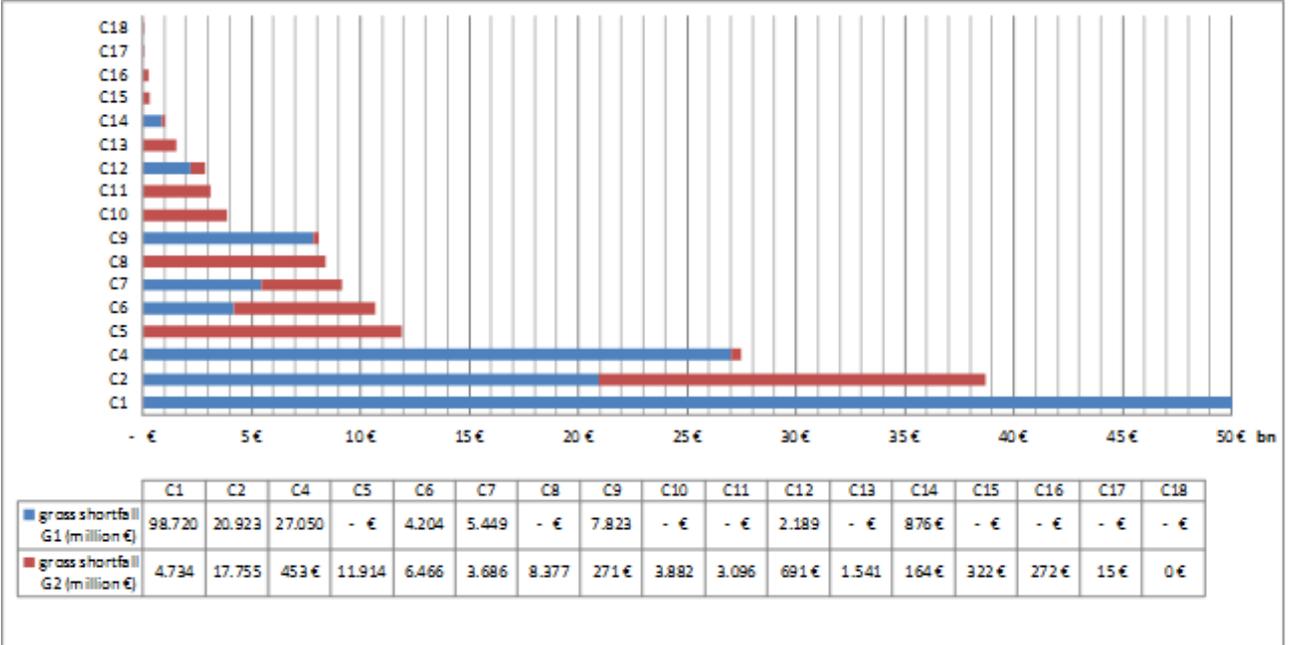
On country level aggregates, LCRs range from 87.1% to 281% (Diagram 3). Only four countries are still below 100%: . All countries are above the 60% threshold to be required by 2015. Nevertheless, 60 banks feature LCRs below 60%.

Diagram 3: LCR 2012q4 (country level aggregates)



Source: EBA voluntary LCR monitoring exercise. One country deleted from diagram.

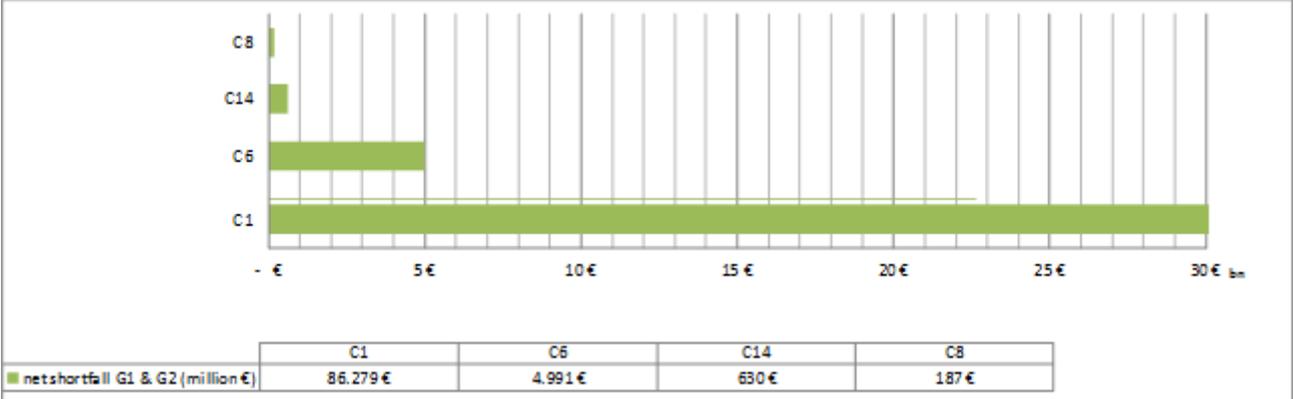
**18 of 21 member states show a gross liquidity shortfall.** The gross shortfall across countries varies strongly (Diagram 4). The amount of the shortfall is affected by the number and the size of the banks in a country. For that reason larger countries tend to show a higher gross shortfall than smaller countries. For that reason, the size of the banking system has to be taken into consideration in the evaluation of the amount of the shortfall (Diagram 6). Diagram 4: Gross shortfall (G1 and G2 banks) per country 2012q4



Source: EBA voluntary LCR monitoring exercise. One country deleted from diagram.

Relaxing the assumption that banks cannot reallocate liquidity within national banking sectors reduces the liquidity shortfall sharply. **Only five countries feature a net liquidity shortfall.** In the other 16 countries aggregated liquidity surpluses across banks extend aggregated liquidity shortfalls, i.e. the net liquidity shortfall is zero.

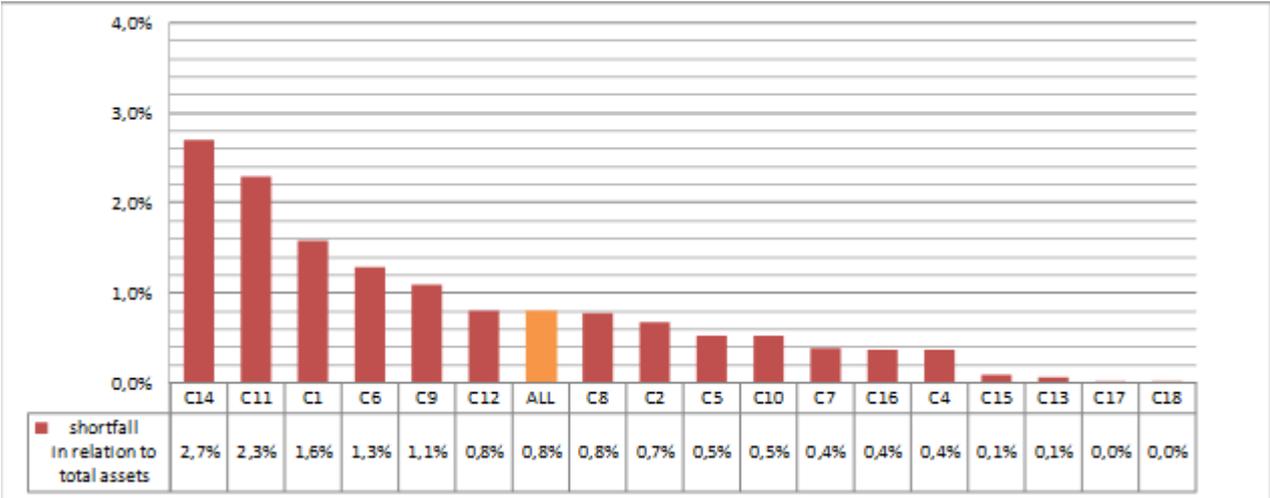
Diagram 5: Net shortfall per country 2012q4



Source: EBA voluntary LCR monitoring exercise. One country deleted from diagram.

Banks in the sample have a total gross liquidity shortfall of EUR 264 billion and total balance sheet assets of EUR 33 trillion. For the whole sample the **aggregated gross liquidity shortfall in relation to total assets amounts to only 0.8%** (Diagram 6, orange bar). Diagram 6 shows the gross liquidity shortfall in relation to total assets per country (red bars).

Diagram 6: Gross liquidity shortfall in relation to total assets

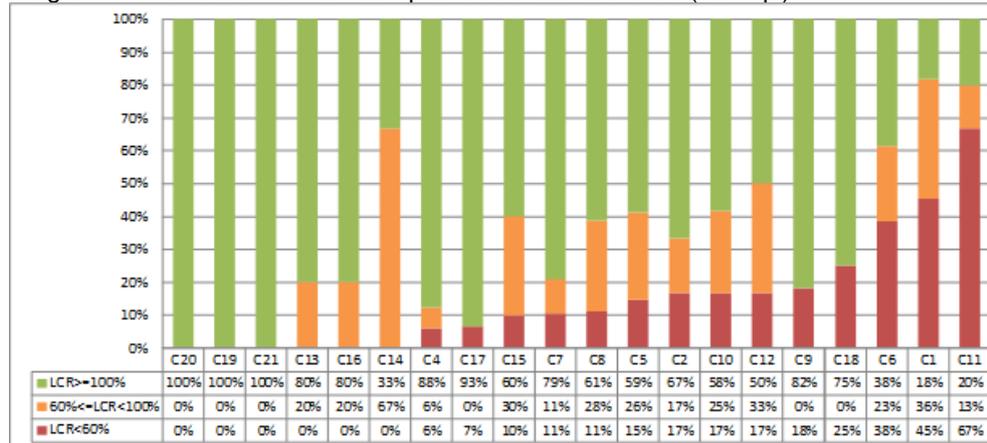


Source: EBA voluntary LCR monitoring exercise. One country deleted from diagram.

The distribution of banks according to their LCR compliance indicates the extent to which liquidity allocation processes will yet have to take place. LCR compliance on a country-level does not necessarily mean that each bank is LCR compliant.

Taking the phase-in period into account, in six countries all banks are already LCR compliant by 2012q4 (Diagram 7, left hand side).

Diagram 7: Distribution of LCR compliance across countries (2012q4)



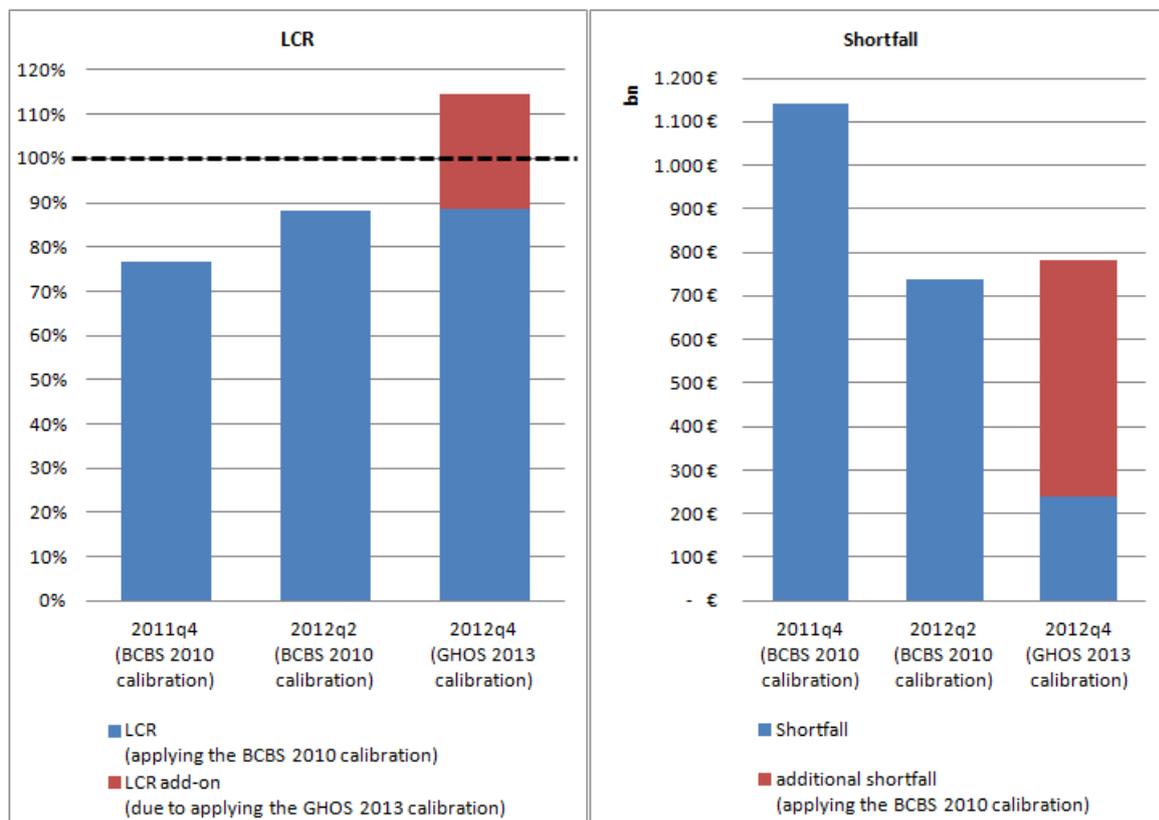
Source: EBA voluntary LCR monitoring exercise.

To investigate the dynamics of the LCR and the shortfall over time, we analysed reports of 245 banks from 21 member states. For this analysis the sample is smaller, because only banks that reported all three data points - 2011q4, 2012q2 and 2012q4 - are included. Nevertheless, this analysis provides a view on the trend in LCR and shortfall for European banks.

The LCR of EU banks in the sample increases by 11 percentage points from 2011q4 to 2012q2 and by another 17 percentage points from 2012q2 to 2012q4. As Diagram 8 (left hand panel) shows, the increase of the ratio between 2012q2 and 2012q4 is mainly driven by the GHOS 2013 recalibration of the LCR. Applying the BCBS 2010 calibration to the 2012q4 data the LCR of European banks would have remained unchanged at 88% and the shortfall would even have increased by about EUR 45 billion or 6% (Diagram 8). Only due to the GHOS 2013 calibration the ratio increases from 88 to 115%. The gross shortfall decreases by 70%.

Thus, **the recalibration of the LCR has led to a drastic softening of the regulation.**

Diagram 8: Change in LCR and shortfall (2011q4 - 2012q4)



Source: EBA voluntary LCR monitoring exercise.

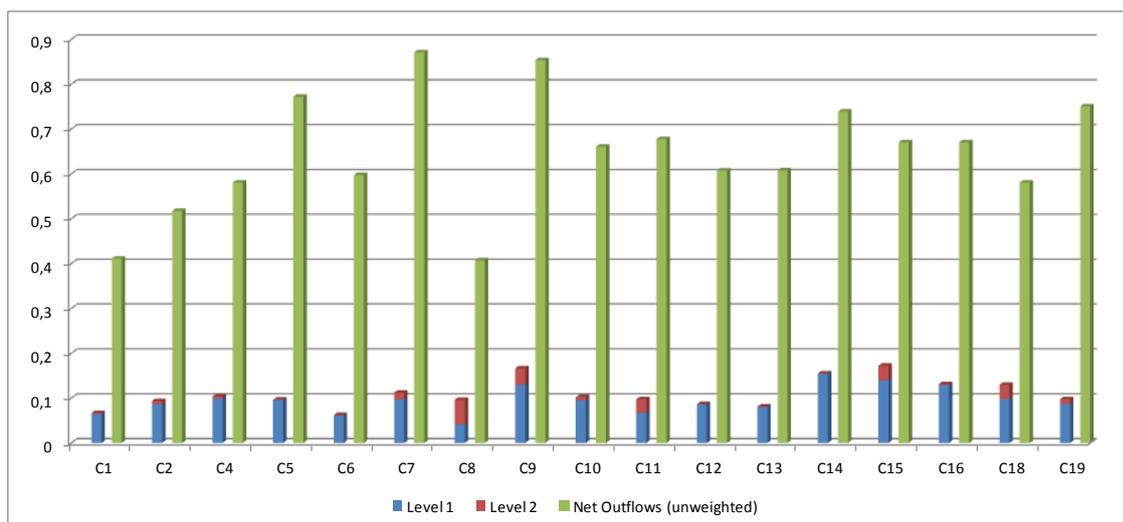
**Between 2011q4 and 2012q4 almost all countries experience improvements of banking sector LCRs.** On the one hand the improvements are driven by the GHOS 2013 recalibration and on the other by banks improvements of their liquidity risk management. The latter is mainly due to increases of HQLA (i.e. drawable CB excess reserves, sovereign bonds, and covered bonds) and to a lesser extent due to decreases of net cash outflows (NCOF). Banks might have to substitute drawable central bank reserves, once central banks attempt returning to pre-crisis liquidity policies, e.g. discontinuation of vLTROs and Quantitative Easing (QE) (though presumably central banks will only return to pre-crisis policies when the economic situation and banks' capacity to manage liquidity risk are both stronger). Banks' excess reserves at central banks account for about EUR 1 360 billion and constitute about 36% of banks' stock of liquid assets. Given the crisis experience, a return to pre-crisis bank behavior (zero excess reserves) is unlikely. But increasing opportunity costs of excess reserves will incentivize banks to economise on them and reduce net cash outflows. The impact of a potential return to pre-crisis monetary policy implementation (i.e. variable rate tenders, maximum allotment volume) is discussed in section 7 below.

### 2.3. Multivariate LCR data analysis: impact of the LCR on non-financial corporate lending, on retail and SME lending, and on trade finance

The multivariate LCR data analysis (see Technical Appendix 2.2. for details) focuses on analyzing the available data in detail and to identify the major drivers of changes of the LCR at bank level. The impact of the LCR on non-financial corporate lending, on retail and SME lending, and on trade finance are investigated at the most granular level, at the level of individual banks. Article 509(1) of the CRR mandates the EBA to study the interaction between other regulatory ratios (e.g. CET1, LR, and NSFR). In addition, we control for country-specific factors by including real GDP growth rates for 2011 and 2012, a dummy for Euro area banks and – where available – data from the Bank Lending Survey. The underlying sample consists of 97 EU banks that participated in both QIS exercises. The data-set had to be restricted to this sample (rather than the full EBA monitoring sample), because only this sample contains information on SME lending, trade finance, lending to non-financial corporate, banking book trading book, total assets, CET1 and LR ratio in 2011q2. The LCR was recalibrated substantially on 6 January 2013. **This section focuses on banks adjustments to the LCR. Thus, the section applies the 2010 calibration for the LCR for 2011q2 and for 2012q4.** Two approaches are applied to the data analysis. In the first, the dependent variable is the change in the LCR ( $\Delta LCR$ ) in percentage points at bank level between 2011q2 and 2012q4. In the second, the independent variable is a binary variable that indicates which banks managed the transition from non-compliance in 2011q2 to compliance in 2012q4 (*TransCompLCR*). In both approaches the independent variables refer to changes in banks' balance-sheet structure over the same period. The unweighted components of the LCR are normalised across banks in per cent of the total assets for 2011q2 and for 2012q4. The variables capturing non-financial corporate lending, retail and SME lending, and trade finance, CET1, the NSFR and the LR are derived in the same manner. The changes of these shares constitute the independent variables.

Diagram 9 summarises the independent variables in the sample on a country-level, i.e. the unweighted sum across Level 1, Level 2A, and Level 2B assets as percentage of total assets of the banks represented in both in the QIS samples (2011q2 and 2012q4) for 2012q4. The unweighted net cash outflows over the next 30 days provide an indication of liquidity risk exposure of banking systems. They range from 40% to 85% of total assets across countries. The unweighted HQLAs serve as proxy for banking systems' liquidity risk bearing capacity and amount for about 7 to 17% of total assets across countries. The sample displays sufficient variation across countries (and banks) for a cross-section analysis of changes of the LCR over time.

Diagram 9: Unweighted HQLA and unweighted net cash-outflows (2012q4, in per cent of total assets)



Source: QIS exercise.

The raw data (displayed in Technical appendix 2.3 Diagram A2.18) shows that banks increased unweighted HQLA (in particular Level 1 assets) between 2011q2 and 2012q4. At the same time, inflows (mostly) decreased which was largely driven by a reduction of short-term lending to other financial institutions. The raw data on outflows presents a very heterogeneous picture across countries. In about half the countries outflows decreased, but the drivers varied strongly. In the other half, outflows increased, often (but not exclusively) driven by increases in short-term retail deposits. In order to investigate the drivers of change more accurately, we conducted a multivariate analysis to complement the univariate analysis in section 2.

The multivariate analysis yields the following results (Table A2.6 and A2.7, in Technical appendix A2.2):

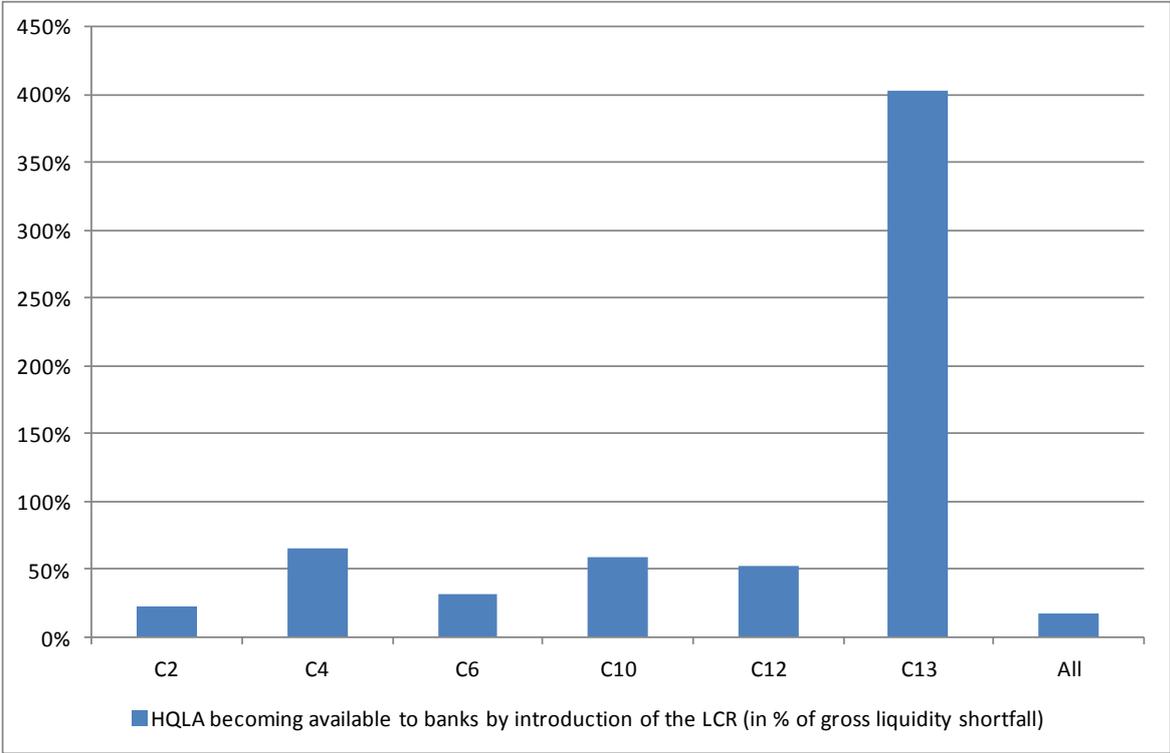
- Both approaches to the dependent variable (change of the LCR,  $\Delta LCR$ , and transition from non-compliant to compliant, *TransCompLCR*) provide very similar results. The results are robust across both approaches.
- **Banks have a number of options to adjust to the LCR.** Relatively few components of the LCR explain large shares of the variations of the dependent variables across banks. The most robust across both approaches is the **increase in HQLA** (especially drawable central bank reserves and sovereign debt) **and, both, lengthening and staggering the maturity of deposits from non-financial corporates and retail and SME customers.**
- **Banks in the sample did not restrict lending to non-financial corporates, retail and SME customers or cut back trade finance exposure** to improve their LCR/become compliant over the period 2011q2 to 2012q4.
- **The sample data shows that other regulatory ratios (CET1, LR, and NSFR) or their changes do not contribute significantly to the observed variations across banks.** These ratios did not impose restrictions on the adjustment of banks in the sample.

#### 2.4. Other potential adjustment mechanisms

The operational requirements in Article 417 of the CRR (and QIS rules text paragraphs 30, 193-194, 28-29<sup>4</sup>) lead to the exclusion of some HQLA from the LCR for some countries ().

<sup>4</sup> "The stock of liquid assets should not be co-mingled with or used as hedges on trading positions, be designated as collateral or be designated as credit enhancements in structured transactions or be designated to cover operational costs (such as rents and salaries), and should be managed with the clear and sole intent for use as a source of contingent funds. ... The stock should be under the control of the specific function or functions charged with managing the liquidity risk of the bank (typically the treasurer). ... As noted in paragraphs 193 and 194, at the consolidated level, banks may also include in the stock qualifying liquid assets that are held to meet legal entity requirements (where applicable), to the extent that the related risks (as measured by the legal entity's net cash outflows) are

Diagram 10: Banks' volumes of HQLA currently non-eligible but eligible by introduction of the LCR (in % of gross liquidity shortfall)



Source: EBA voluntary LCR monitoring exercise.

**The aggregate volumes of HQLA currently excluded from the LCR due to these restrictions amounts to about EUR 45 billion or 17% of the aggregate gross shortfall in the sample** (Diagram 10). The share of HQLA held on bank balance sheets that is excluded from the LCR varies strongly across countries. However, it should be noted that only EUR 16 billion of these additional HQLA are currently held by banks with a liquidity shortfall.

The order of magnitude of assets that are currently excluded due to operational requirements (about 17% of banks' aggregate HQLA shortfall) is such that this additional adjustment mechanism can improve banks' LCR (see Technical appendix 2.3.). In the QIS banks indicate that the share of assets excluded due to operational restrictions is likely to decrease, once the LCR will be implemented, e.g. by transferring control over the assets to the treasury department which does not incur significant opportunity costs yet increases HQLA substantially in some countries. This adjustment mechanism has a non-negligible impact on the potential compliance costs associated with the LCR. This implies an upward bias of the assessment of the impact of the LCR in the following section which is based on the currently available gross liquidity shortfall.

### 3. Assessing alternative calibrations of the LCR

also reflected in the consolidated LCR. Any surplus of liquid assets held at the legal entity can only be included in the consolidated stock if those assets would be freely available to the consolidated (parent) entity in times of stress." (BCBS 2010, pp. 6)

Article 509(1) of the CRR requires the EBA to assess the benefits and costs of alternative calibrations of the LCR for the EU. This section contains the operationalisation of the alternative calibrations in the form of alternative scenarios. The scenarios are described in section 3.1.

The assessment is structured along a regulatory impact assessment based on a discussion of the potential benefits and costs of each scenario and a simulation of the potential impact on the real economy. Regulatory impact assessments are based on a number of assumptions. As such they only provide an indication of the order of magnitude of the potential impact of the LCR on the macro-economy. In addition, they improve our understanding of the interaction between liquidity and capital regulation. The impact assessment is subject to uncertainty with respect to the underlying assumptions. Thus, each of the assumptions is based on substantial empirical analysis which is documented in the technical appendices. Furthermore, sensitivity analyses are conducted to gauge the sensitivity of results with respect to the underlying assumptions.

A number of institutions and researchers presented assessments of the economic costs and benefits of the Basel III liquidity standards (see Technical appendix A2 for an overview). The general conclusion of these studies is that the benefits significantly exceed the costs. The EBA simulation of the potential impact of the LCR on the economy and growth in the EU builds on six corner-stones:

- Different scenarios as how to calibrate the LCR (section 3.1)
- Banks' behavioral reaction to the introduction of the LCR (section 3.2)
- Cost savings due to the interaction between liquidity and capital regulation (section 3.3)
- The expected opportunity costs of banks' adjustment strategies (section 3.4)
- The pass-through of higher costs to customers and the repricing capacity of banks (section 3.4)
- The sensitivity of an economy with respect to increases in long-term interest rates (section 3.5)

### 3.1. The scenarios and the respective underlying rationales

SCRePol decided that the **Baseline Scenario** is defined by the Basel III recalibration of the LCR on 6 January 2013 (Denmark and Norway are likely to become jurisdictions with insufficient liquid assets and be granted derogations from the GHOS 2013 calibration such that there will be no cap on liquid assets.).<sup>5</sup> The main rationale for this decision was that the CRR does not contain a definition of the components of the LCR; neither HQLA nor cash-in- or -outflows are defined. The decision has a number of advantages:

- Many banks are already familiar with the B III recalibration due to their participation in the QIS or due to internal preparations.
- It is well documented and a growing body of literature is available.
- It is applied internationally and, thus, ensures international comparability.
- For internationally active banks, a deviating baseline would increase adjustment costs and add to confusion over the future LCR.

**Scenario 1** is defined by Article 509(2)(a) of the CRR; it assesses the impact of removing the 75% cap on inflows.

**Scenario 2a and 2b** are derived from Article 509(2)(b) of the CRR. In scenario 2a, the roll-over rate for loans to non-financial customers is set to 0% from 50% in the baseline. Technically, inflows from performing loans from retail, small businesses, non-financial corporates and other counterparties (Article 425(2)(a) and (b) of the CRR) are increased. In scenario 2b, the run-off rate for other outflows is set to 0%, from 100% in the baseline.

**Scenario 3** is derived from point (c) of that Article and focuses on the removal of the 40% cap on L2A HQLA and the 15% cap on L2B.

**Scenario 4** analyses the impact of a recalibration of outflow and inflow rates for intra-group flows, in accordance with Article 509(2)(d) of the CRR. For the purpose of the analysis, we tested three alternative calibrations for this scenario: (1) asymmetric preferential treatment: the inflows from undrawn intra-group committed lines are

---

<sup>5</sup> For the GHOS recalibration of the LCR see <http://www.bis.org/publ/bcbs238.pdf>.

increased from 0 to 60% and corresponding outflows from 40 to 100%. (2a) Symmetric preferential treatment: the inflows from undrawn intra-group committed lines are increased from 0 to 50% and corresponding outflows from 40 to 50%. (2b) Symmetric preferential treatment: the inflows from undrawn intra-group committed lines are increased from 0 to 100% and corresponding outflows from 40 to 100%. In all cases inflows from operational intra-group deposits are increased from 0 to 25%.<sup>6</sup>

**Scenario 5** discusses the implications of increasing outflow rates applicable to undrawn committed credit and liquidity to non-financial corporates from 10 to 100%, as per Article 509(e).<sup>7</sup>

**Scenario 6, as per Article 509(f) of the CRR**, tests the contribution of correspondent banking and prime brokerage services to the institutions' LCR (Article 509(1)(k) of the CRR). The run-off rate is set from 100% in the baseline at 0% in this scenario.

**Scenario 7** turns to assessing a broadening of HQLA (Article 509(2) of the CRR).<sup>8</sup> Work on common definitions for HQLA continues in parallel at the EBA and will be presented to the EU Commission in January 2014. Hence, the EBA has been collecting data on a set of assets broader than the Basel HQLA definition. This enables the EBA to complement its work on liquidity characteristics of asset classes and common definitions by an assessment of the impact of a broader or narrower buffer calibration.

**Scenario 8** assesses the impact of reducing the outflow rate on stable retail and SME deposits from 5 to 3%. For the purpose of the analysis it is assumed that all stable deposits in the sample are subject to a 3% run-off, although only a small share of deposit guarantee scheme in the EU is likely to fulfill the necessary criteria: i.e. prefunding via the periodic collection of levies on banks with insured deposits and evidence of run-off rates for stable deposits within the banking system below 3% during any periods of stress experienced that are consistent with the conditions within the LCR.

For information, we also provide a short overview of the proposed implementation of the LCR in the USA in 3.7.2

### 3.2. Banks' behavioural reactions to the introduction of the LCR

Banks' behavioral reactions (see Technical appendix 3.4. for technical details) are identified based on five approaches (LCR data analysis, relative cost of adjustment strategies per unit of LCR improvement, case studies from the Netherlands, Sweden, Switzerland and the UK (especially the UK natural experiment)<sup>9</sup> and a literature review). The UK introduced quantitative liquidity regulation in 2008. At the same time, it waived the standard for a number of banks. This enables us to study the impact of the new standard on bank behaviour in the setting of a natural experiment. The results are consistent with the findings reported in the Technical appendices 2.1. and 2.2. Increasing HQLA holdings accounts for the lion's share of banks' adjustment to the new standard. However, no evidence has been found of a reduction in the loans to private non-financial corporates (PNCs).

The expected opportunity costs associated with each adjustment strategy are estimated based on historical, volatility adjusted yield differentials (asset side) and historical funding costs differentials (liability side). The report presents the methodology, literature reviews on individual strategies, and underlying data sources (see Technical appendix 3.4. for the extensive analysis).

The cost assessment deals with uncertainty with respect to banks' behavioural reactions to regulatory change. Banks for which the LCR is not binding do not need to react; banks for which it is binding have broadly three options:

- Pure asset side substitution: increase the stock of liquid assets at the expense of less liquid assets (e.g. substitute LCR eligible transferable assets for non LCR eligible transferable assets)

<sup>6</sup> The increase to 25 per cent reflects the corresponding outflow from these deposits in Art. 422 (3) CRR.

<sup>7</sup> For a discussion of the empirical literature see BCBS 2013c.

<sup>8</sup> The following deviation from BIII are assumed for the purpose of this scenario: Covered bonds, not self-issued, rated A- up to A+, accepted as Category II instruments by the ECB or equivalent by national central bank (weight 50%); Unsecured bank issuances, rated A- or greater, Financial corporate bonds, rated A- or greater (weight 20%); Assets, not reported in Section section A, issued by a credit institution which has been set up and is sponsored by a Member State central or regional government and the asset is guaranteed by that government and used to fund promotional loans granted on a non-competitive, not for profit basis in order to promote its public policy objectives (weight 85%); Other Central Bank eligible unencumbered assets not included in the previous categories (weight 25%); Gold (weight 50%); Shares of CIU in Level 1 assets (weight 95%) and in Level 2 assets (weight 80%).

<sup>9</sup> Empirical study in which the experimental conditions determined by factors out of the control of the experimenters.

- Pure liability side substitution: decrease short-term unstable funding and increase long-term stable funding (e.g. decrease unsecured short-term money market funding, liquidity lines; and increase deposits, long-term issuance)
- Combination of asset and liability side substitution. Increase or decrease in leverage: depending on banks' behavioural response and on other constraints such as the leverage ratio and capital adequacy ratio (CAR), banks might increase leverage (financing a portfolio of liquid assets by market borrowing) or decrease leverage (reduce interbank borrowing and lending) to meet the LCR.

From those three options we derive seven strategies, taking into account the fact that banks' choices are driven by (i.) the impact of the contraction of a position that generates outflows on the LCR (i.e. positions with higher run-off rates are more likely to be reduced in relation to positions with lower run-off rates, *cet. par.*) and (ii.) the opportunities costs of banks' behavioural reactions (i.e. positions that generate high costs or low revenues are more likely to be reduced than those with low costs or high revenues, *cet. par.*).

The prioritisation of strategies draw on the results of various other sections: (i.) the univariate and multivariate LCR data analysis, (ii.) the relative opportunity costs per unit of LCR improvement, (iii.) the case studies, i.e. the empirical analysis of a natural experiment in the UK and (iv.) the available literature.

The multivariate data analysis uncovered a simultaneous decrease of outflows and inflows while the volume of HQLA increased substantially, validating the hypothesis that banks in the sample implemented mainly two strategies (1) arbitrage (substitute non-HQLA with HQLA) and (2) deleveraging (term out short-term funding and simultaneous sale of non-HQLA). The case studies, mainly the UK natural experiment and the Swedish case, as well as the literature (Technical Appendix 3.4.4) tend to corroborate this hypothesis. The five remaining strategies then complement the main two strategies, according to their level of likeliness arising from the various sources already quoted.

Table 2a: Strategies of adjustment and their combination into behavioural reactions (BR) scenarios

Balance Sheet	Method	BR1	BR2	BR3
Assets	Arbitrage: sell non-liquid assets, buy liquid assets	50%	35%	15%
	Shorten average maturity of assets	5%	1%	3%
	Reduce committed lines	10%	5%	10%
Liabilities	Lengthen funding maturities	10%	10%	15%
	Increase retail deposits	5%	9%	7%
Assets & Liabilities	Deleveraging: sell non-liquid assets to pay down short-term liabilities	15%	35%	50%
	Leveraging: issue long-term wholesale debt to buy liquid assets	5%	5%	0%

Table 2a provides an overview of the weights assigned to each balance-sheet adjustment strategy under the three behavioural reactions (BR1 to 3). BR1 focuses on the strategy of arbitrage, while BR3 is mostly based on the deleveraging strategy. BR2 is a mix of the two strategies. (For an in-depth discussion of adjustment strategies see Technical appendix A3.4)

### 3.3. Cost savings due to the interaction between capital and liquidity regulation

In accordance with Article 509(1) of the CRR the impact assessment takes into account the interaction between capital and liquidity regulation. The analysis reveals non-negligible cost savings associated with increases in HQLA (see Technical Appendix 3.4. for details). Information on banks' internal ratings is not publicly available to the extent required by the analysis. Thus, the analysis rests on the standardised approach. The interaction between capital and liquidity regulation depends on the banks' adjustment strategy. While some strategies, focusing on liabilities do not influence the banks' capital ratios, other strategies, changing the bank's balance sheet composition or the balance sheet total, influence the risk based capital ratio and / or the volume based leverage ratio. Some behavioural adjustments to the LCR are associated with decreasing risk weights or decreasing exposure and yield non-negligible savings due to decreasing capital requirements. The opportunity costs associated with these strategies take the associated cost savings due to lower capital requirements into account. The analysis of the interaction between capital and liquidity regulation reveals that the RWA reduction associated with increases in HQLA are non-negligible. They depend on the adjustment strategy and reduce the expected opportunity costs. Technical appendix 3.5 entails an analysis of the interaction between liquidity and capital regulation and the cost impact in terms of basis points. The analysis is based the assumption of a 12% targeted return on equity (RoE), debt costs of 6 per cent, and an effective tax rate of 25%. How would changes of these assumptions affect the costs savings due to RWA reductions? They increase with the RoE and the tax subsidy of debt, but decrease with higher debt costs.

### 3.4. The expected opportunity costs of banks' adjustment strategies

Taking the interaction between the LCR and capital requirements into account, the extensive empirical analysis suggests that expected opportunity costs based on combinations of the potential adjustment strategies are in the order of magnitude of 240 basis points per annum per unit of LCR improvement; i.e. it costs the banking sector about EUR 2.4 billion to reduce the liquidity gap by EUR 100 billion. Two alternative combinations of adjustment strategies are also tested to assess the sensitivity of the results with respect to banks' behavioural adjustments and the ensuing expected opportunity costs. The least costly behavioural reaction for all countries is BR1 except for C 4 where BR2 features lower cost of adjustment (see Table 2b).

Given these results, the model allows for obtaining the average cost of closing a unit of liquidity shortfall on a country level.

Table 2b: Adjustment costs per unit of liquidity shortfall reduction (in per cent)

Adjustment strategy	BR1	BR2	BR3
C1	-1.83%	-2.21%	-3.04%
C2	-2.30%	-2.46%	-3.43%
C3	N/A	N/A	N/A
C4	-1.64%	-1.29%	-2.25%
C5	-2.23%	-2.97%	-3.51%
C6	-2.12%	-2.60%	-3.08%
C7	-2.21%	-2.62%	-3.44%
C8	-2.06%	-2.99%	-3.91%
C9	-2.26%	-2.39%	-3.30%
C10	-1.80%	-2.41%	-3.12%
C11	-1.74%	-2.23%	-3.02%
C12	-2.12%	-2.56%	-2.89%
C13	-1.94%	-2.46%	-3.07%
C14	-4.14%	-4.34%	-4.91%
C15	-1.95%	-2.34%	-3.25%
C16	-3.12%	-4.52%	-4.63%
C17	-2.16%	-2.60%	-3.35%
C18	-1.84%	-2.21%	-3.68%
C19	-2.05%	-2.63%	-3.03%
C20	-2.19%	-2.89%	-3.23%
C22	-1.78%	-2.23%	-2.85%
C26	-2.70%	-3.18%	-3.32%

Source: Authors' own calculations; for details and data see the technical and data appendices, respectively. Interaction between capital and liquidity regulation already accounted for.

The impact of adjustment costs on loan spreads depends on the pass-through of these costs to bank customers and on the repricing capacity of banks (see Technical Appendix 3.5.1. and 3.5.3). Based on the bank product controlling literature, we allocate the incremental costs to a subset of bank products only, namely, those that are capital and liquidity intensive. This substantially increases the impact of the LCR, but it is in line with the literature, banks' practice in product pricing, and qualitative liquidity regulation. In the long-run banks can reprice their entire loan book, as all loans eventually mature. During the transition period (2015-19), banks can only reprice the share of loans that mature during these four years. In the EU few comparable data exist on the maturity of bank loans. The analysis combines various data sources and empirical studies to derive an estimate of the repriceable base during the transition period. The incremental costs of the LCR are allocated to the volume of repriceable loans to determine the impact on loan spreads. The impact on loan spreads differs widely across countries. The differences are driven by the variations of the liquidity gaps across countries.

### 3.5. The repriceable base

The data is sourced from the ECB Statistical Data Warehouse that collects by sectors and country comparable lending data (as well as deposit and the other balance sheet categories). We take aggregated values recorded at the end of 2012 to ensure compatibility with QIS data on banks LCR compliance. The data is available for all countries in the sample as show in table 3. This base was adjusted to the sample size reducing the repriceable base to the figures shown in Table 3 below. On average, 20% of total assets can be repriced during the transition period.

We also use data breakdowns by different maturities to estimate the transitional period base. Over the transitional period banks do not have the ability to reprice the whole lending portfolio. As a result the repriceable base will be smaller and banks will need to increase credit margins by more in the initial period. As time passes and a greater part of the lending portfolio can be repriced, banks will be able reduce the pass-through per unit of credit granted. Over the long run banks will be able to spread the adjustment cost over the entire lending portfolio. Our transition period repriceable base is a single value to proxy this dynamic process and consists of the average repriceable

base over 4 years. The proxy is 65% of the repriceable base over the long-term; it is derived from the little information on loan maturities that is available in the ECB SDW. The estimate for the transitional period is reduced to just over EUR 6 trillion.

Table 3: Repriceable base in the long-term and during the transitional period (% of total assets)

	Long term	Transitional Period
C1	28%	19%
C2	31%	20%
C3	N/A	N/A
C4	25%	16%*
C5	38%	25%
C6	21%	14%*
C7	42%	27%
C8	52%	34%*
C9	20%	13%
C10	27%	18%
C11	8%	5%
C12	34%	22%
C13	31%	20%
C14	18%	12%
C15	31%	20%*
C16	14%	9%
C17	29%	19%
C18	43%	28%*
C19	6%	4%
C20	39%	25%
C21	46%	30%
All	31%	20%

Source: ECB Statistical Data Warehouse; authors' own calculations. These countries feature substantial shares of loans that can be repriced before maturity by banks. Thus, the data in the table underestimates the repriceable base during the transition period. As a consequence, the macro-impact during the transition period is over-estimated for these countries.

### 3.6. Assessment of the impact of LCR and alternative calibrations

The increase in loan spreads is fed into a macroeconomic model for all countries in the sample. The exercise uses NiGEM and the so-called Stress Test Elasticities (STEs) to estimate the impact on the economy and growth (see Technical appendix 3.5.2. for details). STEs are reported to the Eurosystem by national authorities. They provide estimates of the simultaneous increase in long-term interest rates by 50 basis points on the estimated growth rate of GDP in each EU country. In order to test the robustness of this approach, we also fed the impact on loan spreads into NiGEM which resulted in comparable estimates of the macroeconomic impact. The entire analysis is run for ten scenarios which cover the policy options included in Article 509(2) and (3) of the CRR. The results are summarized in Table 4a and 4b. The assessment initially assumes a 100% pass-through of additional costs due to the LCR to customers; the sensitivity analysis uses a 80% pass-through rate.

An important caveat is that the analysis focuses on the gross liquidity shortfall; i.e. assumes that compliant banks do not distribute liquidity to non-compliant banks. Under the assumption that banks distribute liquidity only five countries have a liquidity shortfall.

Table 4a: Summary of the Baseline and scenarios 1 to 3 for the simulation analysis and the respective results in terms of the respective gross-liquidity shortfall (in EU billion) and the relative gross-liquidity shortfall (in % relative to the Baseline gross-liquidity shortfall)

	Baseline	Scenario 1	Scenario 2a	Scenario 2b	Scenario 3
Reference	B III LCR*	Art. 509(2)(a) CRR	Art. 509(2)(b) CRR	Art. 509(2) (b) CRR	Art. 509(2)(c) CRR
Gross liquidity shortfall in EUR bn (sample aggregate, non-compliant banks only)	GHOS calibration of Jan 6, 2013	Removal of cap on inflows	Reduction of roll-over rate from 50% to 0% for loans to non-financial customers**	Reduce Run off Rate for other outflows***	Remove cap on L2A and/or L2B HQLA
Total (in EUR bn) (change in scenarios)	263.5	-7.7	-81.5	-244.7	-5.8
Change to baseline	n.a.	-2.9%	-30.9%	-92.9%	-2.2%

Source: EBA voluntary LCR reporting. \* <http://www.bis.org/publ/bcbs238.pdf>. \*\* Inflows from performing loans from retail, small business, non-financial corporates and other counterparties (Article 425(2)(a) and (b) of the CRR). \*\*\* Article 422(7)(a) of the CRR.

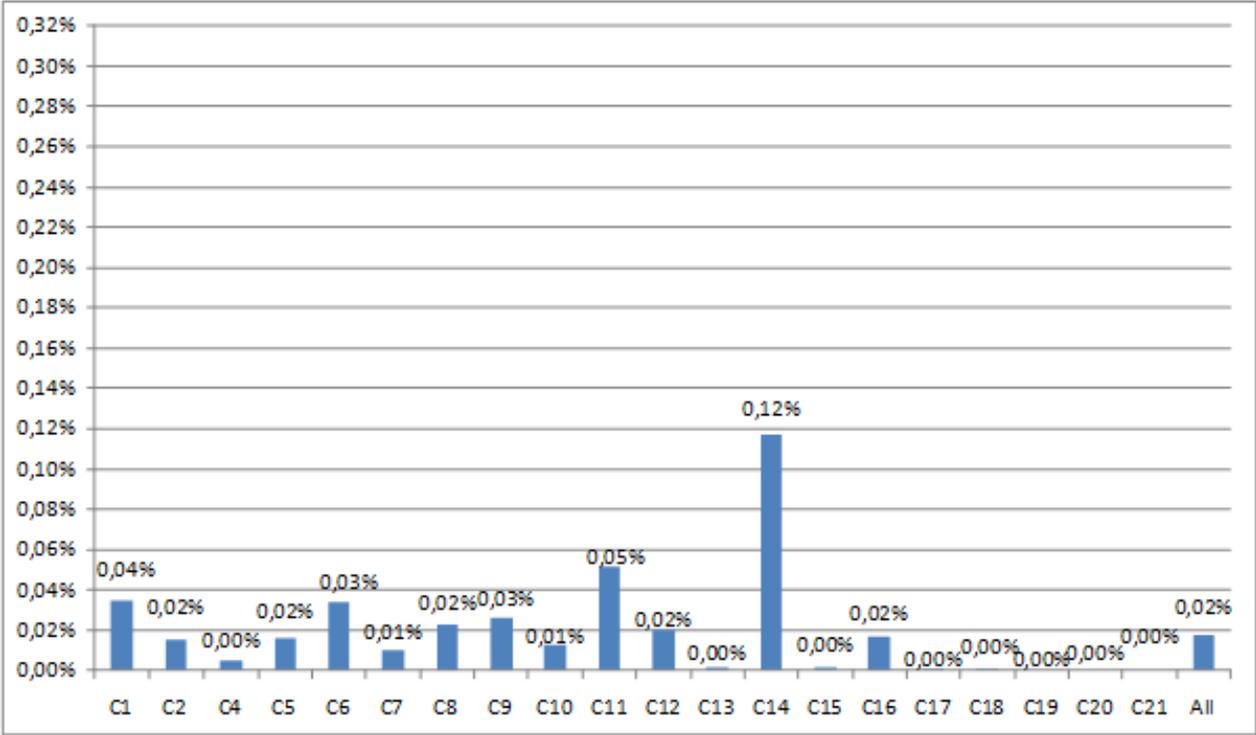
Table 4a summarises the results of scenarios 1 to 3 (in EUR billion) and relative to the baseline (in per cent of the gross liquidity gap in the baseline).

### 3.6.1. Assessing the impact of the baseline scenario

**The baseline results in a gross liquidity short-fall of EUR 263.5 billion or 0.8 per cent of total assets of the banks in the sample. Assuming banks apply adjustment strategy BR2 (Table 2) the yearly costs across all banks in the sample amount to EUR 6 billion. To put this into perspective: With total assets of EUR 33.1 trillion this translates into a reduction of the average return on assets across banks in the sample (RoA) of 1.8 basis points (ceteris paribus), if banks will not pass-through the incremental costs on assets at all (Diagram 11) and if banks are unable to improve efficiency by reducing cost-income-ratios.** Under these assumptions the RoAs of most banks will not be affected, some business models could see a greater impact (see section 4). While the average impact on RoA for the EU aggregate is low, some banking systems experience higher impacts on profitability, ranging from 11 to 40 bps, depending on the chosen adjustment strategy. Overall, the impact of the LCR on EU banks' profitability is low. A more detailed analysis of the distribution of the impact of the LCR on bank profits will be supplied for the next version of the report. For the major part of the assessment, we assume a 100% pass-through rate.

**The sensitivity analysis with respect to banks' behavioural reactions and adjustment costs shows that the results are robust across estimated adjustment costs:** The lion's share of the expected adjustment costs stems from the strategy component 'Deleveraging' which accounts for two thirds of the total costs, although its weight is only 35%. A less costly adjustment strategy (BR 1 in table T 2) leads to yearly costs of Euro UR 5 billion p.a. (a reduction of about 14%). A more expensive adjustment strategy (BR 3 in table T 2) increases costs to EUR 8 billion p.a. (an increase of 36%).

Diagram 11: The impact of the LCR gross liquidity shortfall on banks' RoA (in % of total assets)



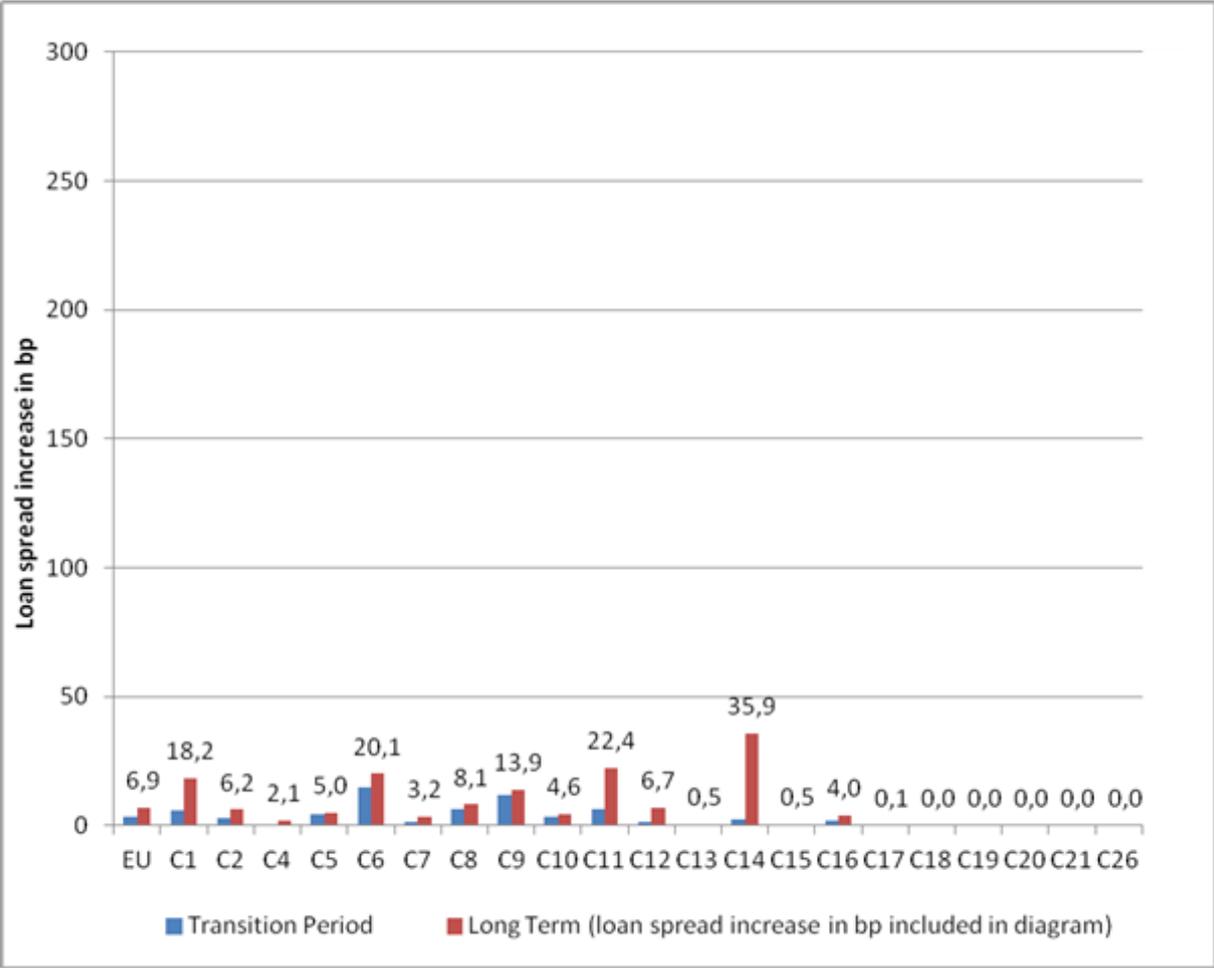
Source: EBA voluntary LCR reporting. Bank behavioural reactions BR2 (table T 2); pass-through to customers 0. One outlier deleted.

However, banks have some pricing power in some markets such as deposit or loan markets. If they manage to pass through costs completely, the impact on the RoA would be zero. Based on the literature on bank product pricing we focus on the loan spread (see Technical appendix 3.5). In the analysis of the impact of the baseline and the scenarios on credit spread we distinguish between long-term and short-term perspectives: **In the long-term, banks can reprice their entire repriceable base (about EUR 9 trillion in aggregate); in the short-term the repriceable base is smaller (about EUR 6 trillion), because only newly granted loans can be repriced.**<sup>10</sup> Data on bank loan maturity in a standard format for all MS is difficult to retrieve.<sup>11</sup> On average (across MS) the repriceable base is about 35% lower over the transition period, then long-term. This would imply higher economic costs in terms of increases of loan spreads. However, the GHOS 2013 calibration and the CRR foresee **long phase-in period** for the LCR which lowers the adjustment costs for banks. Under the assumption that banks try to smoothen the adjustment costs and their pass-through to loan spreads the adjustment costs during the transition period are based on an average minimum required rate of the LCR of 80% (instead of 100%). Market pressure might render the phase-in period less effective and many banks will fulfil the LCR already by 2015. This would put downward pressure on the impact of the LCR during the transition period after 2015. Overall, the repriceable base is estimated very conservatively. In the long-term it accounts for about 1/4 of total assets of all banks in the sample; during the transition period that ratio falls to about 1/5 of total assets.

<sup>10</sup> Some MS feature high shares of variable rate loans; these are linked to a benchmark rate (e.g. 3M EURIBOR). But the relevant spread above the benchmark can only be repriced once a new loan is granted (or a loan is rolled over).

<sup>11</sup> The analysis therefore had to make a few assumptions in this respect (see Technical appendix A3.5 for a discussion).

Diagram 12: Estimated loan spread increases over the long-term and during the transition period (in basis points)



Source: EBA voluntary LCR reporting. Bank behavioural reactions BR2 (Table 2) and a pass-through of 100 per cent. Transition Period: LCR threshold 80 per cent and repriceable base only newly priced loans over four years. Long-term: LCR threshold 10 per cent and entire repriceable base can be repriced. One outlier deleted.

Overall, the incremental loan spreads are low. For the EU they amount to 6.9bps in the long-term and 3.6bps in the short term.

The analysis shows that, in general, impact of the LCR on **loan spreads is lower during the transition period than over the long-term**. The effect of the lower LCR requirement during the phase-in period outweighs the effect of the lower repriceable base. **The phase-in arrangements are effective with respect to lowering adjustment costs to the LCR.** Is a longer phase-in period necessary than that stipulated under Article 460(2) of the CRR? At the current juncture, the phase-in period seems to fulfil its purpose of reducing the adjustment costs of banks that do not yet comply with the standard. Given the high degree of compliance and the current market expectations, it is unlikely that postponing the transition to the 100% requirement would yield any benefits.

Extensive **sensitivity analyses** yield the following results:

- If banks choose strategies that result in lower adjustment costs (BR1, Table 2), the increase in loans spreads in the sample declines from 6.9bps to 5.9bps.
- If banks choose more expensive adjustment strategies (BR3, Table 2), the increase in loans spreads in the sample steepens from 6.9bps to 9.4bps.
- The results are presented for pass-through rates of incremental costs to bank customers of 100%. The sensitivity analysis assumes a 80% pass-through rate. This would reduce the incremental loan spread to 6.9 from 5.5bps.

**Overall, the order of magnitude of the results is robust with respect to a broad range of expected opportunity costs per unit of gross liquidity shortfall reduction (about 220 to 330bp s) and with respect to a reduction of the pass-through from 100 to 80%.** The model is linear for each country around the central parameter values, so that as a rule-of-thumb a 10 %age point change of expected opportunity costs or the pass-through rate leads to a 10 % change of the incremental loan spread.

### 3.6.2. Assessing the impact of alternative calibrations of the LCR

#### 3.6.2.1 Scenario 1: Inflow cap

The inflow cap, which aims at ensuring that banks hold a minimum of HQLA in relation to their outflows, has the following rationale:

- To increase banks' resilience against the unexpected loss of contractual inflows due to liquidity/solvency problems of the counterparty.
- To reduce contagion risk by curbing the room for 'domino effects' in stress situations, thus contributing to stabilising money markets and EU banks' access to funding sources.
- To account for maturity mismatches between inflows and outflows within the 30 days stress horizon, i.e. liquid assets may cover cash outflows in case the inflows materialize later than outflows.

On the other hand, imposing a cap increases indirect liquidity costs (i.e. opportunity costs from holding a liquidity buffer) for the banks for which the inflows exceed 75% of outflows, i.e. banks for which the cap is binding.

A removal of the cap on inflows<sup>12</sup> (**Scenario 1**) would reduce the gross liquidity gap by EUR 7.7 billion or 2.9% of the baseline. The liquidity gap relative to total assets of the banks in the sample would decrease slightly to 0.77% (from 0.80%). In most countries the impact would be negligible. **The distribution of the advantage across business models is very uneven:** for business models Group 8 (auto/consumer credit banks), 9 (merchant banks), and 11 (Shari'ah-compliant banks) the gross liquidity shortfall decreases somewhat.<sup>13</sup>

**The costs of removing the cap on inflows for all EU banks do not outweigh the associated benefits in terms of lower incremental loan spreads, which are reaped almost exclusively by pass-through finance banks. The impact across business models is detailed in data appendix 3.**

#### 3.6.2.2 Scenario 2: Reduction of roll-over and run-off rates

The calibration of inflows and outflows (in particular, roll-over rates on loans to non-financial customers and run-off rates for other outflows stemming from the Basel rules text, as detailed in the baseline scenario, has the following rationale:

- Non-zero roll-over and run-off rates differentiated across asset and liabilities classes are intended to improve banks' ability (i.e. by the build-up of liquidity buffers) to fulfil their payment obligations under stress without curtailing lending to the real economy. Assuming zero roll-over rates for loans on commitments or zero run-off rates on maturing liabilities would very likely lead to a substantial underestimation of liquidity risk, thus falling short on the main regulatory objective of the Liquidity Coverage Requirement.
- The assumption on which a zero per cent rollover rate of loans is based (i.e. loans to non-financial corporates can be cut of 100 per cent in times of stress) is unrealistic and not empirically founded.
- Positive roll-over rates for outstanding loans better reflect the banks' desire to maintain franchise value and retain customers even under stress. Furthermore, positive roll-over rates have an impact on the banks' transfer pricing systems and may induce a better pricing of liquidity risk.

<sup>12</sup> The cap on inflows limits inflows to a maximum 75 per cent of cash outflows.

<sup>13</sup> See Data appendix 8 for data concerning the impact of the scenarios across business models.

A reduction of the roll-over rate of loans to non-financial customers from 50 to 0% (**Scenario 2a**) would have a somewhat larger impact on the gross liquidity gap in the sample. It would drop by EUR 81.5 billion or 31 % and amounts to 0.55 % of the total assets. Banks in two countries would capture the lion's share of the benefit in absolute terms, totalling EUR 50 billion. In relative terms, banks in six countries experience reduction of their gross liquidity gap by about 60 % or more. Only well diversified large cross-border banks, with substantial capital market activities, profit from the recalibration. Overall, this deviation from Basel III would reduce the effectiveness of the standard and the benefits from international harmonisation. However, the reduction of the gross shortfall by 31 % is not negligible. This could lead to lower credit spreads for non-financial customers, as banks were allowed to rely more heavily on non-renewal of loans to generate extra net-cash inflow; i.e. the recalibration would assume a reduction of non-financial loans by 100 (rather than by 50) % during stress, and banks would have to hold less HQLA against them. Overall, the economic advantages (lower GDP impact) could be outweighed by the economic risks associated with the recalibration (i.e. increased probability of a credit crunch).

A reduction of the run-off rates for other outflows in Article 422(7)(a) of the CRR (**Scenario 2b**) would have a strong impact on the LCR. The gross liquidity gap would shrink by EUR 245 billion to EUR 19 billion or 93 %. Relative to total assets of the sample banks it would amount to 0.06%. All countries feature gaps below 1 % of total assets; in 17 countries the gap would amount to less than 0.1 % of total assets. The gross liquidity shortfall across all business models is effectively wiped out, except for Group 4 (pass-through financing) which hardly benefits.

The reduction of roll-over rates of inflows and run-off rates of outflows in Article 422(7) and Article 425(2)(a) combination of Scenarios 2a and 2b would effectively reduce the liquidity gap to 0. This would result in the LCR becoming an economically non-binding constraint; it would not incentivize banks to adjust their balance-sheet and reduce liquidity risk. It would not attain its objectives, but impose implementation costs on, both, EU banks and supervisors. Therefore, **the reduction of roll-over rates of inflows in Article 422(7) from 50% to 0% is not economically realistic, as it assumes that non-financial loans would be cut by 100% in times of stress. Its impact would be to reduce the level of shortfall by a third and might lower credit spreads for non-financial corporates. The run-off rates of outflows in Article 425(2)(a) should not be reduced from the GHOS 2013 calibration, because it would render the LCR largely ineffective.**

### 3.6.2.3 Scenario 3: Removal of the cap on Level 2 assets

The rationale for imposing quantitative limitations to the recognition of L2A/B assets as HQLA is based on the observation that the lower opportunity costs of holding L2A/B vs. L1 assets would incentivise banks to largely rely on the firsts to cover net cash outflows.

The removal of the cap has been assessed, also on quantitative grounds, and it is deemed not desirable based on the following arguments:

- L2A/B assets feature higher price volatility and higher haircuts variability in the repo market as compared with L1 assets. Since the liquidity which can be generated by repoing/selling these assets is subject to higher uncertainty, their unlimited recognition as HQLAs would weaken the effectiveness of the buffer in improving banks' resilience against idiosyncratic and market shocks and liquidity risk pricing. The buffer reduces reliance on Level 2 assets.
- Maintaining the cap would ensure full Basel compliance with the standard agreed upon at the Basel Committee level, avoiding level playing field concerns across jurisdictions.

However, we also acknowledge what follows:

- Where the supply of Level 1 assets falls short of the justified demand, the possibility for a derogation from such cap should be provided, under objective and stringent conditions.
- The cap's calculation is quite complex. In order to prevent regulatory arbitrage, the calculation is based on the 'adjusted amount' of L1 and L2A/B assets which would result, if all secured transactions involving eligible liquid assets were unwound. For example, the current QIS template calculates a negative stock of HQLA when repo transactions against Level 2 HQLA are unwound because the cash received had not

necessarily been counted as Level 1 asset, e.g. if the bank re-invested the cash in other assets. This example illustrates the operational difficulties of the cap.

- The cap on Level 2 assets does not address concentration risk within Level 1 assets.

The removal of the 40 % cap on Level 2 assets and the 15% cap on Level 2B assets (**Scenario 3**) would have the following impact: The total liquidity shortfall would amount to EUR 258 billion (a minus of EUR 6 billion or 2.2 %).<sup>14</sup>, with one country accounting for 97 % of the reduction. Across business models, Group 11 (Shari'ah-compliant banks) would profit exceptionally strongly with a reduction of the gross liquidity shortfall by 100%.<sup>15</sup> Thus, **the benefits of the caps outweigh the associated costs across the EU and the caps should not be removed.**

Table 4b: Summary of the Baseline and Scenarios 4 to 8 for the simulation analysis and the respective results in terms of the respective gross-liquidity shortfall (in EUR billion) and the relative gross-liquidity shortfall (in % relative to the Baseline gross-liquidity shortfall)

	Baseline	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8
Reference	B III LCR*	Art. 509(2)(d) CRR	Art. 509(2)(e) CRR	Art. 509(2)(1) CRR	Art. 509(3) CRR	Art. 509(2) (g) CRR
Gross liquidity shortfall in EUR bn (sample aggregate, non-compliant banks only)	GHOS calibration of Jan 6, 2013	Increase inflow from undrawn intra-group committed lines to 60% and corresponding outflow of intra-group committed lines to 100% and inflows from operational deposits to 25%	Increase outflow from undrawn committed facilities to non-financial corporates to 100%	Outflow rate for correspondent banking and prime brokerage services decreased to 0%	Broadening HQLA asset classes**	◆ Lower run off rate for deposits
Total (in EUR bn) (change in scenarios)	263.5	-15.4	1007.9	-14.1	-57.1	◆ -132.8
Change to baseline	n.a.	-5.8%	382.5%	-5.3%	-21.7%	◆ -50.4%

Source: EBA voluntary LCR reporting. \* <http://www.bis.org/publ/bcbs238.pdf>. \*\* Covered bonds, not self-issued, rated A- up to A+, accepted as Category II instruments by the ECB or equivalent by national central bank (weight 50%); Unsecured bank issuances, rated A- or greater, Financial corporate bonds, rated A- or greater (weight 20%); Assets, not reported in section A, issued by a credit institution which has been set up and is sponsored by a Member State central or regional government and the asset is guaranteed by that government and used to fund promotional loans granted on a non-competitive, not for profit basis in order to promote its public policy objectives (weight 85%); Other Central Bank eligible unencumbered assets not included in the previous categories (weight 25%); Gold (weight 50%); Shares of CIU in Level 1 assets (weight 95%) and in Level 2 assets (weight 80%). The weights are the conversion factors applied to the nominal value of the respective assets; they equal one minus the respective haircut.

#### 3.6.2.4 Scenario 4: treatment of intra-group committed lines and intra-institutional network deposits

<sup>14</sup> The gross liquidity shortfall is calculated under the assumption that the ITS on insufficient HQLA will be adopted. The number thus assumes the caps on Level 2A and 2B are not applied to NO and DK banks.

<sup>15</sup> Note the sample only includes three Shari'ah-compliant banks.

**Scenario 4** looks at preferential treatment of intra-group committed lines and intra-institutional network deposits. The former is operationalised along three calibrations: (1) asymmetric preferential treatment: the inflows from undrawn intra-group committed lines are increased from 0 to 60% and corresponding outflows from 40 to 100%. (2) Symmetric preferential treatment: the inflows from undrawn intra-group committed lines are increased from 0 to 50% and corresponding outflows from 40 to 50%. (3) Symmetric preferential treatment: the inflows from undrawn intra-group committed lines are increased from 0 to 100 per cent and corresponding outflows from 40 to 100%. In all cases inflows from operational intra-group deposits are increased from 0 to 25%. The latter focuses on the asymmetric treatment of outflows from deposits according to Article 422(3)(b) of the CRR and assumes that symmetry is established by an increase of inflows from 0 to 25%. All three calibrations of the preferential treatment yield very similar results; this is mainly due to the fact that banks reporting the data are all compliant and the analysis focuses exclusively on gross liquidity gaps; i.e. the analysis disregards changes to compliant banks' liquidity surpluses. Each of the calibrations in combination with 25% inflows from deposits according to Article 422(3)(b) of the CRR would reduce the aggregate liquidity shortfall of the banks in the sample by EUR 15.4 billion to EUR 248.1 billion or 5.8% of the baseline shortfall. **The impact across business models is negligible. However, the data set available on intra-group flows is limited and further work will be conducted for the second annual report based on a more comprehensive data set;** the analysis is based on a limited subsample of banks who reported the data on intragroup exposures. **Further analysis addressing these shortcomings will be performed by March 2014 and after which policy recommendations will be made.**

#### 3.6.2.5 Scenario 5: treatment of outflow from undrawn committed facilities to non-financial corporates

A draw-down rate of 100% has been assessed vs. the current treatment of 10%. The current treatment of 10% is based on the following rationale:

- Based on the available literature a 10% outflow rate reflects the empirical evidence on the drawing of committed lines to non-financials.
- A substantial divergence from the Basel rules text would create an uneven playing field in the competition for non-financial corporate customers, strongly penalising EU banks.

An increase of the outflow from undrawn committed facilities to non-financial corporates to 100%, from 30%, is analyzed in **Scenario 5**. It would lead to a strong increase of the liquidity shortfall by EUR 1 trillion to EUR 1.3 trillion (a 3.8-fold increase). The banking systems of two countries would be hardest hit with an increase of 400 per cent and a 1 200% liquidity shortfall.. Only Groups 4 (pass-through financing banks), 7 (CCP, securities trading house, custodian institutions (non-member of ESBG and EACB), 9 (Merchant banks, specialised in trade finance) and 10 (Private banks) would see manageable impacts. **Based on the empirical findings the 100% outflow rate might overestimate the drawing of committed lines to non-financials. Given the potentially substantial costs for the real economy (e.g. in terms of higher fees), the costs outweigh the benefits of the increase.**

#### 3.6.2.6 Scenario 6: Outflow rate for correspondent banking and prime brokerage services

**Scenario 6** presents a study of the decrease in the outflow rate for correspondent banking and prime brokerage services decreased to 0 from 100%.

Higher outflow rates for operational deposits under the baseline are based on the following rationale:

- In principle, both refer to deposits from financials. As such a deviation from the 100% outflow rate, which is applied for deposits from financials, would be inconsistent and incentivise banks to circumvent the regulation by labelling wholesale deposits from financials as correspondent banking/prime brokerage

service. For auditors and supervisors it would be very costly to verify the label in each case based on the underlying, often complex documentation, contracts, and covenants.

- The institution would have to present evidence that the client is unable to withdraw funds without compromising the client's operational functioning. If banks are the counterparty, this requirement is challenging to meet. It requires in-depth knowledge of the client's operations and evidence on a counterfactual (if the client withdrew deposits, how would that impact its operations? Which alternative channels/payment systems could the client use?).
- For supervisors both are near impossible to verify.
- Higher complexity of regulation increases legal uncertainty and implies higher compliance costs for banks.
- Higher rates would increase costs for banks (as correspondents and respondents) and for hedge funds but they would be in line with B III. This reduces compliance and reporting costs for internationally active EU banks.
- A deviation from BIII could lead to an uneven playing field for EU banks in their competition for highly leveraged hedge funds.

But the higher outflow rates set in the baseline also have disadvantages:

- Higher outflow rates for operational deposits under both categories may not be justified if the deposits need to be held to maintain customers' access to brokers' centralised securities clearing services.

This recalibration would lead to a reduction of the gross liquidity shortfall by 5 per cent or EUR 14 billion. Only banks in one country would benefit from this recalibration; for all other banks in the EU the recalibration would have a negligible impact. Across business models, only Group 7 (CCP, securities trading house, custodian institutions) would profit. **The data analysis suggests that the highly concentrated benefits in terms of lower costs for banks do not outweigh the costs. The outflow rates on corresponding banking and prime brokerage should not be recalibrated to a 0% outflow.**

### 3.6.2.7 Scenario 7: Broadening of HQLA

The impact of a broadening of HQLA is investigated in **Scenario 7**.

The January GHOS agreement is used as a starting point. Resorting to the definitions used therein has the following advantages:

- Reduction of compliance and reporting costs for internationally active EU banks. It ensures a level playing field for EU institutions vis-à-vis non-EU institutions.
- Easy to communicate when Basel III compliance is validated, e.g. in Level 2 assessments.

As in the baseline, the 40 and 15% cap on Level 2 and Level 2B assets have been applied to all countries except Denmark and Norway. To emphasise, this selection of liquid assets does not explicitly represent a view on their suitability as HQLA but purely on the impact on banks' LCR depending on the buffer calibration.

Nevertheless, the following more general aspects should be duly considered in any debate on possible broadening of the buffer:

- A broader definition would reduce adjustment costs for banks. Most banks would already fulfil the LCR to 100% six years ahead of this requirement entering into force (end of 2012 as against the beginning of 2019). The LCR would not force banks to adjust their balance-sheets and to reprice liquidity (risk). The LCR would thus be ineffective, but still impose substantial compliance costs on the EU banking sector and on NSAs.

- A broader definition of HQLA would lead to an unlevel playing field at the international level.<sup>16</sup> Especially banks from countries with narrower definitions of HQLA would face a competitive disadvantage, unless they are granted derogations under Article 419 of the CRR.
- The inclusion of bank liabilities in the definition of HQLA increases connectivity and contagion. Especially in a broader crisis of confidence banks assets are perceived as illiquid and elevated credit risk. The very source of banks' funding liquidity risk is loss of access to the primary market of bank bonds. It is unlikely that under these conditions the secondary market would prove to be stable in terms of depth, breadth, and price.
- The inclusion of bank equity is counterproductive. Under stress bank equity tends to be very volatile. This is the very reason why it is so costly for banks (if possible at all) to increase equity under stress when leverage is most damaging. More volatile assets in the buffer might have negative implications for banks' P&L under stress which could initiate a downward spiral of profitability, solvency, and liquidity problems.
- The inclusion of potentially fewer liquid assets with lower credit quality would reduce the effectiveness of the buffer in times of stress. This would undermine the objective of increasing the resilience of EU banks and banking systems.

Bank bonds in the buffer provide incentives for banks to generate artificial liquidity by buying each other's issuances. Thus, buffers would be inflated artificially without additional liquidity provided to the banking system from outside. The Icelandic banks inflated the liquidity of their balance-sheet artificially in this manner and deposited each other's bonds as collateral at the Eurosystem.

For the purpose of this scenario, Article 509(3) of the CRR is implemented by including the following asset classes in the numerator of the LCR (weights in parenthesis), although they do not fulfill the criteria of (extremely) high credit quality and (extremely) high liquidity or the operational requirements of Basel III or Articles 416 and 417 of the CRR: Covered bonds, not self-issued, rated A- up to A+, accepted as Category II instruments by the ECB or equivalent by national central bank (weight 50%); Unsecured bank issuances, rated A- or greater; Financial corporate bonds, rated A- or greater (weight 20%); Assets, not reported in section A, issued by a credit institution which has been set up and is sponsored by a Member State central or regional government and the asset is guaranteed by that government and used to fund promotional loans granted on a non-competitive, not for profit basis in order to promote its public policy objectives (weight 85%); Other Central Bank eligible unencumbered assets not included in the previous categories (weight 25%); Gold (weight 50%); Shares of CIU in Level 1 assets (weight 95%) and in Level 2 assets (weight 80%). The assets are allocated across L2A and L2B with the respective caps. The broadening of HQLA has a substantial impact on the LCR. The liquidity shortfall decreases by 22% or EUR 57 billion. In relative terms banks in three countries (gross liquidity shortfall decreases between 70 to 80% each) would profit most from this recalibration; mostly well diversified large cross-border banks with substantial capital market activities ( ) would profit. The GHOS 2013 definition of HQLA already constitutes a substantial broadening (see section 2). **A further recalibration is neither warranted from an economic cost perspective nor from a financial stability perspective.**

### 3.6.2.8 Scenario 8: Reduction of the outflow rate on stable retail and SME deposits from 5 to 3 per cent

Finally, **Scenario 8** assesses the impact of a reduction of the outflow rate on stable retail and SME deposits from 5 to 3%. For the purpose of the analysis it is assumed that all stable deposits in the sample are subject to a 3% run-off, although only a small share of deposit guarantee scheme in the EU is likely to fulfill the necessary criteria: i.e. prefunding via the periodic collection of levies on banks with insured deposits and evidence of run-off rates for stable deposits within the banking system below 3% during any periods of stress experienced that are consistent with the conditions within the LCR. As such the results in Scenario 8 overestimate the impact of the recalibration and underestimate the differences of impacts across banking systems. Given these caveats, the reduced run-off rate would lower the gross liquidity shortfall by EUR 133 billion or 50%. The impact is unevenly distributed across

<sup>16</sup> To note: The BCBS is currently studying the possibility of using market-based indicators for the determination of assets liquidity quality. This is however only possible with a view to remove eligibility, not to broaden the buffer.

business models; Group 9 (Merchant banks, specialised in trade finance) and 11 (Shari'ah compliant banks) would see their gross liquidity shortfall wiped out completely. Given the ongoing development of the EU DGS Directive it is possible that the EU DGSs would fulfill the preconditions for lower run-off rates in the future. This should be taken into account by a **review clause in the calibration of the respective run-off rates for retail deposits**.

### 3.6.3. Assessment of the macroeconomic impact of the baseline scenario (LCR Basel III GHOS 2013)

**The results (Diagram 13) show that for the increase in loan spreads under the baseline scenario effects on GDP are limited under our assumptions. The main driver of this result is the small increase in credit margins** which are in a range between 0 and 25 bps 180 bps corresponding to an average impact of 6 bps across countries. The small change in the cost of finance explains the reduced effect on households' and businesses' budget. Across the Euro area, the fall in GDP corresponds to between 3 and 4 bps of a percentage point permanent reduction for both behavioural reaction 1 and 2. **Across the whole European Union this impact is smaller, close to 2½ bps of a percentage point, due to the contribution and smaller impacts from four countries.** Behavioural reaction 3 results in a marginally greater impact - with a 5 bps and 4 bps of a percentage point over the long term - on the Euro area and the European Union, respectively.<sup>17</sup>

Diagram 13: GDP impact due to an increase in loan spreads under the baseline scenario (in bp deviation from GDP levels)

---

<sup>17</sup> The report focuses on the gross social costs of LCR which would have to be interpreted in the light of the gross social benefits of regulation to derive the net social costs/benefits. As such the results might appear to deviate from the results reported in the EU COM's own impact assessment published in 2011 which focused on net social costs/benefits. In terms of gross social costs both reports arrive at very similar results, while the EBA report also notes the benefits to the real economy achieved by liquidity regulation.

Impact	Real GDP long-term impact			Real GDP transitional period impact		
	BR1	BR2	BR3	BR1	BR2	BR3
C1	-5	-6	-8	-8	-9	-13
C10	-3	-4	-5	-3	-5	-6
C11	-4	-5	-7	-6	-8	-11
C12	-2	-3	-3	-2	-3	-3
C13	0	0	0	0	0	0
C14	-21	-22	-25	-29	-31	-35
C15	0	0	0	0*	0*	-1*
C16	-2	-3	-3	-2	-3	-3
C17	0	0	0	0	0	0
C18	0	0	0	0*	0*	0*
C19	0	0	0	0	0	0
C2	-3	-3	-5	-5	-5	-7
C20	0	0	0	0	0	0
C21	0	0	0	0	0	0
C4	-1	-1	-1	-2*	-1*	-2*
C5	-3	-4	-5	-5	-7	-8
C6	-7	-8	-9	-3*	-4*	-4*
C7	-1	-1	-2	-2	-2	-3
C8	-5	-8	-10	-7*	-11*	-14*
C9	-3	-3	-4	-5	-5	-7
Eurozone	-3	-4	-5	-4	-5	-7
European Union	-3	-3	-4	-4	-5	-6

Source: authors' own calculations. \* These countries feature substantial shares of loans that can be repriced before maturity by banks. Thus, the data in the table underestimates the repriceable base during the transition period. As a consequence, the macro-impact during the transition period is over-estimated for these countries.

### 3.7. Sources of over- and underestimation of the economic impact of the LCR

The LCR data analysis and the simulations make a number of assumptions that can give rise to over- or underestimation of the impact of the LCR. Some assumptions made in the model calculations will cause effects to be underestimated, whereas other will cause effects to be overestimated. This section shall critically discuss the results.

The **underestimation bias** results from the impact of other crisis effects which we have neglected (such as the fact that the general repricing of risks in money and capital markets drives up banks' refinancing costs). We focused on price effects and assumed the supply of capital and liquidity meets demand at the long-term average prices documented in Technical appendix A3.4; yet in the case of very stringent capital and liquidity provisions poorly capitalized banking systems might suffer from rationing and second-round effects (see Technical appendix

7). This problem might in fact have been solved through recalibrations of the LCR undertaken in January 2013. An underestimation bias may also result from the fact that, while we did include spill-over effects from other euro area countries, we did not take into account spill-overs from other economic areas (USA, Japan). As the LCR is meant to apply on a global scale, we may have underestimated the effects on exports, and thus on GDP growth. Applying the LCR at a global scale would also reduce inflation. An underestimation of the effect on exports may be compensated by an overestimation of world inflation, particularly oil and other commodities. The assessment does not take into account pre-2012 adjustments and the possible costs emanating from them.

The **overestimation bias** underlying the macroeconomic effects results above all from the assumption that liquidity is not redistributed within banking systems (focus on gross rather than net liquidity shortfalls) and from disregarding the non-permanently non-eligible HQLA. Further sources of overestimation are the use of recent data on the growth of credit, which has fallen below long-term growth rates in the wake of the financial crisis, and the failure to account for possible substitution effects in the behaviour of banks and borrowers. The reforms themselves might cause equity and debt servicing costs to go down as the banking system becomes more resilient to shocks, as a result of which the macroeconomic effects would be lower than we found them to be in our analysis. Moreover, we started from the assumption of constant asset and liability levels and balance sheet structures beyond the mechanic impact of the LCR. Asset-side and/ or liability-side substitution effects should – assuming rational behaviour of banks – tend to lower banks' costs and the ensuing macroeconomic effects. Another overestimation bias may result from the fact that we neglected the kind of positive long-term effects that may result from volume effects: The proposed regulatory measures should limit economically inefficient lending (where lending spreads do not cover liquidity risk costs) which is detrimental to long-term growth and should thus dampen the boom-bust lending cycle. The macroeconomic impact analysis focuses on the country level, while the large EU banking groups operate at the international level. Therefore, they will not only reprice domestic loans, but also international loans within and beyond the EU.

A further bias might emanate from less than full coverage of EU banks. The sample size will increase, once most European banks will be required to report the LCR, the Leverage Ratio, and the NSFR under the CRR.

#### 3.7.1. Intended consequences of the LCR

Critics of the LCR argue that it would increase bank credit spreads, reduce credit supply to the real economy, and decrease bank profitability. Few reports have tested these hypotheses as thoroughly as this one. It finds no evidence of volume effects and shows that increases in credit spreads are small. This, however, it is an intended effect of the LCR, because it is likely to improve the sustainability of the refinancing of the real economy and thus contributes to sustainable economic growth for the following reasons:

First, **high credit growth at low interest rates is not an economic policy objective** (ECB 2013d). Investment projects that only have positive net present value (NPV), if interest rates do not cover the costs of liquidity and credit risk, are economically inefficient and should not be undertaken. They lead to the misallocation of capital and risk. The LCR contributes (in conjunction with improved capital regulation) to avoiding excessive credit growth at interest rates that do under-price risk.

**Anecdotal evidence suggests that credit spreads underestimate the costs of risk and are too low during boom phases; this leads to an economically inefficient allocation of capital and risk** (see Technical appendix 1). The LCR shall contribute to avoiding the systemic under-estimation of liquidity risk during credit booms. It shall also curb excessive credit growth financed by short-term funds; as such it improves the sustainability of refinancing of the real economy by avoiding the credit crunches and sharp loan spread increases that inevitably follow unsustainable credit booms.

Second, **the implementation of the LCR merely makes the costs of liquidity risk explicit and helps allocate these costs in an economically efficient way**. No new costs are imposed on society; they are only redistributed from the public to the banking sector. Without the LCR these costs do not disappear. The profits associated with riding the yield curve are pocketed by the banks' shareholders. In the current crisis the costs of materialising liquidity risk are partly born by bank shareholders, but partly shifted to tax payers via central bank emergency liquidity, government guarantees for bank liabilities, and to bank customers through a reduction of credit supply and an increase in loan spreads to recoup former underpricing of risk.

#### 3.7.2. The US Board of Governors of the Federal Reserve System (Fed), Federal Deposit Insurance Corporation (FDIC), and Comptroller of the Currency (OCC) proposal for a US LCR

On 18 October 2013, the US Board of Governors of the Federal Reserve System (Fed), Federal Deposit Insurance Corporation (FDIC), and Comptroller of the Currency (OCC) proposed to implement the Basel III LCR in the USA.

**The scope of application differs** from that proposed in the CRR: only internationally active depository institutions (with USD 250 billion in consolidated assets or more or total on balance sheet foreign exposure of at least USD 10 billion) and depository institutions holding companies, as well as their depository institution subsidiaries exceeding USD 10 billion in total consolidated assets. In addition, non-internally active depository institution holding companies with more than USD 50 billion in consolidated assets are subject to a modified LCR (with 70% of the original run-off rates and a coverage period of 21 days).

**The exact definition of the denominator of the LCR (net cash outflows) is more stringent** than in Basel III and the CRR proposal: instead of the net cumulative cash outflow over the entire 30-day period, the denominator as defined as the largest net cumulative cash outflow within the 30-day period. This definition is not only more stringent but also more realistic, as cash inflows after the peak net cash outflow day are not allowed to off-set earlier liquidity shortages, as in Basel III and the CRR. The objective of a 30-day minimum survival period is more likely to be attained in the US proposal. The proposal includes a 3% run-off rate for stable retail deposits subject to full FDIC insurance. In this respect, it is less stringent than the proposal in this report; at least until the EU Directive enters into force and a review of the EU proposal is launched in accordance with this report. The US proposal also entails the 75% cap on inflows.

**The exact definition of the numerator of the LCR (HQLA) is more stringent** in the US proposal than in Basel II or the CRR: Level 1 assets comprise of excess reserves at the Federal reserve and withdrawable reserves at foreign central banks, securities issued or guaranteed by the US government and certain securities issued or guaranteed by sovereigns or international institutions subject to a 0 per cent risk weight. Level 2A assets are claims issued or guaranteed by a US GSE (Government Sponsored Entity) or a sovereign/international institution with a 20% risk weight. Level 2A assets are subject to a 40% cap (including Level 2B assets) and a 15% haircut. Covered bonds are not recognised as HQLA at all. Level 2B assets include investment grade publicly traded corporate debt securities and publicly traded equities (in the S&P index or an equivalent index meeting the criteria of the respective local supervisor). They are subject to a 15% cap and a 50% haircut. The capacity to borrow from the Fed is not recognised as HQLA.

**The phase-in period is shorter and more stringent** than under Basel III. From 2015 banks have to hold an LCR of 80%, and from 2016 an LCR of 90%, and from 2017 an LCR of 100%.

## 4. The LCR across bank business models

The purpose of this section is to analyse the impact of the LCR on banks business models (Article 509(1) of the CRR). How is LCR compliance related to business models? Are there business models that systemically and significantly under- or outperform the sample? Which banking business models have already adapted to the LCR? Which still face pressure to evolve in order to meet the LCR requirements?

Two different analyses are proposed (for details see Technical appendix 4):

- A peer group analysis based on a business model classification;
- An analysis of asset and funding exposures.

The analyses are based on 2012q4 QIS data.

### 4.1. Peer group analysis based on a business model classification

#### a) Representativeness of the sample

---

<b>Group 1</b>	Well diversified large cross-border banks with substantial capital market activities
----------------	--

---

Group 2	Saving and loan associations
Group 3	Co-operative banks
Group 4	Pass-through financing banks
Group 5	Leasing and factoring banks
Group 6	Mortgage banks and building societies
Group 7	CCP, securities trading house, custodian institutions
Group 8	Auto banks, consumer credit banks
Group 9	Merchant banks (specialized in trade finance)
Group 10	Private banks
Group 11	Shari'ah-compliant banks
Group 12	Other well diversified [predominantly nationally active] banks
Group 13	Other specialized credit institutions (e.g. transport financing, promotion banks)

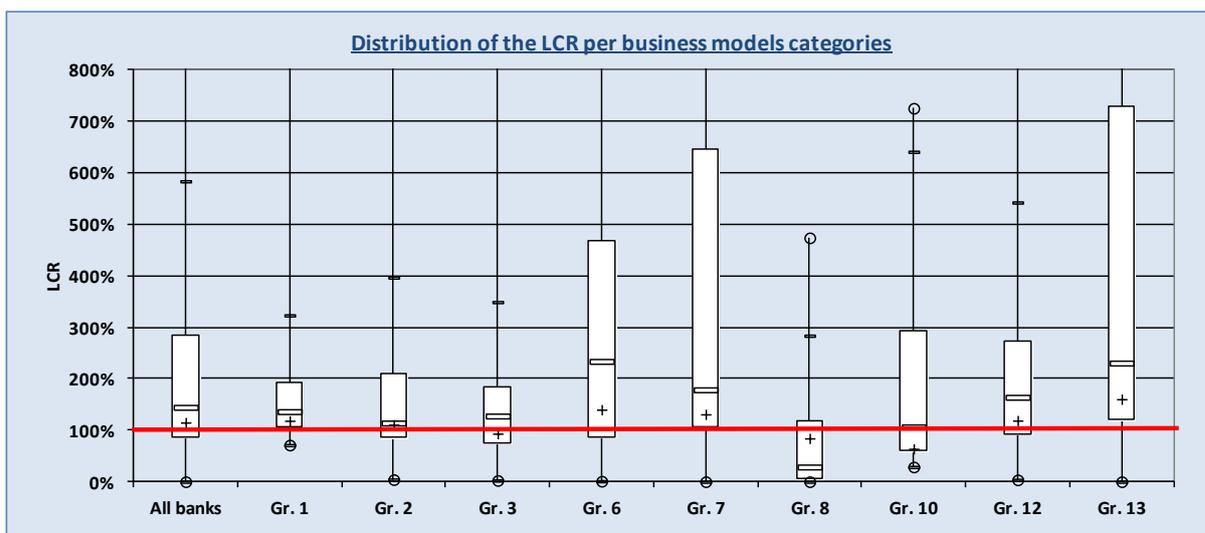
There is a **high concentration of banks in just a few business model categories**. As a consequence, the level of representation in the case of some business models is poor: very low number of banks has been identified as specialised in leasing and factoring activities (1 bank), Shari'ah products (3 banks), trade finance (6 banks) and in pass-through financing activities (7 banks).

Due to the low level of representation for some business models, the peer group analysis appears particularly challenging and the conclusions of the study should be taken with a significant degree of caution. Especially, given the low number of banks reported, it is not possible to provide an in-depth assessment of the impact of the LCR for leasing and factoring activities (Group 5) shari'ah products (Group 11), trade finance (Group 9) and pass-through financing activities (Group 4). In that respect, implementation of the EU regulatory liquidity reporting which will include a larger sample of European banks, would allow a more accurate analysis of the influence of business models in the 2014 annual report. Furthermore, the EBA will consider a more granular classification of business models for the second annual report. In addition, the analysis could move below the bank level to focus on the impact on single business segments. However, both would require additional data generation exercises.

b) LCR distribution of the per business models

**The level of LCRs is very diverse in the QIS sample** (30% of banks have a LCR below 100% while 20% of them have an LCR above 300%). Upper outliers are also numerous since around 10% of banks have an LCR above 600%. Even within business model groups, LCRs remain very heterogeneous. The peer group analysis shows a high LCR dispersion within business model groups with an inter-quartile range that goes from 86 percentage points (pp) for Group 1 (large cross-border banks) to 607 pp for Group 13 (other specialised banks). The distribution is especially large for mortgage banks (Group 6) CCP, securities trading house, custodian institutions (Group 7) and other specialised institutions (Group 13). In those groups, LCRs are not highly correlated to the business model.

Diagram 14: Distribution of LCR per business model



**N.B.:** Given the very few number of banks classified in Groups 5, 9 and 11, it was not relevant to include them in box plot charts.

c) Explanatory variables of the performance of business models

**In every business model group, there are banks that do not reach the LCR minimum requirement.** However, the share of non-compliant banks is higher for auto and consumer credit banks (Group 8; 73%), Pass-through financing banks (Group 4, 53%); and private banking (Group 10; 45%). On the contrary, well diversified large cross-border banks with substantial capital market activities (Group 1), other well-diversified predominantly nationally active banks (Group 12) and merchant banks (Group 9) relatively better perform with less than 20% of banks which are not LCR compliant.

To demonstrate for what reasons some types of business models better performed compared to others, a peer group analysis was carried out based on a set of key indicators. The results show that:

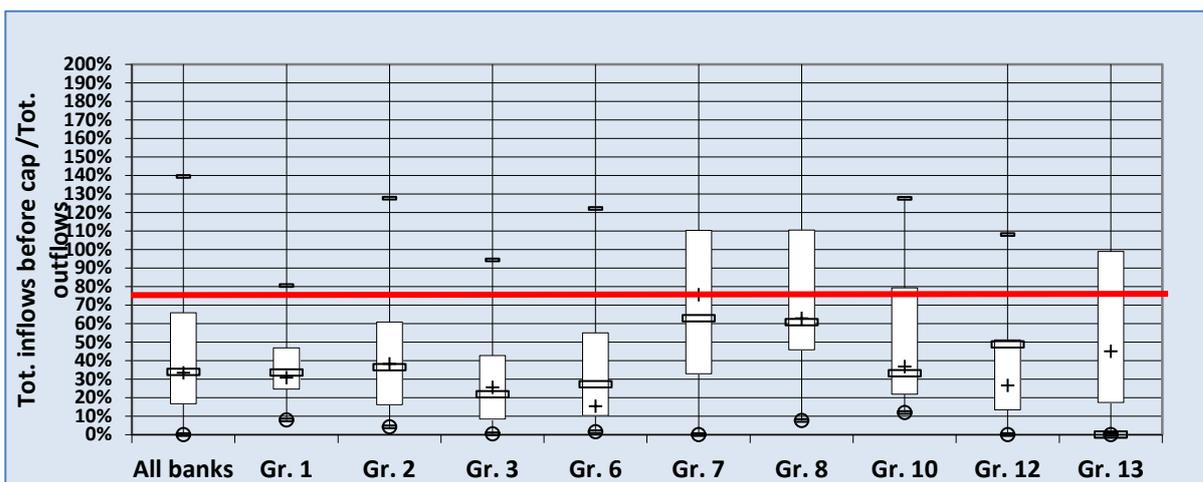
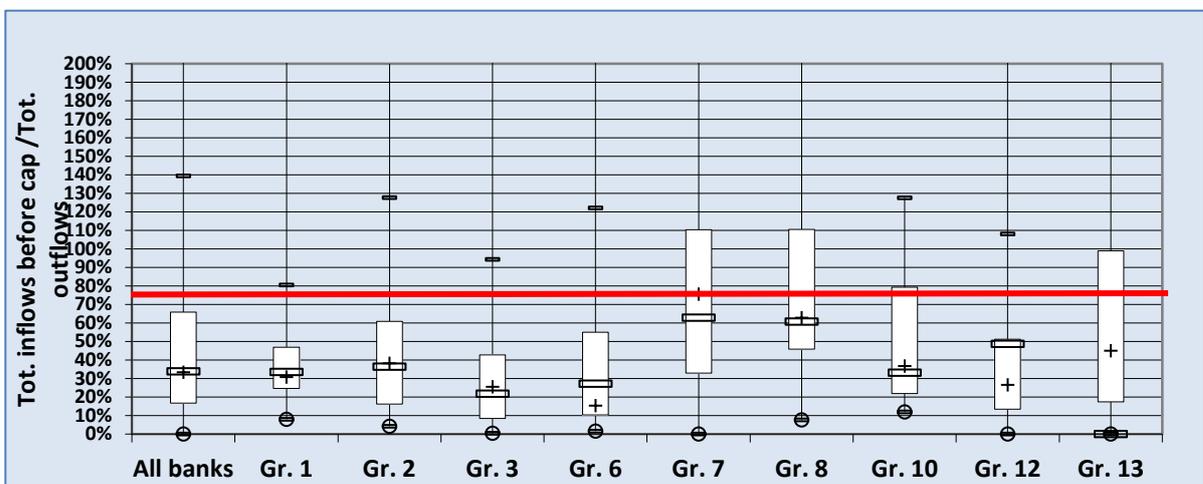
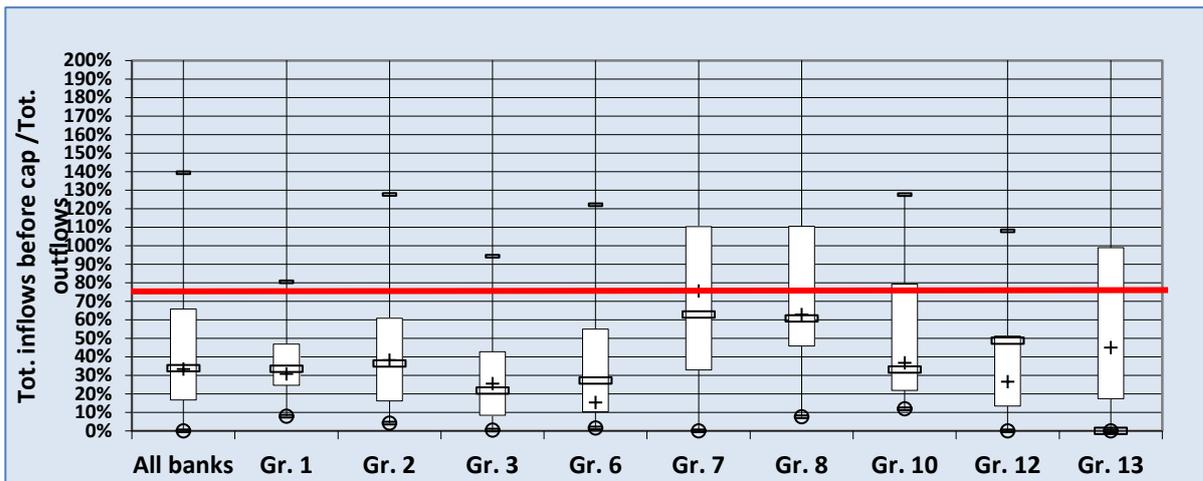
- There is a **strong positive correlation between the share of HQLA in relation to the total balance sheet and the LCR.**
- The share of net outflows (or short-term liquidity gap) relative to total balance sheet is also a key driver of the performance of business model. The liquidity gap relative to total balance sheet is very similar across banks that have the same business model.
- The level of stable deposits of a bank is also closely linked to business model. **Retail-oriented business models hold more stable deposits compared to other types of business model.**
- A very limited number of banks reported exposures on operational deposits (50% of the whole QIS sample have a share of operational deposits, in relation to the total balance sheet, below 1%). Such exposures are restricted to only a few types of business models which show a higher incidence of operational deposit exposures.
- As regards the amount of debt maturing within 30 days, there are no major differences between business models. In relation to the total balance sheet, this share is very low (close to 0%) in most business models except in Group 8 (auto and consumer credit banks).

d) Business models and a cap on inflows

**A cap on inflows is a constraint for some banks across all type of business models.** Around 22% of the whole QIS sample reaches the cap on inflow and 6% reaches the cap but does not meet the minimum LCR requirement.

A cap on inflows affects specialised banks more. At least 30% of the banks classified as CCP, securities trading house, custodians institutions (Group 7), auto and consumers credit banks (Group 8), and other specialized credit institutions (Group 13) reach the cap. On the contrary, well-diversified large cross-border groups (Group 1) saving and loan associations (Group 2), co-operative banks (Group 3) and other well-diversified predominantly active banks (Group 12) are far less affected by the cap with less than 20% of banks reaching the cap.

Diagram 15: Cap inflows per business model



Business models which are more affected by the cap have relatively more inflows within 30 days (close to 10% on average) but their cash outflows within 30 days are not atypical. Auto and consumer credit banks are especially penalized by the cap as they have no HQLA. As a result, the cap on inflows would negatively impact business models which do not hold lots of HQLA and which predominantly manage their liquidity risk by reducing maturity mismatch between asset and liability. Although the sample of pass-through financing institutions (Group 4) is too

small to make sensible distribution analysis, one main take away is that many of these are hit by the cap. The reason is that these institutions manage the liquidity risk by matching in and outflows and consequently hold hardly any HQLA.

e) Conclusions

The main findings are summarised below.

- **Diversified business models tend to be more adapted to the LCR than specialised banks.** They generally hold a fair amount of HQLA and they benefit more from lower calibrations applied to stable and operational deposits. For these types of business models, adjustment to the LCR should be manageable.
- **LCRs of specialised banks are very heterogeneous:**
  - **LCRs of mortgage banks and building societies (Group 6) as well as of CCPs, securities trading house, and custodian institutions (Group 7) are relatively high.** The first type of business model benefits from a lower liquidity gap as it predominantly manages its liquidity risk by limiting maturity mismatch between asset and liability. The second type of business model enjoys a solid portfolio of HQLA.
  - While posting strong HQLA portfolios, **private banks have a significant short-term liquidity gap.** To adapt to the LCR, they would have to significantly increase their stable funding and reduce the average maturity of assets.
  - **The situation looks very critical for auto, consumer credit banks (Group 8) and pass-through financing banks (Group 4).**

Despite reduced short-term liquidity gaps, both business models are over-affected, proportionately, by the inflow cap due to their HQLA portfolios. They also tend to be more affected by the cap on inflows and they do not benefit from lower calibrations applied to stable and operational deposits. For those two business models, adjustment to the LCR should be very challenging. It would lead to a global review of the structure of asset (sharp investment in HQLA) as well as to a significant increase of deposits. However, given the restricted number of banks included in those business model groups (respectively 11 and 6 banks), conclusions should be taken with a significant degree of caution. Some of these pass-through systems are, however, prohibited by law from taking deposits. Therefore, derogations from the cap (Article 425 of the CRR) or exemption from the cap or a higher cap than the 75% are suggested based on the results documented in Data Appendix 3 (column Scenario 1). Two aspects are to be taken into account:

1. Who can apply?
2. What criteria need to be adhered to?

Ad 1:

- The EBA suggests two possible options:
- (i) Only institutions specialised in the above business models can apply. Specialisation could be measured by a certain percentage of inflows stemming from specific activities, e.g. pass-through financing, auto loans, consumer credit, leasing, factoring.
- (ii) All institutions may apply for such derogation, but only for particular business lines which perform the above activities.

We have a preference for option (i), due to its less complex implementation and the potential impact on the LCR of the whole institution, i.e. including all business lines, in case of option (ii).

Furthermore, for well-diversified banks the LCR is less of a constraint, thus reducing the need for such derogation.

Ad 2:

To ensure harmonised implementation of the derogation across Member States and to avoid regulatory arbitrage, such derogations should be subject to stringent conditions and objective criteria.

Such conditions may include, but may not be limited to,

- The institution exhibits a low liquidity risk profile, taking into account the following:
  - The securitised assets (the cover-pool) can be assigned to the issued securities and are not reported as liquid assets.
  - The bank is neither contractually nor non-contractually obliged to redeem the issued securities during the 30-day stress horizon.
  - It is unlikely that the bank will buy back the issued securities in the interest of mitigating reputational risk.
  - Payments on covered bonds are based on (and do not exceed) payments on the underlying assets, i.e. the bank does not bear any interest, market volatility or default risk.
  - The timing of inflows matches the timing of outflows.
  - The bank does not retain credit risk, i.e. it is only obliged to pass through amounts received to the bondholders.
- The institution is not internationally active.
- The institution's total assets do not exceed EUR 30 bn, or equivalent and 1 per cent of total assets of the domestic banking sector.
- Derogations are disclosed in annual reports.
  
- In addition, NCAs need to notify the EBA on their decision to permit such derogation and provide the supporting documentation.

Irish Credit Unions are not subject to the LCR pursuant to Article 2(5)(8) of the CRD. However, as a result of their classification as a 'financial customer' in accordance with Article 411(1) of the CRR, the calibration of the outflow rate under Article 422(7) of the CRR could have an unintentional impact on this sector. Irish Credit Unions are financial co-operatives and as such they are regulated by the Central Bank of Ireland and subject to quantitative liquidity requirements. They are required to maintain a liquidity ratio and hold liquid assets in the form of short-dated investments (which may also include deposits in credit institutions). Irish Credit Union funds deposited with credit institutions – in excess of the amounts held for operational reasons – are subject to outflow rates in accordance with Article 422(7) of the CRR. During the consultation period the Irish Credit Unions raised concerns that the inclusion of Credit Union deposits in this outflow category (Article 422(7) of the CRR) may potentially impact on their profitability. This report's quantitative analysis does not include measure this impact; however consideration should be given to reviewing unintentional impacts of the LCR calibration in any subsequent analysis.

#### 4.2. The impact of balance-sheet structure on the LCR

To complete the peer group analysis based on business model classification, banks with higher and lower level of various assets and funding exposures were isolated in order to gauge how this influences their LCR.

**Preliminary results show that there is no a systematic correlation between the LCR and the structure of asset and liability.** For instance, **banks with larger SME and trade finance exposures do not necessarily have lower LCR compared to banks with lower SME and trade finance exposures. The only type of exposure that seems to significantly influence the performance of the LCR is sovereign exposure which correlates closely to HQLA.**

The correlation increases when we examine the maturity profile of liabilities. Indeed, **banks with a lower share of debt maturing within 1 month and a lower share of ASF maturing within 3 months relative to the total balance sheet tend to have a higher LCR.**

As a result, the performance of banks as regards the LCR is also closely linked to the way liquidity is managed and not only to the business model.

Diagram 16: Comparison of the LCR and its components within business models to sample averages (based on the classification of business models according to section 4.1)

	Gr. 1	Gr. 2	G. 3	G. 4	Gr.5	Gr.6	Gr.7	Gr. 8	Gr. 9	Gr.10	Gr. 11	Gr. 12	Gr. 13
	Well diversified large cross-border banks with substantial capital market activities	Saving and loan associations	Co-operative banks	Pass-through financing banks	Leasing and factoring banks	Mortgage banks and building societies	CCP, securities trading house, custodian institutions	Auto banks, consumer credit banks	Merchant banks	Private banks	Shari'ah compliant banks	Other well diversified [predominantly nationally active] banks	Other specialized credit institutions
<b>Number of banks</b>	38	55	61	7	1	28	32	11	6	11	3	79	25
<b>LCR dispersion (Diagram 14)</b>	Smaller	Smaller	Smaller	Smaller	-	Larger	Larger	Smaller	Larger	Similar	Larger	Similar	Larger
<b>LCR level</b>	Similar	Similar	Similar	Smaller	-	Larger	Larger	Smaller		Smaller	-	Larger	Larger
<b>HQLA/ total balance sheet</b>	Larger	Similar	Similar	Smaller	-	Similar	Larger	Smaller	-	Larger	-	Similar	Similar
<b>Net outflows/ total balance sheet</b>	Larger	Similar	Similar	Similar	-	Smaller	Similar	Smaller	-	Larger	-	Similar	Similar
<b>Stable deposits / total retail and SBC deposits</b>	Similar	Larger	Larger	Smaller	-	Smaller	Smaller	Smaller	-	Smaller	-	Larger	Smaller
<b>Operational deposits/ total wholesale deposits</b>	Larger	Smaller	Larger	Smaller	-	Smaller	Similar	Smaller	-	Larger	-	Larger	Similar
<b>Debt maturing within 30 days/ total outflows</b>	Similar	Smaller	Smaller	Smaller	-	Smaller	Smaller	Larger	-	Smaller	-	Smaller	Smaller
<b>Impact of cap on inflows</b>	Smaller	Smaller	Smaller	Larger	-	Smaller	Larger	Larger	-	Similar	-	Smaller	Larger

## 5. The interaction between the LCR, Leverage Ratio, Capital Adequacy Ratios, and the NSFR

The hypothesis is that LCR interacts negatively with the leverage ratio. Basically, the leverage ratio is a volume based capital ratio and does not make a difference whether a bank holds liquid assets or non-liquid assets. However, banks with low-risk business, holding lots of liquid assets, might be incentivised to decrease their leverage ratio to boost their return on equity. As a result, a high LCR would imply a low leverage ratio.

There is no evidence that supports this hypothesis in the monitoring data. **Banks with a higher LCR or a higher share of liquid assets do not show a lower.** The monitoring data also shows that a **higher share of liquid assets and a higher LCR indeed imply lower risk weights** and that there is a positive relation between the LCR and the risk-based capital ratios.

Overall, these findings suggest that the LCR does not conflict with capital ratios, i.e. compliance with the LCR does not make it more difficult to meet the (volume or risk based) capital ratios and vice versa. On the contrary, **the level of LCR seems to be substantially driven by the maturity and structure of liabilities**, which determine the cash outflows and do not influence capital ratios at all. By contrast, the former sections revealed that the change in the LCR is best explained by changes in the stock of liquid assets. However, it is not sure whether the increased investment in central bank reserves and other high liquid assets is due to the banks' adjustment to the new liquidity requirement or the financial crises and whether in the long term, banks will influence their level of LCR by re-structuring their liabilities or adding liquid assets.

Both liquidity ratios, the LCR and the NSFR, treat retail and small business customer deposits as well as liquid assets in a preferential way. On average, banks with a high LCR also report a high NSFR, whereby the variation in the NSFR is comparably low.

## 6. Case studies: The impact of quantitative liquidity requirements in countries that have actually implemented quantitative liquidity regulation

The simulations in the report are complemented by case studies on the experience of countries that actually implemented quantitative liquidity regulation (see Technical appendix 6 for the six case studies). A number of EU countries have introduced quantitative liquidity regulation in the recent past: the Netherlands introduced a binding standard in 2003, the UK announced its new liquidity regime in 2010, Switzerland imposed a binding one on their two largest banks and Sweden declared it will impose the LCR already in 2013. Furthermore, Denmark and France report on their experiences with quantitative liquidity regulation. These natural experiments contain valuable information and insights regarding the consequences of the introduction of binding quantitative liquidity regulation in the EU. Article 509(1) of the CRR requires an assessment of whether the LCR is likely to have a material detrimental impact on the macro-economy, the stability of financial markets, lending to the real economy and the implementation of monetary policy. **The case studies presented in this section do not report that quantitative liquidity regulation had material detrimental effects on the macro-economy, lending to the real economy, the stability of financial markets or the implementation of monetary policy.** While the actual experiences reported in the case studies are important complements of the descriptive and multivariate analyses as well as the simulation exercise, important caveats remain. The variants of quantitative liquidity regulation implemented in these countries are not identical to the LCR. The resilience of the banking sectors and the economies in these countries might also differ from the current state of the EU banking sector and the EU economy. Furthermore, in some of the case studies the regulation was not binding at the time of its introduction, i.e. limited evidence can be gathered on the consequences for banking system with higher adjustment needs due

to the introduction of new liquidity introduced regulatory. Therefore, the experience of these six countries cannot be mapped one-to-one to the other 24 countries in the EEA.

## 7. The interaction between the LCR and monetary policy implementation

Article 509(1) of the CRR mandates the EBA to assess the interaction between the LCR and the implementation of monetary policy in its report to the EU COM (for details see Technical appendix 8). It is aware that other fora at the Eurosystem level and at the BCBS level address similar questions; this chapter, therefore, focuses on the positions expressed by the international central banking community. The chapter draws on published and unpublished material from the international central banking community such as ACP/BdF (2012), BCBS (2013a, 2013b), BIS (2012), Cœuré (2012), Debelle (2011), ECB (2012b), ECB (2013), ECB (2013b), Stein (2013). Furthermore, the EBA closely cooperates with these fora which include multiple membership overlaps.

In January 2013 the BCBS set up a dedicated Task Force on Liquidity (TFL) to study the role of central bank committed liquidity facilities (CLFs) in the LCR. It has focused on (i.) potential changes to disclosure recommendations of non-HQLA but central bank eligible assets, (ii.) the expansion of the eligibility of central bank committed liquidity facilities (CLFs) from jurisdictions with insufficient liquid assets to all jurisdictions, and (iii.) the concrete implementation of such a recalibration of the LCR, if deemed appropriate. It found that the operationalisation of a CLF involves a large number of complex choices. In particular, setting the appropriate operational details is difficult, i.e. fees and collateral haircuts and where in the HQLA such facilities could be recognised. As a reminder, under a central bank committed liquidity facility (CLF) banks could purchase a commitment from the central bank to grant liquidity against collateral and in exchange of a fee. Even when undrawn, banks could recognise the CLF liquidity in the pool of HQLA (High Quality Liquid Assets) under the LCR, although subject to a strict limit.

A final decision regarding the CLF is expected in January 2014. .

With regard to the terms of the CLF, the latest proposal foresees that:

- Jurisdictions would not be obliged to offer an CLF – it would be entirely optional;
- In normal times, a low/moderate price for the commitment fee would apply, which must be the greater of 75 basis points, or at least 25 basis points above the difference in yield on the assets used to secure the CLF (normally non-HQLA) and the yield on a representative portfolio of HQLA<sup>18</sup>;
- In times of market wide stress, the commitment fee is not subject to the minimum applicable in normal times;
- The drawing fee, the type of collateral and haircuts will be determined by national authorities, in order to be consistent with national monetary policy frameworks. Moreover, the collateral must be unencumbered and readily available should the facility need to be drawn down;
- The limit will be provided by treating the committed liquidity obtained under the CLF as Level 2B assets during both normal and stressed times (which can be a maximum of 15% of the total HQLA, within a 40% cap on Level 2 assets), in order to incentivise banks to use private sources of HQLA and to ensure credibility of the LCR. However, the drawn amount under the facility would count as a Level 1 asset;
- The central bank may choose to offer this facility as long as the bank is solvent, so it is not fully unconditional and irrevocable;

---

<sup>18</sup>As envisaged in Art. 5 (5) to (7) of the draft RTS on derogations in accordance with Art. 419 (5) CRR and in Section 3.4 above.

- National authorities that offer CLFs to banks within their jurisdiction should disclose the availability of such facilities without identification of the banks to which facilities have been granted. Additionally, national authorities should determine and disclose when they consider there to be market-wide stress that justifies an easing of the conditions for use of the CLF.

Similar to the BCBS the respective analysis conducted at the EBA (for the preparation of the RTS pursuant to Article 419 of the CRR) found that **pinning down the details of the CLF is challenging**: (i.) it is unlikely that central banks can unconditionally commit to disburse liquidity even if the solvency of the receiving bank is questioned; (ii.) unless access to the liquidity line is restricted to times of stress, it could be used to endogenise the supply of central bank money, which impairs the implementation of monetary policy; (iii.) the time for which liquidity is granted under the line needs to be sufficiently long to ensure that the HQLA is available for a sufficient time span (i.e. over the first 30 days the funds should not generate outflows), (iv.) the maximum amount of usage of the central bank commitment requires reliable estimates of banks' justified demand for liquid assets and their availability in the respective currency. To avoid that banks use the committed line as substitute for central bank standard operations, the drawing should be restricted to the conditions defined under Article 509(2)(h) of the CRR. However, the current deliberations within the BCBS do not include such a restriction. Given the complexities of calibrating a CLF that addresses the unintended consequences of liquidity regulation on monetary policy without creating other distortions and/or leading to an uneven level playing field other avenues should also be explored. These could include a reduction in the roll-over rates for central bank funding on the regulatory side but may also deserve considerations from the perspective of monetary policy operations.

In 2011, the Eurosystem mandated a joint Monetary Operations Committee (MOC) and Financial Stability Committee (FSC) Task Force to assess the impact of the Basel III liquidity risk regulation on the recourse of banks to Eurosystem monetary policy recommendations and related effects on financial markets (LR-MPO). The **main recommendations of the LR-MPO** were (i.) that **minimum reserve requirements should not be considered HQLA** and (ii.) that the Eurosystem shall set up a joint MOC/FSC Basel III Monitoring Group (MG B III) to monitor the impact of the LCR (and the NSFR) on the implementation of monetary policy in the Euro area.

This Basel III Monitoring Group was established in July 2012 and its first report was tabled to the MOC and the FSC in March 2013 (ECB 2013). The report includes a survey conducted by the group (ECB 2013, Annex 2, p. 2) which found that *'the majority of the remaining [all 16 NSAs/NCBs in the sample except NL] supervisors replied that no impact from the introduction of liquidity regulation [on monetary policy implementation] has been observed. The replies were unanimous with regard to the impact on the implementation of monetary policy: all responses were negative.'* This finding is corroborated by the case studies in Appendix 6.

**Two broad principles** form the basis of the assessment of the interaction between the LCR and monetary policy implementation:

**Banks should not be enabled or much less incentivised to arbitrage liquidity regulation via central bank operations.**

**Liquidity regulation should not have unintended negative consequences on central banks' ability to implement monetary policy.**

Recent literature (ACP/BdF 2012, ECC 2012, LR-MPO 2012, Coeure 2013, Bech, Keister 2013, Bindseil, Lamoot 2011, ECB 2012b, Schmitz 2013) regarding the interaction between the LCR and monetary policy suggests that the current calibration of the LCR as agreed by GHOS in January 2013 might have an impact on monetary policy implementation. It suggests **some adjustment of the calibration of the LCR to avoid regulatory arbitrage via central banks, to remove an internal inconsistency of the LCR, and to reduce the unintended consequences on monetary policy implementation**:

**First**, banks should not be enabled or much less incentivised to have liquidity regulation dealt with by arbitrage via central bank operations (ECB 2012b) (especially during times of very accommodative liquidity policies; once these were discontinued, more aggressive bidding by banks in standard open market operations might emerge). The **treatment of central bank exposure should be consistent across the components of the LCR** – net cash-outflows (i.e. repos with the central bank) and HQLAs (i.e. minimum reserves and excess reserves). Eurosystem

eligible collateral is broader than HQLAs, so that the treatment of central bank reserves and the run-off factor of central bank repos can have a substantial impact on banks' LCR. The Eurosystem's collateral haircuts are more granular and sometimes higher than those in the LCR. The composition of collateral used by banks for regulatory arbitrage is likely to be influenced by the relative haircuts between the LCR and central bank operations. Banks would be enabled to arbitrage the LCR by exploiting these differences (Bindseil/Lamoot 2012).

The changing scale and composition of collateral posted at central banks is documented in BIS (2013). The report looks at the collateral frameworks of and usage at 16 central banks in G-20 countries<sup>19</sup>. It finds (i.) that **collateral frameworks differ widely across the central banks** in the sample, (ii.) that most central banks modified their collateral framework in due course of the crisis (e.g. additional asset classes/issuer types/currency denominations, new risk management tools), and (iii.) that the amount and composition of collateral changed substantially between June 2007 and July 2012. According to the report, central banks with extremely narrow eligibility (i.e. domestic government bonds) are the Reserve Bank of India and the Monetary Authority of Singapore; central banks with very broad eligibility are the Eurosystem, the Swedish Riksbank, and the Swiss National Bank. Thus, the opinions regarding the inclusion of all central bank eligible assets in HQLA differ widely across the international community of central banks. Jurisdictions with narrow central bank eligibility oppose it. For central banks with broader eligibility, the report observes that during stress times the composition of collateral shifts towards less liquid assets. This development would be aggravated by different run-off rates for repos with central bank versus repos with other counterparties.

To avoid this, some recalibration of the LCR could be analysed, i.e. making the **treatment of central bank exposures consistent across the components of the LCR** – net cash-outflows (i.e. repos with the central bank) and HQLAs (i.e. minimum reserves and excess reserves) **as well as with other market repos**. Namely, proposed recalibrations of the LCR to be further investigated are:

(i) **The run-off rates for central bank and market repos could be equal to avoid regulatory arbitrage**. That is, operations with the central bank up to the bank's minimum reserve requirements (plus other factors that are exogenous to the banking system like changes in banknote circulation) could receive a 0% run-off in cash outflows. Operations with the central bank exceeding the minimum reserve requirement **could be treated like all other collateralised operations with other market participants based on the underlying collateral**; 0% run-off for repos in Level 1 assets, 15% for repos in Level 2 assets, 50% run-off factor for Level 2B assets and 100% for non-HQLA. This recalibration could not only avoid LCR arbitrage via central bank facilities. It could also ensure a level playing field between banks operating in jurisdictions with high minimum reserve requirements (e.g. Eurosystem) vis-à-vis those operating in countries without (or low) minimum reserve requirements. The US Fed, the OCC, and FDIC propose a run-off rate for all central bank repos that is equal to that for repos with other market participants. On the other hand, the impact of this recalibration on central bank monetary policy operations (i.e. interplay with current central bank haircuts and collateral management systems) would need to be thoroughly analysed. The 0 per cent run off rate for CB repos which assumes that CB repos are always rolled by central banks was intended by the GHOS recalibration in January 2013 to ensure that CB repos are treated identically to outright asset purchases by central banks. Fears of an unlevelled playing field between banks operating under different monetary policy frameworks are discussed in ACP/BdF (2012).

The zero percent run-off rate for CB repos up to the minimum reserve requirements is conceptually in line with the recommendation in Eurosystem (2012) that minimum reserve requirements should not count as HQLA, as they are encumbered for monetary policy purposes and cannot be drawn in times of stress. The zero percent run-off rate for CB repos up to the minimum reserve requirements is conceptually in line with the recommendation in Eurosystem (2012) that minimum reserve requirements should not count as HQLA, as they are encumbered for monetary policy purposes and cannot be drawn in times of stress. Instead, only central bank reserves in excess of minimum reserves should count towards HQLA. Indeed, an important point is that the required minimum reserve holdings increase the structural deficit and therefore the need for banks to borrow from the central bank to counter the liquidity shortage. The proposed zero per cent run-off rate for CB repos up to the minimum reserve requirements therefore partly reduces the 'disadvantage' that banks in jurisdictions with high reserve requirements may face

---

<sup>19</sup> Central banks in the sample stem from AU, CA, EA, FR, DE, IN, IT, JP, KR, MX, SG, ES, SE, CH, UK, US.

Since 2009 central banks across the world engage in outright asset purchases and long-term repos (US Federal Reserve, Swiss National Bank, Bank of England, Eurosystem). The possibility of an unlevel playing field between banks operating under different monetary policy frameworks is discussed in ACP/BdF (2012). The ACP/BdF concludes that a non-zero run-off rate of central bank operations beyond the structural liquidity deficit could pose a disadvantage for banks in currency areas with short-term repos as a predominant implementation instrument. However, banks always have the option to sell their assets in outright sales, irrespective of the jurisdiction. In order to cover minimum reserve requirements in aggregate, banks have to take recourse to the central bank; as such a 0% run-off rate of these amounts is warranted and addresses the perceived uneven playing field. But more importantly, the LCR should treat these two cases differently, precisely because the liquidity risk implications are different: while repos are bank liabilities (contractual cash-outflow); outright asset purchases are not.

(ii) **Term deposits with the central banks should not be treated as loans.** The LCR imposed (prior to the January 2013 recalibration) a 50 per cent roll-over rate on loans to the real economy and to central banks. While the purpose of this rule is to reduce the likelihood of a credit crunch for the real economy, it discourages banks from participating in liquidity absorbing monetary policy operations. The GHOS recalibration of January 2013 takes this into account and reduces the roll-over rate on exposures to central banks to 0 percent, so that term deposits can be fully treated as inflows at maturity. We suggest that this recalibration is also accounted for in Article 425(1) and (2) (a) of the CRR.

The European and, especially, the Euro **unsecured money markets feature much lower volumes and significantly shorter maturities than before the crisis.** This is due to a number of factors. Banks decrease their reliance on unsecured, short-term funding and shift towards secured funding, the European central banks provide ample liquidity and do so over longer periods (through outright asset purchases and vLTROs), the main lenders on the unsecured money market become more risk aware and cut their unsecured exposure to European banks (e.g. US money market funds). **It is unlikely that the LCR contributes much to the explanation of the post-crisis situation on European unsecured money markets.**

Nevertheless, the LCR aims at disincentivising banks' reliance on unstable funding sources like unsecured money market funding with tenors below one month. At the same time it provides incentives for banks to lend over tenors below one month. As such **the functioning of the market will largely be determined by the behaviour of non-bank market participants** (e.g. insurance companies, money market funds). This in turn will be a function of the confidence in the European banking sector.

**Second, essentially, a very broad range of eligible liquid assets in the LCR** (e.g. allowing central bank eligibility as sufficient criterion for eligibility in the counterbalancing capacity of liquidity stress tests) **corresponds to the assumption of a committed liquidity line of the central bank** (BCBS 2013a). **Without pricing these quasi-committed lines appropriately, regulation would be ineffective (Coeure 2013).** The private marginal costs of illiquidity for the bank are not equal to the social marginal costs and the bank is not incentivised to reduce its level of liquidity risk tolerance to the socially optimum. Liquidity regulation thus does not achieve its purpose. For liquidity regulation to bind at the margin, either only assets that are expected to be liquid on private markets should be eligible under the LCR or, alternatively, irrevocably committed central bank liquidity lines could be included in HQLA. The latter would have to be priced based on the expected opportunity costs of holding liquid assets. The pricing of central bank liquidity insurance could take different forms, such as (1) an outright fee (e.g. imposed by the Federal Reserve Bank of Australia), (2) limiting eligible collateral to HQLA, (3) raising haircuts to proxy the opportunity costs of liquid assets or (4) set up a different pricing scheme for non-HQLA i.e. illiquid assets. The challenges involved are substantial (see discussion above).

Beyond the proposed recalibration the interaction between the LCR and monetary policy implementation is relevant for the empirical assessment of the LCR data: the univariate and the multivariate analysis suggest that **excess reserves play an important role as HQLA for EU and Euro area banks. This poses the question about how a return to pre-crisis liquidity policy would impact on EU banks' LCR compliance.** This assessment has to take into account the following issues:

Under pre-crisis liquidity conditions central banks estimated the expected demand for central bank reserves at their target policy rate (see Technical appendix 6.3. for details). These estimates together with the estimates of autonomous factors (e.g. changes in banknote circulation) and other factors (e.g. Secondary Market Program) formed the basis for fixing the allotment volume for open market operations. Before the crisis the demand for excess reserves was usually fairly marginal; since the beginning of the crisis it is significant. **How a return to pre-crisis monetary policy implementation, rationed central bank funding, higher interest rates and the LCR**

**itself will affect the demand schedule for central bank reserves is crucial for analysing the impact on LCR compliance.**

**The distribution of excess reserves differs substantially from the distribution of (remaining) vLTRO exposures;** banks which still have large vLTRO exposures hold relatively little excess reserves. The latter are mostly held by banks that do not need to repay vLTROs; they are the consequence of liquidity inflows into banks (in core countries) that have little (remaining) exposure to vLTROs. Given the 0 per cent run-off rate of central bank repos, the large contractual outflows due at the maturity of the vLTROs are not reflected in the respective banks' LCR at all. So the LCR either counterfactually assumes that these transactions are automatically rolled or misrepresents banks' liquidity risk (if the vLTROs are not rolled).

Finally, **the impact of the maturity of the vLTRO on banks' LCR depends on the composition of the respective collateral;** the higher the share of illiquid collateral the higher the impact on these banks' LCR. The countries with high remaining volumes of outstanding vLTROs feature a relatively high share of non-HQLA in pledged collateral. Increases in unencumbered HQLA – that could compensate for the large cash outflows – are likely to be small, according to the preliminary analysis of Eurosystem aggregate collateral data. Future micro-level analysis will be included as soon as available from the international community of central banks.

**At this stage reliable estimates by the international community of central banks regarding the impact of a potential return to pre-crisis liquidity policy on banks' LCR compliance or regarding the impact of the introduction of the LCR on the demand schedule for central bank reserves are not available.**

In order to frame the problem it is worth recalling that the two three-year LTRO offered by the ECB in December 2011 and February 2012, respectively for EUR 489.2 and EUR 529.5 billion, turned into a **net liquidity injection of EUR 523 billion** (i.e. after taking into account the simultaneous reimbursement of shorter term central bank funding). As of 1 October 2013, **around 65 per cent of the net liquidity injected had already been repaid since early 2013** (ECB Monthly Bulletin, October 2013), with about **EUR 185 billion still outstanding**. This amount is equal to less than 1 per cent of the total liabilities of Euro Area MFIs. The ECB also reports that the amount of excess liquidity in the overnight money market remains high despite the continued early repayment of funds.

Given that the EBA does not have access to the data necessary to empirically analyse the interaction between the vLTRO and the LCR, the EBA conceptually investigates various alternatives to gauge the order of magnitude of the impact of the maturing of the LTRO (Technical Appendix 8). The EBA looked at four potential options which banks could adopt to fund their vLTRO contractual cash outflow: (i) running down excess reserves (which is unlikely as their excess reserves amount to only a small fraction of the remaining vLTRO exposure), (ii) selling assets funded by the vLTRO; (iii) raising secured funding; (iv) raising unsecured long-term unsecured funding at competitive rates. As a matter of course, a roll-over of the vLTRO leaves the LCR unchanged as will banks recourse to MRO and three months LTRO as substitute for the vLTRO. At the current juncture it is difficult to foresee market conditions at the time the vLTRO will mature. Nevertheless, assuming that the respective banks can adopt a mix of the alternatives the overall impact on the gross liquidity short-fall is very low, if the respective banks can fund on the unsecured market at competitive rates (e.g. in October 2013 the costs of the vLTRO exceed 1 year EONIA). The overall impact on the gross liquidity short-fall is highest, if the respective banks substitute their CB funding by unsecured over-night interbank deposits. An example helps gauge the order of magnitude of the potential impact. In a worst case scenario, e.g. should banks only resort to unsecured funding with maturity below 30 days to fully substitute for the remaining EUR 185 billion in net liquidity (assuming that the remainder could be refinanced by means of regular ECB operations with a 0% run-off), an equal increase will show in the aggregate net cash outflows as a 100% run-off applies. Based on December 2012 EU QIS figures that would correspond to a 5.7% increase in the aggregate net cash outflows for the sample (9.0% for Eurozone banks only), reflecting into a drop in the average LCR from 115 to 108 per cent (from 112 to 103% for EA banks).

Ultimately, the impact depends on the confidence the market has in the respective banks; the higher the confidence in the respective banks, the lower the impact on the LCR. The countries with high remaining volumes of outstanding vLTROs feature a relatively high share of non-HQLA in pledged collateral. Increases in unencumbered collateral are likely to have a relatively small impact on the LCR, according to the analysis of Eurosystem aggregated collateral data.

As long as the calibration of the LCR offers opportunities for arbitrage via central banks, excess reserve are likely to remain positive, volatile, and sensitive to interest rate changes and market conditions. This exacerbates the estimation of the structural liquidity deficit and the implementation of monetary policy. **As soon as results**

**become available**, e.g. from the Eurosystem's Basel III Monitoring Group, they will be incorporated in the second annual report to be prepared by the end of 2014.

## 8. The definition of established operational deposits, of retail deposit in Article 411(2) of the CRR, in particular the appropriateness of introducing a threshold on deposits of natural persons

### 8.1. The definition of established operational relationship for non-financial customers as referred to in Article 422(3)(c) of the CRR

Based on the analysis in the Technical appendix 9.1 the **following criteria are suggested to identify which deposits can qualify as deposits with an established operational relationship** other than those generated for clearing, custody or cash management are suggested:

- The relationship with the client has persisted for at least 24 months.
- The deposits are highly liquid, i.e. only current/transaction accounts can be included. Time deposits, savings deposits, brokered deposits are excluded.
- The bank shall present evidence to the NSA upon request that the deposit is vital for the client's operations, i.e. the client has a substantive dependency with the bank and the deposit is required for its activities.
- The client is unable to withdraw amounts legally due over a 30 day horizon, without compromising its operational functioning. Evidence shall be presented at any time upon request of the NSA based on data spanning at least 24 months.
- Only the deposit base is treated as operational balance. It is defined as the balance necessary to make use of the service to which the deposit is a by-product. Excess funds are treated as non-operational. Non-operational balances are considered as all balances in excess of the average 5 day rolling cumulative net-cash outflow over the preceding 90 days.
- The deposit is held in specifically designated accounts and priced without giving an economic incentive to the customer to leave any excess funds on these accounts.
- These services include: Direct or indirect access to national and international payment services, security trading/depository services.

Further, as a filter criteria banks should exclude the following deposits:

- Deposits that are collected on the wholesale market in the sole interest of offering interest income, i.e. the deposit formally is a by-product of another service, but the service is hardly used. The deposits pay interest rates that are at least 5 bps below the prevailing rate for wholesale deposits with comparable characteristics (maturity and other deposit contract features).
- Price sensitive deposits, i.e. deposit balances that display significant co-movements with interest rates are excluded.
- Deposits when a significant portion of the deposits are provided by a small proportion of customers (i.e. concentration risk).

### 8.2. Definition of retail deposit in Article 411(2) of the CRR, in particular the appropriateness of introducing a threshold on deposits of natural persons

Based on the analysis in the Technical Appendix 9.2 **high value depositors are deemed more responsive to market-wide and idiosyncratic stress than regular retail depositors and should therefore be subject to**

**higher outflow rates.** In Article 421(3) of the CRR, the EBA is required, taking into account the behaviour of local depositors as advised by competent authorities, to issue guidelines by 1 January 2014 on the criteria to determine the conditions of application of Article 421(1) and (2) in relation to the identification of retail deposits subject to different outflows and the definitions of those products for purposes of liquidity reporting.

According to the guidelines, institutions should consider as high value deposits, those which fulfil all the following requirements:

- (a) they exceed the lower of one of the following two amounts:
  - (i) EUR 100 000 or
  - (ii) the local deposit guarantee scheme amount
- (b) they are lower than EUR 500 000.

Institutions should consider as very high value deposits, those of at least EUR 500 000.

High value deposits as an explanatory factor stem from the Survey to Competent Authorities concerning, inter alia, observations on retail deposit outflows in times of stress during the recent crisis.

To conclude, high value depositors of both natural persons and SMEs are deemed more responsive to market-wide and idiosyncratic stress than regular retail depositors and should therefore be subject to higher outflow rates.

### 8.3. The need to introduce a new retail deposit category with a lower outflow rate (Article 411 of the CRR)

The analysis in Technical appendix 9.3 studies the need of introducing a new retail deposit category applicable in the EU. The Basel Committee included in its rules on the LCR, a specific category of retail deposits which could receive a run-off rate of 3% (instead of 5% or 10%, respectively). One other criterion is that these deposits need to be insured by an effective DGS. The BCBS requires the following criteria to be met by an effective DGS:

- Ability to make prompt pay-outs,
- Clearly defined coverage,
- High public awareness,
- Formal legal powers of the deposit insurer to fulfil its mandate and operational independence,
- Periodic collection of levies on banks (pre-funding element),
- Adequate means of ensuring ready access to additional funding.

These features are also reflected in the 18 core principles for effective DGS developed jointly by the International Association of Deposit Insurers and the Basel Committee of 2010.

The EBA does not regard the existence of deposit insurance alone as sufficient to allow for a reduced 3% outflow rate for covered deposits. However, the above six criteria should be met at least in order to consider such a reduction.

To this end, the EBA welcomes particularly the legislative initiative taken by the EU Commission to enhance and harmonize European DGS. It is noted that since the proposal has not been adopted yet, the collection of funds in Europe has not yet started in a comparable fashion and existing DGS differ significantly in particular in that respect.

In conclusion, **the EBA agrees on the merits of a specific outflow category for deposits insured by an effective DGS, but does not see the need to introduce a reduced outflow category for retail deposits before the adoption of the legislative package on DGS, which would move EU DGS in the direction of the criteria set out in Basel III for the respective retail deposit category, as required by the BCBS. As soon as the preconditions for a new retail deposit category with lower outflow rates are likely to be fulfilled, the benefits and costs of its introduction should be examined by the EBA.**

# Technical Appendix

## Technical Appendix 1: The benefits of quantitative liquidity regulation – a survey of the theoretical and the empirical literature

Based on a comprehensive literature review, this section lays out the expected benefits of liquidity regulation for the purpose of the economic impact assessment according to Article 509(1) of the CRR.

### 1.1. Introduction

In December 2010, the Basel Committee on Banking Supervision (BCBS) decided to extend the scope of international banking regulation to the liquidity field. In that prospect, two complementary liquidity ratios were designed: the Liquidity coverage ratio (LCR) that requires banks to hold a minimum amount of high liquid assets to overcome short term liquidity disruptions over a 30-day period, and the net stable funding ratio (NSFR) that requires banks to keep a minimum amount of stable funding to serve liquidity commitments over a one-year time horizon. This chapter focuses on the normative economics of short-term liquidity risk. The normative economics of structural, long-term liquidity risk and its regulation (NSFR) constitute the subject of a separate report pursuant to Article 510 of the CRR.

These new Basel III liquidity standards constitute the first harmonisation of international consensus on liquidity requirements. Despite tough technical debates over the adequate calibration of those ratios, there is broad agreement on the necessity to develop an international mandatory liquidity framework. For most of the market operators and supervisors, the 2007-2008 financial crisis made it very clear that an international regulation essentially based on capital requirements cannot address all the financial stability issues. The 2007-2008 crisis was characterised by at least one traditional bank run by depositors (*Northern Rock* in the UK) and by a quick withdrawal of short-term wholesale funding. Moreover, during this period interbank markets froze dramatically and many banks were not able to issue new debt without public support (Gorton, 2009).

However, if the recent financial crisis played an important role in better understanding the benefits of such a regulation, the necessity to develop an international liquidity framework is also structural. Most of the theoretical (Section 1.2.) and empirical (Section 1.3.) literature reveals that without liquidity regulation, banks' incentives to manage adequately liquidity risk are not sufficient.

### 1.2. Benefits of liquidity regulation – an overview of the theoretical literature

- a) Until now, banks have not received sufficient incentives to internalise properly the global cost of liquidity risks.
- Due to their intermediation role, liquidity risks are intrinsic to banking activities.

Within the economy, banks traditionally play a key role of intermediation. They finance long-term investments with short-term resources by transforming short-term liabilities (mostly deposits) into long-term assets (loans and investments). However, this basic function leads to a fundamental maturity mismatch between assets and liabilities making banks structurally exposed to liquidity risk. Indeed, most of the banking resources are liabilities from third parties that traditionally take the form of deposits. As initially shown by Diamond and Dybvig (1983), these liquid claims allow banks' creditors to constantly optimise their investment preferences, but leave banks exposed to the risk of bank runs. Moreover, banks have diversified their sources of funding, being then also exposed to a freeze in wholesale markets.

Bank runs materialise with severe consequences for banks and for financial stability as a whole (Holmstrom and Tirole, 2011; Giavazzi and Giovannini, 2011). Sudden withdrawals may lead to disruptive liquidity runs and force banks to sell their assets below their fundamental price (fire sales). Fire sales affect short-term banking profitability but they could also make access to funding even more difficult by depressing the banking assets' value and by increasing the cost of funding (and/or the price of collaterals used in secured

funding operations) (Holmstrom and Tirole, 2011; Giavazzi and Giovannini, 2011). The deterioration of funding conditions could finally affect the overall lending activity and cause a potential credit crunch (Diamond and Rajan, 2010, Kiyotaki and Moore, 1997).

Given this, banks have to adequately manage their balance-sheet structure to mitigate their liquidity risks. To shorten the maturity gap between assets and liabilities, banks can reduce their short-term funding and especially their exposure to short-term wholesale funding which is very volatile (Gorton, 2009). They could also hold a buffer of liquid assets (Acharya, 2011; Allen and Gale, 2004a and 2004b; Farhi, 2009; Gale and Yorulmazer, 2011; Rochet and Vives, 2004; Tirole 2011; and Vives, 2011).

- However, banks face strong incentives to underestimate their exposures to liquidity risks

According to Perotti and Suarez (2011), 'the rapid expansion of credit may only be funded by attracting short-term funding (for instance, because deposit supply can be expanded only slowly, or because short term market lenders do not need to be very informed about new credit choices)'. In other words, to grow their balance sheets, banks have strong incentives to increase their short term funding.

Moreover, lengthening the maturity of funding and holding liquid assets are costly. Liquid assets provide lower returns than illiquid assets and, holding a liquidity buffer may also be inefficient, as it limits banks 'capacity to provide liquidity to the economy (Bonfim and Kim, 2012).

Due to information asymmetries, external monitoring of liquidity risk management is also very difficult. Liquidity risk management needs lots of internal and complex information which makes its verification very challenging for external auditors. However, without an adequate external verification, banks could underestimate their exposure on liquidity risk.

Liquidity shocks being rare events (of low probability) in good times, banks could also have incentives to overlook their exposure on liquidity risk during those periods. This is what happened prior to the last financial crisis when markets were very liquid and when funding was easily available at a very low cost.

- Even if banks take properly into account their own exposure to liquidity risk, they do not internalise all the negative externalities caused by liquidity risk

Individual choice regarding liquidity risk management could generate substantial externalities on other banks and on the whole economy. Liquidity failure causes fire sales and increase counterparty risk that could affect other banks and intermediaries (Brunnermeier, 2009; Allen, Babus and Carletti, 2010). Under-pricing of liquidity risk could also generate credit bubbles which affect the entire economy through the supply of bank loans (risk over-investment in upturns and an abrupt tightening of the credit supply in downturns - credit crunches) (Acharya and Viswanathan 2011; Allen and Gale, 2000; Brunnermeier and Pedersen, 2009).

As a consequence, banks' private choice regarding liquidity management does not completely reflect what is socially optimal even if it covers adequately their own liquidity exposure. Such considerations call for regulators to set up liquidity prudential standards that are socially optimal. This will be discussed in the next paragraph.

- b) Given these market failures, regulation is justified to ensure that liquidity risks are adequately managed and that negative externalities are properly considered by banks.

- Up to now, liquidity risks were not completely addressed by supervisory standards

As initially shown by Diamond and Dybvig (1983) explicit deposit insurance constitutes a first step to mitigate runs from bank deposits. However it could also have limits. In the presence of a deposits insurance scheme banks are more likely to allow riskier loans (loans with lower internal rating) which can generate moral hazard (Ioannidou and Penas, 2010).

Other regulatory mechanisms must be explored because of the increase of other types of funding such as wholesale funding.

Additional prudential rules on liquidity are essential. However, where they do exist, they differ widely from one jurisdiction to another. The lack of harmonisation between national liquidity prudential rules may lead to regulatory arbitrages and have harmful effects by reducing the overall efficiency of those standards.

When supervisory standards fail to prevent liquidity crisis, central banks are playing a key role by providing or 'lending' liquidity. However, this function of lender of last resort could also generate moral hazard behaviors. To be efficient, central banks need to be credible ex ante. Nonetheless, knowing that they will be helped out in the case of a severe liquidity shortage, banks may engage in excessive risk-taking (Gonzales-Eiras, 2004; Rochet and Tirole, 1996; Rochet and Vives, 2004).

Moral hazard behaviour may also be exacerbated if banks anticipate that there is a high likelihood of a public rescue. Banks may have incentives to engage in collective risk-taking strategies if there is a strong belief that a bailout is possible in the case of distress (Farhi and Tirole, 2012; Rochet, 2004).

- The new international liquidity framework establishes an ex-ante mandatory liquidity regulation that should provide strong incentives for banks to manage liquidity risks properly.

The new liquidity requirements will be based on two internationally harmonised indicators that regulate both short-term and long-term liquidity risks. Regarding short-term risks, the LCR will require banks to hold sufficient high-quality liquid assets to withstand a 30-day stressed funding conditions calculated according to severe scenarios defined in the regulation. This new feature is expected to provide a wide range of benefits:

Holding liquidity buffers in addition to equity should reduce banks' overall vulnerabilities.

Coupled with capital regulation, liquidity regulation would significantly improve the soundness of the banking sector. By minimising the impact of liquidity shortages, liquidity buffers should reduce potential losses from asset fire sales and increase banking solvency.

Holding transparent liquid assets would also limit asymmetries of information regarding banks' liquidity risks. If markets are aware that banks hold a sufficient buffer of high quality liquid assets, it would inspire more confidence within the banking sector. In the medium term this should make it easier and cheaper to obtain funding from investors.

Liquidity holdings can also protect banks against unexpected runs on banks and prevent fire-sale externalities and financial contagion. Liquidity requirements would indeed help to internalise some negative externalities generated by the impact on prices of selling in a falling market.

An appropriate calibration of stress scenarios will help address liquidity crises. One of the key aspects of liquidity crisis is the banks' over dependence on short-term unsecured wholesale funding to finance illiquid assets. To limit these vulnerabilities, the LCR gives banks strong incentives to better match the maturities of their assets and liabilities. Within the new liquidity framework each type of funding receives a run-off rate that is designed to reflect the adequate risk (probability) of withdrawal. As a result, the treatment of stable sources of funding, (e.g. retail deposits, secured funding and deposits from small and medium-sized business customers ) is particularly favourable compared to the treatment applied to more volatile liabilities, such as unsecured wholesale funding. Banks are thus encouraged to have business models that allow them to limit their liquidity risk.

By fulfilling liquidity standards, banks should finally reduce potentially excessive reliance on central bank funding.

- c) A safer financial system should be less complex and more transparent.

Institutions should be less dependent on leverage, better capitalised and can better manage liquidity risk through a more sustainable level of maturity mismatch. Regarding the moral hazard aspect, a safer financial system would discourage individual institutions from taking advantage of an implicit government guarantee and encourage all risks to be properly priced (Elliott and Mitra, 2012). Future regulation should include harsher penalties for banks with riskier liquidity positions. The new set of liquidity standards is expected to mitigate adverse systemic effects, yield substantial macro prudential benefits, increase credit institutions' liquidity buffers and reduce the risk posed by maturity transformation and interconnectedness (ECB, 2012).

### 1.3. Benefits of liquidity regulation – an overview of the empirical literature

a) Financial systems are still overly complex, banking assets are concentrated and the ‘too-big-to-fail’ issues are unsolved

Banks optimise their liquidity risk management individually, often neglecting the externalities generated by their choices on the overall risk to the financial system. Banks may have incentives to engage in collective risk-taking strategies when there is a strong belief that a collective bailout is possible. When other banks are taking more risk, any given bank may have the incentives to engage in similar strategies (Bonfim and Kim, 2012).

Over the past five years, three major trends have been observed: (i) the role of traditional banks has diminished; (ii) greater consolidation among small financial institutions has resulted in more concentrated financial structures; (iii) globalisation has occurred through strategic foreign ownership in emerging economies. Overall intermediation became more efficient and accessible. The change gives rise to concerns about the large size of individual institutions and their contribution to systemic risk (Elliott and Mitra, 2012).

The key sources of liquidity risk in the modern bank are liquidity demands from borrowers and the use of wholesale debt financing (Cornett et al., 2010). Providers of wholesale funding can rapidly cut off lending if the riskiness of a bank becomes excessive. An abrupt funding freeze may complicate a policy response. If such an event affects multiple banks then that would lead to a systemic liquidity event (Elliott and Mitra, 2012).

The materialisation of liquidity risk can lead to the drying-up of liquidity in entire market segments such as unsecured interbank markets. There are also powerful feedback effects between solvency risk and liquidity risk (ECB, 2012).

The intermediation of bank funds via, e.g. money market mutual funds (MMMFs), may make a banking system more unstable than a banking system in which investors deposit funds in banks directly. MMMFs are subject to runs themselves. New information concerning the quality of bank assets may encourage MMMFs to run on the banks en masse (Cipriani et al., 2013).

b) Liquidity risk has played a key role during in the financial crisis.

The underpricing of liquidity (and credit and other) risks is a common feature of credit booms and was particularly prevalent in the build-up of the current crisis. Setting a floor for liquidity risk costs in loan pricing is, thus, a consequence of liquidity regulation. As such, it helps avoid excessive loan growth and the ensuing misallocation of capital (Goodhart, 2008; Trichet, 2009; Sharma, 2011; Tarullo, 2012).

During the financial crisis, banks that were more reliant on wholesale funding curtailed their supply of credit significantly more than retail-funded banks (Dagher and Kazimov, 2012). Bad credit decisions do not necessarily have systemic implications. Losses for investors are more likely to become systemic, if they are combined with excessive maturity transformation (Stein, 2012). If credit losses materialise, higher shares of short-term funding lead to a funding squeeze which in turn could lead to deleveraging and asset fire sales of illiquid assets.

Liquidity dried up during the financial crisis of 2007-2009. Banks that relied more heavily on core deposits and equity capital continued to lend more relative to other banks because of the benefits from stable sources of financing. Banks that held more illiquid assets were hoarding liquidity and reduced their lending (Cornett et al., 2010).

Banks with a larger proportion of liquid assets have a lower probability of requiring recapitalisation. Balance sheet size positively correlates with a higher likelihood of receiving public capital. A shortage of liquid assets is a strong predictor of unconditional recapitalisations. This leads to the conclusion that guaranteeing liquidity during times of systemic distress is useful for reducing public costs (Mariathasan and Merrouche, 2011).

During the global financial crises, banks with weaker structural liquidity and higher leverage, and banks with risk-taking strategy were more likely to fail afterwards (Vazquez and Federico, 2012).

The European sovereign debt crises restricted the financial intermediation of European banks in the USA. The rising prospect of European sovereign defaults together with the regulatory reform requiring money market funds to disclose their asset portfolios translated into a severe funding shock to some of the US branches of European banks. This dollar liquidity shortage was partially compensated with transfers from parent banks to their US branches. However, European parent banks' liquid resources were denominated largely in euro; thus, as parent banks attempted to exchange these funds into dollars in large quantities, the cost of dollar funding increased substantially, reducing the amount of funds they could transfer to their US branches. In turn, this liquidity shock led to a decrease in branch lending to US borrowers (Correa et al., 2012).

c) So, what are the implications of the new regulatory initiatives?

Quantitative liquidity requirements create a strong demand for short-term liquid government securities. We will see banks lengthening deposit offerings and competing more strongly for deposits (Elliott and Mitra, 2012). It will encourage banks to self-insure against both idiosyncratic and systemic liquidity shocks. The LCR is limiting solvency risks, prevents fire-sale externalities and prevents financial contagion (ECB, 2012).

As banks' liquidity risk was at the core of the global financial crises, regulation of liquidity risk is highly necessary (Bonfim and Kim, 2012). The Basel III package on liquidity risk will reduce excessive maturity mismatches and ensure that banks hold enough liquid assets to survive a short stressed period. The new liquidity requirements will be to favor stable, traditional banking rather than non-traditional banking activities. Smaller banks would be less affected than investment banks, with universal banks falling in between.

Cost of operating may increase. On the other hand, liquidity buffers reduce the costs of premature liquidation as during financial crises assets can be liquidated only at a significant loss. Furthermore, liquidity holdings protect banks against early withdrawals motivated by wrong information. Liquidity also helps to align banks' incentives better with the interest of their investors because liquid assets limit the extent to which investors lose from high-risk investment strategies, and it is also an important safeguard against moral hazard (ECB, 2012)..

In countries where quantitative liquidity requirements similar to the LCR have been in place, such as the Netherlands, an adoption of the LCR would not have to lead to significant adjustments. Most banks hold more liquid assets against short-term liabilities than strictly required. Banks do not fully reduce their liquid asset holdings when there is an inflow of cash within the coming month. There is an interaction between capital and liquidity buffers. Safer banks, in terms of higher capitalisation and a stable funding structure hold fewer excess liquid assets against their stock of liabilities (de Haan and van den End, 2012; Delechat et al., 2012).

d) Reducing liquidity risk has a positive impact on the overall economy.

Collective risk-taking strategies caused by a banks' strong belief that a collective bailout is possible may ultimately generate large costs to the economy. If all risks would be properly priced public funds would not be needed for bail-out transaction. Additional macro prudential policy tools such as additional liquidity buffers on the entire banking system and limits to certain types of exposures may need to be considered (Bonfim and Kim, 2012).

Although implications differ, assessments of the economic costs and benefits of the Basel III liquidity standards have shown that the long-term benefits vastly exceed the transitional costs (Elliott and Mitra, 2012). A macroeconomic impact study that compares and assesses the entire Basel III regulation and regulation ambitions in Switzerland, Germany, USA, UK and Singapore comes to the conclusion that between 2008 and 2020 all countries continuously increase the macroeconomic benefit (Schneider et al., 2012).

Decreasing banks reliance on wholesale funding can cushion the curtailing of credit supply during stress periods (Dagher and Kazimov, 2012).

Liquidity crises by banks led to a decline in credit supply. Hence strengthening banks liquidity buffers can prevent a credit crunch (Cornett et al., 2010).

There is a significant relationship between implementation progress of the Basel III liquidity rules in a domestic context and lowered bank credit. Intermediation is moving out of banking systems (Elliott and Mitra, 2012). Banks that concentrate most of their assets in lending tend to show worse liquidity ratios (Bonfim and Kim, 2012).

The lending access of retail customers and small and medium-sized entities could be reduced. Large multinational corporate will be able to substitute funding from bank sources with funding from market sources and even helpfully seeing their cost of credit reduced in some cases (IIF, 2012).

The growth rate of loans declines significantly during periods of high uncertainty. Decline in loan growth is not only a result of lower demand for bank loans, but also the consequence of a reduction in supply. Avoiding uncertainty by installing a proper regulation package can help to positively influence the growth rate of loans (Scharler and Sindermann, 2012).

US Banks that increased their use of funding from the Fed's discount charged higher fees to grant new lines of credit to corporations and increased the credit spreads they charge on credit lines. Shocks to banks' liquidity get transmitted to the corporate sector via the price banks charge corporations for granting them access to liquidity. Thus binding banks to be better prepared to deal with liquidity shocks can reduce credit costs for corporations during stress periods (Bord and Santos, 2011).

#### 1.4. Conclusions

Liquidity regulation internalises the externality of individual banks' liquidity problems, reduces moral hazard in banks' liquidity risk management and reduces the likelihood of shifting liquidity risk to the public balance sheet.

Liquidity regulation contributes to reducing the likelihood of excessive credit growth, the emergence of bubbles, and subsequent banking crisis. It does so by providing incentives for banks to better price liquidity and by limiting credit growth based on excessive liquidity risk.

If risks in the banking sector materialise, liquidity regulation increases the resilience of the banking system. Lower exposure to short-term funding, less re-pricing pressure of formerly underpriced liquidity risk, reduces the volume and price impact of the crisis on loan supply. It contributes to avoiding a credit crunch. In addition, lower maturity mismatches reduce the potential for panic driven wholesale- or retail-bank runs.

The LCR is designed to reduce unsecured interbank interconnectedness. This will reduce the 'too-interconnected-to-fail' problem in the European banking sector and interbank contagion.

For liquidity regulation to achieve its objectives it needs to have a set of simple characteristics (Schmitz and Iltner, 2007):

- a binding constraint for banks; i.e. it needs to actually affect banks' funding structure and the pricing of their liabilities and assets;
  - forward looking (rather than backward looking like traditional stock approaches), i.e. enable banks and supervisors to detect excessive liquidity risk;
  - risk sensitive;
  - encompass;
  - applicable under business as usual as well as under stressed conditions
- A binding constraint for banks; i.e. it needs to actually affect banks' funding structure and the pricing of their liabilities and assets,
- Forward looking (rather than back-ward looking like traditional stock approaches), i.e. enable banks and supervisors to detect excessive liquidity risk,
  - Risk sensitive,
  - Encompass all material sources of liquidity risk on- and off- balance-sheet,

- Applicable under business as usual as well as under stressed conditions.

Over the past decades EU (and international) banks complained that the fragmented, quantitative liquidity regulation across EU countries was very costly; different reporting templates, different legal frameworks, different requirements and different liquid asset definitions were very costly to comply with, decreased transparency, and constituted barriers to cross-border flow of liquidity. This led to pools of trapped liquidity and inefficient use of liquidity across the EU.

## Technical appendix 2: Evaluation of LCR data made in accordance with the voluntary LCR monitoring exercise

This chapter is devoted to the analysis of the reports made in accordance with the voluntary LCR monitoring exercise which commenced in Q4 2011 (Section 2.1.). Since this exercise comprises neither leverage ratio (LR) data nor NSFR data, the multivariate data analysis has to use EU QIS data which started in Q2 2010 (2.2. and 2.3.).

### 2.1. Descriptive LCR data analysis of reports made in accordance with the voluntary LCR monitoring exercise

Due to the delay of the CRD IV and the CRR regular reporting of LCR, NSFR, and LR data will commence only after the first annual report pursuant to Article 509(1) of the CRR is due. In 2011 and on its own initiative the EBA started to collect data based on a voluntary LCR data collection exercise. In 2013, the exercise was broadened to include NSFR and LR data. The templates had to be adapted to the GHOS 2013 recalibration of the LCR and the final version of the CRD IV/CRR. This section of the report is based on Q4 2012 data for a total of 357 EU banks.

Why does the report not analyse more recent data? Given that the first annual report has to be presented to the EU COM on December 31 2013, the first draft had to be submitted to the relevant EBA decision-making bodies in early September 2013. Data for Q4 2012 was submitted by NSAs by April 2013. Data for Q1 2013 was submitted by July 2013. Given the comprehensive data quality checks conducted, the final data set would have been available only after the data analysis session in July 2013. This would have been too late for the submission of the first draft to SCRePol in September 2013.

Why is the sample on which this report draws smaller than the number of reporting banks? Comprehensive data quality checks were conducted in May 2013. All NSAs that submitted data in the EBA LCR monitoring exercise received detailed country-specific feedback error log files including information on each of the cells containing (i) abnormally small/large values (ii) extreme results/outliers; and (iii) missing values. NSAs were also sent clear and detailed instructions on (i) the general information lacking; (ii) additional LCR checks; and (iii) the QIS 1307 data quality checks. NSAs were given until 15 May to resubmit final data. The final sample consists only of those banks whose data quality is guaranteed by the respective NSAs. While this reduces the size of the sample, it increases the reliability of the quantitative analysis. In some analyses, the sample is further reduced because banks did not submit the necessary data, e.g. NSFR or LR data. The final sample was communicated to NSAs by the end of June. NSAs had full information regarding the banks that could not be included in the analysis of the first annual report.

Table A2.1: Number of banks in the voluntary EBA LCR monitoring exercise sample per group

	Group 1	Group 2
Total	50	307

Source: EBA voluntary LCR monitoring exercise.

### 2.1. Descriptive LCR data analysis of reports made in accordance with the voluntary LCR monitoring exercise

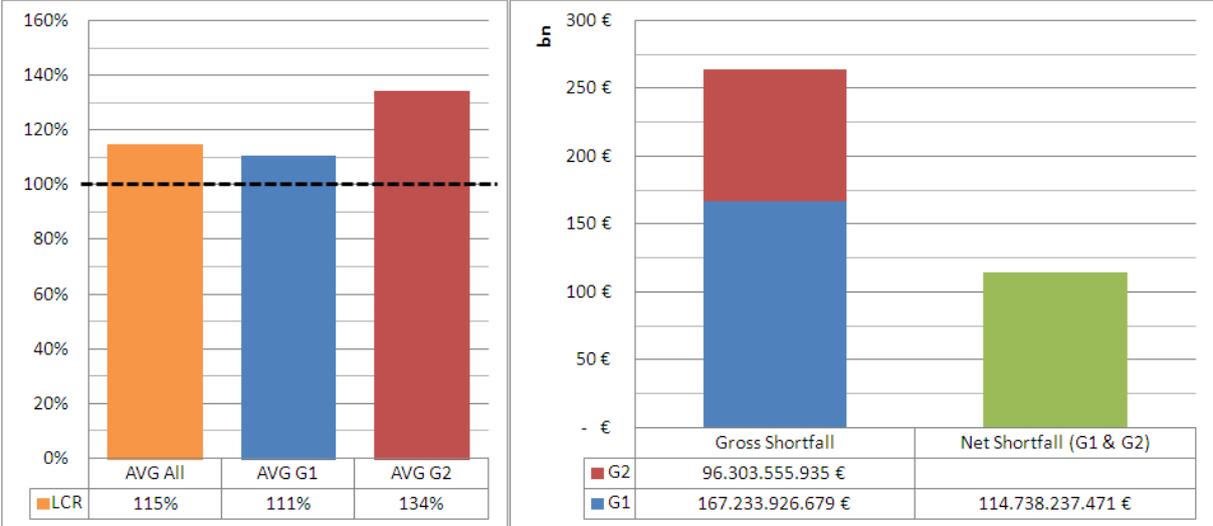
We analysed reports of 357 banks from 21 Member States regarding the latest data point (Q4 2012) and the latest calibration of the LCR (GHOS 2013). At the stage the EBA ITS and RTS on insufficient liquid assets

and the respective derogations (Article 419(4) and (5) of the CRR) are well advanced. Thus, Norway and Denmark are treated as countries with insufficient liquid assets for the purposes of the analysis.

There are 50 Group 1 banks and 307 Group 2 banks in the sample (Table A2.1).<sup>20</sup> The share of Group 1 banks of the whole sample is 14%. The share of Group 2 banks of the whole sample is 86%.

The large range of numbers reported by the member states influences the precision of the analysis. Statements about Group 1 banks are robust as the analysis covers data of almost all of these banks for each member state. Nevertheless, statements about the shortfall are only based on the available records. Because of missing records of few Group 1 banks and several Group 2 banks the actual shortfall might be somewhat higher than estimated in this analysis. Then again, the shortfall could also be overestimated because the analyses include subsidiaries resulting in some double counting.

Diagram A2.2: LCR and total shortfall (gross vs. net) Q4 2012



Source: EBA voluntary LCR monitoring exercise.

We calculate the LCR based on an aggregate level for the whole sample and at country level. Information about the LCR is always a weighted average. The average LCR across all banks of all countries in the sample is 115% (Diagram A2.2, left-hand panel).

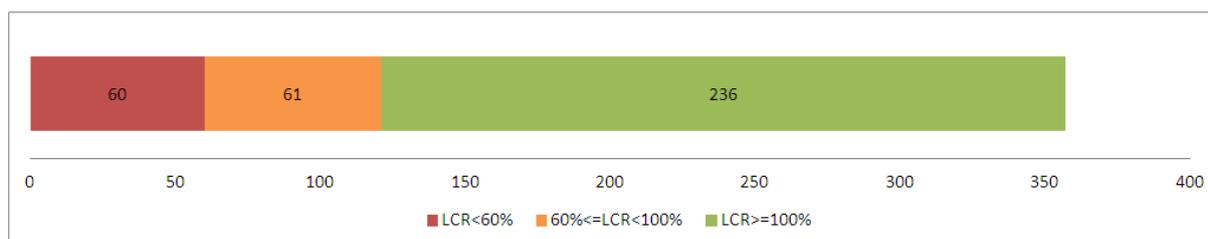
However, the gross shortfall equals the sum of liquidity shortfalls across non-compliant banks only. That means liquidity surpluses are not taken into account. In this analysis we primarily look at gross liquidity shortfalls.

As the right-hand panel of Diagram A2.2 shows, if banks were able to re-distribute liquid assets across banks the shortfall of liquid assets might decrease from EUR 264 billion to a net shortfall of EUR 115 billion (still not considering that banks may aim to meet the liquidity requirements by strategies other than increasing liquid assets).

Group 2 banks tend to have a higher LCR than Group 1 banks (Diagram A2.2, left-hand panel). The major share of the shortfall is due to Group 1 banks.

<sup>20</sup> G1 banks are internationally active, well diversified banks with total regulatory capital of above EUR 3 billion bn. G2 banks are all other banks. It is at the discretion of national supervisors to include a bank in G2.

Diagram A2.3: Number of compliant banks Q4 2012



Source: EBA voluntary LCR monitoring exercise.

More than 66% of European banks were already LCR compliant (LCR >= 100%) by Q4 2012. Another 17% reach a LCR of more 60% and less than 100%. Thus considering the phase-in-period (during which banks only need to reach a LCR of 60% to be compliant) more than 83% of the banks in the sample would fulfill the regulation by now (Diagram A2.3).

#### LCR and shortfall by country (Q4 2012)

For some of the countries there is a wide spread between the highest and the lowest LCR values (Table A2.2 below). Banks which have a LCR substantially above-average may give a distorted picture of the average LCR on a country level.

Due to one bank with a LCR of 1342%, C11, for example, features an average LCR of over 100%, but the distribution of banks according to their LCR compliance on a country level (Diagram A2.5) shows that only three of fifteen C11 banks are LCR compliant. Thus, even for countries that feature high aggregate LCRs, reallocation of liquidity between banks might be necessary.

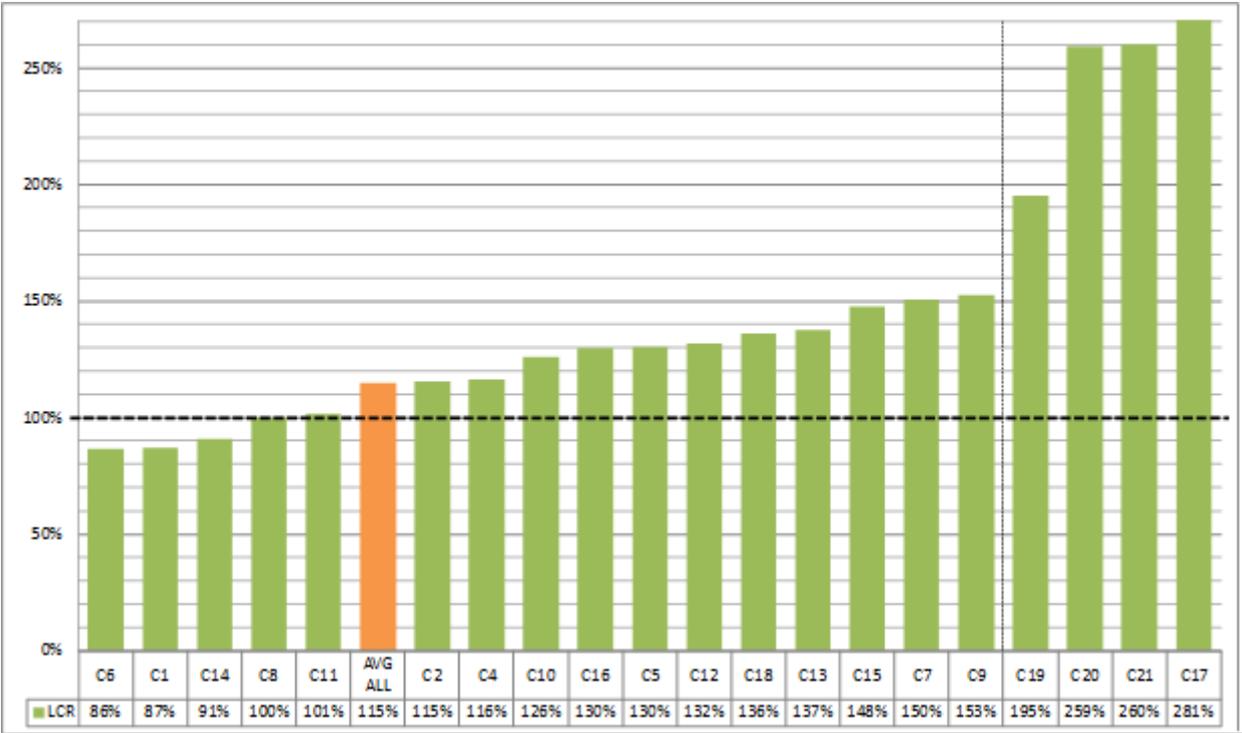
Table A2.2: LCR and shortfall by country Q4 2012

Total							Group 1				Group 2								
Country	number	LCR	Shortfall (bn €)		LCR < 60%	60% <= LCR < 100%	LCR >= 100%	country	number	LCR			Shortfall (bn €)	country	number	LCR			Shortfall (bn €)
			gross	net						AVG	MIN	MAX				AVG	MIN	MAX	
C1		87.1%	103.45	86.28	5	4	2	C1		85%	73%	104%	98.72	C1		134%	0%	175%	4.73
C2		110.8%	38.68	-	15	15	60	C2		99%	86%	134%	20.92	C2		146%	0%	3310%	17.75
C4		116.2%	27.50	-	3	3	43	C4		112%	82%	248%	27.06	C4		165%	0%	489642%	0.45
C5		130.1%	11.91	-	5	9	20	C5		140%	140%	141%	-	C5		118%	0%	694%	11.91
C6		86.5%	10.67	4.99	5	3	5	C6		95%	75%	231%	4.20	C6		69%	0%	257%	6.47
C7		150.3%	9.13	-	2	2	15	C7		146%	89%	225%	5.45	C7		195%	40%	1290%	3.69
C8		99.8%	8.38	0.19	2	5	11	C8		103%	103%	103%	-	C8		97%	7%	1672%	8.38
C9		152.6%	8.09	-	2	0	9	C9		129%	56%	250%	7.82	C9		302%	38%	1075%	0.27
C10		125.9%	3.88	-	2	3	7	C10		125%	107%	142%	-	C10		127%	2%	2680%	3.88
C11		101.4%	3.10	-	10	2	3	C11					-	C11		101%	9%	1342%	3.10
C12		131.8%	2.88	-	1	2	3	C12		124%	85%	325%	2.19	C12		166%	56%	249%	0.69
C13		137.5%	1.54	-	0	2	8	C13		138%	126%	144%	-	C13		135%	85%	189%	1.54
C14		91.1%	1.04	0.63	0	2	1	C14		86%	86%	86%	0.88	C14		136%	73%	572%	0.16
C15		151.2%	0.32	-	1	3	6	C15		152%	152%	152%	-	C15		146%	4%	279%	0.32
C16		129.7%	0.27	-	0	1	4	C16					-	C16		130%	72%	198%	0.27
C17		281.1%	0.02	-	1	0	14	C17					-	C17		281%	3%	4127%	0.02
C18		135.9%	0.00	-	3	0	9	C18		132%	124%	160%	-	C18		302%	0%	387%	0.00
C19		195.3%	-	-	0	0	4	C19					-	C19		195%	157%	212%	-
C20		259.3%	-	-	0	0	2	C20					-	C20		259%	252%	265%	-
C21		260.1%	-	-	0	0	5	C21					-	C21		260%	170%	325%	-
ALL	357	115.0%	263.54	114.74	60	61	236	ALL	50	111%	56%	325%	167.23	ALL	307	134%	-204%	489642%	96.30

Source: EBA voluntary LCR monitoring exercise.

On a country level, aggregates LCRs range from 87.1% (C1) to 281% (C17). Apart from five four countries (C19, C20, C21, C17), the range of LCRs across banks is relatively narrow (about 67 percentage-points, Diagram A2.4).

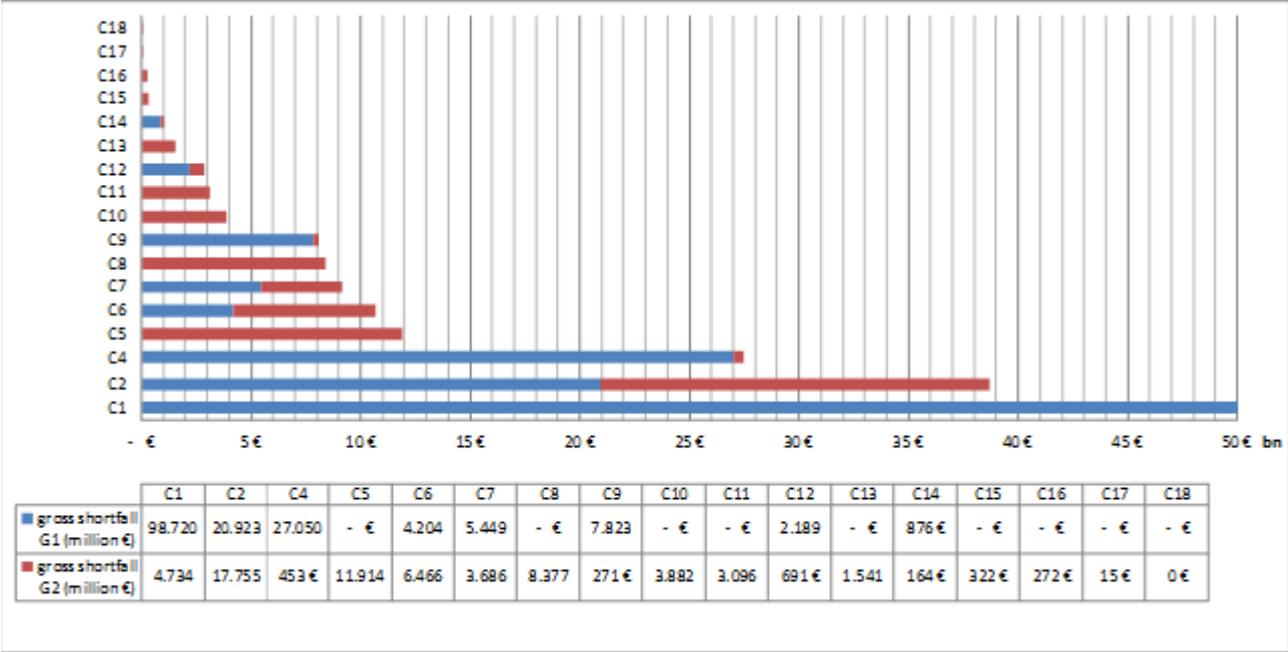
Diagram A2.4: LCR Q4 2012 (country level aggregates)



Source: EBA voluntary LCR monitoring exercise.

A total of 18 of 21 Member States show a gross liquidity shortfall. The gross shortfall across countries varies strongly (Diagram A2.5). With over EUR 100 billion, C1 banks account for the largest portion of the total gross shortfall, followed by C2 and C4 each with an aggregated gross shortfall around EUR 30 billion and EUR 40 billion. The amount of the shortfall is affected by the number and the size of the banks in a country. For that reason, larger countries such as C2 and C4 tend to show a higher gross shortfall than smaller countries such as C18 and C17. The size of the banking system has to be taken into consideration in the evaluation of the amount of the shortfall. In C1,C4 and C9 the gross shortfall is almost entirely due to Group 1 banks. Whereas in C5, C10 and C13 the share of gross shortfall caused by Group 1 banks is zero.

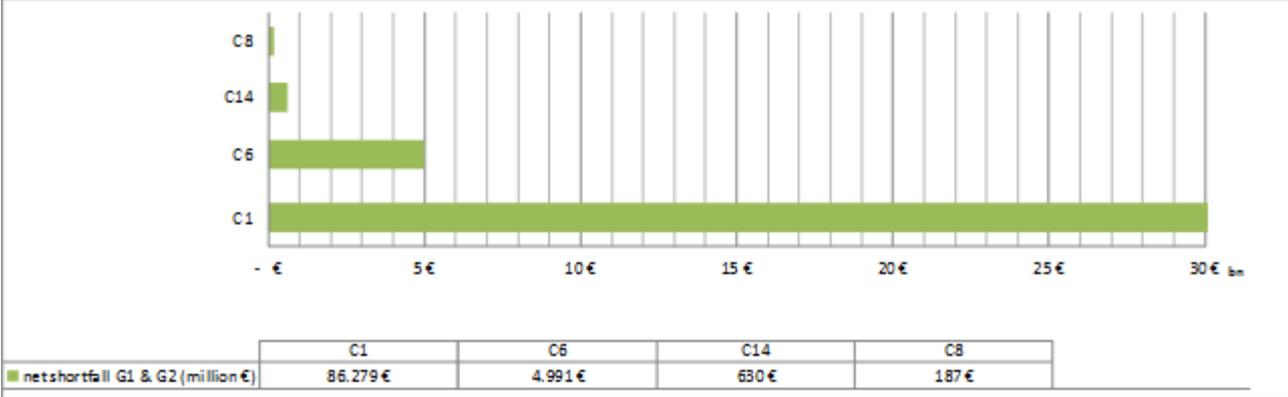
Diagram A2.5: Gross shortfall (G1 and G2 banks) per country Q4 2012



Source: EBA voluntary LCR monitoring exercise.

Relaxing the assumption that banks cannot reallocate liquidity with banking sectors reduces the liquidity shortfall sharply. Only five countries feature a net liquidity shortfall: C1, C6, C14 and C8 (Diagram A2.6). Here again, C1 features by far the largest net shortfall with over EUR 86 billion. In all other countries aggregated liquidity surpluses across banks extend aggregated liquidity shortfalls.

Diagram A2.6: Net shortfall per country Q4 2012

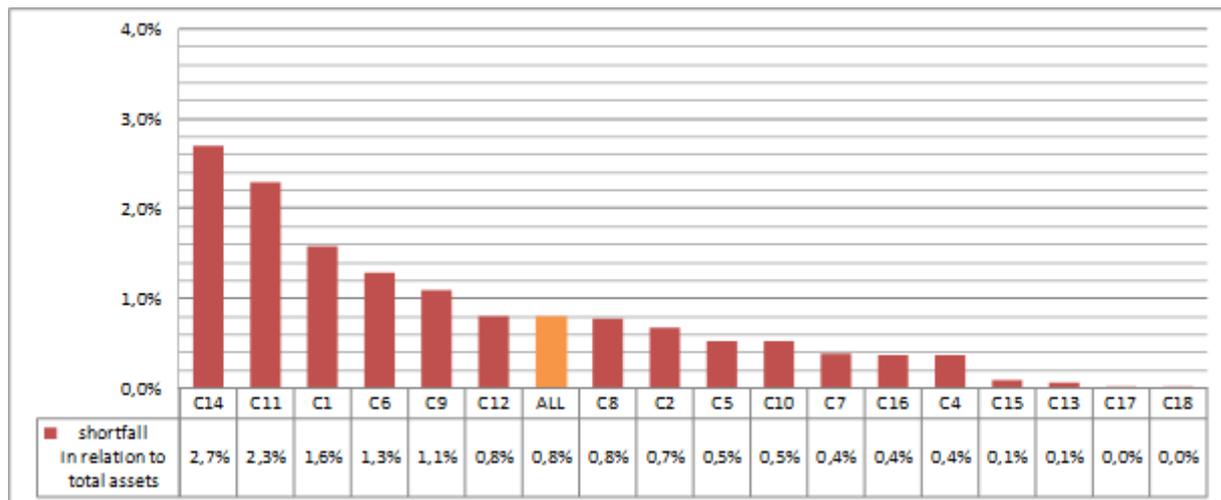


Source: EBA voluntary LCR monitoring exercise.

Banks in the sample have a total gross liquidity shortfall of EUR 264 billion and total assets of all EUR 33 trillion. For the whole sample the aggregated gross liquidity shortfall in relation to total assets is only 0.8% (Diagram A2.7, orange bar). Diagram A2.7 shows the gross liquidity shortfall in relation to total assets per country (red bars).

With nearly 13%, banks in C3 have the highest gross shortfall in relation to total assets which is caused almost entirely by subsidiaries. The shortfall in relation to total assets of banks in C14, C11, C1 and C6 is above-average. All other countries feature gross shortfalls in relative to the size of their banking systems.

Diagram A2.7: Gross liquidity shortfall in relation to total assets

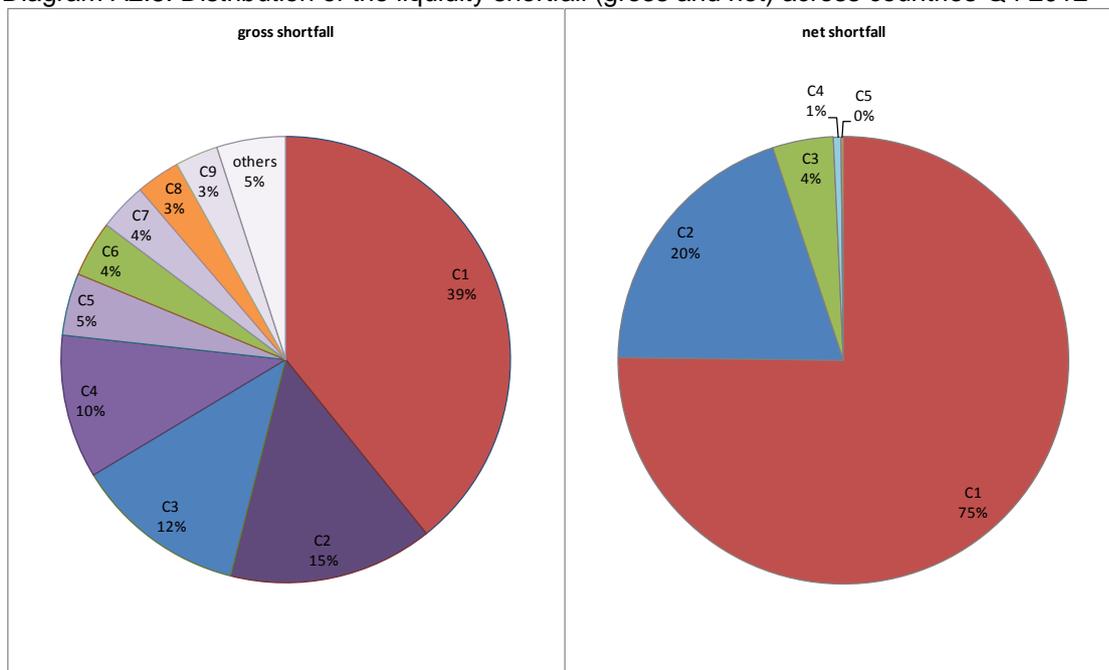


Source: EBA voluntary LCR monitoring exercise.

#### Distribution of the liquidity shortfall across countries

As Table A2.2 and the left-hand panel of Diagram A2.8 show more than 75% of the gross shortfall is due to only four Member States (C1, C2, C3 and C4), which account for 61 per cent of total assets in the sample. By far the largest share of shortfall is caused by C1 banks (>39 per cent), which represent only 20 per cent of total assets in the sample (Diagram A2.8).

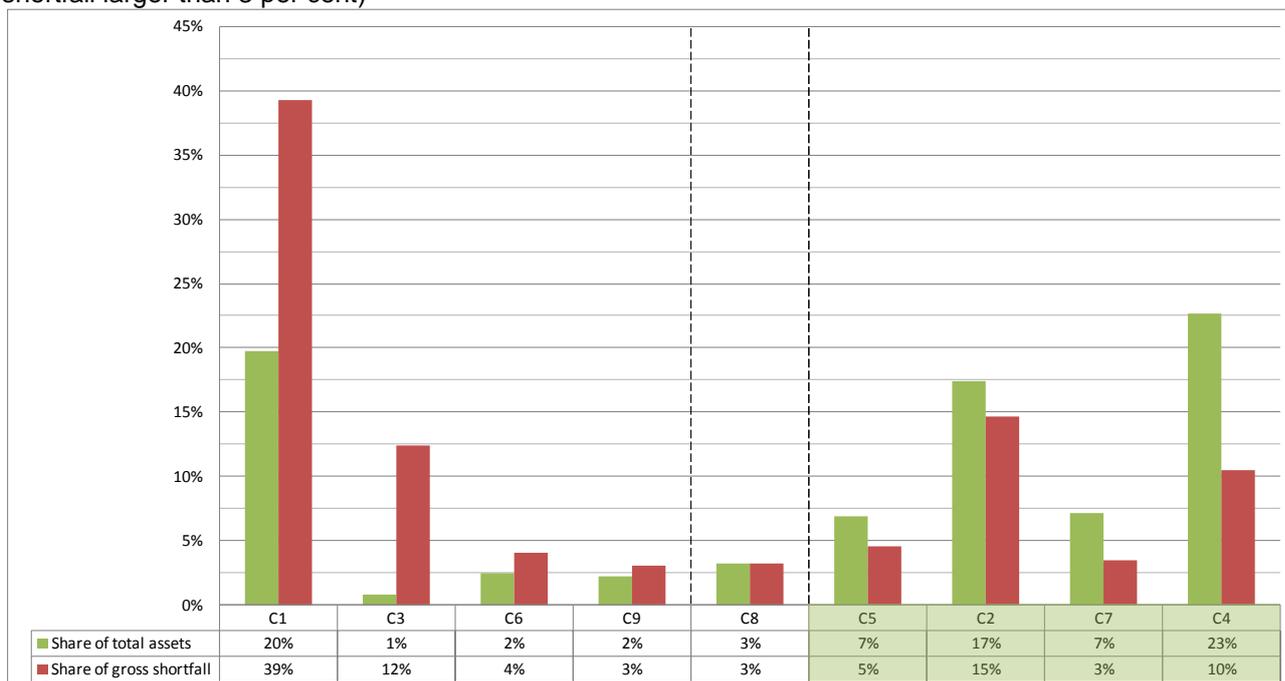
Diagram A2.8: Distribution of the liquidity shortfall (gross and net) across countries Q4 2012



Source: EBA voluntary LCR monitoring exercise.

Diagram A2.9 shows all countries with a share of gross shortfall that is at least higher than 3% in the order of difference in share of gross shortfall and share of total assets. Countries whose share of gross shortfall exceeds the share of total assets are shown on the left-hand side, whereas countries whose share of gross shortfall falls below the share of total assets are shown on the right-hand side. Countries whose share of gross shortfall is proportionate are placed in the middle. The shortfall of C4, C7 and C2 is relatively low compared to their share of total assets whereas the shortfalls of C1 and C3 are disproportionately high.

Diagram A2.9: Share of total assets vs. share of gross shortfall Q4 2012 (only countries with a share of gross shortfall larger than 3 per cent)



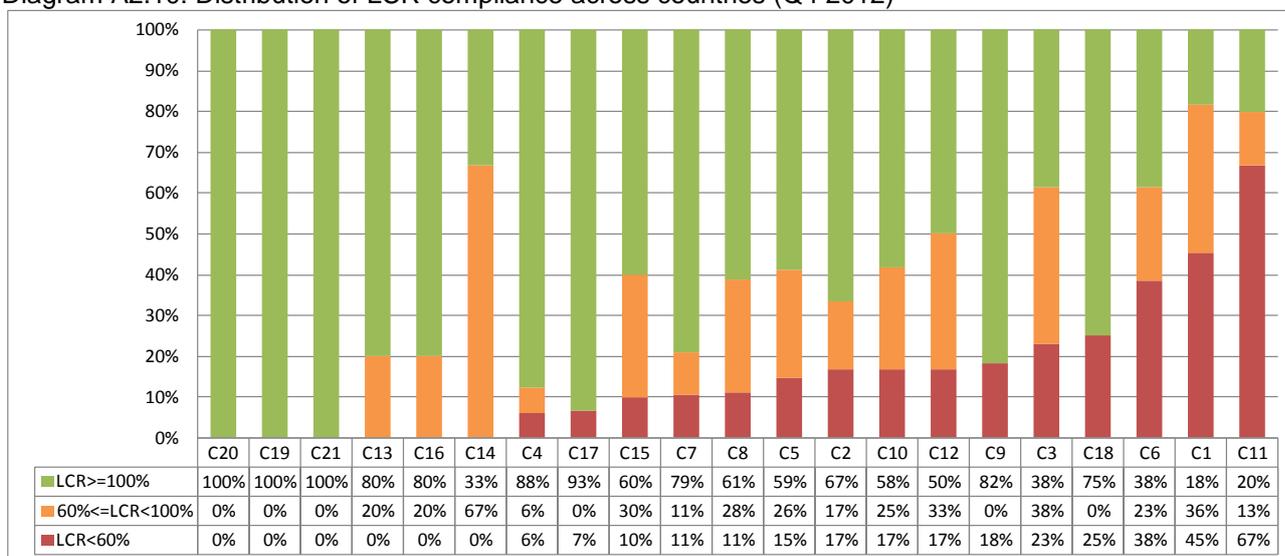
Source: EBA voluntary LCR monitoring exercise.

#### Distribution of LCR compliance (Q4 2012)

The distribution of banks according to their LCR compliance indicates the extent to which liquidity allocation processes might yet have to take place. LCR compliance on a country level does not necessarily mean that each bank is LCR compliant. C8 for example shows a share of 61 per cent of LCR compliant banks (Diagram A2.10) but is not LCR compliant on a country level (Table A2.2). However, C4 shows an above-average share of compliant banks (>88 per cent) although its LCR is only on the average.

Taking the phase-in period into account in six countries, all banks are already LCR compliant by Q4 2012 (Diagram A2.10, left-hand side).

Diagram A2.10: Distribution of LCR compliance across countries (Q4 2012)



Source: EBA voluntary LCR monitoring exercise.

## Change in LCR and shortfall from Q1 2011 to Q4 2012

To show the change in LCR and shortfall over time we analysed reports of 245 banks from 21 Member States. The sample is smaller for this analysis because only banks that reported at all three data points Q4 2011, Q2 2012 and Q4 2012 are included. Nevertheless, this analysis provides a snapshot of the trend in LCR and shortfall for European banks.

Table A2.2: Change in LCR and shortfall across countries (Q4 2011–Q4 2012)

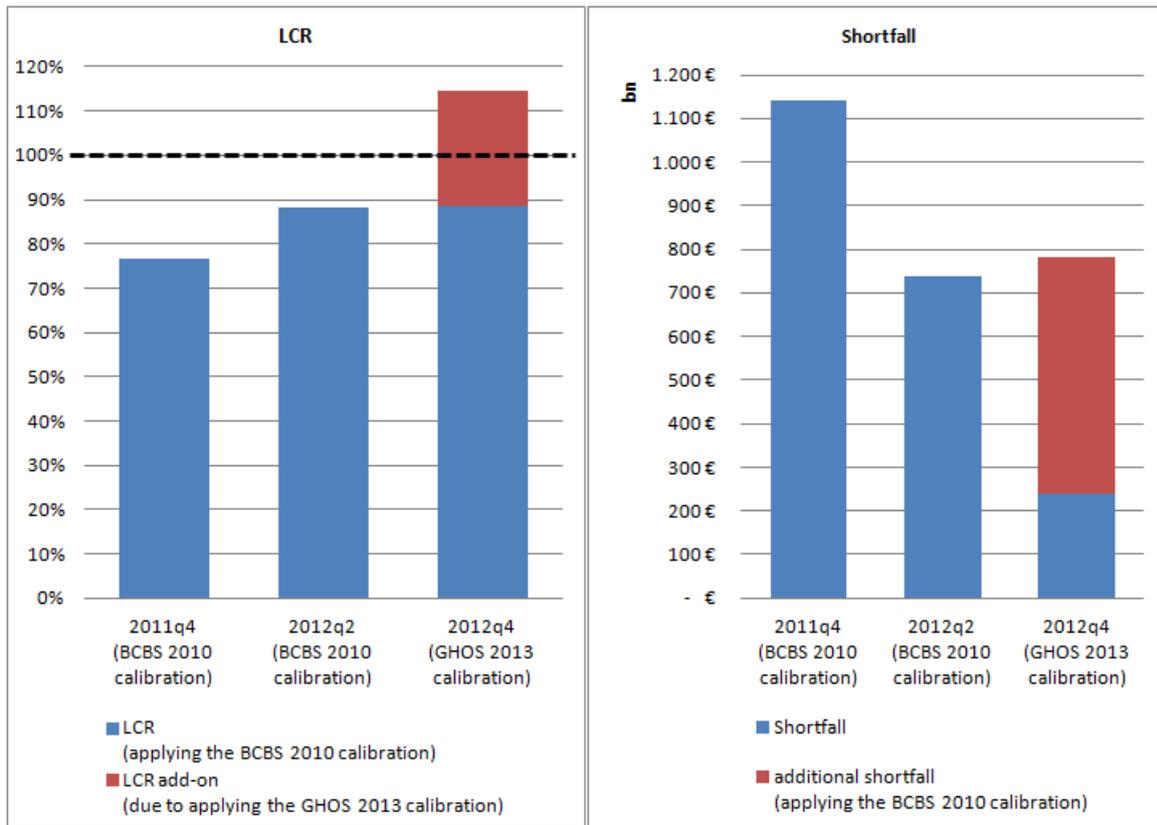
BCBS 2010 calibration								GHOS 2013 calibration		
country		2011q4		2012q2		2012q4		country	2012q4	
		LCR	Shortfall (bn €)	LCR	Shortfall (bn €)	LCR	Shortfall (bn €)		LCR	Shortfall (bn €)
C1		46%	32.02	58%	25.52	73%	10.29	C1	87%	3.88
C2		71%	11.95	89%	2.40	73%	-	C2	111%	-
C3		69%	-	79%	-	66%	0.04	C3	87%	-
C4		91%	215.33	95%	109.40	86%	239.94	C4	115%	37.96
C5		72%	61.31	104%	50.36	108%	25.08	C5	139%	25.58
C6		29%	40.46	59%	39.78	62%	5.04	C6	86%	1.28
C7		94%	8.18	113%	8.16	127%	6.48	C7	150%	3.10
C8		60%	390.51	66%	312.39	99%	220.52	C8	98%	103.09
C9		80%	183.01	109%	113.66	119%	200.08	C9	159%	27.47
C10		66%	3.16	77%	2.55	100%	2.21	C10	126%	1.04
C11		59%	36.91	78%	21.40	79%	19.32	C11	100%	9.48
C12		49%	60.63	101%	9.46	89%	9.03	C12	132%	1.37
C13		82%	-	84%	0.04	109%	-	C13	136%	-
C14		60%	16.33	73%	9.86	78%	17.14	C14	91%	9.78
C15		64%	1.48	92%	0.21	116%	-	C15	151%	-
C16		135%	35.95	113%	15.61	121%	10.74	C16	130%	9.13
C17		168%	20.72	246%	8.22	293%	2.72	C17	427%	1.82
C18		133%	0.04	147%	0.83	112%	0.61	C18	134%	0.27
C19		47%	20.57	93%	7.37	109%	11.52	C19	185%	2.88
C20		203%	2.55	126%	0.01	233%	2.01	C20	259%	-
ALL	245	77%	1,141.10	88%	737.21	88%	782.79	ALL	115%	238.13

Source: EBA voluntary LCR monitoring exercise.

The LCR of European banks increased by 11 percentage points from Q4 2011 to 2012q2 and by 17 percentage points from Q2 2012 to Q4 2012 (Table A2.2). As Diagram A2.12 (left-hand panel) shows the increase of the ratio between Q2 2012 and Q4 2012 is mainly driven by the GHOS 2013 recalibration of the LCR. Applying the BCBS 2010 calibration to the Q4 2012 data the LCR of European banks would have remained unchanged at 88 per cent and the shortfall would even increase by about EUR 45 billion or 6 per cent (Diagram A2.11). Using the GHOS 2013 calibration, the ratio increases from 88 to 100 per cent. The gross shortfall decreases by 70 per cent. The net shortfall vanishes completely in the EU.

Thus, the recalibration of the LCR leads to a drastic softening of the regulation.

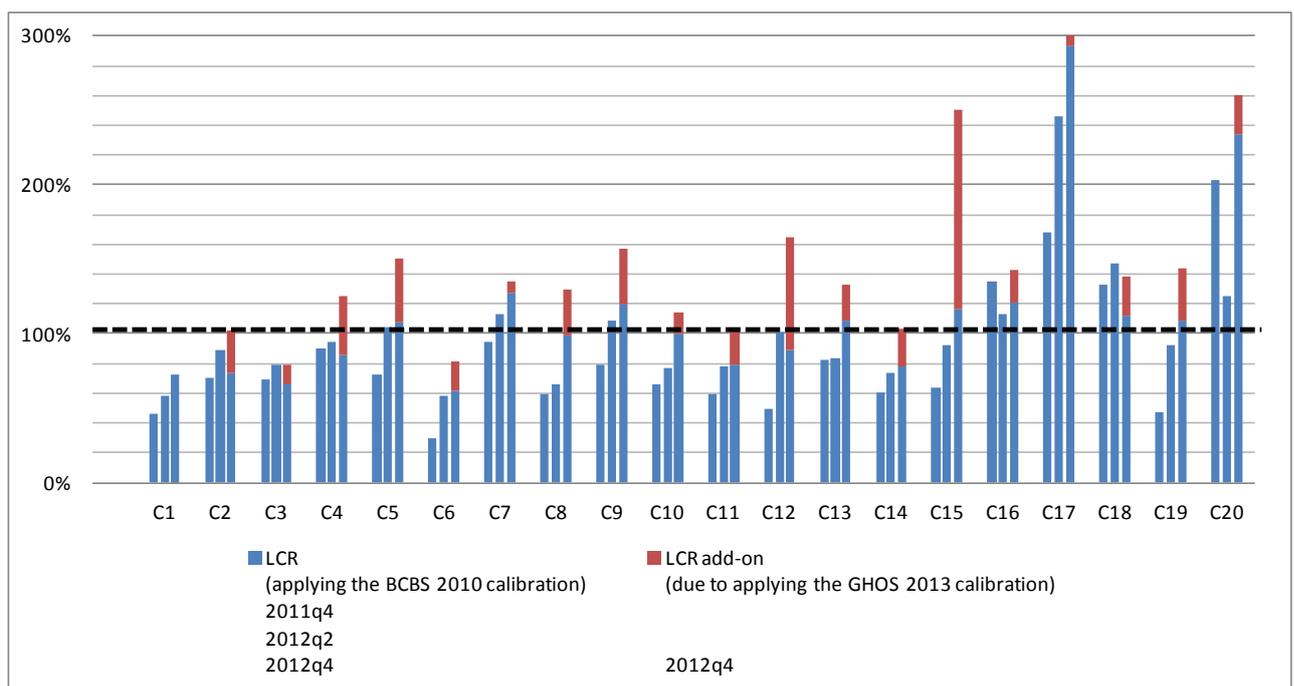
Diagram A2.11: Change in LCR and shortfall (Q4 2011-Q4 2012)



Source: EBA voluntary LCR monitoring exercise.

All countries except for C8 benefit from the GHOS 2013 calibration. In Q4 2012 each country shows a higher LCR applying the GHOS 2013 calibration than applying the BCBS 2010 calibration (Diagram A2.12).

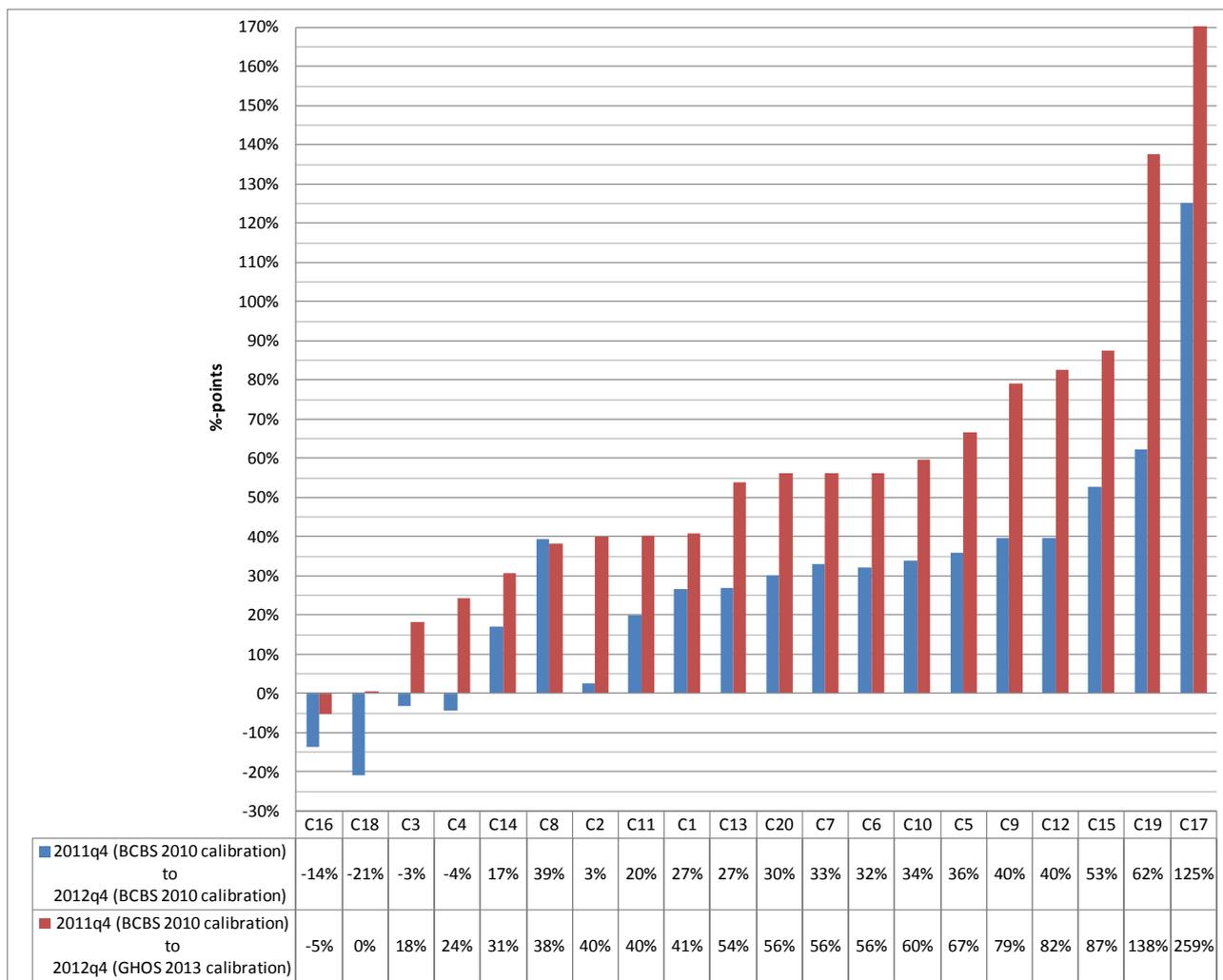
Diagram A2.12: Change in LCR across countries (Q4 2011-Q4 2012)



Source: EBA voluntary LCR monitoring exercise.

Concerning the structural changes in LCR (blue bar in Diagram 14) – those not due to the recalibration – C4, C3, C16 and C18 were not able to raise the ratio from Q4 2011 to Q4 2012. Even applying the GHOS 2013 calibration C16’s LCR still slightly decreases from Q4 2011 to Q4 2012 whereas all other countries could raise the LCR under the GHOS 2013 calibration within this period (red bar in Diagram A2.13).

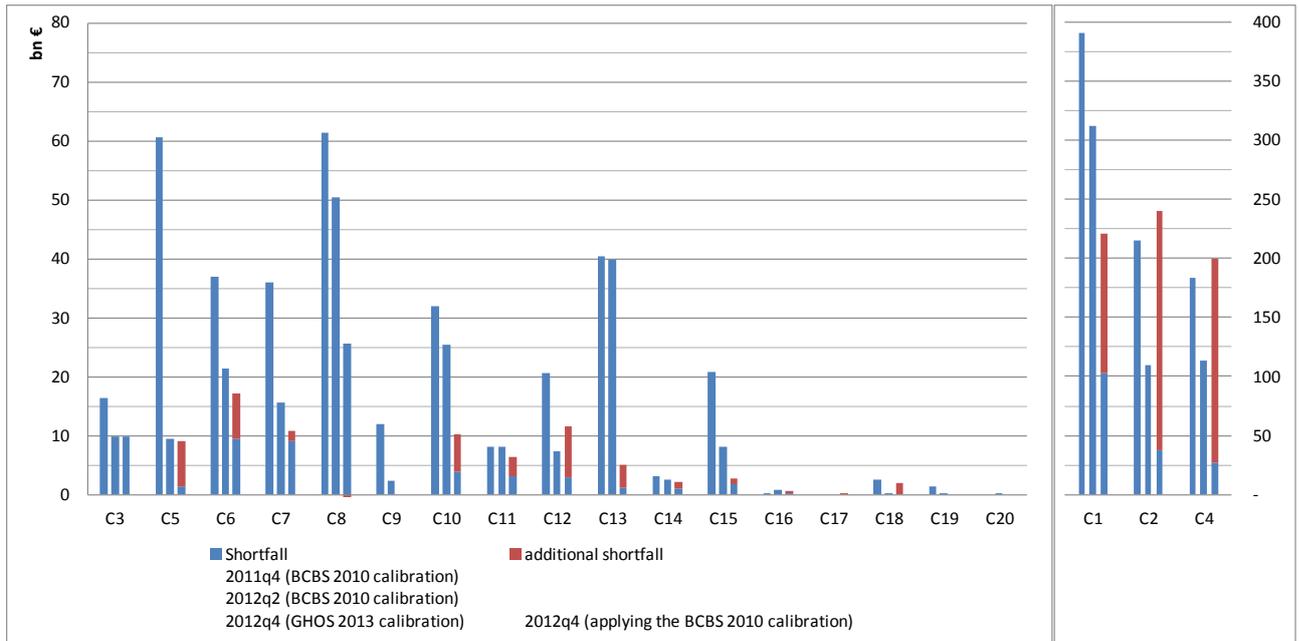
Diagram A2.13: Change in LCR from Q4 2011 to Q4 2012 across countries (% points)



Source: EBA voluntary LCR monitoring exercise.

Regarding the structural changes (applying the BCBS 2010 calibration in Q4 2012) except for C1, C2 and C4 all countries could constantly decrease the liquidity shortfall (red bar in Diagram A2.14). Only due to the GHOS 2013 calibration these three countries as well show a decreasing shortfall from Q2 2012 to Q4 2012 (blue bar in Diagram A2.14).

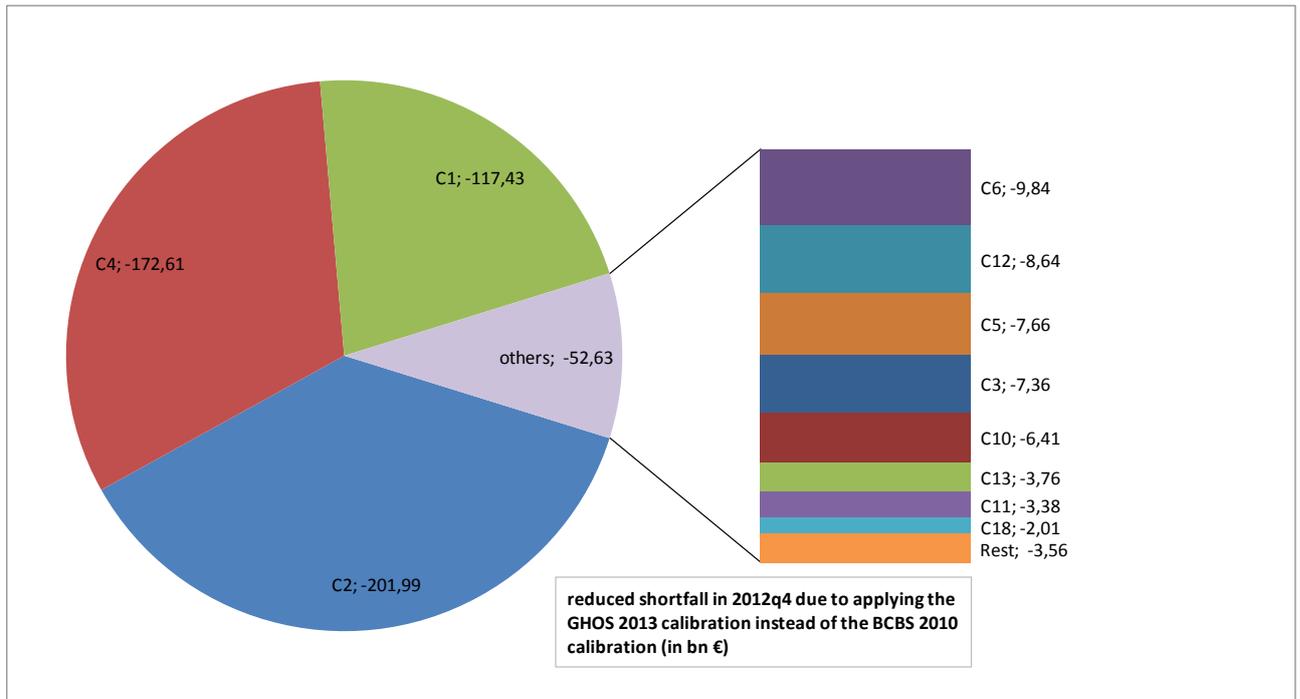
Diagram A2.14: Change in shortfall across countries (Q4 2011-Q4 2012)



Source: EBA voluntary LCR monitoring exercise.

C2, C1 and C4 banks benefit the most of the recalibration (Diagram A2.15). In Q4 2012 the liquidity shortfall of those banks in sum is over EUR 492 billion less than it would be under the old calibration (Diagram A2.15).

Diagram A2.15: Beneficiaries of the recalibration (Q4 2012)



Source: EBA voluntary LCR monitoring exercise.

## Main drivers of the LCR

To find the main drivers of the LCR we identified those banks in the sample that were able to at least double their LCR from Q4 2011 (2010 calibration) to Q4 2012 (2010 calibration, as well). Across all countries there are 46 banks in the sample that increased their LCR by 100% or more in this period (Table A2.3). We aggregated the data of these 46 banks to build up a fictive institute as a whole.

Table A2.3: Banks that increased their LCR by 100% or more between Q4 2011 and Q4 2012

country	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C14	C15	C13	C16	C17	C18	C19	C20	ALL
number	2	12	1	3	2	4	4	2	0	3	1	2	0	3	0	0	4	1	2	0	46

Source: EBA voluntary LCR monitoring exercise.

Analysing whether the improvement of the LCR was mainly driven by a reduction of outflows or an increase of liquid assets we found that banks that became compliant increased liquid assets rather than reducing outflows (Table A2.4).

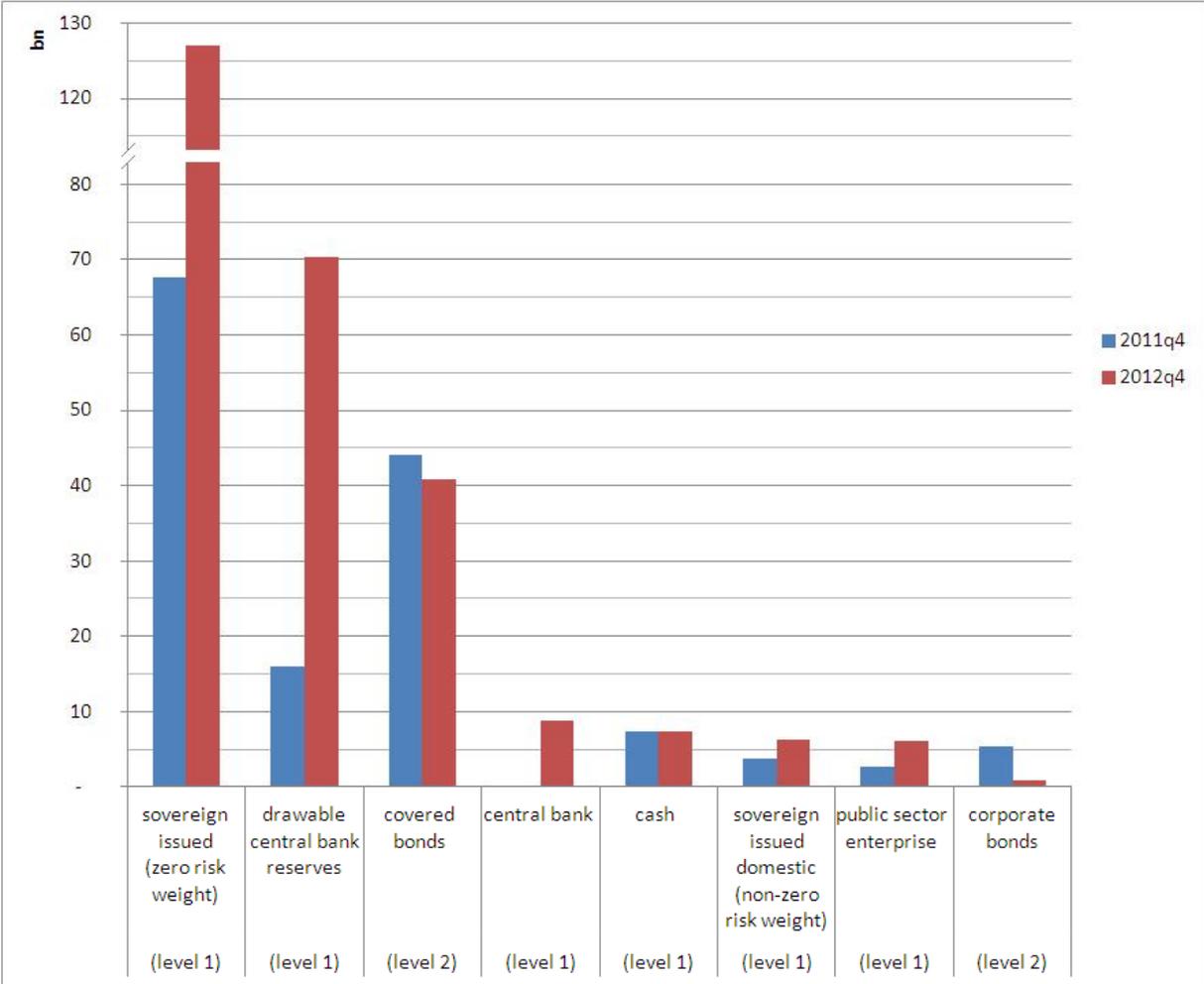
Table A2.4: Fictitious institute and change in liquid assets and outflows

	2011q4	2012q4	change
liquid assets	155.684.500.096 €	277.280.631.430 €	78%
outflows	297.310.486.823 €	223.951.085.260 €	-25%

Source: EBA voluntary LCR monitoring exercise.

Looking in more detail, we then asked which items of the liquid assets constitute the largest part and which show the highest increase. Diagram A2.17 shows the most relevant items which represent more than 96% of total liquid assets in order of the share in liquid assets from left to right.

Diagram A2.16: Most relevant items of the liquid assets (Q4 2011 and Q4 2012)



Source: EBA voluntary LCR monitoring exercise.

Diagram A2.16 suggests that sovereign bonds and drawable central bank reserves within the liquid assets most influence the LCR. Most banks that strongly increased the LCR did that by raising sovereign bonds and drawable central bank reserves.

The former might be related to the central banks’ liquidity policy since 2007 (see Technical Appendix 6); full allotment, 6-month and 3 year repos (vLTROs of EUR 1 100 billion), and broadened collateral eligibility have enabled banks to increase excess reserves at very low opportunity costs (short-term unsecured money market rates are close to 0%). Once and if central banks tighten their liquidity policy and increase interest rates, banks would have to replace drawable central bank reserves or incur higher opportunity costs. However, the impact on the LCR is not straightforward to assess and depends on a number of factors discussed in Section 6.

2.2. Multivariate analysis

The following section focuses on analysing the available data in detail and to identify the major drivers of changes of the LCR at bank level. In addition, the multivariate analysis aims at identifying the interaction between the LCR, the NSFR, and CET1. The impact of the LCR on non-financial corporate lending, on retail and SME lending, and on trade finance are studied. The LCR was recalibrated substantially on January 6 2013. The following sections focus on banks adjustments to the LCR. Thus, it studies the LCR in the 2010 calibration for, both, Q2 2011 and for Q4 2012. (This explains why a relatively small number of banks in the sample become compliant, while the univariate analysis shows that the 2013 GHOS

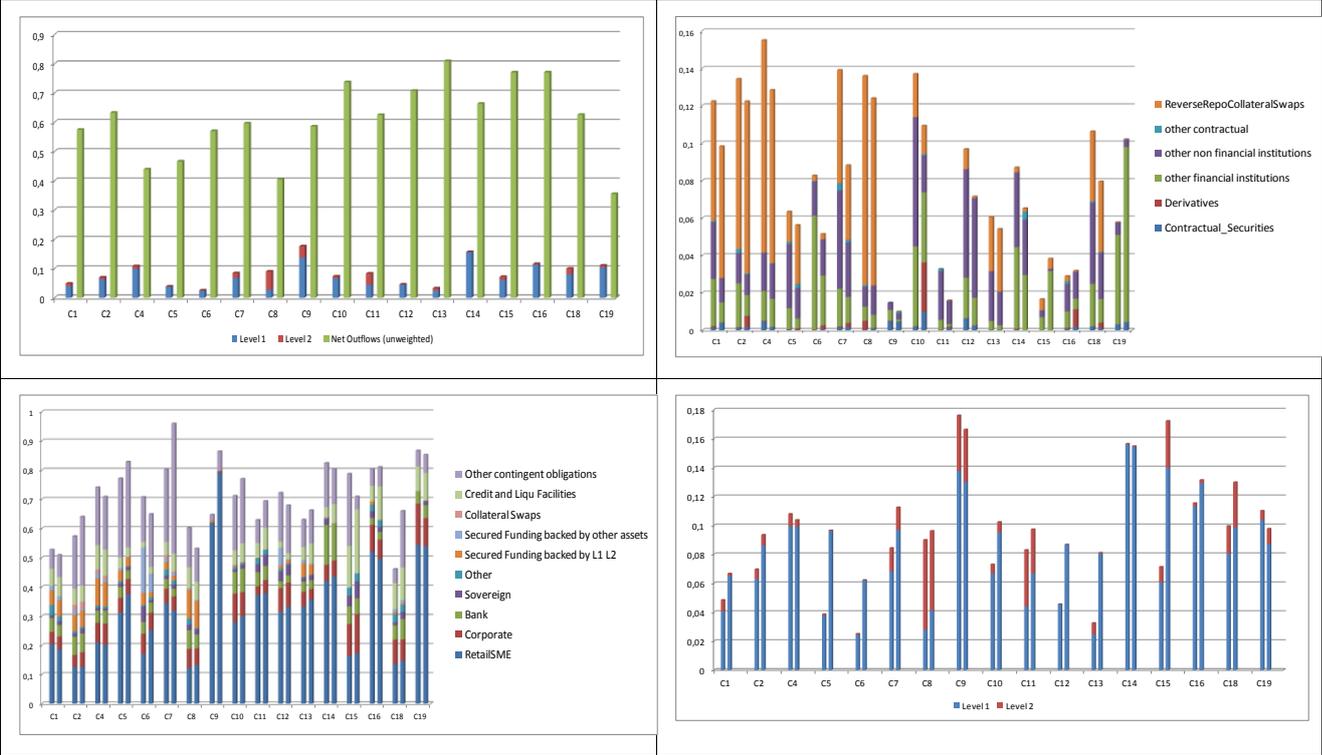
recalibration has a big impact on compliance.) All components of the LCR and the leverage ratio are unweighted.

2.2.1 The sample

The underlying sample consists of 97 EU banks that participated in both QIS exercises. The data-set had to be restricted to this sample (rather than the full EBA monitoring sample), because only this sample contains information on SME lending, trade finance, lending to non-financial corporates, banking book trading book, total assets and the Tier 1 ratio. In addition, three outliers had to be eliminated because of extreme changes in their LCR over the period. [The additional data used in the multivariate analysis stems from the leverage ratio reporting template under the QIS according to the definitions of the QIS which might deviate from standard balance sheet metrics. From 2013, more banks in the EBA monitoring sample will also report on the leverage ratio, such that the additional data would be available for a broader sample in the future.]

Diagram A2.18 summarises the independent variables in the sample at a country level, i.e. the unweighted sum across Level 1, Level 2A, and Level 2B assets as percentage of total assets of the banks represented in both in the QIS samples (Q2 2011 and Q4 2012) for Q4 2012 (upper left-hand panel). The unweighted net cash outflows over the next 30 days provide an indication of liquidity risk exposure of banking systems. They range from 40 per cent to 85 per cent of total assets across countries. The unweighted HQLAs serve as proxy for banking systems' liquidity risk bearing capacity and amount for about 7 to 17 per cent of total assets across countries. The sample displays sufficient variation across countries (and banks) for a cross-section analysis of changes of the LCR over time.

Diagram A2.18: Unweighted HQLA and unweighted net cash-outflows in Q4 2012 (upper left-hand panel), unweighted inflows in Q2 2011 and Q4 2012 (upper right-hand panel), unweighted outflows in Q2 2011 and Q4 2012 (lower left-hand panel) and HQLA in Q2 2011 and Q4 2012 (lower right-hand panel) (all in per cent of total assets)



Source: QIS exercises for Q2 2011 and 2012q4.

The raw data shows that banks increased unweighted HQLA (in particular Level 1 assets) between Q2 2011 and Q4 2012 (lower right-hand panel). At the same time, inflows (mostly) decreased which was largely driven by a reduction of short-term lending to other financial institutions (lower left-hand panel). The raw data on outflows presents a very heterogeneous picture across countries (upper right-hand panel). In about half of the countries outflows decreased, but the drivers varied a great deal. In the other half, outflows increased, often (but not

exclusively) driven by increases in short-term retail deposits. To investigate the drivers of change more accurately, we conducted a multivariate analysis to complement the univariate analysis in Section 2.

## 2.2.2. What explains the variation in changes of the LCR across banks? Does the LCR reduce lending to the real economy?

The dependent variable is the change in the LCR in percentage points at bank level between Q2 2011 and Q4 2012. The first step aims at identifying the main drivers of changes across banks. The independent variables refer to changes in banks' balance-sheet structure over the same period. The unweighted components of the LCR are normalised across banks in per cent of total assets for Q2 2011 and for Q4 2012. The changes of these shares constitute the independent variables.<sup>21</sup> The changes of LCR are driven by changes of its components; the objective here is to identify those that have a significant impact. Other variables which are not included in the LCR data set might have an impact on the variation across LCR changes across banks in the sample. Article 509(1) of the CRR mandates the EBA to study the interaction between other regulatory ratios (e.g. CET1, LR, and NSFR). Therefore, we also include data from the NSFR and LR templates. In addition, we control for country-specific factors by including real GDP growth rates for 2011 and 2012, a dummy for euro area banks and – where available – data from the Bank Lending Survey.

Table A2.6: Output of the regression of the dependent variable Change of LCR ( $\Delta LCR$ ) on changes of components of the LCR in relation to total assets (bank level, Q2 2011 to Q4 2012)

$\Delta LCR$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta(\text{CB Excess Reserves})$	7.6** (0.00)	7.6** (0.00)	7.8** (0.00)	7.7** (0.00)	7.6** (0.00)	7.8** (0.00)	7.6** (0.00)	8.1** (0.03)	7.8** (0.00)	7.6** (0.00)
$\Delta(\text{Sovereign Bonds non-zero RW domestic and zero RW})$	21.0** (0.00)	21.0** (0.00)	21.7** (0.00)	21.0** (0.00)	20.9** (0.00)	20.3** (0.00)	20.9** (0.00)	21.1** (0.00)	20.4** (0.00)	21.0** (0.00)
$\Delta(\text{Covered Bonds})$	22.7** (0.00)	22.8** (0.00)	22.4** (0.00)	21.8** (0.00)	22.7** (0.00)	22.9** (0.00)	22.6** (0.00)	22.5** (0.00)	22.9** (0.00)	22.7** (0.00)
$\Delta(\text{Non-Operational Deposits of Non-Financial Corporates})$	-7.1* (0.05)	-7.0* (0.06)	-7.7** (0.04)	-7.0* (0.06)	-7.1* (0.05)	-7.2* (0.05)	-7.1* (0.05)	-7.1* (0.05)	-7.2* (0.05)	7.1* (0.06)
$\Delta(\text{Undrawn Liquidity Lines Total})$	- 85.2** (0.02)	- 86.9** (0.02)	- 84.3** (0.02)	- 86.3** (0.02)	- 85.7** (0.02)	- 86.9** (0.02)	- 85.2** (0.02)	- 85.0** (0.02)	- 86.5** (0.02)	- 86.2** (0.02)
$\Delta(\text{Fixed Term Deposits Retail \& SME})$	-7.1** (0.00)	-7.1** (0.00)	-7.2** (0.00)	-7.1** (0.00)	-7.1** (0.00)	-7.3** (0.00)	-7.1** (0.00)	-7.1** (0.00)	-7.3** (0.00)	-7.1** (0.00)
$\Delta(\text{Stable Deposits})$	-5.7**	-5.7**	-5.9**	-5.7**	-5.8**	-5.8**	-5.7**	-5.8**	-6.1**	-5.7**

<sup>21</sup> Problems with full determination of the dependent variable do not arise, because the components are unweighted, not all components of the LCR are included and the components are normalized with respect to total assets.

<b>Retail &amp; SME)</b>	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.03)	(0.05)
<b>Δ(Other Contractual Obligation)</b>	-32.8*	33.4*	31.6	33.5*	32.8*	34.4*	-32.8	-32.6	33.0*	33.0*
	(0.10)	(0.10)	(0.12)	(0.10)	(0.10)	(0.09)	(0.11)	(0.11)	(0.10)	(0.10)
<b>ΔCET1</b>	-	-2.6	-	-	-					
		(0.76)								
<b>Δ(Loans to Non-Financial Corporates)</b>	-	-	1.7	-	-					
			(0.37)							
<b>Δ(Loans to Retail &amp; SME)</b>	-	-	-	-2.4	-					
				(0.60)						
<b>Δ(Trade Finance)</b>	-	-	-	-	0.1					
					(0.90)					
<b>CET1 (Level 2011Q2)</b>						-4.2				
						(0.34)				
<b>NSFR (Level 2011Q2)</b>							-0.00			
							(0.96)			
<b>ΔNSFR</b>								0.00		
								(0.85)		
<b>LR (Level 2011Q2)</b>									-4.3	
									(0.33)	
<b>ΔLR</b>										-1
										(0.91)
<b>Constant</b>	0.1	0.1	0.2	0.1	0.13	0.31	0.13	0.12	0.13	0.13
	(0.27)	(0.25)	(0.37)	(0.34)	(0.27)	(0.16)	(0.28)	(0.33)	(0.27)	(0.27)
<b>Prob&gt;F</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Adj-R<sup>2</sup></b>	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%

Number of observations: 97. The table contains estimated coefficients and the probability that it is equal to zero ( $P>|t|$ ) in parenthesis. \*\* (\*) denotes significance at the 95% (90%) significance level, respectively. *Prob>F* is the probability that all variables are jointly insignificant. The *Adj-R<sup>2</sup>* is the share of the variation of the dependent variable that is explained by the independent variables. Estimation method: OLS regressions. Source: PTIA calculations based on the EU QIS sample LCR and Leverage Ratio data sheet data.

The output indicates that changes of banks' balance-sheet structure are captured by the changes of a few unweighted components of the LCR (normalised by total assets). They explain a substantial share of the variation of changes of the LCR over the observation period in the sample (Table A2.6, column (1)). The F-test indicates the explanatory variables are jointly significant. The goodness-of-fit is high ( $Adj-R^2=50%$ ). The following components of the LCR contribute significantly to explaining the variation of changes of the LCR across banks (all columns):

- Increasing shares of (i.) drawable central bank reserves and (ii.) sovereign bonds (zero risk-weight and non-zero risk-weight domestic) and covered bonds significantly contribute to improving LCRs over the period Q2 2011 to Q4 2012 in the sample.
- Decreasing shares of (i.) short-term non-operational deposits by non-financials, (ii.) undrawn liquidity lines (total), (iii.) short-term fixed term deposits of retail & SME customers, (iv.) short-term stable deposits from retail and SME customers, (v.) other contractual obligations significantly contribute to improving LCRs over the period Q2 2011 to Q4 2012 in the sample.
- Other variables such as real GDP growth in 2011, real GDP growth in 2012 were not significant; neither did data from the Bank Lending Survey contribute to the explanation of the variation across banks (net share of respondents for whom finance is the most pressing problem in 2011h2 and 2012h2, respectively).
- Finally, we included the starting levels of the shares of non-financial corporate loans, of the shares of loans to retail and SME customers, of the banking book and trade finance exposure as of Q4 2011. But none of the variables contributed significantly to the explanation of variation across banks in the sample (results not reported separately).

Improving LCRs are not significantly associated with changes of the shares of the following balance-sheet components: (i.) CET1 ratios, (ii.) lending to non-financial corporates (column 3), lending to retail and SME customers (column 4), trade finance (column 5), the starting level of CET1 (column 6), changes of the NSFR (column 7), the starting level of the NSFR (column 8), the leverage ratio in Q2 2011 (column 9) and changes of the leverage ratio (column 10).

We interpret these numbers as evidence that changes of banks' LCR in the sample can be explained by a relatively small number of components of the LCR between Q2 2011 and Q4 2012. The analysis suggests the following adjustment strategies to increase the LCR for banks:

- Lengthen the maturity of non-operational deposits by non-financials, of fixed term deposits of retail & SME customers, of stable deposits from retail and SME customers can improve their LCR significantly, of other contractual obligations,
- Reduce undrawn liquidity lines (total),
- Increase HQLA (i.e. Level 1 assets and covered bonds).

However, the data does not allow us to assess whether the introduction of the LCR caused the adjustments. The changes in balance-sheet structure are also likely to be driven by demands of banks' money market and capital market for lower liquidity risk exposure and changes in bank funding structures due to the banking and sovereign debt crisis in the EU. Irrespective of the motivation the data reveals which adjustments among LCR (sub-)categories contribute significantly to LCR changes and which do not.

2.2.3. What explains the variations across banks regarding their transition of banks from non-compliant (LCR < 100%) to compliant (LCR ≥ 100%) between Q2 2011 and Q4 2012? Does adjustment to the LCR reduce lending to the real economy?

In this section we focus on a subset of all banks in the EU QIS sample. We study the following question: what explains the variation across banks of either migrating from non-compliance in Q2 2011 to compliance in Q4 2012 or of remaining non-compliant? We then assign variable value of 1 to banks that were non-compliant in Q2 2011 and became compliant in Q4 2012, all others are assigned a value of 0. Again, we analyse which variables explain the variation of transition from non-compliant to compliant among banks.

Table A2.7: Output of the regression of the dependent variable transition from non-compliance to compliance from Q2 2011 to Q4 2012 (*TransCompLCR*) on changes of components of the LCR in relation to total assets (bank level, Q2 2011 to Q4 2012)

TransCompLCR	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Δ(CB Excess Reserves)</b>	53.4** (0.00)	52.0** (0.00)	54.4** (0.00)	54.1** (0.00)	54.3** (0.00)	56.9** (0.00)	53.5** (0.00)	53.9** (0.00)	52.8** (0.00)
<b>Δ(Sovereign Bonds non-zero RW domestic and zero RW)</b>	60.4** (0.00)	57.9** (0.00)	60.9** (0.00)	61.2** (0.00)	60.2** (0.00)	61.5** (0.00)	60.2** (0.00)	60.3** (0.00)	59.4** (0.00)
<b>Δ(International Inst. Bonds zero risk-weight)</b>	221.0** (0.04)	212.7** (0.05)	221.7** (0.04)	221.7** (0.04)	223.6** (0.04)	246.2** (0.03)	226.9** (0.03)	222.2** (0.04)	215.4** (0.05)
<b>Δ(Non-Operational Deposits of Non-Financial Corporates)</b>	-44.3** (0.02)	-40.7** (0.04)	-43.3** (0.02)	-45.3** (0.02)	-45.2** (0.02)	-40.9* (0.05)	-34.6* (0.08)	-44.9** (0.02)	-41.9** (0.03)
<b>Δ(Operational Deposits of Non-Financial Corporates)</b>	-34.2** (0.00)	-35.0** (0.01)	-34.9** (0.01)	-34.7** (0.01)	-34.6** (0.01)	3.8 (0.91)	3.8 (0.91)	-34.4** (0.01)	-35.1** (0.01)
<b>Δ(Other Contingent Obligations)</b>	-10.3** (0.05)	-10.2** (0.05)	-10.2** (0.05)	-10.5** (0.05)	-10.2** (0.05)	-7.6 (0.17)	-7.6 (0.17)	-10.3** (0.05)	-10.5** (0.05)
<b>Δ(Loans to Non-Financial Corporates)</b>	28.7** (0.00)	28.9** (0.00)	28.4** (0.00)	28.3** (0.01)	28.9** (0.00)	27.2** (0.01)	25.8** (0.01)	28.8** (0.00)	29.5** (0.00)
<b>GDP Growth 2011</b>	-0.6* (0.07)	-0.62* (0.5)	-0.56* (0.7)	-0.55* (0.6)	-0.56* (0.7)	-0.62* (0.6)	-0.57* (0.7)	-0.56* (0.7)	-0.61* (0.6)
<b>ΔCET1</b>	-	-32.4 (0.32)	-	-					
<b>Δ(Loans to Retail &amp; SME)</b>	-	-	-5.4 (0.72)	-					
<b>Δ(Trade Finance)</b>	-	-	-	5.0 (0.59)					
<b>CET1 (Level 2011Q2)</b>					-4.4 (0.78)				
<b>NSFR (Level 2011Q2)</b>						-1.07 (0.43)			
<b>ΔNSFR</b>							0.52 (0.62)		
<b>LR (Level 2011Q2)</b>								-2.7	

							(0.86)		
<b>ΔLR</b>									-25.1 (0.373)
<b>Constant</b>	-2.6 (0.00)	-2.3 (0.00)	-2.7 (0.00)	-2.6 (0.00)	-2.5 (0.02)	-1.5 (0.33)	-2.5 (0.00)	-2.5 (0.02)	-2.4 (0.01)
<b>Prob&gt;Chi<sup>2</sup></b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Pseudo-R<sup>2</sup></b>	41%	43%	41%	42%	41%	43%	43%	41%	42%

Number of observations: 97. The table contains estimated coefficients and the probability that it is equal to zero ( $P>|t|$ ) in parenthesis. \*\* (\*) denotes significance at the 95% (90%) significance level, respectively. Prob> Chi<sup>2</sup> is the probability that all variables are jointly insignificant. The Pseudo-R<sup>2</sup> is the share of the variation of the dependent variable that is explained by the independent variables. Estimation method: Logit regression. Source: PTIA calculations based on the EU QIS sample LCR and Leverage Ratio data sheet data.

The analysis in Table A2.7 yields the following results:

The independent variables are jointly significant (LR chi<sup>2</sup> (8) ranges from 38.35 (column 1) to 40.40 (column 6) and the hypothesis that the independent variables are jointly insignificant is rejected at the 99.99 per cent confidence level). The explanatory power of the independent variables is quite high (Pseudo R<sup>2</sup> ranges from 41 to 43 per cent).

The following adjustment strategies significantly increase the probability of compliance:

- Increasing the shares in total assets of drawable central bank reserves, of sovereign Bonds non-zero RW domestic and zero RW, and of international institutions bonds with zero risk-weights,
- Lengthening maturities on operational and non-operational deposits of non-financial institutions,
- Reducing other contingent obligations.

Further results can be summarised in the following manner:

- Banks in the sample with high shares of loans to non-financials have a higher probability of becoming compliant over the period. But higher real GDP growth in 2011 has a negative impact on the probability of compliance of the banks in the respective country.
- The data does not show a significant relationship between the transition from LCR non-compliance to compliance with changes of the leverage ratio, the CET1 ratio, and the NSFR. The data analysis did not find evidence the starting levels of the CET1, the leverage ratio or the NSFR are significantly correlated with the transition. Real GDP growth in 2012 and the data from the Bank Lending Survey are not significantly related to the transition.
- Finally, the data rejects the hypothesis that banks would have had to cut lending to retail and SME customers or their trade finance exposure to become compliant. On the contrary, banks in the sample which increased their loans to non-financial corporates are more likely to become compliant over the period Q2 2011 to Q4 2012. We also included the starting levels of the shares of non-financial corporate loans, of the shares of loans to retail and SME customers, of the banking book and trade finance exposure as of Q4 2011. But none of the variables contributed significantly to the explanation of variation across banks in the sample (results not reported separately).

The model in Table A2.7 column 1 does not only have relatively high explanatory power according to the Pseudo R<sup>2</sup>s, but also its predictive power is quite good (Table A2.8).

Table A2.8: Predictive power of the model (in Table A2.7, column 1)

Classified	True		Total
	D	~D	
+	10	3	13

-	8	76	84
<b>Total</b>	<b>18</b>	<b>79</b>	<b>97</b>

Source: PTIA calculations based on the output of the regression of the dependent variable *TransComLCR* on changes of various components of the LCR and of balance-sheet positions in relation to total assets (bank level, Q2 2011 to Q4 2012).

Table A2.8 documents the predictive performance of the model in Table A2.7, column 1. The columns in Table 18 refer to the observed values of the dependent variable ( $D=1$  [Transition of bank  $i$  from non-compliance to compliance] and  $\sim D=0$  [bank  $i$  remained non-compliant]). The rows refer to the model output. If the modelled probability of a bank to migrate from non-compliant is above 0.5, the bank is assigned to row +. Otherwise, it is assigned to row -. A bank in the sample is correctly identified, if it is in cell +/D or -/~D. In total the model identifies 18 banks as migrating from non-compliant to compliant. In fact, 10 of these were identified correctly (56%) and 8 falsely (44%). In the total the model assigned 84 banks to row - (i.e. banks remained non-compliant). In fact, 76 of them were indeed non-compliant in Q2 2011 and in Q4 2012. They were correctly identified (90%) while 8 were falsely assigned to  $\sim D$  (10%). Across columns and rows the model correctly classified 86 out of 97 banks (89%). In sum, we regard the performance as encouraging.

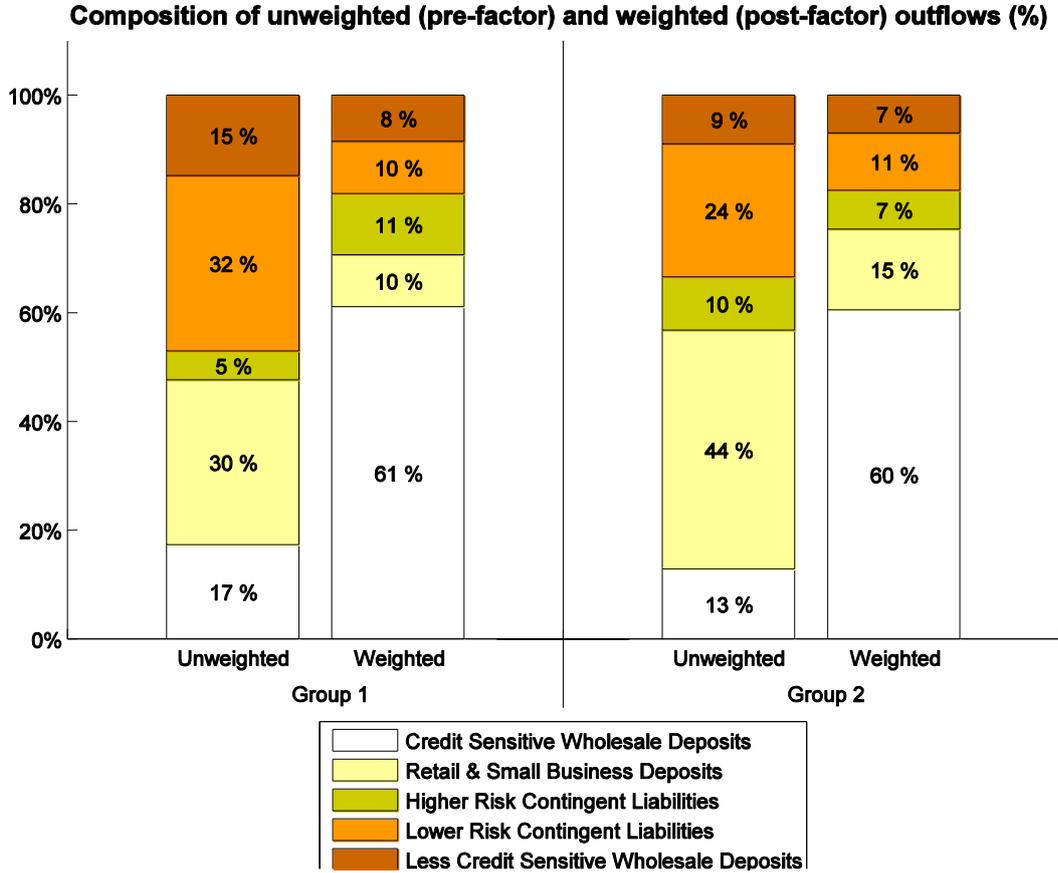
To sum up, the analysis suggests the following results (Table A2.6 and A2.7):

- Both approaches to the dependent variable (change of the LCR,  $\Delta LCR$ , and transition from non-compliant to compliant, *TransCompLCR*) yield very similar results. The results are robust across approaches.
- Banks have a number of options to adjust to the LCR. Relatively few components of the LCR explain large shares of the variations of the dependent variables across banks. The most robust across both approaches is the increase in HQLA (especially drawable central bank reserves and sovereign debt) and lengthening the maturity/staggering the maturity of deposits from non-financial corporates and retail and SME customers.
- Banks in the sample did not restrict lending to non-financial corporates, retail and SME customers or cut back trade finance exposure to improve their LCR/become compliant over the period Q2 2011 to Q4 2012.
- The sample data shows that other regulatory ratios (CET1, LR, and NSFR) or their changes do not explain significantly the observed variations across banks. These ratios did not impose restrictions on the adjustment of banks in the sample.

### 2.4. Composition of weighted versus unweighted cash outflows

The results of the multivariate analysis and the C4 natural experiment correspond well with the segmentation of cash-inflows (Diagram 1A2.19). It shows that credit sensitive wholesale deposits (i.e. unsecured financial deposits) account for the largest share of weighted outflows for, both, G1 (61 per cent) and G2 banks (60 per cent). Thus reductions of these outflows in terms of share of total assets have the greatest impact on banks' LCR. For G2 banks weighted outflows of retail and SME deposits (15 per cent) play a large role in total outflows. Contingent liabilities account for 21 and 18 per cent of outflows of G1 and G2 banks, respectively. Further analysis could investigate the role of these categories in banks' adjustment mechanisms in more detail. Especially, the options of adjusting the tenors and/or contracts underlying the respective contracts to be more in line with the definition of stable deposits and low risk contingent liabilities could reduce the liquidity shortfall of non-compliant banks.

Diagram A2.19: Composition of unweighted and weighted outflows (GHOS 2013 calibration)



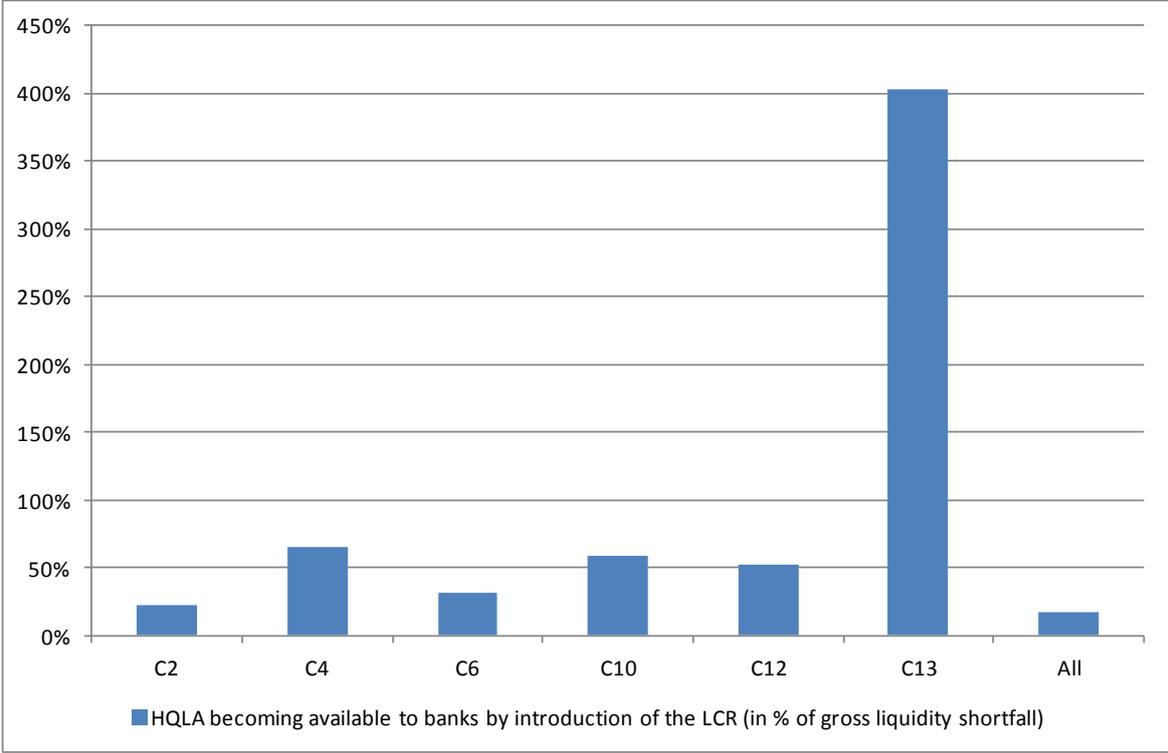
Source: EBA voluntary LCR monitoring exercise.

### 2.5. Other potential adjustment mechanisms

The operational requirements in Article 417 of the CRR (and QIS rules text paragraphs 30, 193-194, 28-29<sup>22</sup>) lead to the exclusion of some HQLA from the LCR for some countries.

<sup>22</sup> "The stock of liquid assets should not be co-mingled with or used as hedges on trading positions, be designated as collateral or be designated as credit enhancements in structured transactions or be designated to cover operational costs (such as rents and salaries), and should be managed with the clear and sole intent for use as a source of contingent funds. ... The stock should be under the control of the specific function or functions charged with managing the liquidity risk of the bank (typically the treasurer). ... As noted in paragraphs 193 and 194, at the consolidated level, banks may also include in the stock qualifying liquid assets that are held to meet

Diagram A2.20: Banks' volumes of HQLA currently non-eligible but eligible by introduction of the LCR (in % of gross liquidity shortfall)



Source: EBA voluntary LCR monitoring exercise.

The aggregate volumes of HQLA currently excluded from the LCR due to these restrictions amounts to about EUR 45 billion or 17 per cent of the aggregate gross shortfall in the sample (Diagram A2.20). The share of HQLA held on bank balance sheets that is excluded from the LCR varies greatly across countries. C13 banks can easily cover the gross liquidity shortfall once these assets become eligible with the introduction of the LCR; for C4, C12, and C10 banks the shares are also substantial and exceed 50 per cent. C6 and C2 banks will also experience notable reductions.

Banks in C10 (13.9 per cent), C4 (11.6 per cent), C9 (10.6 per cent) and C6 (10.3 per cent) report more than 10 per cent of their HQLA to be excluded from the stock of liquid assets. The additional breakdown of the data in each bar refers to non-permanent versus permanent exclusion of assets from the stock. Banks report which of the assets that are currently excluded from HQLA would be included by the time the standard is implemented. Most of these temporarily excluded assets constitute Level 1 assets and will not be subject to a haircut once they will be included in the stock. Given the order of magnitude of assets that are currently excluded, this adjustment mechanism has a significant impact on the potential compliance costs associated with the LCR; e.g. transferring control over the assets to the treasury department does not incur significant opportunity costs yet increases HQLA substantially in some countries.

This implies an upward bias of the assessment of the impact of the LCR which is based on the currently available gross liquidity shortfall.

legal entity requirements (where applicable), to the extent that the related risks (as measured by the legal entity's net cash outflows) are also reflected in the consolidated LCR. Any surplus of liquid assets held at the legal entity can only be included in the consolidated stock if those assets would be freely available to the consolidated (parent) entity in times of stress." (BCBS 2010, p. 66ff66)

## Technical appendix 3: Assessing alternative calibrations of the LCR: rationale and costs

An impact assessment cannot – and is not expected to – provide an exact point estimation of the potential costs and benefits of future regulatory change under future economic conditions. What is possible – and expected by the EU Commission – is guidance for the political debate: first, we can develop a transparent and well-structured approach to the subject. Second, we can provide rough approximations of the order of magnitude of quantitative effects. In order to incorporate the uncertainty that prevails with respect to a number of inputs, we can develop an approach that allows us to incorporate sensitivity analysis with respect to the underlying economic/behavioural parameters.

Recent high quality impact assessments of regulatory reform have often followed a similar general approach:

First, additional capital/liquidity requirements are estimated (in terms of absolute numbers).

Second, the additional explicit costs per annum are approximated (in terms of absolute numbers per annum).

Third, the link to the real economy is established via the impact of these additional explicit costs on credit margins (in terms of basis points of refinancing costs for the real economy).

Finally, these higher credit margins are fed into macroeconomic models to gauge the level of foregone economic growth (in terms of basis points per annum). Since a number of important inputs into the analysis are still moving targets and some are inherently hard to estimate, we suggest a 4-dimensional scenario approach to gauge the impact on lending margins. This approach is then complemented by a country level analysis on the impact of the LCR on bank lending standards (BLS):

### 3.1. Four scenario dimensions

While the number of scenarios seems large, the focus of the conceptual framework rests on the flexibility of the tools employed. The four chosen dimensions, i.e. (i) different levels of LCR calibration, (ii) banks' behavioural adjustments to the LCR, (iii) the cost of these adjustments and (iv) the interaction between capital and liquidity regulation, will reduce the number of scenarios/sensitivity analysis to a level that is necessary to enable the EU COM to draw the necessary policy conclusions.

### 3.2. Scenarios to calibrate the LCR

The first dimension addresses **whether the Basel III calibration of the LCR** is likely to have a material detrimental impact on credit margins and the real economy. Results for the scenarios are described in Technical appendix 3.5. The following scenarios should be tested according to Article 509(2) of the CRR :

SCRePol decided that the **Baseline Scenario** is defined by the Basel III recalibration of the LCR on January 6, 2013 (Denmark and Norway are likely to become jurisdictions with insufficient liquid assets and be granted derogations from the GHOS 2013 calibration such that there will be no cap on liquid assets.).<sup>23</sup> The main rationale for this decision was that the CRR does not contain a definition of the components of the LCR; neither HQLA nor cash-in- or -outflows are defined. The decision has a number of advantages:

- Many banks are already familiar with the B III recalibration due to their participation in the QIS or due to internal preparations.
- It is well documented and a growing body of literature is available.
- It is applied internationally and, thus, ensures international comparability.

<sup>23</sup> See SCRP 2013 101. For the GHOS recalibration of the LCR see <http://www.bis.org/publ/bcbs238.pdf>.

- For internationally active banks a deviating baseline would increase adjustment costs and add to confusion over the future LCR.
- **Scenario 1** is defined by Art. 509(2)(a) CRR; it assesses the impact of removing the 75 per cent cap on inflows. SCRePol decided that the **Baseline Scenario** is defined by the Basel III recalibration of the LCR on January 6. For internationally active banks a deviating baseline would increase adjustment costs and add to confusion over the future LCR.

**Scenario 1** is defined by Article 509(2)(a) of the CRR; it assesses the impact of removing the 75 per cent cap on inflows. The cap has the following rationale:

- The cap ensures that banks hold a minimum of HQLA in relation to their outflows.
- This minimum requirement aims at increasing banks' resilience. If a contractual inflow does not materialise unexpectedly (e.g. due to liquidity/solvency problems of the counterparty), the minimum buffer can be utilised to cover the unexpected increase of net cash outflows. Thus, holding of a buffer can also reduce contagion.
- Reduced contagion can contribute to stabilising money markets and EU banks' access to funding markets under stress.
- The minimum requirement also accounts for maturity mismatches between inflows and outflows during the 30 days stress horizon. Liquid assets may cover cash outflows in case the inflows materialise later than outflows.

The disadvantages of the 75 per cent cap are predominantly the associated costs for those banks for which the cap constitutes a binding constraint; i.e. banks with net cash outflows lower than 25 per cent of cash outflows.

Alternatively, cash inflows could be capped without referring to the amount of cash outflows, in order to increase resilience and account for maturity mismatches. However, this would not ensure that banks hold a minimum of liquid assets.

**Scenario 2a and 2b** are derived from 509(2)(b) of the CRR. In scenario 2a, the roll-over rate for loans to non-financial customers is set to 0 per cent from 50 per cent in the baseline. Technically, inflows from performing loans from retail, small business, non-financial corporates and other counterparties (Article 425(2)(a) and (b) of the CRR) are increased. In scenario 2b, the run-off rate for other outflows is set to 0 per cent, from 100 per cent in the baseline. The higher roll-over and run-off assumptions made in the baseline have the following rationale:

- It requires banks to hold higher levels of HQLA than under a 0 per cent roll-over or 100 per cent run-off assumption as in these scenarios. This is intended to improve banks' ability to fulfil their payment obligations under stress without curtailing lending to the real economy, which may be more difficult to achieve under a 0 per cent roll-over or 100 per cent run-off assumption.
- A roll-over rate significantly above zero can contribute to avoiding a credit crunch for the real economy, if banks are under stress. The effects of negative feedback-loops between stress in the banking system, real economy funding problems, and worsening bank credit quality, can be reduced.
- The baseline scenario thus better reflects banks' desire to maintain their franchise value under stress.
- The pricing of liquidity risk improves: Assuming a roll-over rate above zero should have an impact on banks' funds transfer pricing system in a way that the cost of liquidity reflect better the expected maturity of a loan under a going concern assumption.
- It is in line with B III. This reduces compliance and reporting costs for internationally active EU banks and facilitates an international level playing field.

The disadvantage of the higher roll-over and run-off rate is an increase in required HQLA and the therefore potentially increased adjustment costs.

**Scenario 3** is derived from point (c) of Article 509(2) and focuses on the removal of the 40 per cent cap on L2A HQLA and the 15 per cent cap on L2B. The caps have the following rationales:

- Given the differentials between expected opportunity costs of holding L1 and L2A/B HQLA, banks have incentives to concentrate buffer components in L2A/B assets. Without applying any diversification requirement, this could potentially lead to increased concentration risk. Moreover, as generally these assets are regarded as less liquid, the buffer could become less effective in terms of improved resilience against idiosyncratic and market shocks and in terms of improving liquidity (risk) pricing.
- The minimum haircuts in the LCR and the market haircuts<sup>24</sup> of L2A/B assets are higher and more volatile; thus, the liquidity generated by repoing/selling these assets is subject to higher uncertainty.
- The volatility of L2A/B assets is higher. Market risk and market liquidity risks are higher which would imply higher negative P&L affects (either through sales at depressed prices or mark-to-market accounting).
- It is in line with Basel III. This reduces compliance and reporting costs for internationally active EU banks. It also avoids an unlevel playing which would, in case the cap were removed, provide a competitive advantage for EU banks vis-a-vis non-EU banks.

On the contrary, the cap has disadvantages, too:

- The cap's calculation is quite complex. In order to prevent regulatory arbitrage, the calculation is based on the 'adjusted amount' of L1 and L2A/B assets which would result, if all secured transactions involving eligible liquid assets were unwound. For example, the current QIS template calculates a negative stock of HQLA when repo transactions against Level 2 HQLA are unwound but if the cash received had not been counted as Level 1 asset, e.g. because the bank re-invested the cash in other assets. This example illustrates the operational difficulties of the cap.
- The cap is a rather crude method to achieve diversification and could practically be ineffective, in particular if only applied to Level 2 assets. If e.g. government bonds are exempted from the broad diversification requirement in Article 417(a) of the CRR, this could lead to a concentration of government bonds holdings in banks' home country. That in turn could reinforce the already excessive bank-sovereign nexus in the Euro area. A shift from a rough cap to e.g. a diversification index could reduce this interdependency and overall variability of the HQLA portfolio.

**Scenario 4** analyses the impact of a recalibration of outflow and higher inflow rates for intra-group flows, according to point (d) of Article 509(2) of the CRR. For the purposes of the analysis we tested three alternative calibrations for the scenario:

1. Asymmetric preferential treatment: increase the inflows from undrawn intra-group committed lines from 0 to 60 per cent and corresponding outflows from 40 to 100 per cent.
2. Symmetric preferential treatment: increase the inflows from undrawn intra-group committed lines from 0 to 50 per cent and corresponding outflows from 40 to 50 per cent.
3. Symmetric preferential treatment: increase the inflows from undrawn intra-group committed lines from 0 to 100 per cent and corresponding outflows from 40 to 100 per cent.

In all cases inflows from operational intra-group deposits are increased from 0 to 25 per cent.

The rationale for the asymmetric treatment for committed lines is based on the following:

---

<sup>24</sup> See BCBS 2013c.

- During the crisis intra-group committed lines proved unreliable (e.g. Icelandic banks, Lehman US versus Lehman UK).<sup>25</sup> The asymmetric treatment disincentivises reliance on this source of funding that may not be honoured in times of crisis.
- Committed lines often contain complex covenants. Thus, uncertainty with respect to timely enforceability is high. Banks might have incentives to renege on committed lines, especially when the receiver is under stress.
- Intra-group commitments increase complexity and interconnectivity which potentially impedes the future resolution of banks under the Bank Recovery and Resolution Directive.
- Intra-group commitments tend to spread shocks within banking groups across borders and thus increase negative externalities. Removing the principle of asymmetry would allow NSAs to shift liquidity risk exposure to the provider of the committed line and into another jurisdiction. This would increase the liquidity risk exposure of the respective banking system.

The rationale for symmetric treatment for committed lines is based on the following:

- Symmetric treatment better reflects the higher likelihood that a liquidity provider will honour first its commitments to intragroup entities.
- Symmetric treatment is more aligned with the aims of the single market, while an asymmetric treatment would seem to advocate trapped pools of liquidity within member states.
- Basel III is applied at the consolidated level; in the CRR the LCR is to be applied at the solo and the consolidated level. Under BIII, intra-group committed lines cancel out due to consolidation. Shifting liquidity risk exposure within consolidated banking groups is not a concern for BIII.
- The asymmetric treatment increases the aggregate liquidity buffer across the group; this also increases adjustment costs and credit spreads.

The disadvantages of the BIII treatment of intra-group committed lines stem mainly from the perimeter of application of the LCR under BIII:

- Basel III is applied at the consolidated level; in the CRR the LCR is to be applied at the solo and the consolidated level. Under BIII intra-group committed lines cancel out due to consolidation. Shifting liquidity risk exposure within consolidated banking groups is not a concern for BIII.
- The asymmetric treatment increases the aggregate liquidity buffer across the group; this also increases adjustment costs and credit spreads.

The advantages of maintaining inflows from operational intra-group/intra-IPS deposits at 0 per cent (rather than increasing them to 25 per cent) are:

- The treatment would be in line with BIII. This reduces compliance costs for internationally active EU banks. It also ensures the international comparability of LCR figures across jurisdictions.

The disadvantage of the 0 per cent inflow rate is that decentralised sectors with legal or statutory minimum deposits at the central institution would face incentives to adapt this liquidity regulation/statutory provision to be more in line with the new internationally harmonised liquidity regulation. Legal reform might be costly for the respective member states and/or decentralised sectors.

**Scenario 5** discusses the implications of increasing outflow rates applicable to undrawn committed credit and liquidity to non-financial corporates from 10 to 100 per cent, as per Article 509(e) of the CRR.<sup>26</sup>

The 10 per cent outflow rate is based on the following rationale:

---

<sup>25</sup> See BCBS 2013c.

<sup>26</sup> For a discussion of the empirical literature see BCBS 2013c.

- A lower run-off rate implies lower costs for banks and, thus, implies lower fees for committed lines for non-financial corporates.
- It is in line with BIII. This reduces compliance and reporting costs for internationally active EU banks. It also avoids an unlevel playing field for EU banks in the competition for non-financial corporate business.

The disadvantage of the lower run-off rates is mainly that it might underestimate the liquidity risk associated with committed lines to non-financials and, thus, the objective of promoting the re-pricing of liquidity (risk) might not be reached.

**Scenario 6, as per Article 509(f) of the CRR**, tests the contribution of correspondent banking and prime brokerage services to the institutions' LCR (Article 509(1)(k) of the CRR). The run-off rate is set from 100 per cent in the baseline at 0 per cent in this scenario.

**Scenario 6, as per point f of Article 509 CRR**, tests the contribution of correspondent banking and prime brokerage services to the institutions' LCR (Art. 509(1)(k) CRR). The run-off rate is set from 100 per cent in the baseline at 0 per cent in this scenario.

Higher outflow rates for operational deposits under the baseline are based on the following rationale:

- In principle, both refer to deposits from financials. As such a deviation from the 100 per cent outflow rate, which is applied for deposits from financials, would be inconsistent and incentivise banks to circumvent the regulation by labelling wholesale deposits from financials as correspondent banking/prime brokerage service. For auditors and supervisors it would be very costly to verify the label in each case based on the underlying, often complex documentation, contracts, and covenants.
- The institution would have to present evidence that the client is unable to withdraw funds without compromising the client's operational functioning. If banks are the counterparty, this requirement is hard to meet. It requires in-depth knowledge of the client's operations and evidence on a counterfactual (if the client withdrew deposits, how would that impact its operations? Which alternative channels/payment systems could the client use?).
- For supervisors both are near impossible to verify.
- Higher complexity of regulation increases legal uncertainty and implies higher compliance costs for banks.
- Higher rates would increase costs for banks (as correspondents and respondents) and for hedge funds but
- they would be in line with B III. This reduces compliance and reporting costs for internationally active EU banks.
- A deviation from BIII could lead to an unlevel playing field for EU banks in their competition for highly leveraged hedge funds.

But the higher outflow rates set in the baseline also have disadvantages:

- Higher outflow rates for operational deposits under both categories may not be justified if the deposits need to be held to maintain customers' access to brokers' centralized securities clearing services.
- A deviation from BIII could lead to there not being a centralised securities clearing services.

**Scenario 7** turns to assessing a broadening of HQLA (Article 509(2) of the CRR). Work on common definitions for HQLA continues in parallel at the EBA and will be presented to the EU Commission in January 2014. The EBA has hence been collecting data on a set of assets broader than the Basel HQLA definition. This enables the EBA to complement its work on liquidity characteristics of asset classes and common definitions by an assessment of the impact of a broader or narrower buffer calibration.

The January GHOS agreement is used as a starting point. Resorting to the definitions used therein would have the following advantages:

- Reduction of compliance and reporting costs for internationally active EU banks. It ensures a level playing field for EU institutions vis-à-vis non-EU institutions.
- Easy to communicate when Basel III compliance is validated, e.g. in Level 2 assessments.

For the purpose of this assessment, the buffer has been broadened using the following perimeters:

- (i) Inclusion of covered bonds rated A+ to A-, as Level 2B assets with a haircut of 50 per cent,
- (ii) Inclusion of financial corporate bonds rated A- or greater, as Level 2B assets with a haircut of 50 per cent,
- (iii) Inclusion of unsecured bank issuances rated A- or greater, as Level 2B assets with a haircut of 80 per cent,
- (iv) Inclusion of assets issued by a credit institution which has been set up and is sponsored by a Member State central or regional government and the asset is guaranteed by that government and used to fund promotional loans granted on a non-competitive, not-for-profit basis in order to promote its public policy objectives as Level 2 asset with a haircut of 15 per cent
- (v) Inclusion of other Central Bank eligible unencumbered assets as Level 2B asset with a haircut of 75 per cent
- (vi) Inclusion of gold as Level 2B assets with a haircut of 50 per cent,
- (vii) Inclusion of shares or units in CIUs, depending on the underlying assets, as Level 1 or Level 2 asset with a haircut of 5 or 20 per cent, respectively.

As in the baseline, the 40 and 15 per cent cap on Level 2 and Level 2B assets have been applied for all countries except Denmark and Norway. To emphasise, this selection of liquid assets does explicitly not represent a view on their suitability as HQLA but purely on the impact on banks' LCR depending on the buffer calibration.

Nevertheless, the following more general aspects should be duly considered in any debate on possible broadening of the buffer:

- A broader definition would reduce adjustment costs for banks. Most banks would already fulfil the LCR to 100 per cent six years before this requirement would enter into force. The LCR would not force banks to adjust their balance-sheets and to reprice liquidity (risk). The LCR would thus be ineffective, but still impose substantial compliance costs on the EU banking sector and on NSAs.
- A broader definition of HQLA would lead to an unlevel playing field at the international level.<sup>27</sup> Especially banks from countries with narrower definitions of HQLA would face a competitive disadvantage, unless they are granted derogations under Article 417 of the CRR.
- The inclusion of bank liabilities in the definition of HQLA increases connectivity and contagion. Especially in a broader crisis of confidence banks assets are perceived as illiquid and elevated credit risk. The very source of banks' funding liquidity risk is loss of access to the primary market of bank bonds. It is unlikely that under these conditions the secondary market would prove to be stable in terms of depth, breadth, and price.
- The inclusion of bank equity is counterproductive. Under stress, bank equity tends to be very volatile. This is the very reason why it is so costly for banks (if indeed it is possible at all) to increase equity under stress when leverage is most damaging. More volatile assets in the buffer might have negative

---

<sup>27</sup> To note: The BCBS is currently studying the possibility of using market-based indicators for the determination of assets liquidity quality. This is however only possible with a view to remove eligibility, not to broaden the buffer.

implications for banks' P&L under stress which could initiate a downward spiral of profitability, solvency, and liquidity problems.

- The inclusion of potentially less liquid assets with lower credit quality reduces the effectiveness of the buffer in times of stress. This undermines the objective of increasing the resilience of EU banks and banking systems.
- Bank bonds in the buffer provide incentives for banks to generate artificial liquidity by buying each other's issuances. Thus, buffers would be inflated artificially without additional liquidity provided to the banking system from outside. The Icelandic banks inflated the liquidity of their balance-sheet artificially in this manner and deposited each other's bonds as collateral at the Eurosystem.

**Scenario 8** assesses the impact of reducing the outflow rate on stable retail and SME deposits from 5 to 3 per cent. For the purposes of the analysis it is assumed that all stable deposits in the sample are subject to a 3 per cent run-off, although only a small share of deposit guarantee scheme in the EU is likely to fulfill the necessary criteria: i.e. prefunding via the periodic collection of levies on banks with insured deposits and evidence of run-off rates for stable deposits within the banking system below 3 per cent during any periods of stress experienced that are consistent with the conditions within the LCR.

### 3.3. Banks' behavioural reactions to the incentives provided by the LCR

The second dimension deals with **uncertainty with respect to banks' behavioural reactions** to regulatory change. Banks for which the LCR is not binding do not need to react; banks for which it is binding have broadly three options:

- (a) Pure asset side substitution: increase the stock of liquid assets at the expense of less liquid assets (e.g. substitute LCR eligible transferable assets for non LCR eligible transferable assets)
- (b) Pure liability side substitution: decrease short-term unstable funding and increase long-term stable funding (e.g. decrease unsecured short-term money market funding, liquidity lines; and increase deposits, long-term issuance)
- (c) Combination of asset and liability side substitution. Increase or decrease in leverage: depending on banks' behavioural response and on other constraints such as the leverage ratio and capital adequacy ratio (CAR), banks might increase leverage (financing a portfolio of liquid assets by market borrowing) or decrease leverage (reduce interbank borrowing and lending) to meet the LCR.

Banks' choice is driven by (i.) the impact of the contraction of a position that generates outflows on the LCR (i.e. positions with higher run-off rates are more likely to be reduced relative to positions with lower run-off rates, *cet. par.*) and (ii.) the opportunities costs of banks' behavioural reactions (i.e. positions that generate high costs or low revenues are more likely to be reduced than those with low costs or low revenues, *cet. par.*).

In order to determine the banks' behavioural reaction, this section will draw on the results of various other sections: (i) LCR data analysis (Technical Appendix 2); (ii) relative opportunity costs per unit of LCR improvement (Technical Appendix 3.4.); (iii) case studies (Technical Appendix 5); (iv) in particular, the analysis of an empirical study in the UK (Technical Appendix 5.5.); and (v) available literature (Technical Appendix 3.4.).

### 3.4. Deriving the expected opportunity costs of banks' behavioural reactions to the LCR

The third dimension focuses on the **increases of explicit (P&L effective) costs associated with banks' behavioural adjustment**. The aim of this strand of investigation is to produce the actual estimates of opportunity costs required as inputs

The cost a bank incurs in adjusting to close its liquidity gap depends on how it adjusts. Firms have a range of options for adjusting (Table 20).

Table A3.1: Taxonomy - adjustment strategies

Balance Sheet	Method	BR1	BR2	BR3
Assets	Arbitrage: sell non-liquid assets, buy liquid assets	50%	35%	15%
	Shorten average maturity of assets	5%	1%	3%
	Reduce committed lines	10%	5%	10%
Liabilities	Lengthen funding maturities	10%	10%	15%
	Increase retail deposits	5%	9%	7%
Assets & Liabilities	Deleveraging: sell non-liquid assets to pay down short-term liabilities	15%	35%	50%
	Leveraging: issue long-term wholesale debt to buy liquid assets	5%	5%	0%

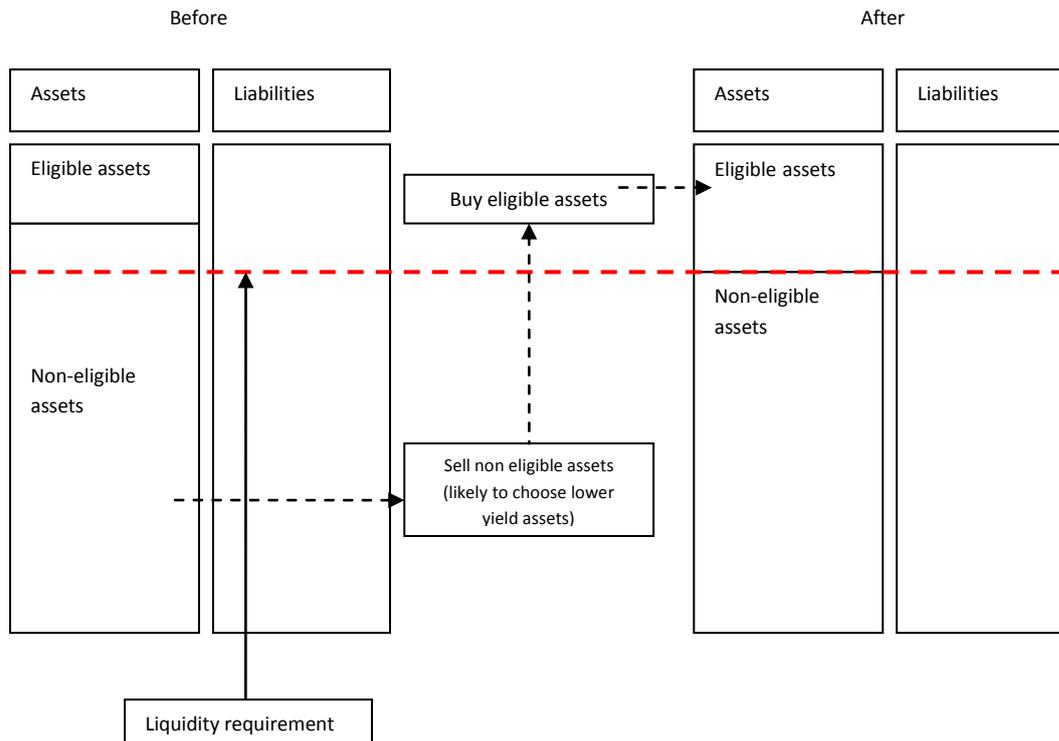
The next section sets out our proposed approach to estimating the cost of each option, the 'per unit' cost.

### 3.4.1. Asset-side adjustments

#### A. Arbitrage: selling non-HQLA and use the proceeds to buy HQLA

The most conceivable strategy for a bank to reach the required level of LCR might be to arbitrate between HQLA and non-HQLA, i.e. sell non-eligible assets to purchase eligible assets, and preferably Level 1 assets (Diagram A3.1.).

Diagram A3.1: Asset arbitrage



To assess the impact of the LCR, the interim report written by the BIS Macroeconomic Assessment Group (MAG, 2010) builds on two simple scenarios:

- Scenario 1 sets a 25% increase of HQLA holdings;
- Scenario 2 sets a 50% increase in HQLA holdings.

The MAG poses that LCR implementation would have a single behavioral response from banks, *i.e.* an asset-side arbitrage between HQLA vs. non-HQLA. However, the methodology on how the increase of 25% in HQLA holdings impacts the net income of the bank is not detailed. And, in the final report of the Macroeconomic Assessment Group, the macroeconomic impact of liquidity requirements is not mentioned anymore.

Elliott *et al.* (IMF, 2012) regret the lack of literature on the macroeconomic impact on liquidity requirements, and the 'paucity of information about the costs of potential actions to close [liquidity gaps]'. The authors follow the work of Abouhossein *et al.* (2011) for the definition of bank strategies. They attribute the value of opportunity cost arbitrarily, *i.e.* the cost of holding HQLA vs. non-HQLA is fixed at 2% in Europe & the US, and 1.25% in Japan. In other words, the volume of shortfall is multiplied by that arbitrary cost and it results in the assessed opportunity cost.

The FSA paper from 2008, 'Strengthening Liquidity Standards', takes almost the same position, with the setting of an arbitrary 1.5%. However, this spread is calculated on a different basis from that for Abouhossein *et al.* as it is the introductory paper to the UK liquidity ratio, the FSAs Individual Liquidity Guidance, thus having a slightly different numerator definition. The 1.5% figure refers to the spread between the 'current' (date of paper, December 2008) 5-year yield-to-maturity of UK gilts and the average return on assets (December 2007) of the top ten UK banks.

Abouhossein *et al.* (2011) study the arbitrage strategy, by defining the arbitraging as detrimental to corporate loans (option 2) and consumer loans (option 3). The reducing of those portfolios leads, in the authors' assessment, to a decrease in return on net asset value (RoNAV) from 12% to 11.5% and 10.5% respectively. The authors have built this strategy assessment on data (return) deduced from Central Banks data, or from expert judgment. However, they adopt a microeconomic perspective, without focusing on the

dynamics within the banking system, e.g. price of HQLA might change (increase) due to higher demand which itself could fall after the transitional period, pushing the LCR numerator downwards.

Method

The following paragraphs present the method used to estimate the opportunity costs of holding HQLA instead of non-eligible assets. In accordance with economic intuition and the literature review, the compliance with LCR requirements might result in banks replacing assets with lower returns (HQLA) by higher yielding instruments (non-HQLA).

In practice, the opportunity cost should be balanced with the reduction in RWA/own funds requirements stemming from the holding of ‘safer’ and more liquid assets within the HQLA. Given the constricted timeframe, the proposed study will nonetheless concentrate on the sole opportunity cost.

For each strategy, we consider banking groups arbitrage simultaneously, at a defined point in time t. We don’t take into account the price effect, i.e. the fact that an increase in the demand for HQLA might push the prices upward at constant supply. Thus the assessment lies on the hypothesis that the order book is infinite at the initial market price (and supply is unchanged). The rate of return for each LCR category is approximated by bond indices. Once the return for the three indices has been approximated, it is adjusted by the volatility of the market, using Modigliani & Modigliani (1997) risk-adjusted performance (RAP). Such an adjustment enables us to obtain a return that is corrected of the relative standard deviation of the market, and of the risk-free interest rate.

$$RAP(index) = \left(\frac{\sigma_M}{\sigma_{index}}\right) \times (r_{index} - r_{risk\_free}) + r_{risk\_free}$$

- $r_{index}$ , average return of the index
- $r_{risk\_free}$ , risk-free interest rate
- $\sigma_M$ , standard deviation of the market return
- $\sigma_{index}$ , standard deviation of the index

Data

To get information concerning the returns of various categories of assets, we propose building indices of assets, trying as much as possible to comply with the typology of the LCR numerator:

- HQLA Level 1
- HQLA Level 2a
- HQLA Level 2b
- non-HQLA

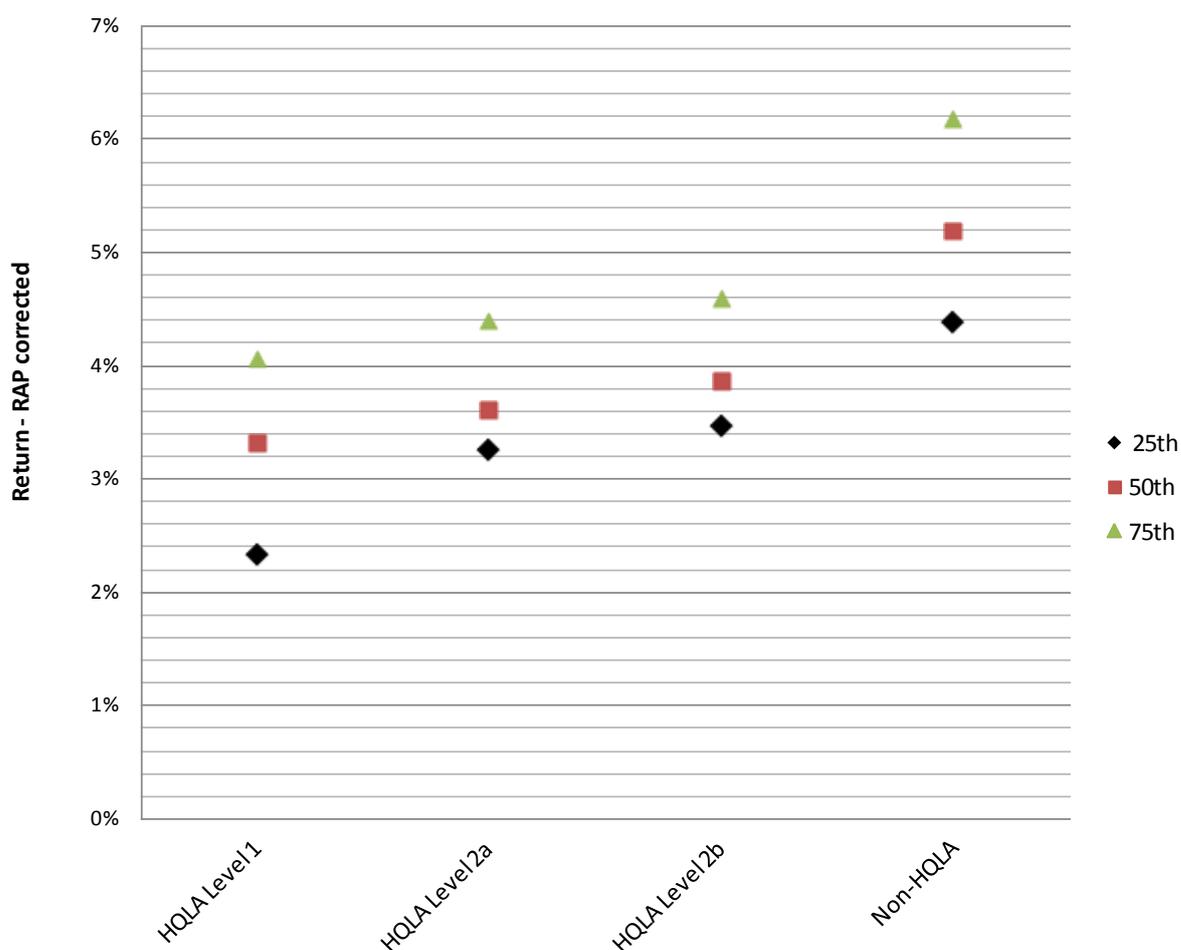
There we focus on the average returns, for each category of assets. Market data providers (e.g. Bloomberg) are used to build such a database, by extracting the yields to maturity of bonds indices computed by Bank of America/Merril Lynch (BoAML). This implies to use some shortcuts when needed, due to the imperfect matching of HQLA categories and BofAML indices definition.

The differentiation for low- against high-volatility assets implies to correct the chosen indices. As planned, we use the Modigliani *et al.* ‘Risk Adjusted Performance’ method. To proxy the market return, we use the index Global Broad Market Index (GBMI). As we also need a risk-free rate, we use the 10Y German Bund. The following Table A3.2 sums up the returns after RAP adjustment.

Table A3.2: Percentiles of RAP-corrected returns, by LCR categories

Assets Category	Percentile 25 <sup>th</sup>	Percentile 50 <sup>th</sup>	Percentile 75 <sup>th</sup>
HQLA Level 1	2.32%	3.30%	4.06%
HQLA Level 2a	3.25%	3.59%	4.39%
HQLA Level 2b	3.46%	3.86%	4.59%
Non-HQLA	4.38%	5.18%	6.17%

Diagram A3.2: Returns - RAP corrected



To harmonise the time series collected, the assessment starts in July 2004 and ends on the 31 December 2012. It appears that HQLA yields, whatever the level, are concentrated in terms of RAP return: the median of the 3 levels are comprised within a 60 bp interval (Diagram A3.2.). Non-HQLA proxy, however, features much higher yields (median above 5%). This is in line with expectations concerning the return of high-yield assets: even if corrected for its volatility, it should yield a higher return (see 'caveats' below).

### Caveats

- The use of indices is based on the hypothesis that banks have the same portfolio structure of assets (risk, maturity).

- As a second round effect, the increase in the quality of assets, depending on the strategy chosen by the bank, might (1) reduce the risk borne by the banking group; and (2) reduce the liquidity risk. Those two effects combined might lower the refinancing spread of the group. This aspect is not taken into account in this specific strategy.
- The choice of the proxy for non-HQLA is the same across countries as it doesn't include the rate of return of credit distributed. This category of assets will be included for the next report.
- The hypothesis of simultaneous arbitrage is not realistic in usual market conditions (mainly due to liquidity and price effects). An improvement could be to implement a dynamic approach, taking into account liquidity and price phenomena.

**B. Shortening maturities of assets**

Reducing the average maturity of assets increases the amount of cash flowing in within any 30-day window. The rate of inflow under stress is assumed to be 100% for loans to financials but only 50% for retail loans and non-financial wholesale loans (presumably reflecting a bank's need to preserve its relationship with its customers).

We have not found existing studies which consider this option as a way for banks to reduce liquidity needs.

**Method**

In terms of reducing liquidity requirements, the gains to shortening the maturity of loans to financials are twice those of reducing loans to non-financials.

For retail and corporate counterparts, we use ECB time series for rates of new credits distributed to households for (1) house purchase; (2) consumption; and to (3) non-financial corporates. These series provide granularity on maturities as they differentiate between:

- less than 1 year;
- between 1 and 5 years;
- more than 5 years.

For financial counterparts, a database has been built based on the LIBOR/EURIBOR values, for four currencies (GBP, EUR, DKK, SKK) on the longest time range available on Bloomberg (starting in 1987 for GBP, 1999 for EUR, 2003 for DKK and 2006 for SKK)<sup>28</sup>. It combines 14 different maturities on the unsecured interbank market for each currency zone, from 1 week to 12 months (Table A3.3).

$$C = ShM - LoM$$

*ShM*, the LIBOR/EURIBOR rate of shorter term

*LoM*, the LIBOR/ EURIBOR rate of longer term

*C*, the cost to reduce the tenors of assets.

Table A3.3: Cost for shortening maturities

3 months to 1 month	12 months to 3 months	12 months to 1 month
---------------------	-----------------------	----------------------

<sup>28</sup> The time period of the sample is then harmonized so that all currencies are on a level-playing field.

-0.1687%	-0.505%	-0.7541%
-0.24%	-0.4355%	-0.705%
-0.244%	-0.3963%	-0.64%
-0.1744%	-0.4563%	-0.645%

We obtain a proxy of the opportunity cost of shortening maturities on the assets-side, per currency area.

### C. Commitments: reducing credit / liquidity lines

Commitments are given relatively high stressed outflow assumptions – in the December 2010 proposal, notably 100% outflows on wholesale liquidity commitments. The January 2013 BIS decision implies a reduction in the weights on outflows, as the unused portion of committed liquidity facilities to non-financial corporate, sovereigns, central banks and PSEs are now given a weight of 30% (previous weighting:100%). Nevertheless, banks can still reduce their liquidity needs by reducing their commitments.

Abouhossein and Lee consider reducing committed lines. They assume that banks would reduce lines to financials first, then to corporates and sovereigns. The authors are wary though that it would ‘prove challenging from a corporate relationship perspective.’

Abouhossein *et al.* assume that for each type of commitment, the cost of their reduction is 25 bps. The authors assume repricing of 10 bps on remaining outstandings.

#### Method

Using a credit lines database we find that an average annualised fee for maintaining such lines open is around 22 bps. Before 2008, this average cost was as low as 9.5 bp but could range between 3.5 bps and 20 bps. After the recession, the undrawn fees on these credit lines increased to an average 35 bps and range moved between 15 bps and 75 bps. In addition, after the recession the average maturity of these facilities was reduced by one year. Borrowers from C7, C13, C9, C4 and C5 pay higher fees in the sample; this result may be influenced more recently by the higher volatility in the recession.

We use Loan Pricing Corporation’s DealScan (LPC) database to obtain credit lines information.<sup>29</sup> Our database includes: undrawn fees, all-undrawn spread, maturity, etc.; information on the borrower, and information on the lending syndicate, including the name and role (in some cases) of the banks in the syndicate. We analyse the data by borrower firm and by lending banks. The data includes credit lines that were opened between the 17 January 2005 and 24 June 2013 and with maturities up to the 28 October 2018.

<sup>29</sup> For a full list of banks in the database see Data appendixAppendixappendixappendix 2.

Table A3.4: Averages across the whole sample period (2005-2013)

Borrower-Country	Total Fee (US\$)	Fee annualised (US\$)	Loan Amount (US\$)	Years	Total Fee (bps)	Annualised Fee (bps)
C1	893,326,288	169,551,396	191,569,296,431	5.27	46.63	8.85
C2	771,891,944	197,189,428	98,614,039,648	3.91	78.27	20.00
C3	197,945,377	46,860,078	19,845,302,268	4.22	99.74	23.61
C4	1,199,144,752	271,598,122	88,303,622,438	4.42	135.80	30.76
C5	385,655,247	77,739,830	30,569,919,543	4.96	126.16	25.43
C6	749,583	150,000	300,000,000	5.00	24.99	5.00
C7	1,304,865,016	283,588,407	45,663,144,403	4.60	285.76	62.10
C8	38,380,609	7,531,939	6,047,429,866	5.10	63.47	12.45
C9	375,747,696	84,140,292	26,979,587,513	4.47	139.27	31.19
C10	30,695,164	6,907,561	7,730,453,071	4.44	39.71	8.94
C11	73,907,878	14,141,110	15,471,646,538	5.23	47.77	9.14
C12	637,675	212,755	618,475,088	3.00	10.31	3.44
C13	308,037,108	60,567,413	17,685,678,690	5.09	174.17	34.25
C15	17,862,896	2,913,855	4,286,334,862	6.13	41.67	6.80
C18	100,038,404	17,062,696	18,048,073,678	5.86	55.43	9.45
C26	4,201,564	600,462	1,066,539,518	7.00	39.39	5.63
C27	3,327,661	832,493	693,744,519	4.00	47.97	12.00
C30	9,285,547	1,857,474	1,799,005,522	5.00	51.61	10.33
C31	697,735,309	259,102,309	121,878,530,869	2.69	57.25	21.26
A11	6,427,692,699	1,505,444,072	697,894,937,427	4.27	92.10	21.57
Europe	6,404,150,172	1,500,690,146	695,371,818,943	4.27	92.10	21.58

Source(s): Loan Pricing Corporation's Dealscan (LPC) and authors' own calculations

The undrawn fee usually includes both a one-time commitment fee and an annual fee the borrower pays the bank. The fee is a measure of the cost the bank charges the borrower (in bps) for granting access to liquidity to the undrawn part of a credit line. The undrawn fee compensates a bank for the liquidity risk it incurs by guaranteeing the borrower access to liquidity at its discretion and up to the total commitment amount. Most of the credit facilities from our dataset include data on the spread (over EURIBOR or Libor) paid on the drawn amounts and a separate line for the commitment fee the customers pay on the undrawn credit.

Table A3.4 above shows the average commitment fee. The data has been broken down by borrower nationality and not by lender's nationality. Therefore, the annualised cost by country might not reflect exactly the cost structure of each national banking system but more the characteristics of borrowers in each country.

In any case, the total average for Europe of 22 bps is close to the reported 25 bps of Abouhossein and Lee (2011) and to the range reported by Bord and Santos (2013), between 19 bps and 21 bps.

Most of the loans are syndicated, i.e. many banks may provide the facility but the conditions are equal for any of the banks in the syndicate. For some of the credit lines there is additional information on which banks play a greater or smaller role as a percentage. The data also includes names of the banks in each syndicate which allow extracting the commitment made by each bank.

However, if we analyse this dataset by bank it is difficult to weight these commitments appropriately. For example, if we want to know what average fee ABN AMRO charges from two syndicated lines provided by ABN AMRO and a few other banks, we could add the total amounts and fees and calculate an average. The problem is that in reality AMRO is making a contribution to the facility that is smaller than the total amount available from the facility and we don't know exactly what it is. We thus estimate first the average by borrower's country which gives an idea of the costs of arranging these facilities in a given country. This is equivalent to assuming that each bank is committed to providing the entire line.

Using the results from Table A3.4 above we can group the countries in three blocks:

1. average fees higher than 25 bps occur in C7, C13, C9, C4 and C5;
2. average fees higher than 10 bps but below 25 bps occur in C3, C31, C2, C8 and C27; and
3. low fees below 10 bps occur in C18, C11, C10, C1, C15, C26, C6 and C12.

An important caveat here is that these fee buckets reflect characteristics of the borrowers and not of the banks.

We can separate the data in pre- and post-2008 data (i.e. pre- and post-recession). Tables A3.5 and A3.6 show this with an average fee of 9.5 bps before the recession against a 40 bps between 2008 and 2013. The tables also show a great deal of by-country variation in both the undrawn fee and the maturity of the loans. This observation is in line with Bord and Santos (2013), suggesting that lenders under liquidity stress might find it more difficult to maintain these lines open or that they can only do it at a higher cost. Finally, the average length of the facilities falls from an average pre-recession of five years to a post-recession average of around four years.

Table A3.5: Undrawn fee before the recession (2005-2008)

Borrower-Country	Total Fee (US\$)	Fee annualised (US\$)	Loan Amount (US\$)	Years	Total Fee (bps)	Annualised Fee (bps)
C1	598,049,497	110,493,134	169,179,214,550	5.41	35.35	6.53
C2	329,445,223	69,125,249	81,805,620,886	4.77	40.27	8.45
C3	63,193,173	11,575,343	12,600,476,847	5.46	50.15	9.19
C4	364,561,893	67,150,425	40,038,758,634	5.43	91.05	16.77
C5	55,097,135	8,053,110	11,593,796,122	6.84	47.52	6.95
C6	749,583	150,000	300,000,000	5.00	24.99	5.00
C7	111,592,436	20,729,498	22,751,109,516	5.38	49.05	9.11
C8	23,724,202	4,600,658	4,186,298,871	5.16	56.67	10.99
C9	23,944,466	4,790,076	3,631,613,014	5.00	65.93	13.19
C10	19,278,178	3,098,372	5,386,336,803	6.22	35.79	5.75
C11	73,907,878	14,141,110	15,471,646,538	5.23	47.77	9.14
C12	637,675	212,755	618,475,088	3.00	10.31	3.44
C13	45,316,363	8,023,264	6,699,109,422	5.65	67.65	11.98
C15	17,862,896	2,913,855	4,286,334,862	6.13	41.67	6.80
C18	87,670,279	14,587,696	16,548,073,678	6.01	52.98	8.82
C26	4,201,564	600,462	1,066,539,518	7.00	39.39	5.63
C27	3,327,661	832,493	693,744,519	4.00	47.97	12.00
C30	9,285,547	1,857,474	1,799,005,522	5.00	51.61	10.33
C31	141,023,807	58,020,005	29,414,004,712	2.43	47.94	19.73
All	1,987,126,437	403,851,431	428,794,272,064	4.92	46.34	9.42
Europe	1,963,583,910	399,097,505	426,271,153,580	4.92	46.06	9.36

Source(s): Loan Pricing Corporation's Dealscan (LPC) and authors' own calculations



Table A3.6: Undrawn fee after the recession

Borrower-Country	Total Fee (US\$)	Fee annualised (US\$)	Loan Amount (US\$)	Years	Total Fee (bps)	Annualised Fee (bps)
C1	295,276,792	59,058,262	22,390,081,881	5.00	131.88	26.38
C2	442,446,721	128,064,179	16,808,418,762	3.45	263.23	76.19
C3	134,752,204	35,284,734	7,244,825,421	3.82	186.00	48.70
C4	834,582,859	204,447,697	48,264,863,804	4.08	172.92	42.36
C5	330,558,112	69,686,720	18,976,123,420	4.74	174.20	36.72
C6						
C7	1,193,272,580	262,858,909	22,912,034,887	4.54	520.81	114.73
C8	14,656,407	2,931,281	1,861,130,995	5.00	78.75	15.75
C9	351,803,230	79,350,216	23,347,974,499	4.43	150.68	33.99
C10						
C11						
C12						
C13	262,720,745	52,544,149	10,986,569,268	5.00	239.13	47.83
C15						
C18	12,368,125	2,475,000	1,500,000,000	5.00	82.45	16.50
C26						
C27						
C30						
C31	556,711,503	201,082,305	92,464,526,157	2.77	60.21	21.75
All	4,440,566,261	1,101,592,641	269,100,665,363	4.03	165.02	40.94
Europe	4,429,149,276	1,097,783,452	266,756,549,095	4.03	166.04	41.15
Europe (exc1. C7)	3,235,876,696	834,924,543	243,844,514,208	3.88	132.70	34.24

Source(s): Loan Pricing Corporation's DealScan (LPC) and authors' own calculations

### 3.4.2. Liability-side adjustments

The following assessments are based upon the assumption that the liabilities side is fully elastic, e.g. an increase in demand of long-term funding stemming from a bank meets its supply at the initial price. It is, of course, acknowledged that this might not match the reality faced by a bank treasurer.

#### A. Lengthening funding maturities

This is one of the key options for adjusting, according to the literature.

Abouhossein *et al.* assume that banks first refinance debt due within one month (debt securities, seemingly) by one year unsecured debt. Average cost across the sample of European banks is 209 bps. But the figure

ranges from below 1% to 7% or 8% depending on the banks. A word of caution here is that it is not clear whether the study really uses one month vs. one year. A second strategy is adjusting the deposit funding structure – converting interbank deposits due within one month to one year (to exhaust that effect) (see also Bonner 2012). Converting interbank deposits to term costs on average 209 bps (*i.e.* the same data as for refinancing securities due, to be taken with the same caution). There is a limit on banks’ ability to convert short-term deposits, as some are operational and need to be at sight. The study runs together in this scenario ‘increasing term retail deposits’, but this scenario appears to be increasing term retail deposits and using the proceeds to buy liquid assets - so for this, see under Section 3.4.3. Leveraging.

Elliott *et al.* make a similar assumption about the cost of terming out wholesale funding, at 200 bps, noting that ‘the cost of altering the maturity of the [...] liabilities can only roughly be estimated’ and that 200 bps is ‘broadly consistent with those of the equity analysts who have reported on this’.

The UK FSA in assessing the costs of its new regulatory liquidity regime in 2009 assumed that the cost of terming out wholesale funding (beyond three months given the design of its requirement) was of 50 bps. This estimate was calculated by looking at the highest cost of long-term funds for UK banks between 2000 and early 2007 using a number of secondary market indices maintained by leading investment banks. However, this estimate will not capture the greater credit risk attached to banks since the start of the financial crisis: in the run up to 2007, credit spreads were excessively compressed.

The Basel Committee’s long-term economic impact study assumes a term spread of 100 bps for wholesale funding, but it seems likely that this assumption is not based on the correct part of the yield curve for our study. ‘Short-term’ is less than a year and ‘long-term’ more than a year. ‘Short-term’ is not short enough for our purposes. It is also not clear over what time period this yield is calculated.

**Method**

The same database as before (*cf.* cost assessment on shortening maturities) is used for the liabilities side. In short, it collects LIBOR/EURIBOR values, for four currencies (GBP, EUR, DKK, SKK) on the longest time range available (starting 1987 for GBP, 1999 for EUR, 2003 for DKK and 2006 for SKK), on 14 different maturities on the unsecured interbank market for each currency zone, from 1 week to 12 months.

Then we calculate the additional cost to extend maturities on the liabilities side, as follows:

$$C = LoM - ShM$$

*ShM*, the LIBOR/EURIBOR rate of shorter term

*LoM*, the LIBOR/ EURIBOR rate of longer term

C, the cost to reduce the tenors of assets.

Table A3.7: Increase in interbank rate, due to the extension of maturities

	1 month to 3 months	3 months to 12 months	1 month to 12 months
GBP	-0.1687%	-0.505%	-0.7541%
EUR	-0.24%	-0.4355%	-0.705%
DKK	-0.244%	-0.3963%	-0.64%

SKK

-0.1744%

-0.4563%

-0.645%

## B. Increasing retail deposits

As retail deposits are given run-off rates of 3%, 5% or 10%, respectively, under the current LCR definition, it is considered an inexpensive and stable way to get funding, as well as a preferential tool to improve the LCR. Thus, one adaptation to LCR requirements could be the increase of interest rates paid to retail deposit holders, in order to simultaneously decrease the volume of short term funding.

Most of the papers on the LCR impact focus on the arbitrage between high quality liquid assets and non-eligible assets, and secondly on the lengthening of liabilities maturities. Most of the literature does not focus on the possibility that banks may prefer to increase their retail deposits. Abouhossein *et al.* (2011) includes an assumption on retail deposits, as it builds on the hypothesis that this source of funding could rise of a further 5%, with an associated cost equivalent to the wholesale market (estimated at 221 bps). The authors are cautious on the impact it might have over other assets: 'We assume that accelerating deposit taking would come at the expense of the mutual funds and insurance life products'. But the authors do not propose a dynamic scheme for the banking system, *i.e.* where competition might push prices upwards without any additional effect due to competition neutralisation. They implicitly set the assumption that customers will arbitrate between assets in favor of deposits, if banks increase the rate they pay for deposits to the spread bucket of between 100 and 150 bps.

### Method

The increase of retail deposits might be used as an adjustment tool to help banks reach the required level of LCR. However, there are some exogenous effects that must be taken into account, among which the likeliness of retail deposit competition. Such a competition could lead to an under-optimal equilibrium where banks have increased the average rate paid to retail customer for their deposits, without having succeeded into attracting more deposits (neutralisation effect) if we consider there will be no arbitrage among assets. And, if we assume there will be competition, it can also be assumed that a bank will not pay more for deposits than it would have paid for its 3-year funding. The run-off rate for retail deposit is fixed at 3%, equivalent to the roll-over of a term deposit with a 33-month maturity. The assessment of rates adjustment to retail deposits could be achieved on an individual basis estimate, within each country as retail deposits are essentially anchored to the domestic country, following Ho & Ishii (2011). It also implies that in a country where all banks are non-LCR compliant, an increase in rates for deposits till each bank reaches its 3-year funding rate, there will be a premium for the bank considered the least sound, as it will be able to increase its deposit rate to a higher level than the safest banks. If we consider a two-bank model under the following assumptions:

Table A3.8: Prior equilibrium

	3-year unsecured funding rate (in bp)	Outflows gap (EUR billion)	Deposit interest rate at prior equilibrium (in bp)	Level of retail deposit (EUR billion)
Bank A	180	30	25	60
Bank B	150	10	25	40

Source: Authors' own calculations.

If we set:

- the level of customers that are unresponsive to rate changes (*i.e.* faithful customers) at 10%<sup>30</sup>;
- the hypothesis that the funding replaced by retail deposit is a 1-month maturity funding;
- the volume of retail deposits at a stable level over the two periods.

Then we might reach the following non-optimal equilibrium:

Table A3.9: New equilibrium

	3-year unsecured funding rate (in bp)	Outflows gap (EUR billion)	Deposit interest rate at prior equilibrium (in bp)	Level of retail deposit (EUR billion)
Bank A	180	-	180	96
Bank B	150	44.2	150	4

Source: Authors' own calculations. This simulation assumes a 5% run-off rate for all retail deposits.

Even though this example is excessively simple (two-bank model with strong assumptions), it already rises many questions on qualitative aspects, specifically on the behavioral reactions a bank may adopt concerning retail deposits (tables A3.8 and A3.9). Considering all those questions, the banking sector might prefer a *status quo* on retail deposits in order to avoid an inefficient competition.

*Status quo* is the assumption we make for the purpose of our quantitative assessment: the cost of increasing retail funding is supposed to be constant, at December 2012 prices.

Following Abouhossein *et al.*, we define the increase in retail deposits' rate as a secondary strategy. In other words, we consider it as an option to improve marginally the LCR to a certain extent, but under binding volume restrictions so that the whole banking system is not urged into a race for attracting deposits. Even if the preference for liquidity could be a positive exogenous effect, that might push retail customers arbitrate their assets in favor of deposits, it doesn't seem that, at this stage, the increase of interest rates on retail deposits could alone allow the closing of a sizeable proportion of the liquidity gap.

## Data

Data could be retrieved from ECB data warehouse on overnight rate paid for deposits by banks, for 27 Member States of the EU<sup>31</sup>. We took advantage of the availability of data to distinguish between household deposits<sup>32</sup> and non-financial corporate deposits<sup>33</sup> (Table A3.10).

<sup>30</sup> Figure set arbitrarily, for the purpose of our demonstration.

<sup>31</sup> Croatia was not included in the data for this report.

<sup>32</sup> **UM.M.XX.B.L21.A.R.A.2250.EUR.N.VAL**: Annualised annualised Annualised Annualised agreed rate (AAR)/narrowly defined effective rate (NDER), Credit credit Credit Credit and other institutions (MFI except MMFs MMMFs MMFs MMFs and central banks) reporting sector - overnight deposits, Total total Total Total maturity, new business coverage, households and non-profit institutions serving households (S.14 and S.15) sector.

<sup>33</sup> **UM.M.XX.B.L21.A.R.A.2240.EUR.N.VAL**: Annualised agreed rate (AAR) / Narrowly narrowly defined effective rate (NDER), C credit and other institutions (MFI except MMFs and central banks) reporting sector - o Overnight deposits, t Total maturity, n New business coverage, n Non-Financial corporations (S.11) sector.

Table A3.10: Rate paid for deposits

	Median over the sample		Dec 2012	
	Non-financial corporates	Households	Non-financial corporates	Households
C1	0.00%	0.00%	0.26%	0.09%
C2	0.13%	0.11%	0.22%	0.57%
C3	1.56%	1.17%	0.24%	0.57%
C4	0.00%	0.00%	0.00%	0.00%
C5	2.18%	1.24%	1.09%	0.36%
C6	0.51%	0.74%	0.23%	0.35%
C7	2.81%	0.89%	0.59%	0.45%
C8	1.47%	1.23%	0.25%	0.84%
C9	0.90%	0.86%	0.26%	0.24%
C10	1.74%	1.31%	0.33%	0.48%
C11	0.77%	1.60%	0.15%	0.36%
C13	1.00%	1.00%	0.37%	0.21%
C14	2.16%	2.65%	1.46%	1.74%
C16	1.93%	1.74%	2.09%	2.07%
C17	0.54%	0.65%	0.31%	0.70%
C18	1.25%	1.05%	0.74%	0.71%
C19	0.29%	0.32%	0.29%	0.32%
C20	0.39%	0.25%	0.00%	0.00%
C21	0.15%	0.40%	0.09%	0.43%
C22	0.78%	0.55%	0.04%	0.12%
C12	0.45%	0.15%	0.11%	0.09%
C23	0.53%	0.87%	0.32%	0.63%
C24	0.54%	1.13%	0.59%	1.10%
C25	0.81%	0.40%	0.05%	0.02%
C26	1.08%	NA	0.46%	0.49%

C28	1.87%	3.42%	1.53%	1.06%
C29	0.30%	0.30%	0.31%	0.17%
EuroZone	1.849%	1.622%	0.000%	0.000%
Eurozone	0.914%	0.702%	0.417%	0.388%

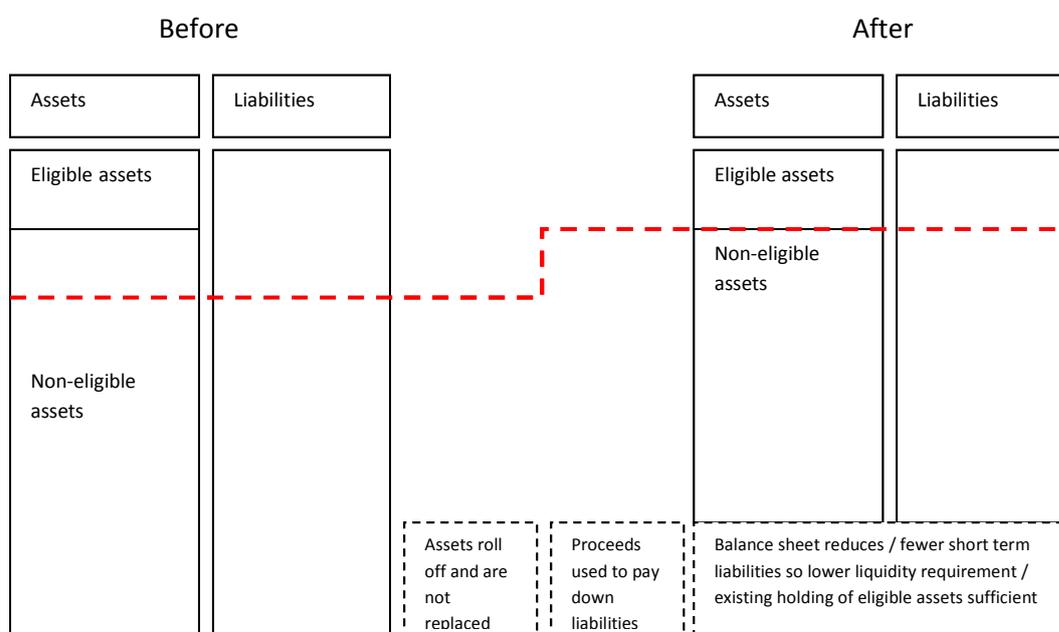
We use December 2012 data, as the overall sample covers situations that are structurally quite different.

### 3.4.3. Adjustments combining asset & liability sides

#### A. Deleveraging

In the LCR regulatory environment, deleveraging refers to a balance-sheet downsizing, through a decrease in short-term funding as well as a decrease in non-eligible assets holdings. This implies an LCR increase by a shrink in LCR-costly funding means without affecting the numerator (Diagram A3.3).

Diagram A3.3: Deleveraging



Abouhossein *et al.* (2011) do not consider deleveraging straightforward, but they propose two distinct scenarios of reduction of credit distribution:

- decrease of corporate loans by 15%;
- decrease of consumer finance loans by 54%.

For each scenario, they estimate a margin loss, due to reinvestment in low-yield assets (HQLA Level 1). This loss is considered partly offset by margin re-pricing on the remaining book. In the case of the reduction of corporate loans, they assess the reduction in banks' earnings per share (EPS) might be of 5%, when the reduction in consumer loans could decrease the EPS by 12%. However, Abouhossein *et al.* (2011) do not detail how they take into account the maturity effect, *i.e.* the decrease of loans books reduces inflows, even if at a much slower pace than it reduces the outflows due to the usual short term funding structure of banks.

The authors mention it, however: 'Note that the amount of shrinkage is higher than the EUR 493.4 billion shortfall as reducing/running off loans also implies lower levels of inflows in the LCR calculation'.

They consider that the loss in terms of margin is 170bp for corporate loans, partially offset by the re-pricing of loans (20bp). The latter seems to be an estimate according to the authors' view, and the former is calculated upon the average spread of (1) BBB-rated corporate syndicated loans; (2) BBB-rated corporate unsecured senior bond; and (3) authors' view for traditional bank loans. For consumer finance, they estimate the average spread by country (according to data from central banks and their own estimates. The spread ranges from 3.3% to 5.8%. They assume that the cost to shrink the personal finance loan book might be partly offset by the increase of 150bp (arbitrary) in remaining outstandings.

**Method**

Table A3.11: Loan rates to non-financial corporates, mortgages, and consumption loans in the EU

	1 month to 3 months	3 months to 12 months	1 month to 12 months
GBP	-0.1687%	-0.505%	-0.7541%
EUR	-0.24%	-0.4355%	-0.705%
DKK	-0.244%	-0.3963%	-0.64%
SKK	-0.1744%	-0.4563%	-0.645%

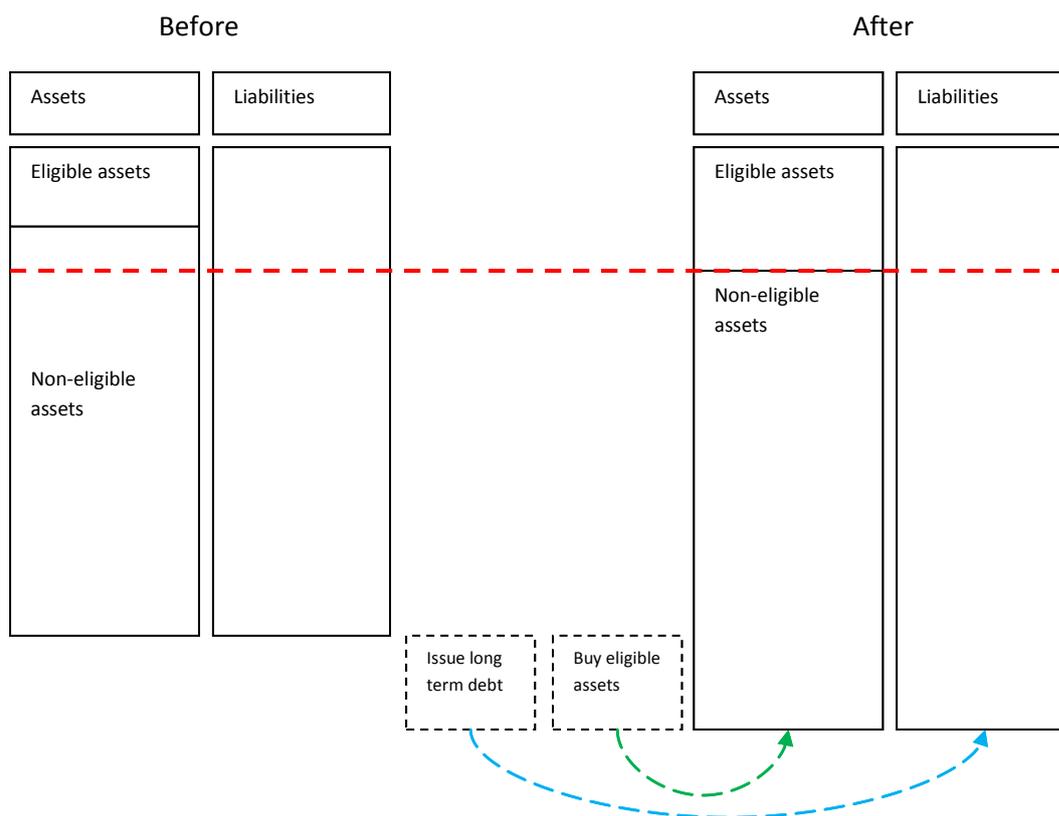
Source: ECB data warehouse. For non-euro countries, the rate is the rate on national currency credits

Deleveraging: adjustment on the liability side

**B. Leveraging**

It refers to the increase of banks' balance sheets through an increase in long-term funding and the simultaneous increase in eligible asset holdings (Diagram A3.4).

Diagram A3.4: Leveraging



There doesn't seem to be much focus on this strategy in the literature. Abouhossein *et al.* (2011) expect the strategy of leveraging to be a marginal improvement tool in their scenario of maturities lengthening on the liability side. In that scenario, it is assumed that if banks cannot reach the level of 100% by lengthening the maturities on the liability side, they 'would raise additional unsecured with two year maturity to increase the liquid asset buffer – assuming the cash proceeds from the 2-year unsecured debt are reinvested in 2-year government bonds which would qualify as level-1 assets'.

## Method

### Leveraging: asset-side adjustment

The indices method used in the strategy of arbitrage allow us to approximate HQLA Level 1 and Level 2 returns. We obtain the opportunity cost by subtracting HQLA returns to the funding rate

### Leveraging: liability-side adjustment

The liability-side adjustment is approximated by calculating, for each country of the sample, an average yield curve, under the assumption that each banking system, according to its BICRA<sup>34</sup> group, conveys a spread to be added to the sovereign spread.

## 3.4.4. Expected opportunity costs and bank behavioural reactions in the simulations

### Review of literature

In the literature, *Abouhossein and Lee* assume that in the first instance, every bank refinances debt maturing over the next 30 days with one-year securities. Every bank uses this route before turning to others. Then they issue two-year debt and buy two-year government bonds. Most banks can get to 100% through these

<sup>34</sup> Banking Industry Country Risk Assessment, produced by Standard & Poor's and resulting into the classification of national banking systems into groups according to their level of risk, from 1 (the least risky) to 10 (the most risky).

two routes. For the four banks which cannot, they pursue the following policies in this order: reduce undrawn commitments; convert financial deposits to term; reduce IB trading assets e.g. derivatives; shrink corporate loan book. Next is converting interbank (financial) deposits due within one month to one year. Only 50% of financial deposits can be converted, as some are required for operational/transactional purposes. Next, interbank deposits are converted into term retail deposits.

*BCBS MAG* Acroeconomic Assessment Group assumes that banks build up liquid asset buffers by issuing additional term wholesale debt. *FSA 2009* recognises two options – terming out wholesale liabilities and issuing term liabilities to buy government debt – and does not make an assumption about which banks will pursue, rather just showing the costs to banks of different combinations of these options.

Recently, *zeb/* (2013) published a study on the impact of the LCR on banks which also covered their behavioural reactions. It is based on detailed surveys of 23 banks in Austria (coverage: market share 65 per cent) and Germany (coverage: market share 13 per cent). It includes nine large banks (G1 banks) and fourteen smaller banks (G2 banks). The sample also covers different business models; such as co-operative banks, savings banks, internationally active universal banks, specialised banks and direct banks.

At the end of 2012, only 10 per cent of respondents featured an LCR at the consolidated level of below 60 per cent (based on the GHOS calibration of January 6 2013), but 50 per cent had LCRs of above 100 per cent. At the solo level, the reported LCRs are lower, especially for Austrian banks. The target rates for the LCR differ across banks: roughly one third targets an LCR of 111-120 per cent, one third aims at above 121 per cent, and the remaining third plans for an LCR slightly above the regulatory minimum of 100 per cent.

More than half of the banks have already studied the impact of the LCR on their business model and their business strategy. Between 43 per cent and 57 per cent of these banks expect effects on their P&L, their balance-sheet and their business model and strategy. The major driver of negative effects on profitability are expected opportunity costs of HQLA (83 per cent) and lengthening of tenors of their liabilities (52 per cent), increase in stable deposits (17 per cent) and reduction of committed liquidity and credit lines (13 per cent). However, 53 per cent expect no or only a small impact on profitability and 5 per cent a strong impact, the remainder expect a medium impact. G2 banks report a larger impact than G1 banks.

What measures are planned by banks so that they become compliant? The major strategies are reductions of unsecured outflows (86 per cent), increases of L1 HQLA (76 per cent) and of L2 HQLA (38 per cent). Respondents also plan to cut committed credit and liquidity lines (33 per cent) and secured outflows (33 per cent).

Do banks include direct (i.e. funding costs) and indirect (i.e. costs of buffers) liquidity costs in their fund transfer pricing (FTP) models? The majority of respondents account for direct liquidity costs in their FTP models (91 per cent), but only 39 per cent also take indirect liquidity costs into consideration. Regarding the pass-through of direct liquidity costs 78 per cent report a complete pass-through to customers and further 9 per cent indicate a pass-through with a discount. The situation differs for indirect liquidity costs; only 9 per cent can pass them through fully and a further 30 per cent with a discount. In the future 79 per cent plan to integrate indirect liquidity costs in their FTP models.

De Haan and van den End (2013) investigate the reaction of 17 Dutch banks (covering 95 per cent of total assets in the Dutch market) to funding liquidity shocks. The data comprises of monthly data on assets and liabilities according to the Dutch liquidity reporting scheme from January 2004 to April 2010. The analysis finds that banks reacted to the funding shock beginning in August 2007 by increasing liquid assets (in particular highly liquid assets and excess central bank reserves) and by reducing wholesale loans (i.e. to financial corporates and non-financial corporates) and less liquid assets. Retail loans (to households and SMEs) were not reduced significantly.

### 3.5. Cost savings due to the interaction between liquidity regulation, capital regulation, and the leverage ratio

The fourth dimension aims at taking into account potential interaction between capital and liquidity regulation. Changes of the asset side of banks' balance sheets have an impact on capital requirements: substituting assets with high and extremely high credit quality for those with lower levels of credit quality will, *ceteris paribus*, reduce risk-weighted assets (RWA). That implies lower capital requirements and lower costs of equity (at each level of targeted return on equity/cost of equity). In addition, banks, that pose lower liquidity risk, will, *ceteris paribus*, face lower refinancing costs on debt capital markets and equity capital markets. Furthermore, high quality non-financial corporate bonds could experience lower yields, which partly offset the higher costs of financing for the real economy. In addition, we assume that other costs of banking (i.e. the cost income ratio) remain stable. In fact, banks could increase their efficiency to partly compensate increased opportunity costs of higher liquidity risk bearing capacity.

The mandate in Article 509(1) of the CRR was amended by the European Parliament which inserted the following requirement: 'Such analysis should take due account of markets and regulatory developments as well as of the interactions of this ratio with other prudential requirements under the present regulation such as the risk capital ratios or the leverage ratios.'

Irrespective of the amendment, the requirement is reasonable and the following note clarifies how WS 5 will take the interaction between capital requirements, the leverage ratio, and the LCR into account.

The behavioural adjustments induced by the LCR influence the balance sheet total and the balance sheet structure. Capital requirements are sensitive to both the balance-sheet total and balance sheet structure. Overall, the interaction between liquidity regulation and capital requirements is three ways:

First, the purpose of the LCR is to incentivise banks to manage their funding in terms of maturity and counterparty. Lengthening the term of liabilities, smoothing the maturity structure of liabilities or focusing on different counterparties does not affect capital ratios at all.

Second, liquidity regulation requires banks to hold a stock of liquid assets and therefore provides incentives to change the composition of assets which has feedback effects on risk weights and the risk-based capital ratio and therefore required capital.

Banks may also extend their balance sheet in order to hold the required amount of liquid assets which affects not only on the risk-based capital ratio but also on the banks' leverage ratio.

Third, capital requirements incentivise banks to increase capital at any given balance sheet size. Depending on the liabilities that are substituted by capital, this adjustment can reduce net cash outflows and influences the LCR.

Irrespective of the amendment, the requirement is reasonable and the following note clarifies how the interaction between capital requirements, the leverage ratio, and the LCR feeds into the simulation model and is considered in calculating the impact of the LCR on banks and the macro economy.<sup>35</sup>

Seven behavioural adjustment strategies induced by the LCR are taken into account:

1. Sell non-liquid assets, buy liquid assets (impact on HQLA and inflows)
2. Reduce committed lines (impact on cash outflows)
3. Shorten average maturity of assets (impact on cash inflows)
4. 'Term out' short-term wholesale funding (impact on cash outflows)
5. Reduce short-term wholesale funding, increase retail deposits (impact on cash outflows)
6. 'Deleveraging': sell non-liquid assets to pay down short-term liabilities (impact on cash inflows and cash outflows)
7. 'Leveraging': buy liquid assets, funded by issuing long-term wholesale debt [or retail deposits or capital] (impact on HQLA and, if funded by liabilities, cash outflows)

---

<sup>35</sup> A detailed analysis of the interaction between the liquidity and capital standards is also given in the technical appendix 5.

Banks' may adjust differently to the LCR, depending on their business model. Table A3.11 gives an overview of the banks' balance sheet structure, based on Basel III monitoring data (and the 2010 calibration of the LCR), focusing on liquid assets, cash outflows and cash inflows.

If banks change the composition of assets by holding more liquid assets, risk weights will decrease and therefore required capital decreases (strategy 1). Banks may also extend their balance sheet in order to hold the required amount of liquid assets which impacts not only on the risk-based capital ratio but also on the banks' leverage ratio (strategy 7). Only limited fraction of assets and liabilities are considered in the LCR. For HQLA, the fraction is the portion of assets which is eligible for the stock of liquid assets. For outflows (inflows), the fraction equals the portion of liabilities (assets) maturing within 30 days.

The LCR also incentivises banks to manage their funding in terms of maturity and counterparty. Lengthening the term of liabilities, smoothing the maturity structure of liabilities or focusing on different counterparties, however, does not affect capital ratios at all.

The first channel of interaction between the LCR and capital ratios (CR) rests on the impact of LCR-induced behavioural adjustments on banks' CR (Section 3.5.1.). The impact of CR and LR induced adjustments on the banks' LCR are considered in Technical Appendix 5. Furthermore, the unweighted amount of liquid assets as well as assets and liabilities maturing within 30 days are subject to a haircut, run-off rate or inflow rate to define the stock of liquid assets, cash outflows and cash inflows under stress.

The first channel of interaction between the LCR and CR rests on the impact of LCR induced behavioural adjustments on banks' CR (Section 3.5.1.). The impact of CR and LR induced adjustments on the banks' LCR are considered in Section 3.5.2.

### **3.5.1. The impact of changing the balance sheet structure (reduction of risk weights)**

The macroeconomic costs associated with the LCR are the result of bank behavioural reactions to the LCR. Banks are forced to change their balance-sheet structure away from what they deem optimal based on their private profit maximisation. These adjustments apply to expected opportunity costs. Rather than extending or reducing the balance sheet, banks may shift out of non-liquid assets with higher yield into liquid assets with lower yield but higher credit quality. As a consequence, the risk weights decrease, while total exposure for the leverage ratio remains unchanged, and the bank makes savings in terms of lower capital requirements. The following includes these savings in the analysis of expected opportunity costs. A cost perspective and a quantity perspective are presented by investigating the following two areas:

- What reductions in risk weights are associated with a particular adjustment strategy?
- What are the savings associated with a reduction in risk weights?

#### **3.5.1.1. Capital requirements and risk weights**

Directive 2006/48/EC establishes risk weights for various exposure classes (Table A3.12). In addition, the framework allows for a standardised approach and an internal ratings-based approach. The latter relies on banks' internal models. Since these are not publicly available the following analysis refers to the standardised approach. To reduce complexity and ensure robustness, the following analysis is based on a simplified version of Directive 2006/48/EC. .

Table A3.12: Overview over ratings and risk weights according to CRD

Exposure Class		AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to BB-	B+ to B-	Below B-	Non rated
Central government (and RGLA, PSE)		0%	20%	50%	100%	100%	150%	100%
Banks (and RGLA, PSE)	Option 1	20%	50%	100%	100%	100%	150%	100%
	Option 2	20%	50%	50%	100%	100%	150%	50%
Corporates		20%	50%	100%	100%	150%	150%	100%
Retail		75%						
RRE (Residential Real Estate)		35%						
Collective Investment Undertakings (Funds)		20%	50%	100%	100%	150%	150%	100%
Securitization		20%	50%	100%	350%	1250%	1250%	1250%

Source: Simplified summary of Directive 2006/48/EC Annex VI. For robustness of the results additional variations of risk weights according to securitisation characteristics and trading book items. Central government (and RGLA, PSE) exposure of EU sovereigns receives a 0% risk weight for EU banks, irrespective of the rating.

Given the lack of publicly available banks' internal ratings and asset characteristics, the analysis has to rely on a simplified approach to risk weights (Table 33). Wherever possible, the banks' average risk weight is approximated using EU QIS data. The CRD IV/CRR foresees common equity of 8% of risk weight assets (RWA) plus a capital conservation buffer of 2.5% RWA plus a SIFI buffer and a countercyclical buffer. The SIFI buffer only applies to SIFIs, thus we abstract from it for the purpose of this note. This implies that for SIFIs we underestimate the impact of the strategies with respect to RWA reductions. In addition, we abstract from the countercyclical buffer which would only apply under certain conditions (i.e. excessive credit growth). In sum we assume a common equity minimum ratio of 10.5% RWA.

The assessment is to demonstrate the level of interaction between liquidity and capital regulation.

### 3.5.1.2. Cost of equity

Different exposure categories are associated with different risk weights. Banks employ capital to generate a return for shareholders. In order to achieve this aim, banks include their return on equity (RoE) objective in their interest rate calculations. Based on historical experience from 1995 to 2007, the return on equity for banks was higher than that of non-financials (table A3.13). Some banks had very high RoEs of 20 per cent or even 25 per cent. Since the beginning of the financial crisis, RoEs above 15 per cent are rare. The RoE objective should be at least the cost of equity which is currently about 12 per cent. For the purposes of this report, we assume a RoE objective of 12 per cent which is in line with the average from 1995 to 2009.

Table A3.13: Overview over return on equity in various sectors over the period 1995 to 2009 (showing means across years and institutions in the various sectors)

	Return on assets <sup>1</sup>				Return on equity <sup>2</sup>				Leverage <sup>3</sup>			
	95–09	95–00	01–07	08–09	95–09	95–00	01–07	08–09	95–09	95–00	01–07	08–09
Banks	0.6	0.7	0.7	0.2	12.2	13.3	12.8	3.2	18.3	17.8	19.1	17.4
Non-bank financials	0.9	1.0	1.0	0.5	11.2	12.3	11.4	5.4	12.1	12.5	12.1	10.8
Non-financials	3.2	3.0	3.4	2.8	11.7	10.9	12.8	9.8	3.0	3.0	3.0	2.9
Energy	5.9	3.9	8.1	5.2	14.2	10.8	18.6	10.1	2.4	2.5	2.3	2.2
Materials	4.3	4.3	4.7	3.2	10.6	8.8	13.1	8.5	2.5	2.4	2.5	2.7
Industrials	2.1	1.4	2.4	2.3	10.4	8.3	11.5	11.0	5.4	6.1	5.4	4.8
Consumer discretionary	2.2	2.1	2.6	1.1	9.1	8.9	10.4	4.2	3.4	4.0	3.1	3.1
Consumer staples	5.4	5.2	5.7	5.1	13.0	12.4	13.8	11.7	2.5	2.4	2.5	3.0
Health care	8.1	8.0	8.3	6.5	18.2	18.8	18.5	15.3	2.3	2.3	2.3	2.3
Information technology	5.1	5.1	5.0	5.6	12.8	15.1	12.8	10.3	2.2	2.2	2.1	2.0
Telecom services	3.2	3.6	2.8	2.9	8.5	10.8	8.4	6.4	2.6	2.7	2.6	2.7
Utilities	2.7	2.5	2.7	2.7	10.8	9.3	11.6	11.9	4.1	3.7	4.4	4.0

<sup>1</sup> Net income over total assets, in per cent. <sup>2</sup> Net income over total shareholder funds, in per cent. <sup>3</sup> Total assets over total shareholder funds.  
Source: Bloomberg. Table VI.1

Source: BIS 80th Annual Report, Basel 2010, p. 75.

### 3.5.1.3. Savings associated with a reduction of risk weights

Strategy 1: sell non-liquid assets, buy liquid assets

The current definition of HQLA in the CRR explicitly states that LCR eligible assets have to be of 'extremely high or high credit quality' (Article 404(1)(b) (d) of the CRR). The Basel text explicitly uses risk weights as asset characteristic to define HQLA:

- Level 1 assets: cash, central bank reserves, securities with 0% risk-weight (sovereign debt, guaranteed by sovereigns, PSEs, CBs, international financial institutions etc.)
- Level 2A assets (15% haircut): covered bonds (rating at least AA-), non-financial corporate bonds (rating at least AA-)
- Level 2B assets (50% haircut): non-financial corporate bonds (rating between A+ and BBB-), mortgage backed securities MBS (rating at least AA)

A shift from non-HQLA assets into HQLA assets has the following implications for the bank's RWA depending on the exposure that is reduced and the exposure that is increased (Table A3.14).

Table A3.14: Matrix of risk weight reductions of a shift out of exposure to various asset classes into Level 1, Level 2 or Level 2B assets (in percentage points of risk weights)

Behavioural adjustment		Increase exposure to			
		Level 1 (0% RW)	Level 2 (20% RW)	Level 2B (BBB Corporate debt 100% RW))	Level 2B (AA RMBS 20% RW)
Reduce exposure to	Non-EU central government with ratings of A+ to A-	20			
	Non-EU central government with ratings of BB+ or lower	50			
	Non-EU central government with ratings of BBB+ to	100			

BBB-				
Banks (unsecured) (AAA to AA-)	20	0	0	0
Banks (unsecured) (A+ to A-)	50	30		30
Banks (unsecured) (BBB+ or lower)	100	80		80
Covered bonds (AAA to AA-)	20	0		0
Covered bonds (A+ to A-)	50	30		30
Covered bonds (BBB+ or lower)	100	80	0	80
Non-financial corporates with a rating of BBB+ to BBB-	100	80	0	80
Non-financial corporates with a rating of B+ or lower	150	130	50	130
Retail loans (non-RRE)	75	55		55
Residential real estate (RRE)	35	15		15
Mortgage Backed Securities (MBS) (AAA to AA-)	20	0		0
Mortgage Backed Securities (MBS) (A+ to A-)	50	30		30
Mortgage Backed Securities (MBS) (BBB+ to BBB-)	100	80		80
Mortgage Backed Securities (MBS) (BB+ to BB-)	350	330	250	330
Mortgage Backed Securities (MBS) (B+ or lower)	1250	1230	1150	1230

Source: EBA voluntary LCR monitoring exercise sample and authors' own calculations. Due to the 0% risk weight for EU sovereigns irrespective of their rating, the table does not include adjustments based on portfolio reallocations among EU sovereign exposures.

Table A3.14 demonstrates that the impact of banks' behavioural adjustments on risk weights does not only depend on the LCR (the target asset allocation) but also on the initial asset allocation:

1. The lower the credit quality of banks' initial asset allocation, the higher the capital savings associated with the shift towards HQLA (*ceteris paribus*).
2. For the shifts into Level 1 assets capital savings are higher than for shifts into Level 2 assets; for shifts into Level 2 assets the savings are higher than for shifts into Level 2B assets.

Based on the relative savings in risk weights, a capital ratio of 10.5 per cent, and the RoE objective of 12 per cent, the following cost savings are associated with strategy one (Table A3.15):

Table A3.15: Matrix of (pre-tax) cost savings of a shift out of exposure to various asset classes into Level 1, Level 2 or Level 2B assets (in basis points) based on an return on equity of 12 per cent

Behavioural adjustment	Increase exposure to			
	Level 1	Level 2	Level 2B (BBB Corporate debt)	Level 2B (AA RMBS)
Non-EU central government with ratings of A+ to A-	21			
Non-EU central government with ratings of BB+ or lower	53			
Non-EU central government with ratings of BBB+ to BBB-	105			
Banks (unsecured) (AAA to AA-)	21	0	0	0
Banks (unsecured) (A+ to A-)	53	32		32
Banks (unsecured) (BBB+ or lower)	105	84		84
Covered bonds (AAA to AA-)	21	0		0
Covered bonds (A+ to A-)	53	32		32
Covered bonds (BBB+ or lower)	105	84	0	84
Non-financial corporates with a rating of BBB+ to BBB-	105	84	0	84
Non-financial corporates with a rating of B+ or lower	158	137	53	137
Retail loans (non-RRE)	79	58		58
Residential real estate (RRE)	37	16		16
Mortgage Backed Securities (MBS) (AAA to AA-)	21	0		0
Mortgage Backed Securities (MBS) (A+ to A-)	53	32		32
Mortgage Backed Securities	105	84		84

Reduce exposure to

(MBS) (BBB+ to BBB-)				
Mortgage Backed Securities (MBS) (BB+ to BB-)	368	347	268	347
Mortgage Backed Securities (MBS) (B+ or lower)	1313	1292	1208	1292

Source: CRD and author's own calculations. Pre-tax cost savings imply that for a given adjustment strategy the interest rate in assets can decrease by this pre-tax amount without reducing the bank's (post-tax) RoE.

The calculations in Table A3.15 are based on the assumption of a RoE target of 12 per cent post-tax alternative funding costs of 4.5 per cent (averaged across maturities and instruments, corresponding to pre-tax alternative funding costs of 6 per cent averaged across maturities and instruments and an assumed tax rate of 25 per cent). Ceteris paribus, a RoE target of 15 per cent would increase the estimated cost saving associated with each asset substitution in the respective cell by 30 per cent. An increase of the pre-tax alternative funding costs from 6 to 8 per cent would reduce the estimates costs savings in each cell by 20 per cent. The calculation is based on Elliott (2009) and estimates the reduced funding costs for a given target  $RoE$ , tax rate ( $tax$ ), and alternative funding costs  $r_D$  per unit of change in risk-weights  $RW$  (in percentage points), ceteris paribus,  $[\Delta RW \times 0.105 \times 0.12] / (1 - tax)$ , where 0.105 is the Basel III minimum  $CAR$  and 0.12 is the target  $RoE$ ,  $r_A$  (endogenous) and  $r_D$  (6 per cent) are the interest rates on assets and debt respectively,  $risk$  and  $adm$  refer to risk costs and administrative costs per unit of asset. The interest rate post-tax income per unit of asset (right-hand side) has to be at least as large as the associated post-tax costs (left-hand side):<sup>36</sup>

$$r_A \times (1 - tax) \geq RW \times CAR \times RoE + (1 - tax) \times [(1 - RW \times CAR) \times r_D + risk + adm]$$

Post-tax costs per unit of asset A:

$$r_A(RW) = \frac{RW \times CAR \times RoE + (1 - tax) \times [(1 - RW \times CAR) \times r_D + risk + adm]}{(1 - tax)}$$

Rearranging terms results in:

$$r_A(RW) = \frac{RW \times CAR \times [RoE - (1 - tax) \times r_D]}{(1 - tax)} - (risk - adm - r_D)$$

And

$$\frac{\partial r_A(RW)}{\partial RW} = \frac{CAR \times [RoE - (1 - tax) \times r_D]}{(1 - tax)}$$

What does table A3.15 tell us?

1. It shows that the interaction between capital requirements and liquidity requirements is quite complex, even for a single behavioural adjustment strategy. While an asset with higher  $RW$  might yield a higher expected yield, it also poses higher funding costs due to the higher share of required capital.
2. The cost savings associated with the reduction of risk weights are non-negligible. For example, assume banks react to the LCR by shifting out of EUR 1 billion of exposure to non-financial corporates with a rating of BBB+ to BBB- and into Level 2 assets, say, covered bonds with a rating of at least AA-. Assume, for example, that the volatility adjusted opportunity costs associated with the lower expected yield on the covered bonds amounts to 100 bps. Due to the reduction of the risk weight associated with the adjustments of 80 percentage points (Table A3.15), the reduction in terms of RoE objective amounts to 84 basis points in terms of costs of regulatory capital requirements. The adjustment generates total opportunity costs for the bank of 16 basis points, if banks take costs of capital/RoE targets and the post-tax alternative funding costs into account in their internal fund transfer price.

<sup>36</sup> We assume that  $RoE$ ,  $r_D$ ,  $risk$  and  $adm$  are independent of  $RW$ , at the margin.

For the analysis of the cost impact of the interaction between liquidity and capital regulation we assume that banks hold their capital buffer above regulatory minimum requirements constant. A bank that targets a capital ratio of 200 bps above the Basel II minimum would also target that buffer above the new Basel III minimum.

Instead of looking at the cost perspective, the interaction between liquidity and capital regulation can be studied from a quantity perspective. A specific adjustment strategy can reduce risk weights and therefore make it easier for the bank to achieve a higher capital requirement under Basel III.

Table A3.16 shows results based on Basel III monitoring data. Non-compliant banks add liquid assets amounting to  $x$ , until the LCR equals 1, whereby we also consider that selling non-liquid assets might reduce cash inflows (see column 'shortfall'):

$$LCR = \frac{f_H \cdot w_H \cdot E + \min(2x; x + Adj)}{f_O \cdot w_O \cdot E - \left(f_I - \frac{x}{E}\right) \cdot w_I \cdot E} := 1$$

Table A3.16 also shows the surplus of liquid assets in compliant banks, which can reduce liquid assets until the LCR becomes 100%. Because the balance sheet total remains unchanged, the leverage ratio is not affected. However, capital ratios of non-compliant banks increase, because the sold (non-liquid) assets were of average risk but the bought (liquid) assets get a zero risk weight. The actual effect on risk-based capital ratios may be greater than stated in Table A3.16, because the average risk weight includes the risk weight for liquid assets while banks are likely to sell assets with a risk weight above average.

Table A3.16: Sell non liquid assets, buy level 1 assets

	LCR in %	CR in %	LR in %	Level 1 assets			Interaction with capital requirements	
				Shortfal l in bn €	shortfall in % HQLA	Surplus in bn €	CR in %	LR in %
C1	87.15	10.2	4.2	55.5	9.5	17.2	10.3	4.2
C2	101.78	9.9	2.3	41.8	9	37.8	9.9	2.3
C3	97.07	22.4	6.8	0.2	3.2	0	22.5	6.8
C4	111.32	8.8	3.9	27.7	3.1	118.4	8.8	3.9
C5	138.7	10.1	6.2	1.4	0.6	64	10.1	6.2
C6	87.73	11.1	4.4	4.7	21.3	1.6	11.2	4.4
C7	150.31	11.7	6.3	9.5	3.1	112.4	11.7	6.3
C8	48.96	13	3.8	64.8	108	0	14.4	3.8
C9	158.87	9.5	4.1	0	0	16.4	9.5	4.1
C10	136.16	9.6	4.1	3.9	7.1	18.1	9.6	4.1
C11	101.43	16.2	5.9	3.3	22.7	3	16.2	5.9
C12	131.8	8	5.4	3	9.1	10.9	8	5.4
C13	138.28	6.6	4.7	1.3	0.5	77.6	6.6	4.7
C14	91.1	15.3	11	1.1	17	0.4	15.6	11
C15	147.76	11.9	5.3	3.3	5.2	22.2	11.9	5.3
C16	129.7	13.5	9.9	0.3	2.3	3.6	13.5	9.9
C18	131.81	13.1	5.6	0	0	44.9	13.1	5.6
C19	184.75	14.4	5.8	0	0	0.5	14.4	5.8
All	111.44	9.6	4.1	221.8	6.8	549.0	9.6	4.1

Source: EU QIS sample and authors' own calculations.

#### Strategy 2: reduce committed liquidity and credit lines

Directive 2006/48/EC states that off-balance-sheet items receive a risk weight between 0 and 100 per cent. For undrawn credit lines it is 50 per cent unless the credit line can be cancelled unconditionally at any time without prior notice (0 per cent). Banks that reduce their committed credit lines which are not cancellable at any time without prior notice reduce their risk weight assets by 50 per cent of the line's volume. Based on a RoE of 12 per cent, the adjustment results in savings of 53 basis points. This saving partly offsets the

foregone fee for the line (the opportunity cost associated with the adjustment strategy). Again, the potential savings are significant relative to the opportunity costs.

Table A3.17: Matrix of risk weight reductions of a reduction in committed liquidity and credit lines (in percentage points of risk weights)

		Up to 1 year	Beyond 1 year
Reduce line to	Retail loans	15	37,5
	Residential real estate	7	17,5
	Corporate	16	40
	Banks	4	10

Source: EU QIS sample and authors' own calculations.

### Strategy 3: shorten average maturity of assets

This strategy does not yield any savings in terms of risk weights, as the risk weights in the standardised approach are independent of the initial maturity of assets (Directive 2006/48/EC).

Nonetheless, exposures to banks are an exception. They can either receive the risk weight corresponding to the rating of the country of domicile of the counterparty or the rating of the counterparty itself. However, if the time of maturity of the exposure falls below three months, the risk weight is 20 per cent, irrespective of the rating options. In this case the impact of the adjustment strategy on risk weights depends on the initial maturity of the exposure and the applicable risk weight. The LCR provides strong incentives to reduce unsecured exposure to banks to below 30 days (this reduces net cash outflows by 100 per cent of the exposure before the application of a potential inflow cap).

### 3.5.2. The impact of changing the balance sheet total (8. 'Deleveraging' and 9. 'Leveraging')

Banks may extend their balance sheet in order to build up their stock, i.e. increase liquid assets without changing other assets. This strategy affects the risk-based capital ratio only if the additional liquid assets are funded by equity or have a non-zero risk weight. The leverage ratio is affected because of the balance sheet extension and possibly by an increase in capital. For some banks, this strategy may not be feasible, depending on their leverage ratio.

In contrast, reducing the balance sheet total by deleveraging, i.e. selling non-liquid assets and paying down short-term liabilities, increases the leverage ratio because of reduced exposures and also increases the capital ratio due to reduced risk-weighted assets (see Section 2), i.e. capital requirements decrease because of both the risk-based capital ratio and the leverage ratio.

Table A3.18: Matrix of risk weight reductions of a reduction in assets (deleveraging) (in percentage points of risk weights)

Banks (unsecured) (AAA to AA-)	20
Banks (unsecured) (A+ to A-)	50
Banks (unsecured) (BBB+ or lower)	100
Covered bonds (BBB+ or lower)	100
Non-financial corporates with a rating of B+ or lower	150
Retail loans (non- RRE)	75
Residential real estate (RRE)	35
Mortgage Backed Securities (MBS) (A+ to A-)	50
Mortgage Backed Securities (MBS) (BBB+ to BBB-)	100
Mortgage Backed Securities (MBS) (BB+ to BB-)	350
Mortgage Backed Securities (MBS) (B+ or lower)	1250

To sum up, the following conclusions are drawn from the analysis of the interaction between capital and liquidity regulation:

1. The interaction between capital and liquidity regulation is complex. The analysis needs to accept a number of simplifications.
2. Information on banks internal ratings is not publicly available to the extent required by the analysis. Thus, the analysis is based on the standardised approach or it estimates results based on the EU QIS monitoring data.
3. The analysis can thus only provide estimates of the size of the cost impact of the interaction between capital and liquidity regulation.
4. The impact of the LCR on risk weights depends on banks' adjustment strategies.
5. Some strategies yield non-negligible savings due to decreasing risk weights associated with behavioural adjustments to the LCR. In addition to the opportunity costs associated with these strategies we also take into account the cost savings associated with a reduction in risk weights. Table A3.19 summarises the adjustment costs per unit of liquidity shortfall reduction (in per cent).

Table A3.19: Adjustment costs per unit of liquidity shortfall reduction (in per cent)

Adjustment strategy	BR1	BR2	BR3
C1	-1.83%	-2.21%	-3.04%
C2	-2.30%	-2.46%	-3.43%
C3	N/A	N/A	N/A
C4	-1.64%	-1.29%	-2.25%
C5	-2.23%	-2.97%	-3.51%
C6	-2.12%	-2.60%	-3.08%
C7	-2.21%	-2.62%	-3.44%
C8	-2.06%	-2.99%	-3.91%
C9	-2.26%	-2.39%	-3.30%
C10	-1.80%	-2.41%	-3.12%
C11	-1.74%	-2.23%	-3.02%
C12	-2.12%	-2.56%	-2.89%
C13	-1.94%	-2.46%	-3.07%
C14	-4.14%	-4.34%	-4.91%
C15	-1.95%	-2.34%	-3.25%
C16	-3.12%	-4.52%	-4.63%
C17	-2.16%	-2.60%	-3.35%
C18	-1.84%	-2.21%	-3.68%
C19	-2.05%	-2.63%	-3.03%
C20	-2.19%	-2.89%	-3.23%
C22	-1.78%	-2.23%	-2.85%
C26	-2.70%	-3.18%	-3.32%

Source: Authors' own calculations; for details and data see the technical and data appendices respectively. Interaction between capital and liquidity regulation already accounted for.

### 3.6. Linking expected opportunity costs of the LCR with the subjects set out in Article Art509(1) of the CRR

In this section, we link the findings on opportunity costs to lending with the macroeconomic impact. This fulfils the explicit requirement to analyse whether the LCR would have a material detrimental impact on bank lending (i.e. SMEs, trade finance) and the EU economy.

Based on the CEBS guidelines on liquidity cost benefit allocation (2010) and on the academic literature on the subject (e.g. Hartmann-Wendels et al., 2007) we analyse how banks' pricing and margins affect economic growth. Given that banks do have pricing power only in a subset of asset and liability classes, we will focus on the re-pricing of loan portfolios and the subsequent changes to credit margins (Section 3.8.1). Deposits are the main item in which banks have pricing power on the liability side. In the other subsets of asset and liability classes banks are (largely) price takers.

#### 3.6.1. Estimating the part of the national banking sector portfolio that can be repriced.

We call this the 'repriceable' base and corresponds to a per country aggregation of the bank lending portfolio over which banks have repricing power. The repricing arises from the opportunity costs incurred on complying with LCR requirement and we based it on the portfolio segments discussed above. We use the increase in credit margins (or increase in cost of credit) to subsequently apply it to the macroeconomic models and estimate the overall macroeconomic impact.

The data is sourced from the ECB Statistical Data Warehouse that collects lending data by sectors and on a country comparable basis (as well as deposit and other balance sheet categories). We take aggregated values recorded at the end of 2012 to ensure compatibility with QIS data on banks LCR compliance. The

data is available for all countries in the sample as shown in Table A3.22. The repriceable base is over EUR 9 trillion across all countries.

We also use data breakdowns by different maturities to estimate the transitional period base. Over the transitional period banks do not have the ability to reprice the whole lending portfolio. As a result the repriceable base will be smaller and banks will need to increase credit margins by more in the initial period. As time passes and a greater part of the lending portfolio can be repriced banks will be able to reduce the pass-through per unit of credit granted. Over the long run banks will be able to spread the adjustment cost over the entire lending portfolio. Our transition period repriceable base is a single value to proxy this dynamic process and consists of the average repriceable base over four years. The estimate for the transitional period is reduced to just over EUR 6 trillion. Some countries (C15, C8, C18, C6, C4) feature substantial shares of loans that can be repriced before maturity by banks. Thus, the data in the table underestimates the repriceable base during the transition period. As a consequence, the macro-impact during the transition period is over-estimated for these countries.

Table A3.22: Repriceable base long term and transitional period (EUR billions) including loans to NFC, households with government and insurance firms.

	Long term	Transitional Period
C1	28%	19%
C2	31%	20%
C3	N/A	N/A
C4	25%	16%*
C5	38%	25%
C6	21%	14%*
C7	42%	27%
C8	52%	34%*
C9	20%	13%
C10	27%	18%
C11	8%	5%
C12	34%	22%
C13	31%	20%
C14	18%	12%
C15	31%	20%*
C16	14%	9%
C17	29%	19%
C18	43%	28%*
C19	6%	4%

C20	39%	25%
C21	46%	30%
All	31%	20%

Source: ECB Statistical Data Warehouse; authors' own calculations. \*These countries (C15, C8, C18, C6, C4) feature substantial shares of loans that can be repriced before maturity by banks. Thus, the data in the table underestimates the repriceable base during the transition period. As a consequence, the macro-impact during the transition period is over-estimated for these countries.

Finally, the national level repricing base was adjusted to the shortfall data in which only a subset of banks from each country was considered. This then reduced the repriceable base to the figures shown in Table A3.22 above.

### 3.6.2. Mapping increased credit spreads to real growth

While a set of estimates of the increases in credit margins would already allow for an assessment of the potential economic costs of the LCR in various forms under various scenarios, we provide a more detailed assessment by feeding these results into macroeconomic models. Our approach uses the interest rate elasticities of the individual macro-models in the European Union which is an often used approximation in European-wide impact assessments. These models were developed for updating the Eurosystem projections and are currently used for stress tests at EU level. This set of elasticities is updated regularly and is available for all Member States.. We take the elasticities from the 2012 model versions. The elasticities should provide a sufficient approximation of the level of the macroeconomic effects of changes in credit margins.

We complement the EU stress test elasticities approach by feeding the results concerning the impact of the LCR on increased credit spreads into the global macro model NiGEM<sup>37</sup>. First, we use elasticities from NiGEM to fill the gaps of the stress test macroeconomic models; in particular we use NiGEM<sup>38</sup> elasticities for C15 and to make a projection of the impact beyond three years (which is the maximum horizon of the stress test macroeconomic models). Second, we implement a full NiGEM simulation to validate the macroeconomic effects of the calculated increase in lending margins due to the opportunity costs. The results are very close<sup>39</sup> (as shown in Technical Appendix 3.9) and this is not surprising as both NiGEM and national models in the EU use official data to estimate their models on standard economic relationships.

## 3.7. Results in terms of liquidity gaps

The increase in loan spreads is fed into a macroeconomic model for all countries in the sample. The exercise uses NiGEM and the so-called Stress Test Elasticities (STEs) to estimate the impact on the economy and growth (see Technical appendix 3.5.2. for details). STEs are reported to the Eurosystem by national authorities. They provide estimates of the simultaneous increase in long-term interest rates by 50 basis points on the estimated growth rate of GDP in each Member State. In order to test the robustness of this approach, we also fed the impact on loan spreads into NiGEM which resulted in similar estimates of the macroeconomic impact. The entire analysis is run

<sup>37</sup> Provided by the UK's National Institute of Social and Economic Research. NiGEM is described in detail in Barrell, Ray, E Philip Davis, Tatiana Fic, Dawn Holland, Simon Kirby and Iana Liadze (2009), 'Optimal regulation of bank capital and liquidity: how to calibrate new international standards', *FSA Occasional Paper* No 38 <http://www.fsa.gov.uk/pubs/occpapers/op38.pdf>. See also: Model structure <http://nimodel.niesr.ac.uk/logon/nigem-index.php?t=1&b=2>

<sup>38</sup> NiGEM is updated quarterly and is a global model consisting of detailed, national-level models each covering the real economy and the financial sector. NiGEM also includes trade and financial relationships between all countries allowing for international spillover effects. The country models include short-term and long-term adjustment equations and relationships. For more details see Barrell et al (2009).

<sup>39</sup> The NiGEM elasticities are generally greater than those of EU stress test models. This implies marginally larger macroeconomic impact when using NiGEM.

for ten scenarios which cover the policy options included in Article Art. 509(2) and (3) of the CRR. The results are summarised in Table A3.20 and A3.21.

An important caveat is that the analysis focuses on the gross liquidity shortfall; i.e. assumes that compliant banks do not distribute liquidity to non-compliant banks. Otherwise, only five countries (C8, C14, C6, C3, C1) have any liquidity shortfall.

Table A3.20: Summary of the baseline and scenarios 1 to 3 for the simulation analysis and the results in terms of the gross-liquidity shortfalls (in EUR billion) and the relative gross liquidity shortfall (in % relative to the baseline gross liquidity shortfall)

	Baseline	Scenario 1	Scenario 2a	Scenario 2b	Scenario 3
Reference	B III LCR*	Art. 509(2)(a) CRR	Art. 509(2)(b) CRR	Art. 509(2) (b) CRR	Art. 509(2)(c) CRR
Gross liquidity shortfall in EUR bn (sample aggregate, non-compliant banks only)	GHOS calibration of Jan 6, 2013	Reduction of cap on inflows from 75% to 0%	Reduction of roll-over rate from 50% to 0% for loans to non-financial customers**	Reduce Run off Rate for other outflows***	Remove cap on L2A and/or L2B HQLA
Total (in EUR bn)	263.5	-7.7	-81.5	-244.7	-5.8
Change to baseline	n.a.	-2.9%	-30.9%	-92.9%	-2.2%

Source: EBA voluntary LCR reporting. \* <http://www.bis.org/publ/bcbs238.pdf>. \*\* Inflows from performing loans from retail, small business, non-financial corporates and other counterparties (Article Art. 425(2)(a) and (b) of the CRR). \*\*\* Article Art. 422(7)(a) of the CRR.

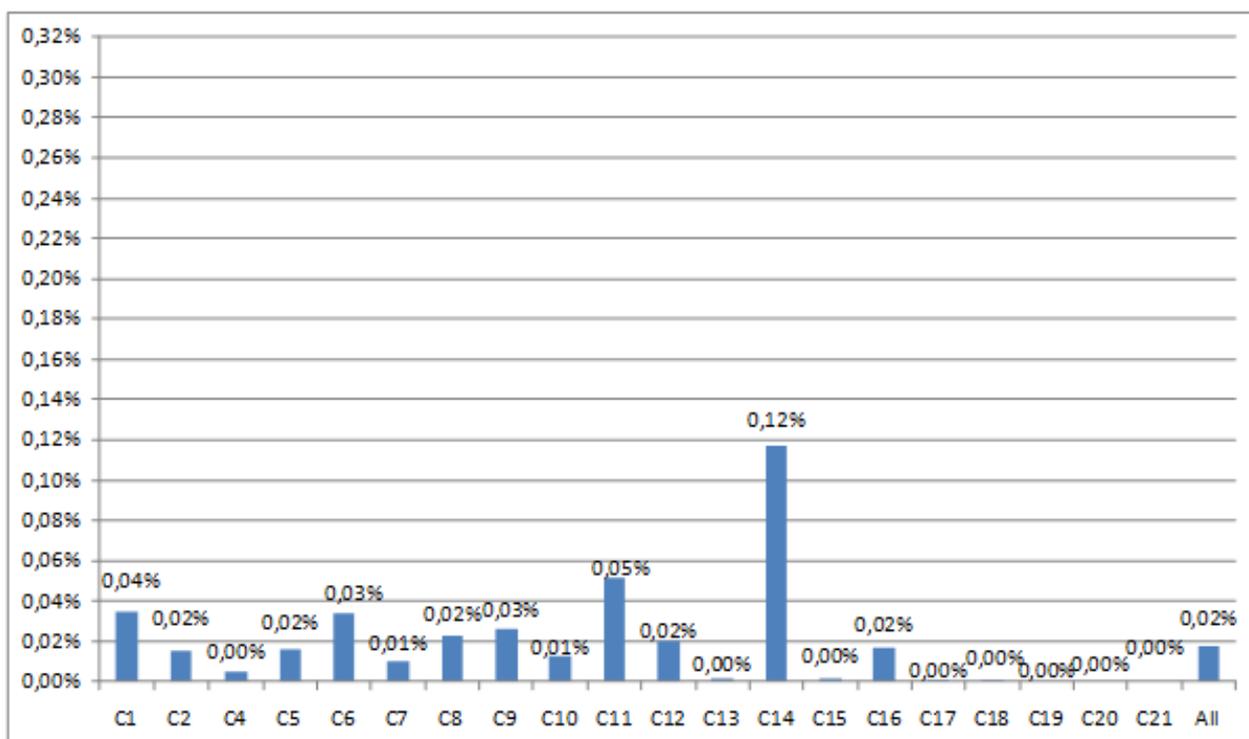
Table A3.10a summarises the results of scenarios 1 to 4 (in EUR billion) and relative to the baseline (in per cent of the gross liquidity gap in the baseline).

### 3.7.1. The impact of the baseline scenario

The baseline results in a gross liquidity short-fall of EUR 263.5 billion or 0.8 per cent of total assets of the banks in the sample (Diagram A3.20). Assuming banks apply adjustment strategy BR2 (table A3.19) the yearly costs across all banks in the sample amount to EUR 6 billion. To put this into perspective: with total assets of EUR 33.1 trillion, if banks did not pass through the incremental costs on assets at all (Diagram A3.6) this would translate into a reduction of the average return on assets (RoA) of 1.8 basis points (ceteris paribus). The lion's share of these costs stems from the strategy component 'Deleveraging' which accounts for two thirds of the total costs, although its weight is only 35 per cent. A less costly adjustment strategy (BR 1 in Table 21) leads to yearly costs of EUR Euro 5 billion or a cost reduction of about 14 per cent. This translates into a reduction of the average RoA of 1.5 bps under the same assumptions as before. However, the aggregate does not capture the heterogeneity across individual institutions in the sample. A more expensive adjustment strategy (BR 3 in Table A3.19) increases costs to EUR 8 billion, an increase of 36 per cent. The corresponding fall in RoA is 2.4 bps. While the average impact on RoA across the EU is low, some banking systems experience higher effects on profitability depending on the chosen adjustment strategy: C6 (28 to 40 bps) and C14 (11 to 13 bps). For C6, 56.2% of the shortfall is due to subsidiaries; for C14, it is 0%.<sup>40</sup> Within banking systems, only banks with a liquidity shortfall would be affected.

Diagram A3.6: The impact of the LCR gross liquidity shortfall on banks' RoA (in % of total assets, BR2)

<sup>40</sup> Also in IT (56%) and BE (97%) a substantial portion of the shortfall is caused by subsidiaries.



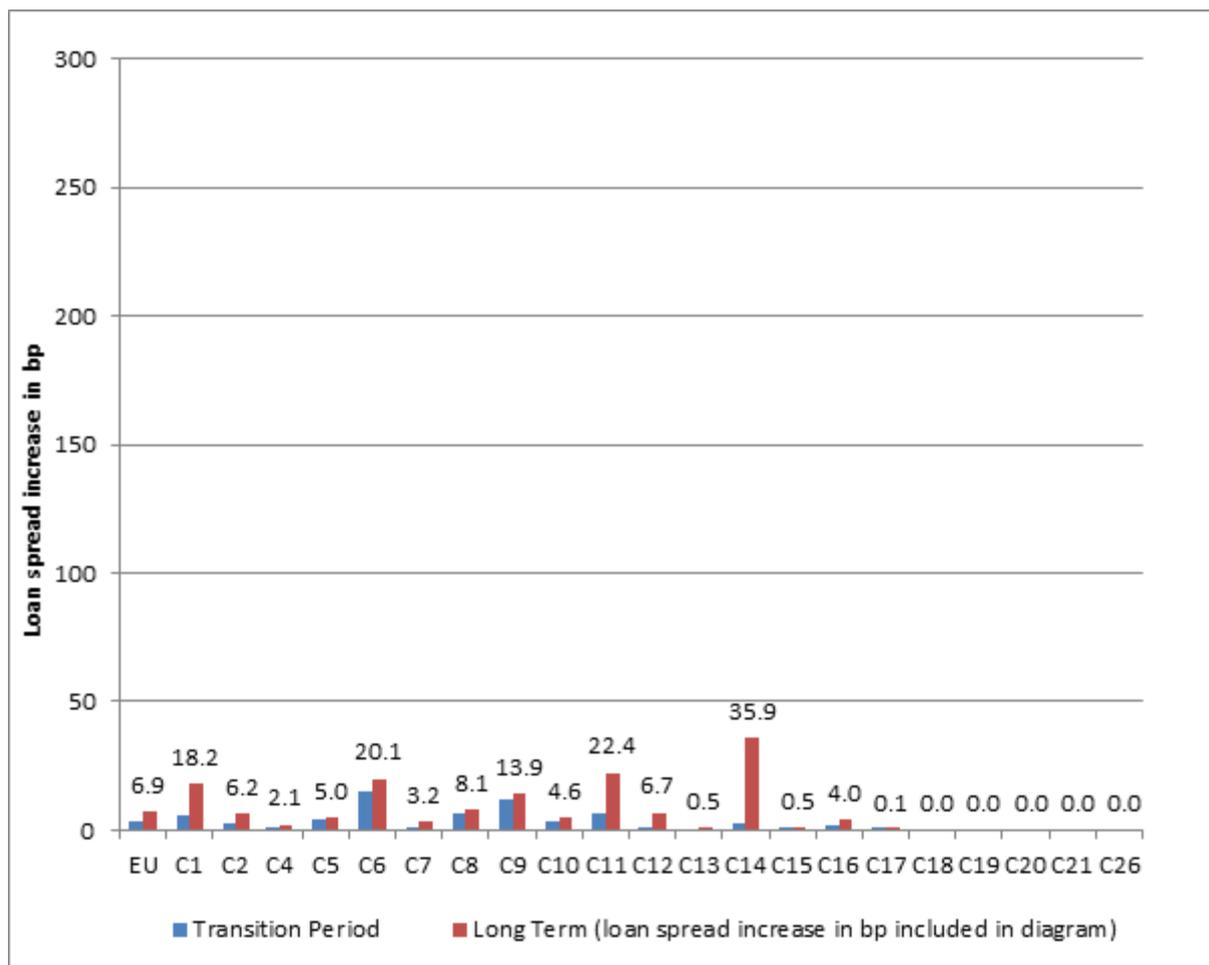
Source: EBA voluntary LCR reporting. Bank behavioural reactions BR2 (Tabletable 2). One outlier deleted.

However, banks have some pricing power in some markets such as deposit or loan markets. If they manage to pass through costs completely, the impact on the RoA would be zero. Based on the literature on bank product pricing, we focus on the loan spread. In the analysis of the impact of the baseline and the scenarios on credit spread, we distinguish between long-term and short-term perspectives:

In the long term, banks can reprice their entire repriceable base (about EUR 9 trillion in total); in the short term, the repriceable base is smaller (about EUR 6 trillion), because only newly granted loans can be repriced.<sup>41</sup> Data on bank loan maturity in a standard format for all Member States is difficult to retrieve. The analysis therefore had to make a few assumptions in this respect. On average (across Member States,) the repriceable base is about 35 per cent lower over the transition period, than the long-term period. This would imply higher economic costs in terms of increases in loan spreads. However, the GHOS 2013 calibration and the CRR foresee a long phase-in period for the LCR which would reduce the adjustment costs for banks. Under the assumption that banks will try to smooth out the adjustment costs and their pass-through to loan spreads, the adjustment costs during the transition period are based on an average target rate of the LCR of 80 per cent (instead of 100 per cent). This would put downward pressure on the impact of the LCR during the transition period. Overall, the repriceable base is estimated very conservatively. In the long term it accounts for about one quarter of total assets of all banks in the sample; during the transition period that ratio falls to about one fifth of total assets.

Diagram A3.12: Estimated loan spread increases over the long term and during the transition period (in basis points)

<sup>41</sup> Some Member States have high shares of variable rate loans; these are linked to a benchmark rate (e.g. 3M EURIBOR). But the relevant spread above the benchmark can only be repriced once a new loan is granted (or a loan is rolled over).



Source: EBA voluntary LCR reporting. Bank behavioural reactions BR2 (Table 2) and a pass-through of 100 per cent. Transition period: LCR threshold 80 per cent and repriceable base only newly priced loans over four years. Long term: LCR threshold 10 per cent and entire repriceable base can be repriced. One outlier deleted.

Overall, the incremental loan spreads are low. For the EU they amount to 6.9 bps in the long term and 3.6 bps in the short term.

The analysis shows that, in general, the impact of the LCR on loan spreads is lower during the transition period than over the long term. The effect of the lower LCR requirement during the phase-in period outweighs the effect of the lower repriceable base. The phase-in arrangements are effective with respect to lowering adjustment costs to the LCR. The therefore

Is a longer phase-in period than stipulated under Article 460(2) of the CRR necessary? At this juncture, the phase-in period seems to fulfil its purpose of reducing the adjustment costs of banks that do not yet comply with the standard. Given the high degree of compliance and the current market expectations, it is unlikely that postponing the transition to the 100 per cent requirement would yield any benefits.

How does the gross shortfall of EUR 264 billion relate to the size of financial markets in the EU? According to Eurostat, the outstanding stock of EU government debt in the form of securities amounts to about EUR 9 000 billion in Q1 2013.<sup>42</sup> The aggregate outstanding stock of agency debt (e.g. EIB, KfW, but excluding ESFS) in the EU amounts to about EUR 1 500 billion. The aggregate sizes of the non-financial corporate debt and the covered bond market in the euro area is about EUR 1 000 billion and EUR 2 500 billion<sup>43</sup>, respectively. The aggregate capitalisation of EU 27 stock markets stands at about EUR

<sup>42</sup> [http://epp.eurostat.ec.europa.eu/cache/ITY\\_PUBLIC/2-22072013-AP/EN/2-22072013-AP-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/2-22072013-AP/EN/2-22072013-AP-EN.PDF)

<sup>43</sup> Houben, Slingenberg 2013.

8,400 billion (Q1 2013).<sup>44</sup> Across asset classes, which are HQLA eligible in principle, the outstanding volume in the European Union is around EUR 22 000 billion (not taking into account issuances in international currencies which might be eligible to cover net cash outflows in non-domestic currencies). However, the volume that is actually eligible depends on ratings, operational criteria and haircuts under the LCR. Assuming that half of the assets are not eligible because of these criteria, we operate with a total universe of EUR 11 000 billion to put the gross liquidity shortfall into perspective:<sup>45</sup> it amounts to 2.4 per cent of the outstanding stock. Relative to flows, it amounts to slightly more than one month's government gross debt issuance in the euro area denominated in euro according to ECB statistics (average January to June 2013).<sup>46</sup> Taking into account the reallocation of liquidity across banks and HQLA holdings on banks' balance sheets that will be eligible when the LCR is introduced, additional demand for HQLA in the European Union is around 0.6 per cent of the outstanding stock or about one third of monthly government debt issuance. The additional amounts withdrawn from markets because of outright EU central bank purchases substantially exceed the additional demand caused by the LCR (Bank of England: around EUR 450 billion<sup>47</sup>; Eurosystem: around EUR 250 billion<sup>48</sup>). It is therefore unlikely that the additional demand for HQLA (even without any reduction of net cash outflows) will lead to a destabilisation of financial markets in the European Union.

### 3.7.2. The impact of alternative calibrations of the LCR

A removal of the cap on inflows (scenario 1 in Diagram A3.20) reduces the gross liquidity gap by EUR 7.7 billion or 2.9 per cent of the baseline. The liquidity gap relative to total assets of the banks in the sample the liquidity gap decreases slightly to 0.77 per cent (from 0.80 per cent). The impact on the total sample is small. In most countries, the impact is negligible except in C8 where it amounts to more than 50 per cent of the baseline liquidity shortfall. The banks C6 (-6 per cent), C5 (-3 per cent), C2 (-2 per cent) and C1 (-1 per cent) also show small reductions in liquidity shortfalls. Similarly, the distribution of the advantage across business models is very uneven. The benefit loss from removing the cap on inflows for all EU banks does not outweigh the cost reduction which benefits C8 banks almost exclusively and which includes banks running a pass-through business model (3 out of 18 C8 banks in the sample). A more detailed assessment of the impact of the 75 per cent cap on business models is to be found in Technical Appendix 4.

A reduction of the roll-over rate of loans to non-financial customers from 50 to 0 per cent (scenario 2a) has a somewhat larger impact on the gross liquidity gap in the sample. It drops by EUR 81.5 billion or 31 per cent and amounts to 0.55 per cent of total assets. Banks in C1 (EUR -36 bn) and C2 (EUR -14 bn) capture the lion's share of the benefit in absolute terms. In relative terms banks in six countries (C9, C13, C14, C7, C15, C12) experience reduction of their gross liquidity gap by about 60 per cent or more. Only Group 1 business models (Well diversified large cross-border banks with substantial capital market activities – not members of ESBG and EACB) profit from the recalibration.

A reduction of the run-off rates for other outflows in Article 422(7)(a) of the CRR (scenario 2b) has a strong impact on the LCR. The gross liquidity gap would shrink by EUR 245 billion to EUR 19 billion or 93 per cent. Relative to total assets of the sample banks it would amount to 0.06 per cent. All countries feature gaps below 1 per cent of total assets; in 17 countries the gap would amount to less 0.1 per cent of total assets. Only C8 banks would have a liquidity gap of 10 times the EU average. The gross liquidity shortfall across all business models is effectively wiped out, except for Group 4 (pass-through financing) which hardly benefits.

The reduction of roll-over rates of inflows and run-off rates of outflows in Article 422(7) and Article 425(2) of the CRR (a combination of scenarios 2a and 2b) would effectively reduce the liquidity gap to 0. This would result in the LCR becoming an economically non-binding constraint; it would not incentivise banks to adjust

<sup>44</sup> <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=teimf090&plugin=1>.

<sup>45</sup> See also CGSF (2013), Table 4, p. 21.

<sup>46</sup> <http://www.ecb.europa.eu/stats/money/securities/debt/html/index.en.html>

<sup>47</sup> <http://www.bankofengland.co.uk/markets/Pages/apf/results.aspx>

<sup>48</sup> <https://www.ecb.europa.eu/mopo/liq/html/index.en.html>

their balance-sheet and reduce liquidity risk. It would not attain its objectives, but impose implementation costs on, both, EU banks and supervisors.

The removal of the 40 per cent cap on Level 2 assets and the 15 per cent cap on Level 2B assets (scenario 3) would have the following impact: The total liquidity shortfall would amount to EUR 257.7 billion (a fall of EUR 5.8 billion or 2.2 per cent). The only banking system profiting from this scenario is C2 which accounts for 97 per cent of the reduction (or EUR 5.6 billion/15 per cent of the C2 liquidity shortfall). Across business models, Group 11 (Shari'ah-compliant banks) would profit exceptionally strongly with a reduction of the gross liquidity shortfall by 100 per cent.

Table A3.21: Summary of the baseline and scenarios 4 to 8 for the simulation analysis and the results in terms of the gross liquidity shortfalls (in EUR billion) and the relative gross liquidity shortfall (in % relative to the baseline gross liquidity shortfall)

	Baseline	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8
Reference	B III LCR*	Art. 509(2)(d) CRR	Art. 509(2)(e) CRR	Art. 509(2)(1) CRR	Art. 509(3) CRR	Art. 509(2) (g) CRR
Gross liquidity shortfall in EUR bn (sample aggregate, non-compliant banks only)	GHOS calibration of Jan 6, 2013	Increase inflow from undrawn intra-group committed lines to 60% and corresponding outflow of intra-group committed lines to 100% and inflows from operational deposits to 25%	Increase outflow from undrawn committed facilities to non-financial corporates to 100%	Outflow rate for correspondent banking and prime brokerage services decreased to 0%	Broadening HQLA asset classes**	Lower run off rate for deposits
Total (in EUR bn)	263.5	-15.4	1007.9	-14.1	-57.1	-132.8
Change to baseline	n.a.	-5.8%	382.5%	-5.3%	-21.7%	-50.4%

Source: EBA voluntary LCR reporting. \* <http://www.bis.org/publ/bcbs238.pdf>. \*\* Covered bonds, not self-issued, rated A- up to A+, accepted as category II instruments by the ECB or equivalent by national central bank (weight 50%); Unsecured bank issuances, rated A- or greater, Financial corporate bonds, rated A- or greater (weight 20%); Assets, not reported in section A, issued by a credit institution which has been set up and is sponsored by a Member State central or regional government and the asset is guaranteed by that government and used to fund promotional loans granted on a non-competitive, not for profit basis in order to promote its public policy objectives (weight 85%); Other central bank eligible unencumbered assets not included in the previous categories (weight 25%); gold (weight 50%); shares of CIU in Level 1 assets (weight 95%) and in Level 2 assets (weight 80%).

Scenario 4 looks at preferential treatment of intra-group committed lines and intra-institutional network deposits. The former is put into operation using three calibrations:

1. Asymmetric preferential treatment: the inflows from undrawn intra-group committed lines are increased from 0 to 60 per cent and corresponding outflows from 40 to 100 per cent.
2. Symmetric preferential treatment: the inflows from undrawn intra-group committed lines are increased from 0 to 50 per cent and corresponding outflows from 40 to 50 per cent.
3. Symmetric preferential treatment: the inflows from undrawn intra-group committed lines are increased from 0 to 100 per cent and corresponding outflows from 40 to 100 per cent.

In all cases, inflows from operational intra-group deposits are increased from 0 to 25 per cent. The latter focuses on the asymmetric treatment of outflows from deposits according to Article 422(3)(b) of the CRR and assumes that symmetry is established by an increase of inflows from 0 to 25 per cent. All three calibrations of the preferential treatment yield very similar results; this is mainly because banks' reporting the data are all compliant and the analysis focuses exclusively on gross liquidity gaps and disregards changes to compliant banks' liquidity surpluses.

All three calibrations, in combination with 25 per cent inflows from deposits (according to Article 422(3)(b) of the CRR), would reduce the aggregate liquidity shortfall of the banks in the sample by EUR 15.4 billion to EUR 248.1 billion or 5.8 per cent of the baseline shortfall. The impact across business models is negligible. However, the data set available on intra-group flows is limited and further work will be conducted for the second annual report based on a more comprehensive data set; the analysis is based on only 119 banks out of 357 reported the data on intragroup exposures. Further analysis addressing these shortcomings is needed before making policy recommendations.

An increase of the outflow from undrawn committed facilities to non-financial corporates to 100 from 30 per cent is analysed in scenario 5. It would lead to a strong increase of the liquidity shortfall by EUR 1 trillion to EUR 1.3 trillion or a 3.8-fold increase. The banking systems of C2 (+398 per cent of liquidity shortfall) and the C4 (+1 166 per cent of liquidity shortfall) would be hardest hit. All business models would face at least a doubling of their gross liquidity shortfall with Group 1 (Well-diversified large cross-border banks with substantial capital market activities (non-member of ESBG and EACB) topping the list with +1 855 per cent. Only Group 4 (pass-through financing banks), Group 7 (CCP, securities trading houses, custodian institutions (non-member of ESBG and EACB), Group 9 (Merchant banks, specialised in trade finance) and Group 10 (Private banks) would see manageable effects. Based on the empirical findings in Berrospide et al. (2012), the 100 per cent outflow rate could overestimate the drawing of committed lines to non-financials. Given the substantial costs for the real economy (e.g. in terms of higher fees for committed lines), the costs outweigh the benefits of the increase.

Scenario 6 studies a decrease of the outflow rate for correspondent banking and prime brokerage services to 0 from 100 per cent. This recalibration would lead to a reduction of the gross liquidity shortfall by 5 per cent or EUR 14 billion. The data analysis suggests that the outflow rates on corresponding banking and prime brokerage should not be recalibrated.

The impact of a broadening of HQLA is investigated in scenario 7. For the purpose of this scenario, Article 509(3) of the CRR is put into operation by the inclusion of the following asset classes into the numerator of the LCR (weights in parenthesis), although they do not fulfill the criteria of (extremely) high credit quality and (extremely) high liquidity or the operational requirements of Basel III or Articles 416 and 417 of the CRR: Covered bonds, not self-issued, rated A- up to A+, accepted as Category II instruments by the ECB or equivalent by national central bank (weight 50 per cent); Unsecured bank issuances, rated A- or greater; Financial corporate bonds, rated A- or greater (weight 20 per cent); Assets, not reported in section A, issued by a credit institution which has been set up and is sponsored by a Member State central or regional government and the asset is guaranteed by that government and used to fund promotional loans granted on a non-competitive, not for profit basis in order to promote its public policy objectives (weight 85 per cent); Other Central Bank eligible unencumbered assets not included in the previous categories (weight 25 per cent); Gold (weight 50 per cent); Shares of CIU in Level 1 assets (weight 95 per cent) and in Level 2 assets (weight 80 per cent). The assets are allocated across L2A and L2B with the respective caps. The broadening of HQLA has a substantial impact on the LCR. The liquidity shortfall decreases by 22 per cent or EUR 57 billion. In relative terms banks in C13, C14 (liquidity shortfall minus 82 per cent each) and C4 (minus 72 per cent) would profit most from this recalibration. Across business models, the costs reductions would be heterogeneous; mostly Group 1 (Well diversified large cross-border banks with substantial capital market activities (non-member of ESBG and EACB) would profit.

Finally, scenario 8 assesses the impact of a reduction of the outflow rate on stable retail and SME deposits from 5 to 3 per cent. For the purpose of the analysis it is assumed that all stable deposits in the sample are subject to a 3 per cent run-off., although only a small share of deposit guarantee scheme in the EU is likely to

fulfill the necessary criteria: i.e. prefunding via the periodic collection of levies on banks with insured deposits and evidence of run-off rates for stable deposits within the banking system below 3 per cent during any periods of stress experienced that are consistent with the conditions within the LCR. As such the results in scenario 8 overestimate the impact of the recalibration and underestimate the differences of impacts across banking systems. Given these caveats, the reduced run-off rate would lower the gross liquidity shortfall by EUR 133 billion or 50 per cent. The impact is unevenly distributed across business models; Group 9 (Merchant banks, specialised in trade finance) and Group 11 (Shari'ah-compliant banks) would see their gross liquidity shortfall wiped out completely. Given the ongoing development of the Directive on Deposit Guarantee Schemes it is possible that EU DGS would fulfill the preconditions for lower run-off rates in the future. This should be taken into account by a review clause in the calibration of the respective run-off rates for retail deposits.

### 3.7.3. Model results

Higher cost of credit for households create short-term budget constraints and result in lower consumer expenditure with mainly short-term economic impacts (lower payable rates on deposits lead to similar outcomes for households). Higher cost of credit for NFCs increases private sector cost of physical investment and this has a negative impact on physical capital accumulation and subsequently long-term growth. Banks may have less pricing power on large corporations as the latter may resource to alternative finance if the cost of credit increases. However, greater demand for other forms of finance could push the overall cost of finance for NFCs (as shown for example in Barrell et al., 2009). Therefore, it is crucial to establish the strength of the linkage between banks' opportunity costs from liquidity management and cost of finance particularly those that affect long-term growth.

The results (Table A3.23) show that for the increase in loan spreads under the baseline scenario effects on GDP are limited under our assumptions. The main driver of this result is the small increase in credit margins which are in a range between 0 and 25 bps 180 bps corresponding to an average impact of 6 bps across countries. The small change in cost of finance explains the reduced effect on households' and businesses' budget. Across the euro area the fall in GDP corresponds to between 3 and 4 bps of a permanent reduction for both behavioural reactions 1 and 2. Across the whole European Union, this impact is smaller; close to 2.5 bps because of the contribution from and lesser impact of the C4, C18, C16 and C17. Behavioural reaction 3 results in a marginally greater impact with a 5 bps and 4 bps over the long term on the euro area and the European Union respectively.

In terms of the timing, both the stress test model elasticities and the elasticities from NIGEM show that the effect on household cost of credit and budget accumulates more slowly over a period of more than 3 years (see tables of Technical appendix 3.8). The impact on business investment is generally greater and accumulates more quickly after one or two years but it tends to reverse to some extent after three years. Therefore the greater impact is on investment rather than consumer expenditure and these drive the permanent marginal reduction on GDP. BR1 shows a long-term weighted average impact on business investment of around 9 bps on the euro area and the European Union. Under BR2 the impact increases to 11 bps for the euro area and European Union, while BR3 shows a greater impact just below 15 bps on the same European groups.

As discussed above, we calculate a transitional period impact as a single point estimate corresponding to the average reprisable base during the four years of implementation and the average percentage of the full requirement (assumed to be 80%). As expected, due to the reduced repricing capacity of banks, the transitional period impact is greater although still marginal. For the European Union and euro area as a whole BR1 and BR2 lead to a GDP fall of 4 bps of a percentage point while BR3 leads to somewhere between 6 and 7 bps. After four or five years the macroeconomic impact should revert to the long-term impact discussed earlier.

Table A3.23: Impact on GDP due to an increase in loan spreads under the baseline scenario

Impact	Real GDP long-term impact			Real GDP transitional period impact			
	Number of Banks	BR1	BR2	BR3	BR1	BR2	BR3
C1	11	-5	-6	-8	-8	-9	-13
C2	90	-3	-3	-5	-5	-5	-7
C4	49	-1	-1	-1	-2*	-1*	-2*
C5	34	-3	-4	-5	-5	-7	-8
C6	13	-7	-8	-9	-3*	-4*	-4*
C7	19	-1	-1	-2	-2	-2	-3
C8	18	-5	-8	-10	-7*	-11*	-14*
C9	11	-3	-3	-4	-5	-5	-7
C10	12	-3	-4	-5	-3	-5	-6
C11	15	-4	-5	-7	-6	-8	-11
C12	6	-2	-3	-3	-2	-3	-3
C13	10	0	0	0	0	0	0
C14	3	-21	-22	-25	-29	-31	-35
C15	10	0	0	0	0*	0*	-1*
C16	5	-2	-3	-3	-2	-3	-3
C17	15	0	0	0	0	0	0
C18	12	0	0	0	0*	0*	0*
C19	4	0	0	0	0	0	0
C20	2	0	0	0	0	0	0
C21	5	0	0	0	0	0	0
<b>Eurozone</b>	<b>234</b>	<b>-3</b>	<b>-4</b>	<b>-5</b>	<b>-4</b>	<b>-5</b>	<b>-7</b>
<b>European Union</b>	<b>347</b>	<b>-3</b>	<b>-3</b>	<b>-4</b>	<b>-4</b>	<b>-5</b>	<b>-6</b>

Source: Authors' own calculation based on STEs. \* These countries (C15, C8, C18, C6, C4) feature substantial shares of loans that can be repriced before maturity by banks. Thus, the data in the table underestimates the repriceable base during the transition period. As a consequence, the macro-impact during the transition period is over-estimated for these countries.

### 3.7.4. Sensitivity analysis with respect to share of incremental costs that is passed-through to loans to the real economy

The pass-through of costs to prices is a function of the relative price-elasticities of loan supply and demand (for country-level data on the sensitivity analysis see Data Appendices 5 and 6). However, given that all banks are subject to the LCR, we assume that additional explicit funding costs are fully feeding into credit margins. The full pass-through assumption also reflects the fact that restricting dividends or reducing costs of business when the market structure is given (e.g. in a short time frame) may be difficult. This certainly

constitutes a simplification and an extreme assumption which biases our results upwards; as such it is a more conservative approach to assessing potential economic costs of the LCR.

Banks may not be able to pass through the entire (potential) increase in funding costs because of, among other things, the very competitive environment in which they operate. We test a low pass-through assumption reducing the pass-through capacity of banks to a fixed 80 per cent from the total opportunity cost. In summary, using the baseline simulation as example, the overall impact on the euro area falls from 3.25 bps of a percentage point to just over 2.5 bps if the pass-through is 80%. This consideration is more relevant for those countries where the impact of a full increase in credit margins is greater. Under the baseline scenario C8, C1, C6, C14 and C16 show greater growth reductions. For example, in C8 the long-term reduction of investment is close to 0.5% under full pass-through of BR2; such reduction could be felt through several quarters of smaller investment growth. If banks pass through only 80% of their opportunity cost this reduction would be less dramatic to just 0.3333% long-term fall.

#### *Repricing deposits instead of loans*

We assumed that the impact on credit margins comes through lending rates, ignoring other alternative repricing strategies by banks, e.g. repriced deposits. In fact, repricing portfolios of loans and retail deposits cause two distinct economic effects:

- i. The cost of credit increases with a negative impact in the economy through higher costs to households, with mainly short-term demand consequences, and to businesses, with an associated reduction of physical capital investment and long-term supply effects.
- ii. The return on deposits falls with a negative impact on savers, mainly households.

Given that the effects are very small, it is of little relevance whether we focus on deposit rates or lending rates. However, if the impact was channelled by banks through a greater impact on households rather than businesses, the result would be a smaller reduction in long-term growth but a greater impact on households' balance sheets, and a greater short-term effect on macroeconomic growth. This repricing choice will depend on the competition in each national market for providing credit to households and businesses.

### 3.8. Conclusions

The assessment of the possible expected costs of the LCR is based on a six step procedure. First, banks' adjustment strategies are identified; there are seven. Changing balance sheet structures affect banks' RWA and capital regulation. The data presented in this section shows that the interactions between capital and liquidity regulation are non-negligible and need to be taken into account in estimating the expected opportunity costs of banks' adjustment strategies.

These expected opportunity costs are then allocated to capital and liquidity intensive bank products. These are largely repriceable loans. Since these account for only about half of EU banks' balance sheets the impact is higher than if the incremental costs were allocated to the entire balance sheet. The pass-through of incremental costs to customers is difficult to estimate, particularly because riding the yield curve by accepting higher liquidity risk does not result in significant economic cost savings. The CEBS guidelines on liquidity cost benefit allocation require banks to adjust their costs of funding when financing long-term assets with short-term liabilities. The adjustment must take into account the yield curve at the maturity of the asset rather than at the maturity of the short-term liability and the implicit costs of refinancing the short-term liability (i.e. the opportunity costs of holding a sufficient liquidity buffer according to CEBS guidelines on liquidity buffers and survival horizons). Qualitative liquidity regulation already obliges banks correctly to allocate the underlying costs and benefits of liquidity to assets and liabilities. The LCR might bring the actual costs of funding closer to the internal fund transfer prices of liquidity. This internal fund transfer price constitutes the benchmark in product pricing. While the LCR increases the actual costs of funding, it does not necessarily increase the internal funds transfer price. As such, the LCR would be more likely to reduce banks' profits from liquidity transformation than to increase loan spreads.

The interaction between capital and liquidity regulation is complex. The analysis needs to accept a number of simplifications. Information on banks internal ratings is not publicly available to the extent required by the analysis; the data required is not part of the monitoring exercise. Thus, the analysis uses the standardised approach. It can therefore only provide estimates of the size of the cost impact from the interaction between capital and liquidity regulation. The impact of the LCR on risk weights depends on banks' adjustment strategies. Some strategies yield non-negligible savings due to decreasing risk weights associated with behavioural adjustments to the LCR. The opportunity costs associated with these strategies have to take into account the cost savings associated with a reduction in risk weights.

### 3.9. Appendix: NiGEM simulation

The NiGEM simulations are based on the same model inputs as those using the STE collected by the ECB from national central banks in the EU. The model is provided by the UK National Institute of Economic and Social Research and is an integrated, multinational macroeconomic model based on short- and long-term economic relationships. NiGEM is updated quarterly and is a global model consisting of detailed, national-level models, each covering the real economy and the financial sector. NiGEM also includes trade and financial relationships between all countries allowing for international spillover effects. The country models include short-term and long-term adjustment equations and relationships. For more details, see Barrell et al (2009). The NiGEM elasticities are generally greater than those of EU stress test models. This implies marginally larger macroeconomic effects when using NiGEM.

For the simulation we took the lending margins calculated from the model opportunity costs and the repriceable base inputting them to NiGEM's lending margins to households and businesses. The result was a higher cost of credit that filters through the economy quarter by quarter as the simulation progressed. We made the additional assumption that the input long-term lending margins applied after four years while the full transitional period margins of Section 3.5.3 applied on the fourth quarter of year two. We interpolated the other quarters in a linear fashion from the beginning of the simulation (period zero) and the long term (first quarter of year five).

Table A3.24 show the effects on GDP for the baseline scenario for all three behavioural reactions. The transitional period results correspond to the average impact between years two and three, while the long-term results correspond to the average impact between years six to eight. Because the lending margins assumptions reach a stable level, the NiGEM model effects also reach stability after five years.

Table A3.24: Results of NiGEM based on the increase in loan spreads under the baseline scenario (reduction of the year-on-year GDP growth rate in bps)

Impact	Real GDP long-term impact (years 6-8)			Real GDP transitional period impact (years 2&3)		
	BR1	BR2	BR3	BR1	BR2	BR3
C1	-9	-11	-15	-5	-6	◆ -8
C2	-3	-3	-4	-1	-1	-2
C3	N/A	N/A	N/A	N/A	N/A	N/A
C4	-1	-1	-1	-1	-1	-1
C5	-3	-5	-5	-3	-4	-5
C6	-15	-18	-22	-11	-13	-15
C7	-3	-3	-4	-2	-3	-4
C8	-5	-7	-9	-3	-5	-6
C9	-8	-8	-11	-10	-10	-14
C10	-4	-5	-6	-2	-3	-4
C11	-12	-15	-21	-5	-7	-9
C12	-7	-8	-9	-2	-3	-3
C13	3	3	4	2	2	3
C14	-17	-18	-21	-5	-6	-7
C15	0	0	0	0	0	-1
C16	-4	-5	-6	-1	-2	-2
C17	-4	-4	-6	-1	-1	-2
C18	1	1	1	2	2	3
C19	N/A	N/A	N/A	N/A	N/A	N/A
C20	1	1	2	0	0	-1
C21	-1	-1	-1	0	0	1
euro area	-4	-5	-7	-3	-3	◆ -4
European Union	-3	-4	-5	-2	-3	-4

Source: Authors' own calculation based on NiGEM simulations.

As shown in Table A3.24 above, the results are very close to those using the STEs collected by the ECB from national central banks in the EU. The euro area sees a long-term impact of 4 bps using NiGEM which matches the impact of 3 bps using the STE models. In general, the NiGEM results are larger than those of the STE models. This increase is however only marginal so the results lead to the same conclusion that the impact is limited for most economies. Both the NiGEM simulations and the STE's simulations show that the impact in the European Union is smaller than in the euro area. This is because there is a smaller impact in the C4, C18 and other non-euro area countries. Through NiGEM's trade and other international relationships both the C4 and C18 benefit from greater price competitiveness when world economic activity falls, in spite of reduced export demand. The simultaneous solution of NiGEM makes it possible to see this effect more accurately and this reduces the impact on those economies. According to the NiGEM simulation, the largest effects are felt in C12, C9, C1, C11, C6 and C14 which replicates the results from the STEs. The impact in C1, C6, C11, C9 and C12 increases compared to the STEs; this is partly explained by lower activity elsewhere in Europe reducing export demand. However, even these greater negative effects are too small to have any significant impact on economic growth. The NiGEM model does not include C3 or C19.

## Technical Appendix 4: The LCR and banks' business models

The analysis of the impact on the LCR on various business models is based on three approaches: (i) a peer group analysis based on business model classifications compiled by the EBA specifically for the purpose of this report (Technical Appendix 4.1.); (ii) an analysis of the impact of balance-sheet structure on banks' LCR based on LCR, NSFR and LR reporting data (Technical Appendix 4.2.); and (iii.) an analysis of outliers and extreme values (Technical Appendix 4.3.).

### 4.1. Peer group analysis based on business model classification

#### 4.1.1. Methodology

Banks have been clustered into different business model categories to compare the performance of each business model group as regards the LCR.

Table A4.1: A total of 13 different business model categories were identified:

Group 1	Well-diversified large cross-border banks with substantial capital market activities
Group 2	Savings and loan associations
Group 3	Co-operative banks
Group 4	Pass-through financing banks
Group 5	Leasing and factoring banks
Group 6	Mortgage banks and building societies
Group 7	CCP, securities trading house, custodian institutions
Group 8	Auto banks, consumer credit banks
Group 9	Merchant banks (specialised in trade finance)
Group 10	Private banks
Group 11	Shari'ah-compliant banks
Group 12	Other well-diversified [predominantly nationally active] banks
Group 13	Other specialised credit institutions

Banks were classified by their national supervisory authorities into one business model group. The methodology used for classification was based on expert judgment. Due to time constraints, it was not possible to provide our own definition of business models based on objective criteria. This will be provided in the 2014 LCR impact report.

All business model categories were exclusive: one bank could only belong to one business model category.

One Swedish bank was removed from the analysis since no LCR data were provided. Two other banks (one Swedish and one British) which do not have any outflows (because of their specific business models) were

still included in the sample but for the purposes of the analysis, their LCR net cash outflows were set at one (infinite LCR).

#### 4.1.1. Classification of banks 'business models

Based on business model categorisation, the QIS sample shows a rather small degree of business model diversity, especially at the country level.

**At the country level, except UK and DE where the QIS sample is very large, only a very few types of business model were reported** (Annex A4.1). On an average, among the 13 business model categories identified fewer than five different types of business model were included in the QIS sample by the national supervisory authorities. Diversity of business models is especially poor in Austria where out of 12 Austrian banks participating in the QIS exercise, only three different types of business model were reported. Diversity is also very low in Poland where out of the five banks included in the QIS sample, only one type of business model was reported (Table A4.2).

Table A4.2: Number of types of business models included in the QIS sample

	Number of types of business models included in the QIS sample	Number of banks in the QIS sample
AT	3	12
BE	5	11
CZ	5	14
DE	9	86
DK	5	18
ES	4	10
FI	6	15
FR	5	11
GB	10	49
HU	3	3
IE	7	13
IT	7	34
LT	1	2
LU	6	13
MT	4	4
NL	7	19
NO	3	10
PL	1	5
PT	3	6

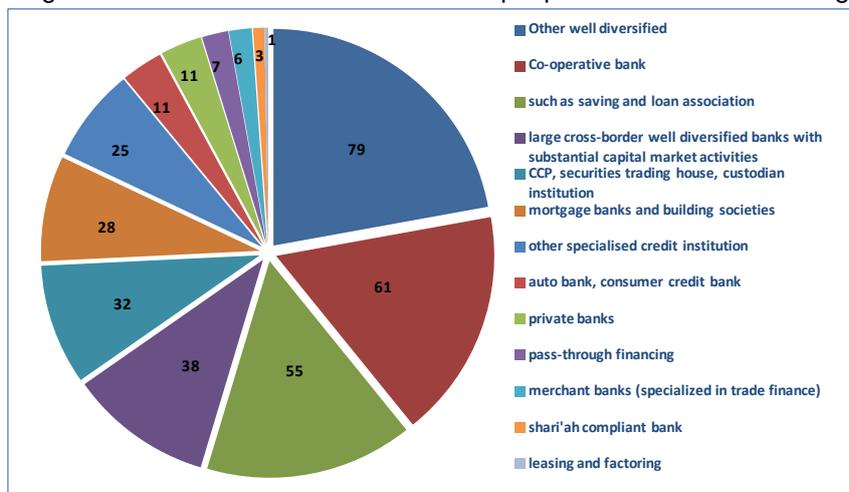
SE	5	8
SK	2	5

Source: EBA voluntary LCR monitoring.

**At EU level, the diversity of the business models increases but there is a high concentration of banks in fewer business model categories:**

- Half of the 357 banks included in the QIS sample were classified as predominantly nationally active banks with well-diversified activities (Group 12); co-operative banks (Group 3); or savings and loans associations (Group 2).
- Other business model categories such as large cross-border groups (Group 1); CCPs and investment banks (Group 7); mortgage banks (Group 6); and other specialised credit institutions (Group 13) are also fairly well represented with more than 20 banks included in one of these groups.
- On the other hand, private banks (Group 5) and auto-banks, consumer credit banks (Group 8) constitute rather small groups with only 11 banks in each of those two categories.
- For the other types of business model, the representativeness of the sample is very poor. A very few number of banks were identified as specialised in leasing and factoring activities (one bank), Shari’ah products (three banks), trade finance (six banks) and in pass-through financing activities (seven banks) (Diagram A4.1).

Diagram A4.1: Breakdown of the QIS sample per business model category



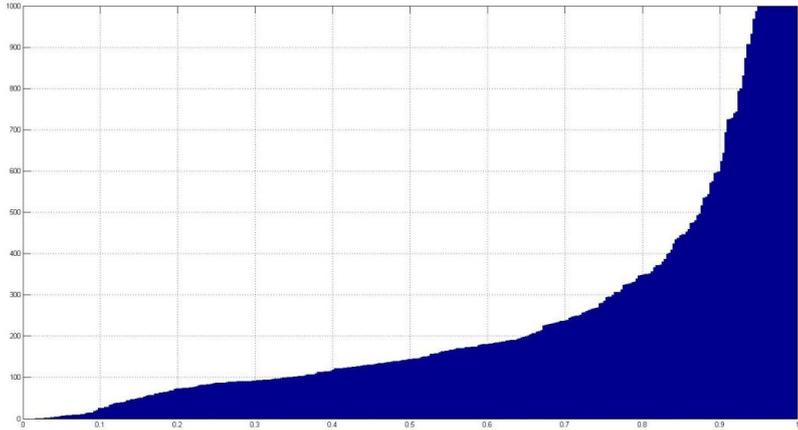
Source: EBA voluntary LCR monitoring.

**Since some business model categories are not very representative, the peer group analysis is particularly difficult and the conclusions of the study should be treated with a significant degree of caution.** Given the very few banks that reported, it is not possible to provide an in-depth assessment of the impact of the LCR for leasing and factoring activities (gr. 5) Shari’ah products (gr. 11), trade finance (gr. 9) and pass-through financing activities (gr. 4). The implementation of the EU regulatory liquidity reporting which will include a larger sample of European banks, would allow for a more accurate analysis of the influence of business models in the next 2014 report.

4.1.2. Distribution of the LCR per business model category

**The level of LCR is very varied in the QIS sample.** 30% of banks have a LCR below 100% and 20% of them have an LCR above 300%. Upper outliers are also numerous since around 10% of banks have an LCR above 600%. The inter-quartile range which measures the spread between the upper quarter (75th percentiles) and the lower quarter (25th percentiles)<sup>49</sup> is very large (200 percentage points on an average) (Diagram A4.2).

Diagram A4.2: Distribution of the LCR (all banks)

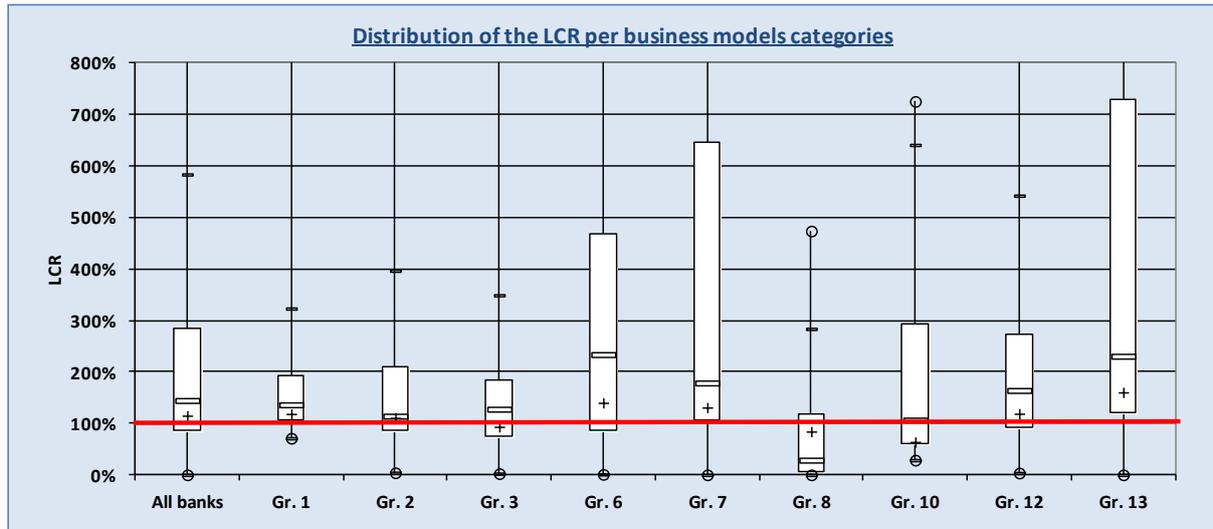


Source: EBA voluntary LCR monitoring.

**Even when banks have the same business model, LCRs still remain very varied.** The peer group analysis shows a high LCR dispersion within business models with an inter-quartile range that goes from 86 percentage points for Group 1 banks (large cross border banks) to 607 percentage points for Group 13 banks (other specialised banks) (Diagram A4.3). Some business models (well-diversified large cross-border banks (gr. 1) saving and loan associations (gr. 2) co-operative banks (gr. 3), auto and consumers credit banks (gr. 8), and other well-diversified banks (gr. 12)) show a lower LCR distribution compared to the average of the whole QIS sample. On the contrary, the distribution is very large for mortgage banks (gr. 6) CCPs, securities trading house, custodian institutions (gr. 7) and other specialised institutions (gr.13). In those three groups, LCRs are not highly correlated to the business model.

<sup>49</sup> The inter-quartile range is a measure of statistical range of middle 50% of observation used as a measure of the spread. It spans 50% of a data set and eliminates the influence of outliers because the highest and the lowest quartiles are removed.

Diagram A4.3: Distribution of the LCR per business model category<sup>50</sup>



Source: EBA voluntary LCR monitoring

**In all business model groups, the distribution is smaller in the first 50<sup>th</sup> percentile than in the second 50<sup>th</sup> percentile.** In other words, there is more homogeneity between banks with lower LCR than between banks with higher LCR. This is suggested by the median (represented by a small rectangle in the chart above) which stands at a relatively low level (generally below 200%). **This also means that, in every business model group, outliers tend to have very high LCR.**

**In addition, except in Group 8 (auto and consumer credits banks) larger banking entities tend to underperform compared to smaller entities.** In all business model groups, the mean (represented by a cross in the chart above) stands below the median. **As a result, in most business model groups, upper LCR outliers tend to be quite small banking entities.**

#### 4.1.3. Performance across business models

**In every business model group, there are banks that do not reach the LCR minimum requirement. However, the share of non-compliant banks is higher for auto and consumer credit banks (Group 8; 73%), pass-through financing banks (Group 4; 53%) private banks (Group 10; 45%).** On the other hand, well-diversified large cross-border banks with substantial capital market activities (Group 1), other well-diversified predominantly nationally active banks (group 12) and merchant banks (Group 9) seem to relatively better perform with less than 20% of banks that are not LCR compliant (Table A4.3)

**LCRs of auto and consumer credit banks (Group 8) and pass-through financing banks (Group 4) are particularly low; both the mean and the median stand below 100%.**

Table A4.3: LCR performance per business model category

	All banks	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6	Gr. 7	Gr. 8	Gr. 9	Gr. 10	Gr. 11	Gr. 12	Gr. 13
<b>Median</b>	<b>145%</b>	136%	114%	128%	94%	-	234%	179%	29%	292%	107%	-	164%	231%
<b>Mean</b>	<b>115%</b>	118%	111%	93%	98%	-	140%	131%	84%	400%	64%	195%	119%	160%
<b>Number of banks &lt;100%</b>	121	6	23	26	4	0	9	8	8	1	5	1	7	6
<b>Share of banks &lt; 100%</b>	<b>34%</b>	16%	42%	43%	57%	0%	32%	25%	73%	17%	45%	33%	9%	24%
<b>Total banks</b>	357	38	55	61	7	1	28	32	11	6	11	3	79	25

Source: EBA voluntary LCR monitoring.

<sup>50</sup> Given the very few number of banks classified in groupGroupsgroupgroup 5, 9 and 11, it was not relevant to include them in box plot charts.

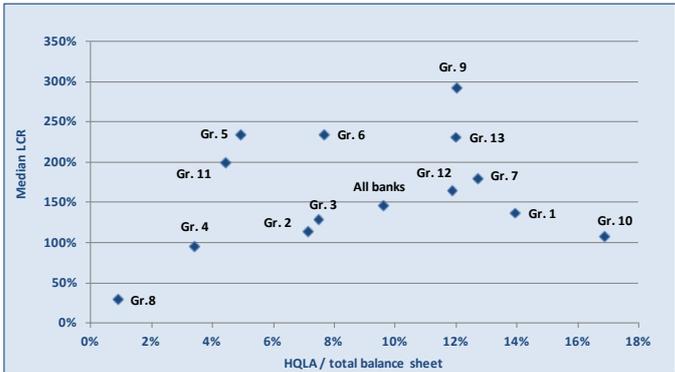
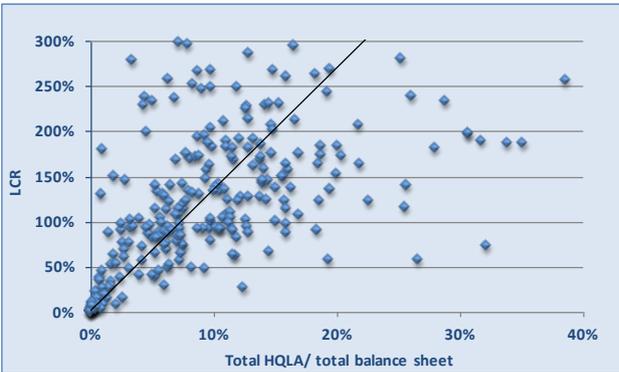
To demonstrate why some types of business models performed better than others, a peer group analysis was done based on a set of key indicators: the share of HQLA relative to total balance sheet; the share of net outflows relative to total balance sheet; the share of total cash outflows relative to total balance sheet; the share of total cash inflows relative to total balance sheet; the share of stable deposits relative to total retail and small business customer deposits; the share of operational deposits relative to total wholesale deposits and the share of debt maturing within 30 days relative to total balance sheet (for more details, see Annex A4. 2).

The peer group analysis shows that:

1. There is a strong positive correlation between the share of HQLA relative to total balance sheet and the LCR. Banks with higher LCR also tend to have a higher share of HQLA relative to total balance sheet (See Diagram A4.4a). Moreover the share of HQLA relative to total balance sheet is highly correlated to business models (see Diagram A4.5). As a result, business models with lower HQLA such as Group 8 (auto and consumer credit banks) and Group 4 (pass through financing banks) are very penalised. On the other hand, Group 7 (CPPs, securities trading house, custodians institutions) group 13 (other specialised institutions) and Group 9 (merchant banks) which hold relatively more HQLA tend to have higher LCR.

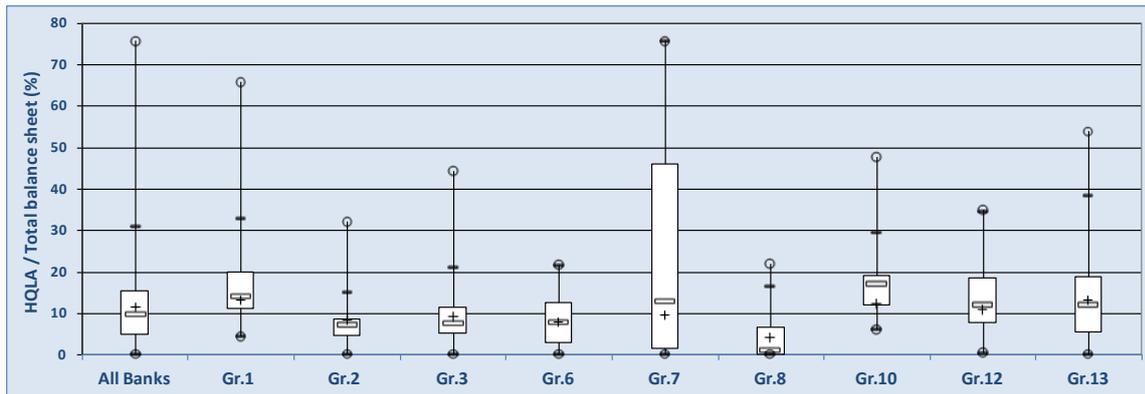
Although the share of HQLA is a strong explanatory variable, it is not enough to explain the very different levels of LCR across business models. Despite large holdings of HQLA, large cross-border banks (Group 1) and private banks (Group 10) do not much better perform compared to their peers. On the contrary, Shari'iah banks (Group 11) which hold fewer HQLA seem to outperform the sample (Diagram A4.4).

Diagrams A4.4: Correlation between the share of HQLA relative to total balance sheet and the LCR



Source: EBA voluntary LCR monitoring.

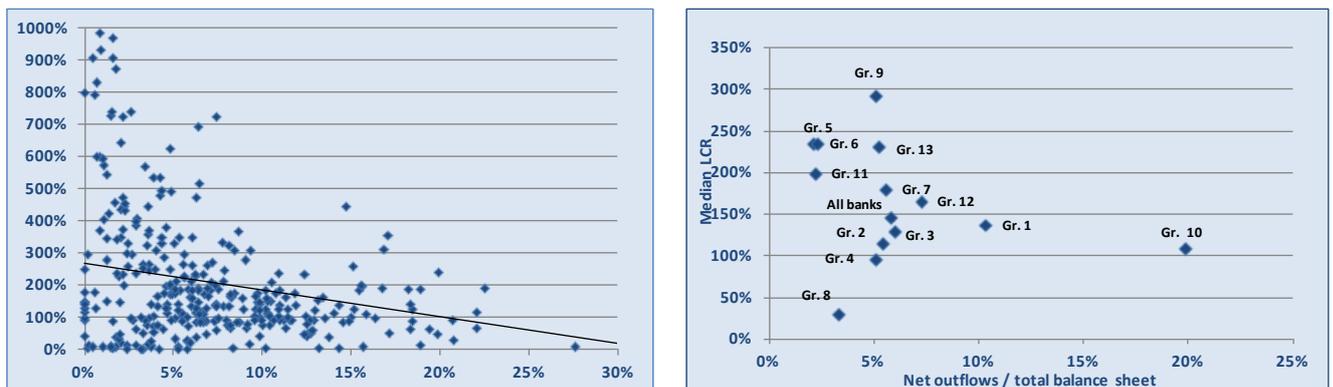
Diagram A4.5: Distribution of the share of HQLA per business model category



Source: EBA voluntary LCR monitoring.

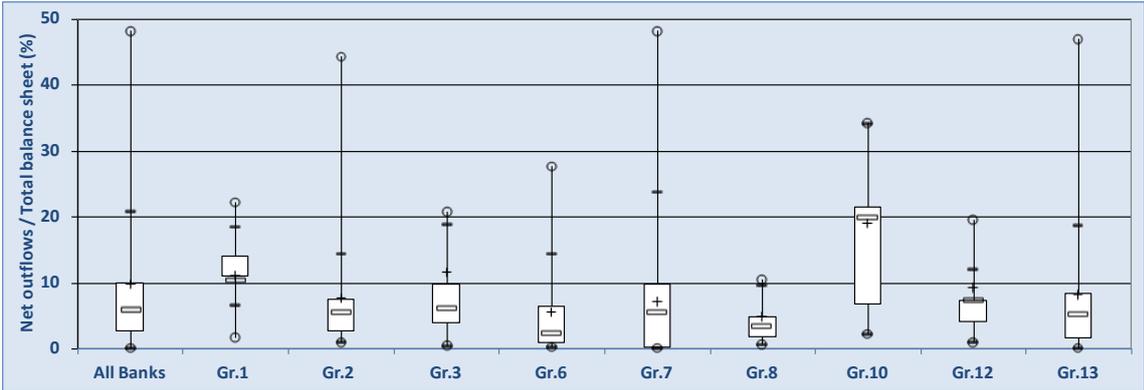
- 2. The share of net outflows (or liquidity gap) relative to total balance sheet is also a key driver of the performance of business models** (Diagram A4.6). The short-term liquidity gap relative to total balance sheet is very similar between banks that have the same business model. Expect group 7 (CPP, securities trading house, custodian institutions) and Group 10 (private banks) business model groups have an inter-quartile range below the average of the whole QIS sample. Diagram A4.7 also shows that large cross-border groups (Group 1) and private banks (Group 10) tend to have higher liquidity gaps. On the contrary, Group 8 (auto and consumer credit banks) and Group 4 (pass through financing banks) have lower liquidity gap. For those last two groups where average LCR is very low, the adjustment triggered by the new liquidity framework will essentially mean holding more HQLA.

Diagram A4.6: Correlation between net cash outflows and the LCR



Source: EBA voluntary LCR monitoring.

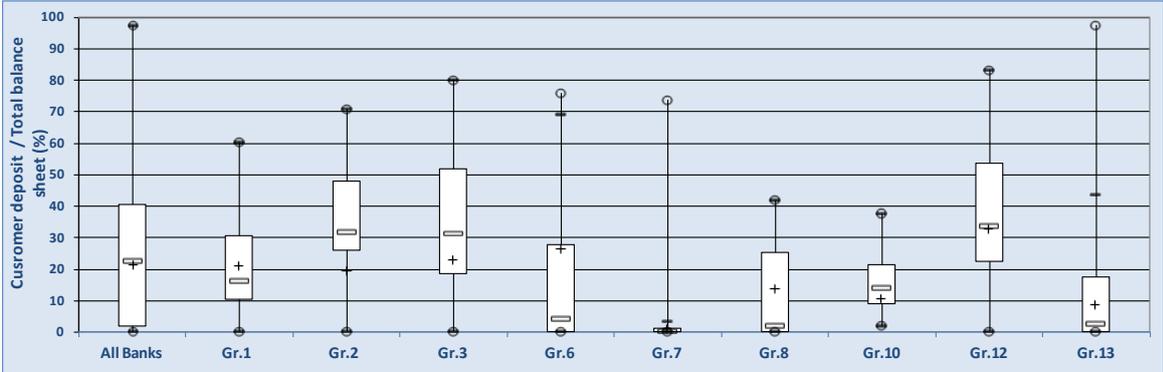
Diagram A4.7: Distribution of the share of net outflows per business model category



Source: EBA voluntary LCR monitoring.

3. The analysis confirms that banks with higher share of customer deposits have a retail oriented business model such as saving and loan associations (Group 2), co-operative banks (Group 3) and other well-diversified predominantly nationally active banks (Group 12) (Diagram A4.8). Those business models also tend to have a higher share of stable deposits compared to other business models.

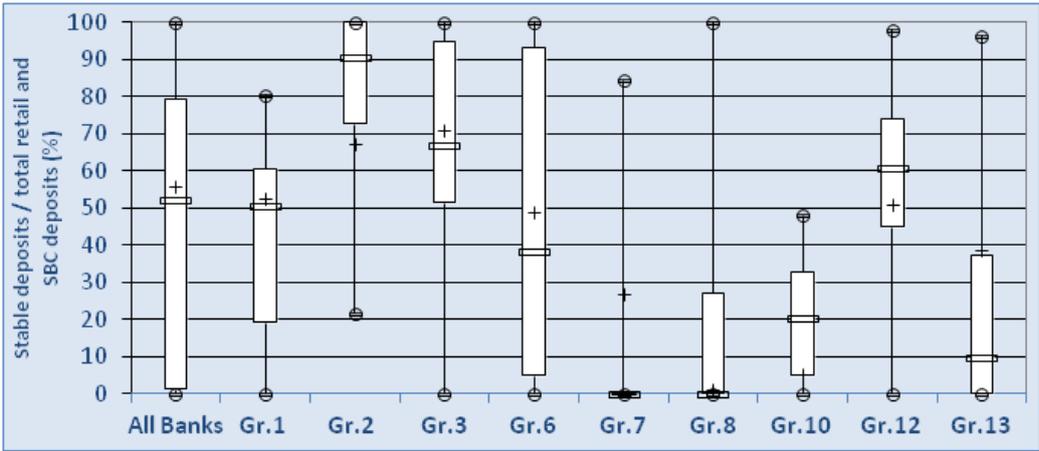
Diagram A4.8: Distribution of the share of retail and small customer deposit per business model category



Source: EBA voluntary LCR monitoring.

4. **The level of stable deposits of a bank is also closely linked to the business model.** Diagram A4.9 shows that the share of stable deposits relative to total balance sheet is more homogeneous within business model groups than within the whole QIS sample (except for mortgage banks (Group 6)). The average share is also very different from one business models to another and no surprisingly, retail oriented business models hold relatively more stable retail deposits. On the contrary, CCPs, securities trading, custodian institutions (Group 8), auto banks, consumer credit banks (Group 7) and other specialised credit institutions (Group 13) hold far less stable retail deposits.

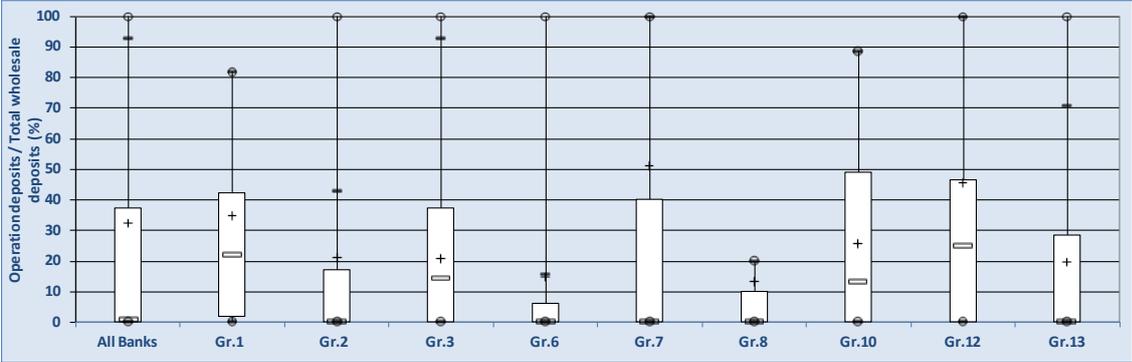
Diagram A4.9: Distribution of the share of stable deposits per business model category



Source: EBA voluntary LCR monitoring.

5. **A very limited number of banks has reported exposures on operational deposits** (50% of the whole QIS sample have a share of operational deposit relative to total balance sheet below 1%). **Such exposures are restricted to a few type of business models which concentrate most of operational deposit exposures** (large cross-border banks with substantial market activities (gr.1), co-operative banks (gr.3), private banks (gr. 10) and other well-diversified predominantly nationally active banks (gr. 12)). Moreover, the large spread between the mean and the median (the latter being much lower) reveals that operational deposit exposures are mostly hold by larger banks than by small banking entities (Diagram A4.10).

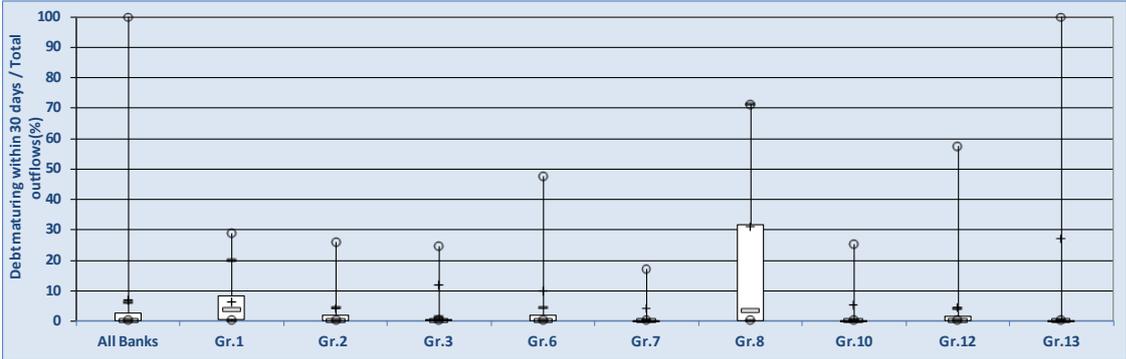
Diagram A4.10: Distribution of the share of operational deposit per business model category



Source: EBA voluntary LCR monitoring.

6. **As regard the amount of debt maturing within 30 days, there are no large differences between business models.** The share of debt maturing within 30 days relative to total balance sheet is very low (close to 0%) in most business models except in Group 8 (auto and consumer credit banks) and Group 1 (large cross-border groups with substantial market activities) (Diagram A4.11).

Diagram A4.11: Distribution of the share of debt maturing within 30 days relative to total outflows per business model category



Source: EBA voluntary LCR monitoring.

4.1.4. Business models and cap on inflows

**A 75% cap on inflows is applied to all banks regardless of their business models and regardless of the amount of liquid assets they hold.** So, there could be some cases where a bank does not reach the LCR minimum requirement even if its short-term liquidity gap (before applying the cap) is extremely low. This situation is however very rare. Although the sample of pass-through financing institutions (Gr. 4) is too small to make sensible distribution analysis, one main take away is that many of these are hit by the cap. The reason is that these institutions manage the liquidity risk by matching in- and outflows and consequently hold hardly any HQLA. **Around 22% of the whole QIS sample reach the cap on inflows but only 6% of the sample reach the cap and to not meet the minimum LCR requirement** (bottom right-hand section of Diagram A4.12.)

Diagram A4.12: LCR and gap on inflows



Source: EBA voluntary LCR monitoring.

**The cap on inflows is a constraint for some banks across all type of business models. But the cap affects specialised banks more.** At least 30% of the banks classified as CCPs, securities trading houses,

custodian institutions (Gr. 7), auto and consumers credit banks (Gr. 8), and other specialised credit institutions (Gr.13) reach the cap. On the other hand, well-diversified large cross-border groups (Gr. 1) savings and loan associations (Gr. 2), co-operative banks (gr.3) and other well-diversified predominantly active banks (Gr. 12) are far less affected with less than 20% of banks reaching the cap. (Table A4.4).

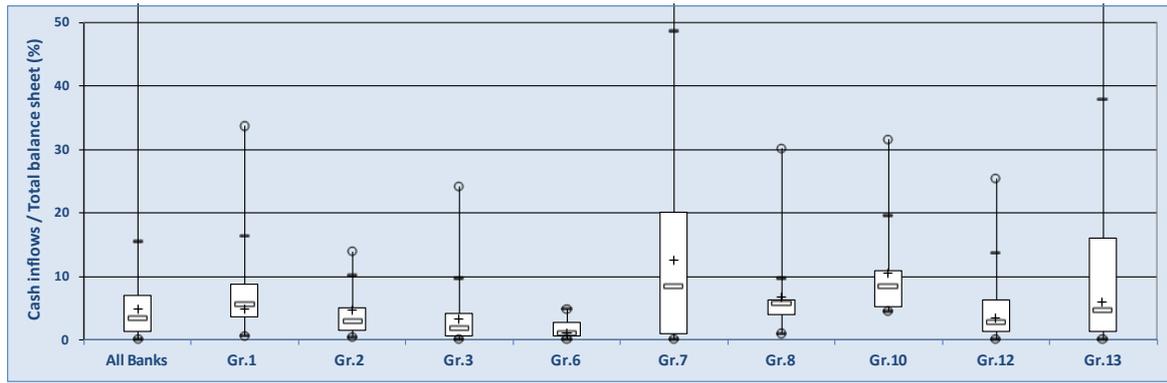
Table A4.4: Distribution of the share of weighted inflows before cap relative to total weighted outflows

	All banks	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6	Gr. 7	Gr. 8	Gr. 9	Gr. 10	Gr. 11	Gr. 12	Gr. 13
MIN	0%	8%	4%	0%	6%	65%	2%	0%	8%	47%	12%	158%	0%	0%
MAX	10009%	212%	200%	201%	461%	65%	512%	6567%	357%	10009%	128%	325%	679%	4710%
Q1	17%	25%	16%	8%	-	-	10%	33%	46%	-	22%	-	13%	17%
Q3	66%	47%	61%	43%	-	-	55%	110%	110%	-	79%	-	51%	99%
Median	34%	34%	36%	22%	77%	-	27%	63%	61%	84%	33%	-	28%	49%
Mean	33%	31%	38%	25%	84%	-	15%	76%	63%	58%	37%	-	27%	45%
Q3-Q1	49%	22%	45%	34%	-	-	45%	78%	65%	-	58%	-	38%	81%
Number of banks >75%	77	4	10	8	4	0	4	11	5	4	3	3	9	12
Share of banks >75%	22%	11%	18%	13%	57%	0%	14%	34%	45%	67%	27%	100%	11%	48%
Total banks	357	38	55	61	7	1	28	32	11	6	11	3	79	25

Source: EBA voluntary LCR monitoring.

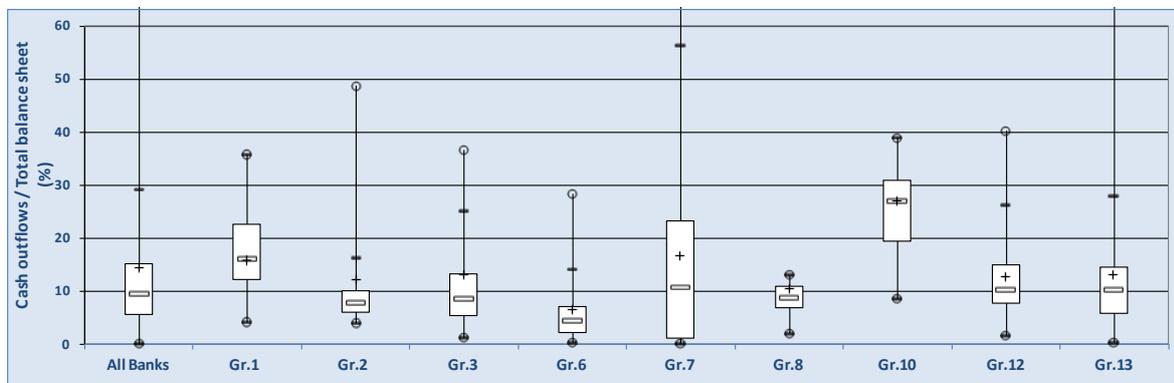
**Business models which are more affected by the cap (Gr. 7, Gr. 8; Gr.13) have relatively more inflows within 30 days (close to 10% on an average (Diagram A4.13) but their cash outflows within 30 days are not atypical (Diagram A4.14). Auto and consumer credit banks are especially penalised by the cap as they have no HQLA (Diagram A4.15). As a result, the cap on inflows would negatively affect business models that do not hold lots of HQLA and which predominantly manage their liquidity risks by reducing the maturity mismatch between assets and liabilities.**

Diagram A4.13: Distribution of the share of cash inflows per business model category



Source: EBA voluntary LCR monitoring.

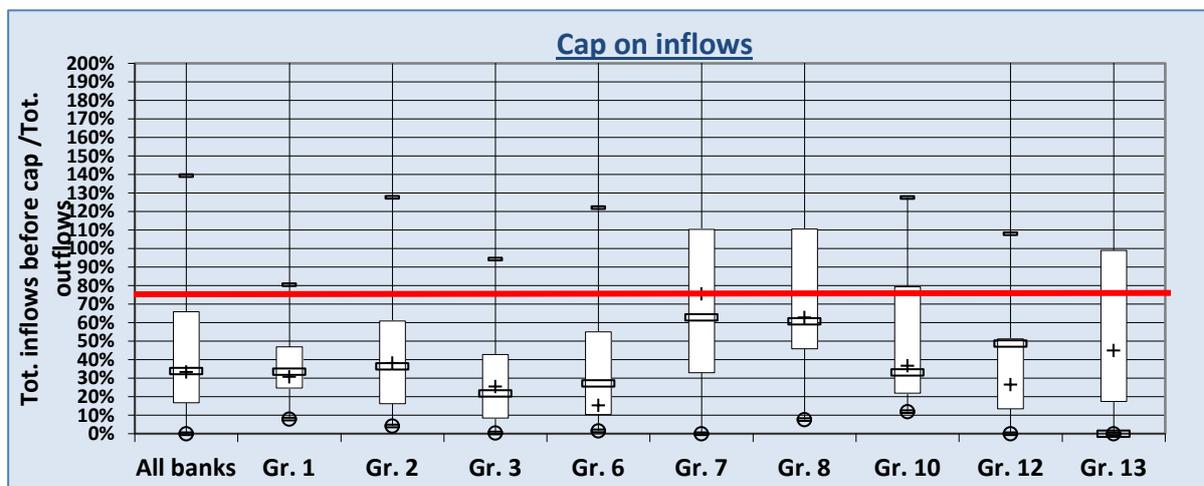
Diagram A4.14: Distribution of the share of cash outflows per business model category

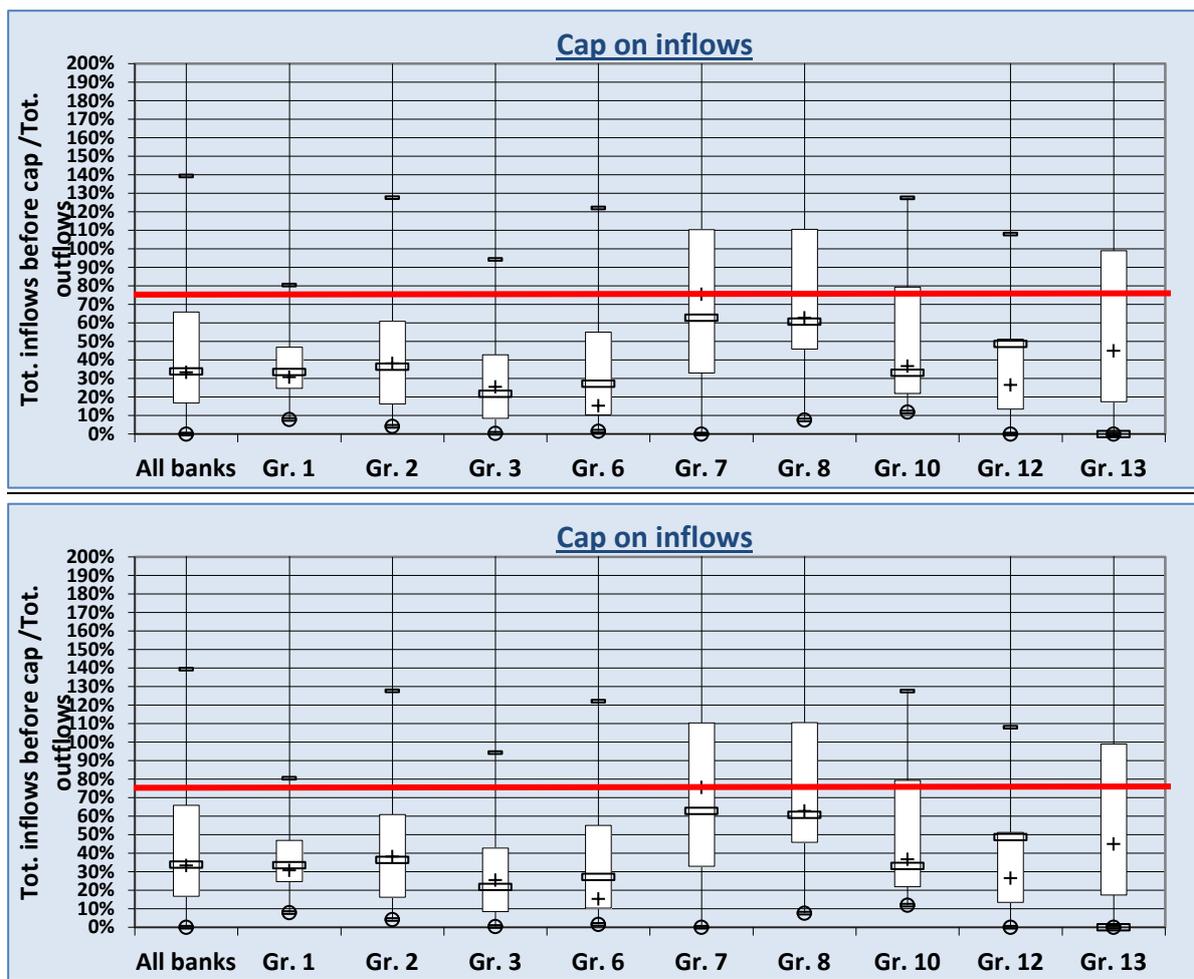


Source: EBA voluntary LCR monitoring.

**The share of inflows (before the cap) relative to the total outflows is very different among banks that have the same business model.** Apart from Group 1 (large cross-border banks), Group 3 (co-operative banks) and Group 12 (other well-diversified predominantly nationally active banks), the inter-quartile range which measures the spread between the upper quarter (75th percentile) and the lower quarter (25th percentile) is higher in business model groups than in the whole QIS sample (Diagram A4.15).

Diagram A4.15: Total inflows before cap / total outflows





Source: EBA voluntary LCR monitoring.

#### 4.2. The impact of balance-sheet structure on the LCR

To complete the peer group analysis based on business model classification, banks with high and lower holdings of various assets and funding exposures were separated out to gauge how this influences their LCR performance.

##### 4.2.1 Influence of asset exposures

###### a) Methodology

The analysis consists of:

- selecting a set of business model indicators reported in the leverage ratio template (*i.e.* share of retail exposures/SME exposures/trade finance exposures/securitisation exposures/bank exposures/corporate and sovereign exposures);
- separating out the 40 largest and the 40 smallest exposures of the sample; and
- assessing which group better performs to identify what type of asset significantly influences the LCR.

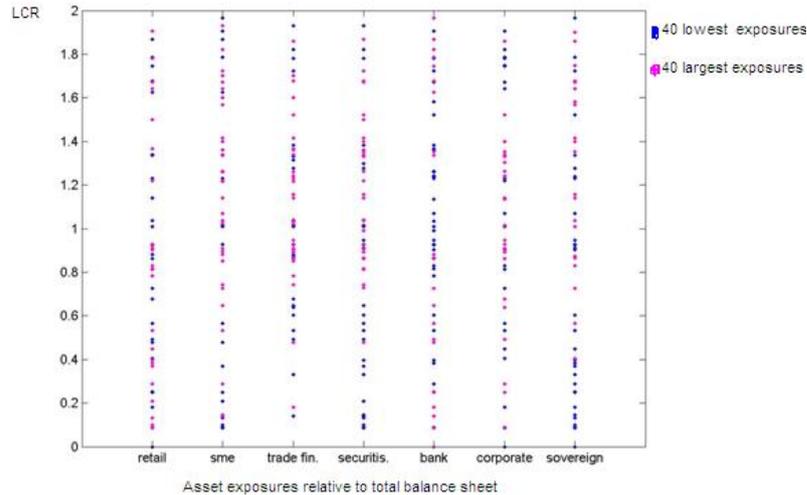
Asset exposures include both on- and off-balance-sheet items.

As leverage ratio data are not available for all European banks which participate to the European QIS exercise, the sample of banks used for this analysis was restricted to 190 banks.

b) Results

The preliminary results show that there is no a clear correlation between the type of assets and the LCR apart from sovereign exposures which correlate highly with the LCR (Diagram A4.16). Banks with the largest exposures (represented in pink dots in the banks chart below) do not perform any differently from the banks with lowest exposures (in blue dots in the chart below).

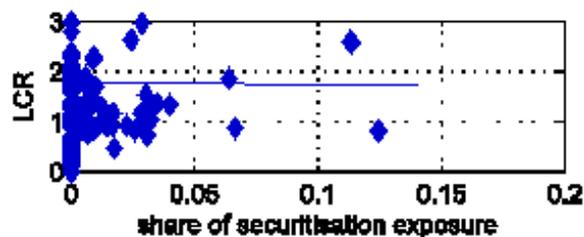
Diagram A4.16: Influence of asset exposures on the LCR



Source: EBA voluntary LCR monitoring.

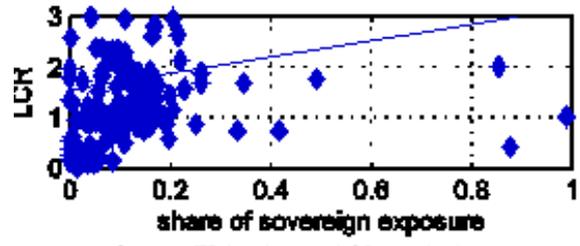
**Banks with larger SME and trade finance exposures do not necessarily have lower LCR compared to banks with lower SME and trade finance exposures.** As regards securitisation, Diagram A4.17 shows that banks with lower securitisation exposures tend to underperform compared to the ones with higher exposures. These results should be taken with a high level of caution as the share of securitisation exposures relative to total exposures does not differ significantly across banks. This makes the comparison between lower and higher exposures on securitisation not sufficiently relevant. **The only type of exposure that seems to influence the performance of the LCR significantly is sovereign exposure** (Diagram A4.18).

Diagram A4.17: Influence of securitisation on the LCR



Source: EBA voluntary LCR monitoring.

Diagram A4.18: Influence of sovereign exposures on the LCR



Source: EBA voluntary LCR monitoring.

## 4.2.2 Influence of the structure of liabilities

### a) Methodology

The same analysis was applied to the liability side of the balance sheet. A set of business model indicators has been selected:

- share of customer deposits relative to total balance sheet;
- share of wholesale deposits relative to total balance sheet;
- share of debt maturing within 30 days relative to total balance sheet;
- share of available stable funding maturing within 30 days relative to total stable funding;
- Basel III Capital ratio;
- Basel III Leverage ratio.

For each of these business model indicators a peer group comparison was made between the 40 largest and the 40 smallest exposures to identify which group better perform and to analyze the main drivers of the LCR.

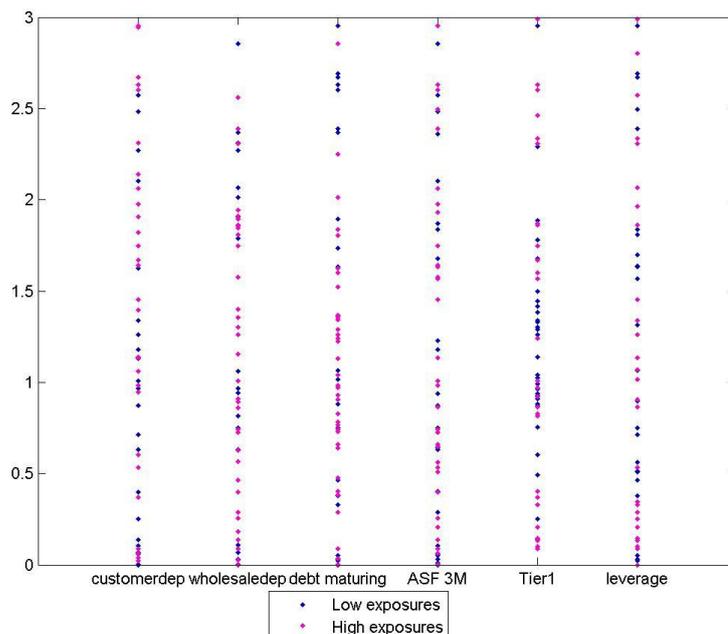
### b) Results

**The preliminary results show that there is no systematic correlation between the structure of the liabilities** (largest and lower exposures do not seem to perform very differently) (Diagram A4.19) **except for banks that significantly outperformed (upper LCR outliers) and underperformed (lower LCR outliers) the sample** (Diagram A4.20).

**But the correlation increases when we examine the maturity profile of liabilities.** Banks with lower share of debt maturing within one month and lower share of available stable funding maturing within three months relative to total balance sheet tend to have higher LCR

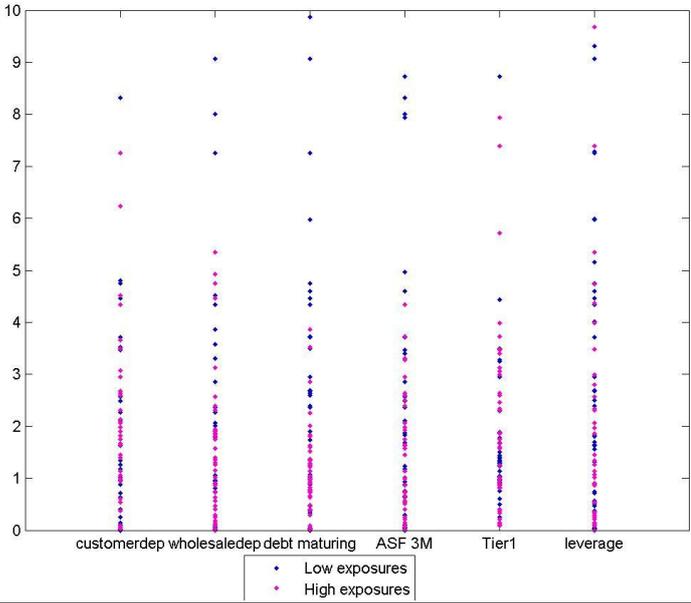
**As a result, the performance of the LCR is also closely linked to the way a bank manages its liquidity and not only to the business model.**

Diagram A4.19: Impact of asset exposures on the LCR



Source: EBA voluntary LCR monitoring.

Diagram A4.20: Impact of asset exposures on the LCR



Source: EBA voluntary LCR monitoring.

Annex 4 A.1: Classification of banks' business models

	Number of banks	Distribution of banks	AT	BE	CZ	DE	DK	ES	FI	FR	GB	HU	IE	IT	LT	LU	MT	NL	NO	PL	PT	SE	SK
1. Large cross-border well diversified banks with substantial capital market activities	38	11%	6	1	-	2	2	2	-	2	12	1	1	2	-	-	-	2	1	-	-	4	-
2. Saving and loan associations	55	15%	-	2	-	28	-	4	3	-	-	1	-	2	-	1	1	1	8	-	2	1	1
3. Co-operative banks	61	17%	5	1	-	24	1	1	4	3	1	-	1	17	-	1	-	1	-	-	1	-	-
4. Pass-through financing banks	7	2%	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	1	-
5. Leasing and factoring banks	1	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
6. Mortgage banks and building societies	28	8%	1	-	2	13	-	-	1	-	7	1	2	-	-	-	1	-	-	-	-	-	-
7. CCP, securities trading house, custodian institutions	32	9%	-	1	2	5	-	-	-	2	10	-	1	2	-	3	-	3	-	-	-	3	-
8. Auto bank, consumer credit banks	11	3%	-	-	-	5	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
9. Merchant banks (specialized in trade finance)	6	2%	-	-	-	-	-	-	-	-	5	-	-	1	-	-	-	-	-	-	-	-	-
10. Private banks	11	3%	-	-	1	3	-	-	2	-	1	-	-	-	-	4	-	-	-	-	-	-	-
11. Shari'ah compliant banks	3	1%	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
12. Other well diversified	79	22%	-	6	6	7	11	3	4	1	3	-	3	9	2	3	1	5	-	5	3	3	4
13. Other specialised credit institutions	25	7%	-	-	4	3	1	-	1	-	4	-	2	1	-	1	1	6	1	-	-	-	-
<b>Total</b>	<b>357</b>	<b>100%</b>	<b>1 2</b>	<b>1 1</b>	<b>1 5</b>	<b>90</b>	<b>18</b>	<b>10</b>	<b>15</b>	<b>11</b>	<b>49</b>	<b>3</b>	<b>13</b>	<b>34</b>	<b>2</b>	<b>13</b>	<b>4</b>	<b>19</b>	<b>10</b>	<b>5</b>	<b>6</b>	<b>12</b>	<b>5</b>

Annex 4A. 2.: Explanatory variables of the performance of business models (%)

		All Banks	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8	Gr.9	Gr.10	Gr.11	Gr.12	Gr.13
<b>HQLA / tot. BS</b>	<b>Median</b>	10	14	7	8	3	5	8	15	1	12	17	4	12	12
	<b>Mean</b>	11	13	8	9	4	5	8	9	4	17	12	5	11	13
	<b>Q1</b>	5	11	4	5			3	2	0		12		8	6
	<b>Q3</b>	16	20	9	11			12	49	7		19		19	19
	<b>Q3-Q1</b>	11	9	4	6			10	47	7		7		11	13
<b>Net outflows / tot. BS</b>	<b>Median</b>	6	10	5	6	5	2	2	6	3	5	20	2	8	5
	<b>Mean</b>	10	11	8	10	4	2	6	7	5	4	19	2	9	8
	<b>Q1</b>	3	7	3	4			1	0	2		7		4	2
	<b>Q3</b>	10	14	7	10			6	12	5		21		8	8
	<b>Q3-Q1</b>	7	7	5	6			5	12	3		15		3	7
<b>Cash outflows / tot. BS</b>	<b>Median</b>	10	16	8	8	15	6	4	12	9	20	27	9	10	10
	<b>Mean</b>	14	16	12	13	14	6	6	17	10	9	27	10	12	13
	<b>Q1</b>	6	12	6	5			2	1	7		19		8	6
	<b>Q3</b>	15	23	10	13			7	25	11		31		16	15
	<b>Q3-Q1</b>	10	10	4	8			5	23	4		11		8	9
<b>Cash inflows / tot. BS</b>	<b>Median</b>	3	6	3	2	14	4	1	7	6	15	8	27	3	5
	<b>Mean</b>	5	5	5	3	12	4	1	12	6	5	11	28	3	6
	<b>Q1</b>	1	4	1	1			1	1	4		5		1	1
	<b>Q3</b>	7	9	5	4			3	20	6		11		6	16
	<b>Q3-Q1</b>	6	5	3	4			2	19	2		6		5	15
<b>Customer deposit / tot. BS</b>	<b>Median</b>	22	16	31	31	0	10	4	0	2	4	14	2	35	2
	<b>Mean</b>	21	21	19	23	0	10	26	1	14	16	10	1	33	8
	<b>Q1</b>	2	11	26	19			0	0	0		9		23	0
	<b>Q3</b>	40	30	48	52			28	1	25		21		56	17
	<b>Q3-Q1</b>	39	20	22	33			28	1	25		12		33	17
<b>Stable deposit / tot. retail and SBC deposits</b>	<b>Median</b>	52	50	91	67	0	0	38	0	0	19	20	0	61	10
	<b>Mean</b>	56	53	67	71	78	0	49	27	1	47	5	0	51	39
	<b>Q1</b>	1	19	73	52			5	0	0		5		45	0
	<b>Q3</b>	79	60	100	95			93	0	27		33		74	37
	<b>Q3-Q1</b>	78	41	27	43			88	0	27		28		29	37
<b>Operational deposit / total wholesale deposit</b>	<b>Median</b>	1	22	0	14	0	0	0	0	0	0	13	0	25	0
	<b>Mean</b>	32	35	21	21	43	0	14	51	13	1	26	0	45	20
	<b>Q1</b>	0	2	0	0			0	0	0		0		0	0
	<b>Q3</b>	37	42	17	37			6	40	10		49		46	28
	<b>Q3-Q1</b>	37	40	17	37			6	40	10		49		46	28
<b>Debt maturing within 30 days / tot. Outflows</b>	<b>Median</b>	0	3	0	0	0	13	0	0	3	0	0	0	0	0
	<b>Mean</b>	7	6	4	12	8	13	10	4	31	1	5	0	4	27
	<b>Q1</b>	0	0	0	0			0	0	0		0		0	0
	<b>Q3</b>	2	8	2	0			2	0	32		0		2	0
	<b>Q3-Q1</b>	2	8	2	0			2	0	32		0		2	0

## Technical appendix 5: The interaction between the LCR and capital regulation, the leverage ratio and the NSFR

There are very few analysis of the interaction between liquidity and capital requirements. The mandate in Article 509(1) of the CRR was amended by the European Parliament which inserted the following requirement: 'Such analysis should take due account of markets and regulatory developments as well as of the interactions of this ratio with other prudential requirements under the present regulation such as the risk capital ratios or the leverage ratios.' Section 5.1 examines the relation between the ratios and between their numerators and denominators. Section 5.2 studies how the LCR and the capital ratios develop under the banks' adjustments to the liquidity requirement.

For the following analysis and Section 5.1 the most significant outliers were removed. The outliers were defined as a LCR above 1 000%, a NSFR above 300% or a leverage ratio above 20%. There is certainly need to study these outliers in more detail in future analysis. Furthermore, we removed banks which obviously submitted data of poor quality, for example if weighted ASF or weighted RSF exceeded the total balance sheet assets. We also removed banks with a stock of liquid assets exceeding 80% of the balance sheet total or a leverage exposure exceeding 400% of the balance sheet total.

Diagram A5.1: The LCR and its components

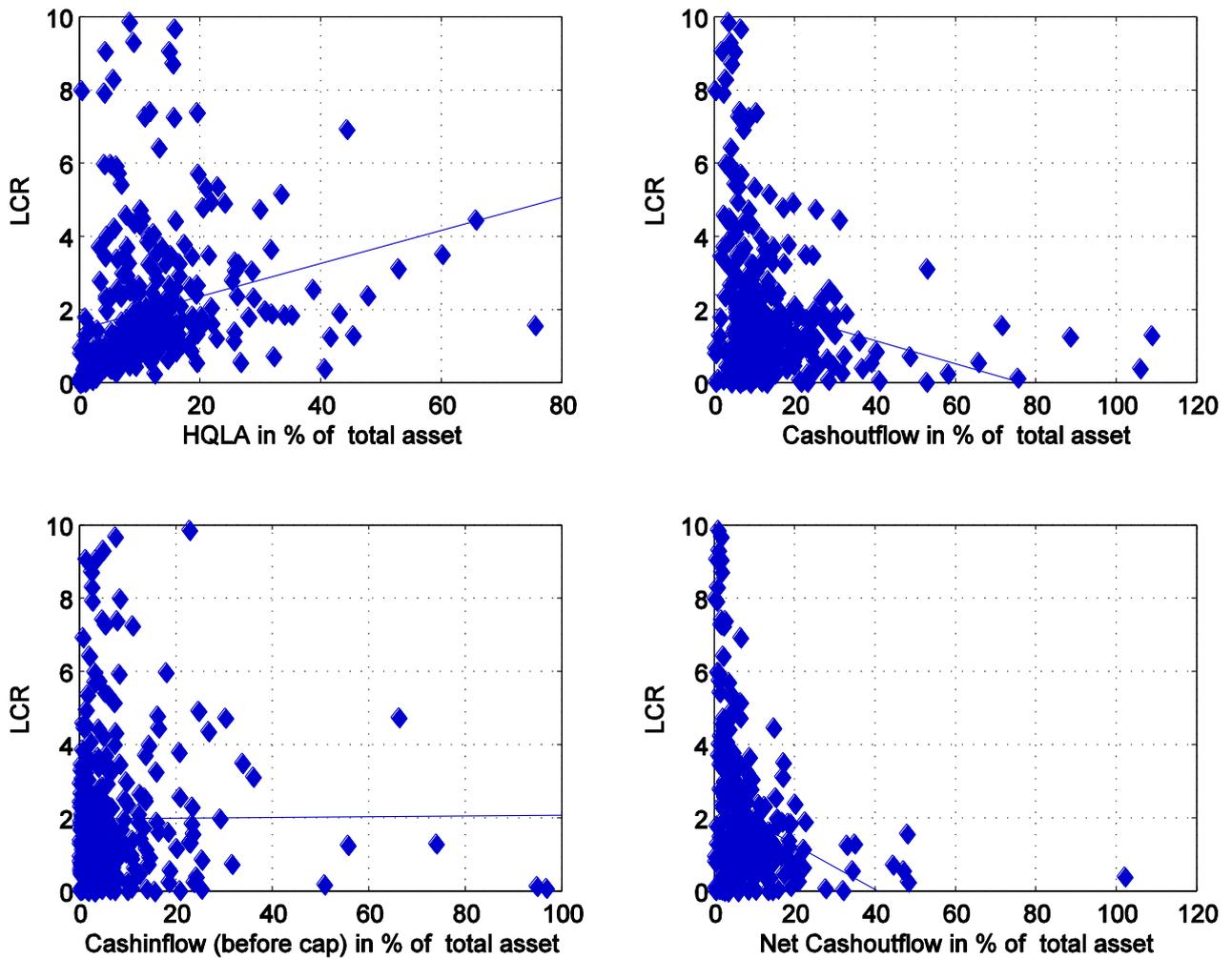


Diagram A5.1 shows how the liquidity coverage ratio relates to the stock of liquid assets and cash outflows (upper charts). As one would expect, banks with higher ratios hold more liquid assets and less cash outflows than banks with lower ratios. However, cash inflows explain almost none of the variation in the LCRs across banks. Very high ratios are mostly associated with a bank's cash outflows. Banks showing LCRs above 600% throughout report very low cash outflows, but they do not hold significantly more liquid assets than banks with low LCR.

### 5.1 The interaction between the LCR and capital requirements

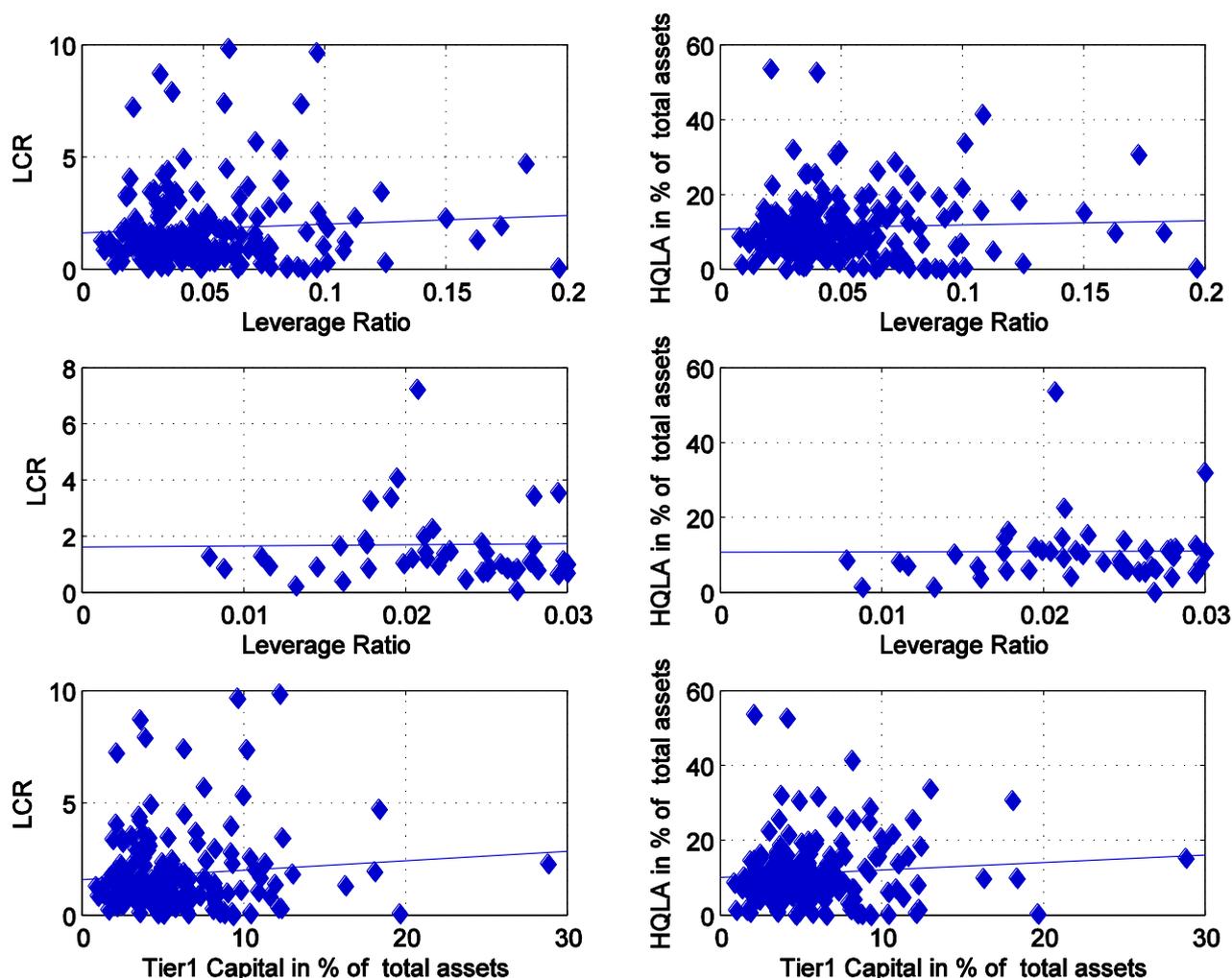
The LCR is supposed to negatively interact with the leverage ratio. The leverage ratio is a volume-based capital ratio and does not make a difference whether a bank holds liquid assets or non-liquid assets. However, banks with low-risk business, holding lots of liquid assets, may earn their required return on equity by a high level of leverage. As a result, a high LCR would imply a low leverage ratio.

Surprisingly, there is no evidence for these hypotheses in the monitoring data. Diagram A5.2 shows that banks with a higher LCR and hold a higher portion of liquid assets do not show a lower leverage ratio also show (upper charts). This is also true if we look only at banks which do not yet meet the leverage ratio (charts in the middle).

The bottom right-hand chart proves that on average, a high portion of liquid assets is not associated with a low capital base, or with high leverage. We only find some banks with a very large LCR which

report low leverage ratios. However, we also found previously that the large LCRs are a matter of low cash outflows rather than a high stock of liquid assets.

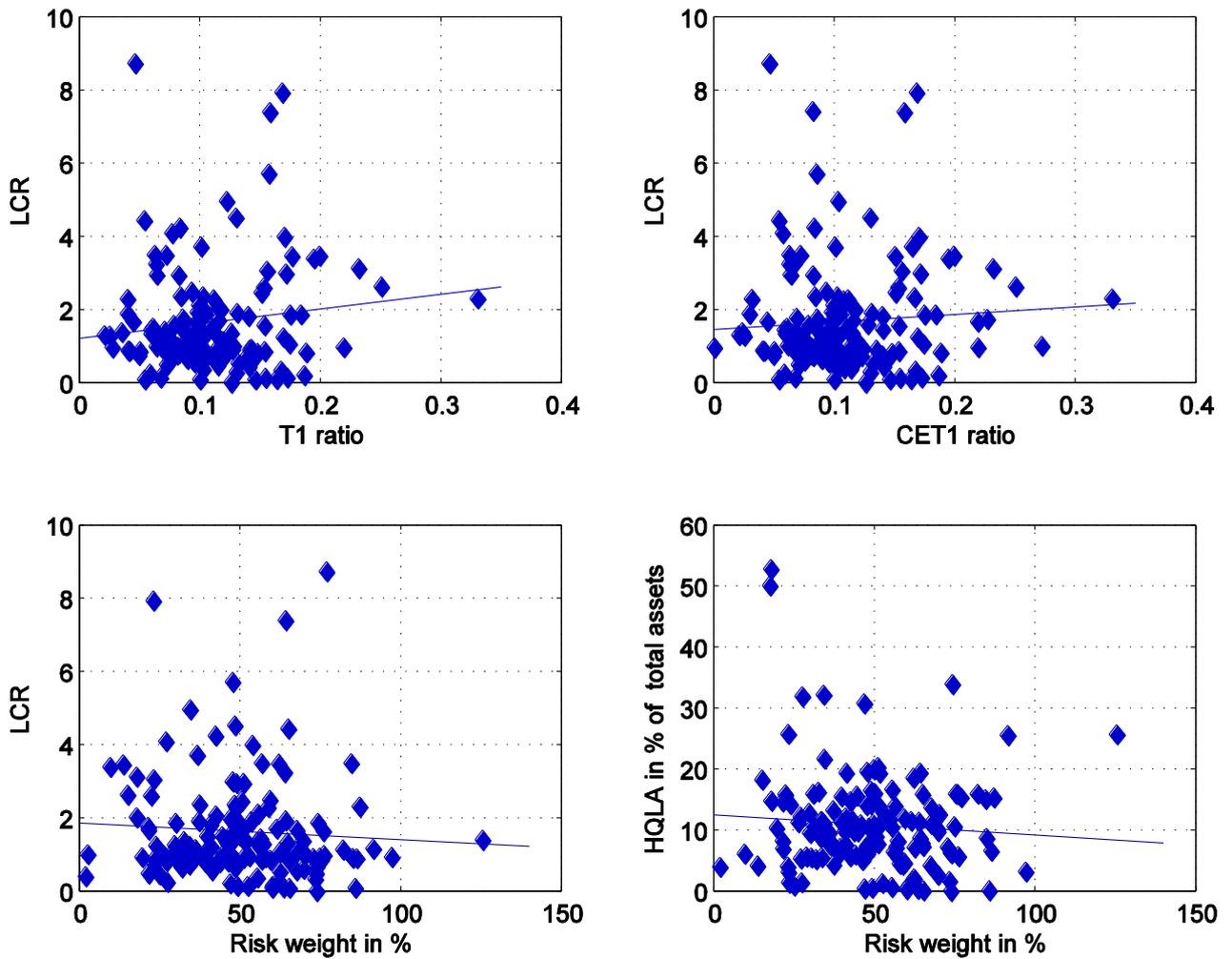
Diagram A5.2: The LCR and capital requirements



One might argue that low-risk business is badly approximated by the portion of liquid assets as defined by the LCR. Banks could also hold a high portion of liquid assets to counterbalance their other, more risky business. We can examine the relation between risk weighted capital ratio and the LCR for a reduced sample of banks which submitted liquidity as well as capital data (Diagram A5.3). A higher portion of liquid assets and a higher LCR (lower charts) are generally associated with lower risk weights. There is a positive relation between the LCR and the risk-based capital ratios.

Overall, these findings suggest that the LCR does not conflict with the capital ratios, meaning that meeting the LCR does not make it difficult to meet the (volume or risk based) capital ratios and vice versa. On the contrary, **the level of LCR** seems to be driven not only by liquid assets but also by the maturity and structure of liabilities, which determine the cash outflows and do not influence capital ratios at all. By contrast, the former sections revealed that **the change in the LCR** is best explained by changes in the stock of liquid assets. However, it is not clear whether the increased investment in central bank reserves and other high liquid assets is due to the banks' adjustment to the new liquidity requirement or the financial crises and whether in the long term, banks will influence their level of LCR by re-structuring their liabilities or adding liquid assets.

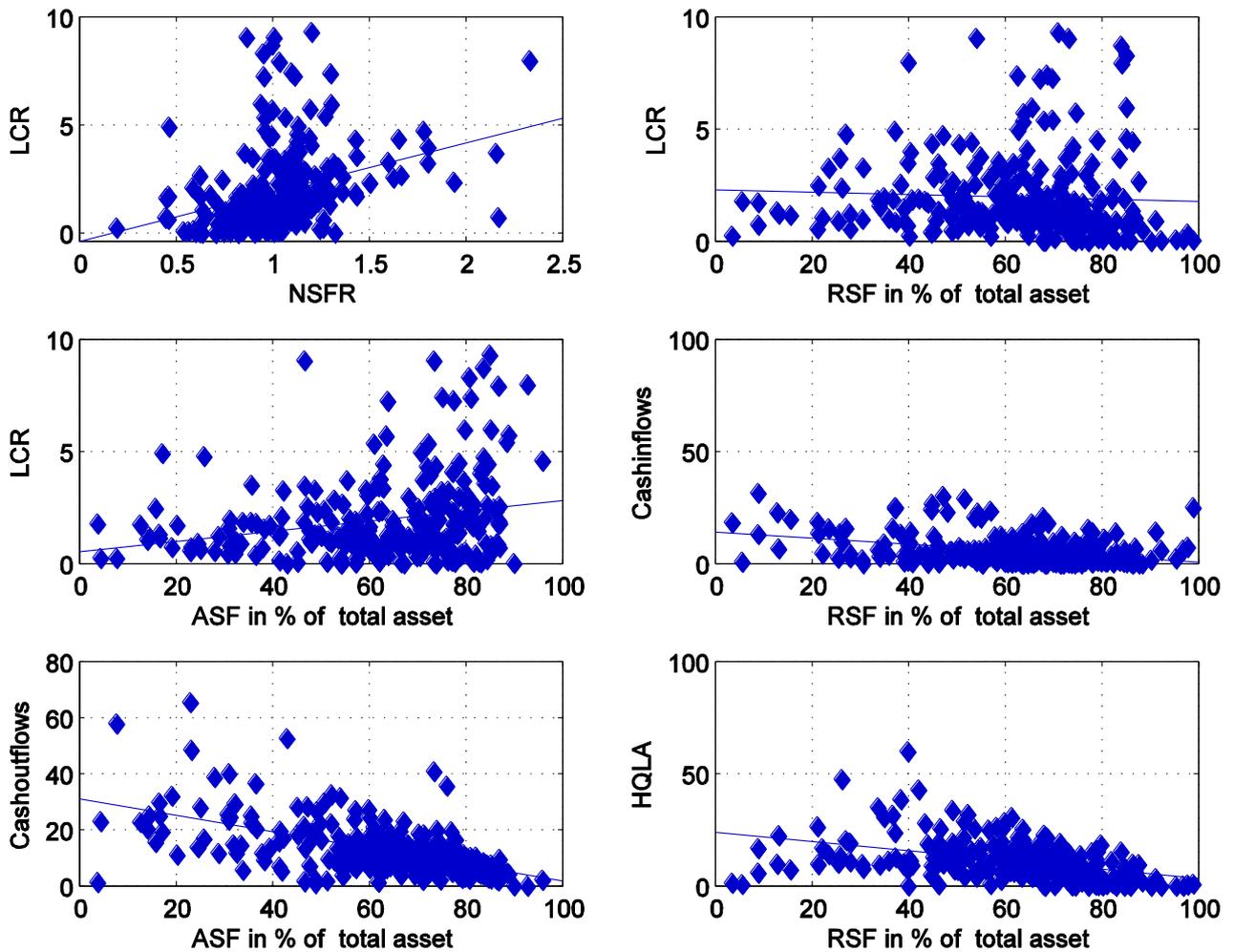
Diagram A5.3



Even though the CRR does not yet define the NSFR as a binding constraint and the NSFR might be subject to revisions, it is interesting to examine the relationship between the two liquidity requirements, in order to see whether the liquidity ratios are complementary or substitutable (Diagram A5.4).

Both the NSFR and the LCR treat retail and small business customer deposits in a preferential way. In the LCR, these deposits receive low run-off rates, in the NSFR these deposits receive a high stable funding factor, irrespective of their maturity. Indeed, the bottom left-hand chart in Diagram A5.4 shows the expected negative relationship between cash outflows and ASF. There is also a negative relationship between HQLA and RSF, which can be explained by a low RSF-factor for liquid assets. On average, banks with a high LCR also report a high NSFR, while the variation in the NSFR is comparably low.

Diagram A5.4



## 5.2 Adjustment by banks to the LCR

Banks' may adjust differently to the new liquidity requirements, depending on their business model. Table A5.5 gives an overview of the banks' balance sheet structure, based on Basel III monitoring data (and the 2013 calibration of the LCR), focusing on liquid assets, cash outflows and cash inflows.

Only limited fraction of assets and liabilities are considered in the LCR. For HQLA, the fraction is the portion of assets which is eligible for the stock of liquid assets. For outflows (inflows), the fraction equals the portion of liabilities (assets) maturing within 30 days.

Furthermore, the unweighted amount of liquid assets as well as assets and liabilities maturing within 30 days are subject to a haircut, run-off rate or inflow rate in order to define the stock of liquid assets, cash outflows and cash inflows under stress.

Therefore, the LCR might not only be written as HQLA over net cash outflows but also as

$$LCR = \frac{HQLA}{Net\ Cash\ Outflows} = \frac{f_H \cdot w_H \cdot E}{f_O \cdot w_O \cdot E - f_I \cdot w_I \cdot E} = \frac{f_H \cdot w_H}{f_O \cdot w_O - f_I \cdot w_I}$$

$f_H$ : fraction of assets which is eligible for the stock of liquid assets

$w_H$ : average weight applied to liquid assets

$f_O$ : fraction of liabilities maturing within 30 days

$w_o$ : average run-off rate applied to outflows

$f_l$ : fraction of assets maturing within 30 days

$w_i$ : average rate applied to inflows

E: Total on- and off balance sheet exposure

whereby

$$f_H = \frac{\text{unweighted amount of assets eligible for the stock of liquid assets}}{E}$$

$$w_H = \frac{\text{weighted amount of liquid assets}}{\text{unweighted amount of assets eligible for the stock of liquid assets}}$$

and  $f_o$ ,  $w_o$ ,  $f_l$ ,  $w_l$  are defined accordingly.

A low weight applied to the assets eligible for the stock of liquid assets indicates that a bank holds a high portion of Level 2 assets or is affected by the cap on liquid assets. On average, 80% of the banks' liabilities are relevant to calculate outflows, but only 19% of the banks' assets are used for calculating cash inflows. The run-off rate for liabilities is on average 17%. The weight for inflows varies significantly between 19% and 99%. Half of the countries are impacted by the cap on inflows, meaning that the weight for inflows before cap is higher than after cap (Table A5.1). In 5 out of 21 participating countries, banks on average do not meet the LCR. In three of these five countries, banks hold on average less liquid assets than the aggregate bank. Also, in four of these five countries, banks surprisingly report less funding maturing within 30 days than the EU average.

C4, C7, C9, C16 and C17 report an outstanding amount of liabilities maturing within 30 days (more than 90% of total balance sheet assets) but on average meet the LCR due to a high stock of liquid assets.

Table A5.5: Overview over the LCR and its components for the banks in the sample (country level)

Source: EU QIS sample and authors' own calculations.

	number of banks	LCR in %	HQLA		Outflows		Inflows		
			unweighted amount in % of total exposure	weight in %	unweighted amount in % of total exposure	weight in %	unweighted amount in % of total exposure	weight (after cap)	weight (before cap)
C1	11	87.1	9.3	96.1	67.1	20.2	15.8	20.8	21
C2	90	110.8	10.1	93.9	60.9	20.3	14.2	26.5	26.7
C3	13	64.9	16.8	96	120.5	29.6	24.8	43.5	45.3
C4	49	116.2	14.1	97.7	106.2	16.4	37.9	14.8	15.3
C5	34	130.1	7.2	99.3	68.7	12	9.8	28.4	33
C6	13	86.5	4.3	91.1	43.3	15.6	4.4	51.9	66.5
C7	19	150.3	13.7	95.1	109.6	12.2	13.7	34.4	34.5
C8	18	99.8	9.2	90.2	57	27	21	33.7	38
C9	11	152.6	16.1	97.3	99.4	18.7	17.2	48.4	68.7
C10	12	125.9	10.7	98.6	80.9	20.5	13	62.6	69.5
C11	15	101.4	11.3	89.9	62.8	18.3	2.3	64.9	72.6
C12	6	131.8	9.5	97.7	80.8	15	8.1	63.1	63.1
C13	10	137.5	12.1	97.6	81.8	13.2	11.7	19	19
C14	3	91.1	16.7	100	87.1	27.1	7.2	72.9	72.9
C15	10	151.2	18.8	95.5	86.9	18	4.5	85.8	85.8
C16	5	129.7	19.6	99.3	106.4	17	5.1	60.1	60.1
C17	15	281.1	21.4	99.8	93.9	13.3	22	22.1	24.5
C18	12	135.9	14.5	92.9	67.8	23.3	12.3	47.6	47.6
C19	4	195.3	14.9	91	99	17.1	10.1	98.7	98.7
C20	2	259.3	8.5	99.3	80.4	15.9	11.8	80.9	92.9
C21	5	260.1	25.5	99.9	87.1	15	5.2	62.6	62.6
All	357	115	11.3	96.2	79.9	17.3	18.8	23.1	24.4

Table A5.6 shows results based on Basel III monitoring data. Non-compliant banks add liquid assets amounting to x, until the LCR equals 1, whereby we also consider that selling non-liquid assets might reduce cash inflows (see column 'shortfall'):

$$LCR = \frac{f_H \cdot w_H \cdot E + \min(2x; x + Adj)}{f_O \cdot w_O \cdot E - \left(f_I - \frac{x}{E}\right) \cdot w_I \cdot E} := 1$$

Table A5.6 also shows the surplus of liquid assets in compliant banks, which can reduce liquid assets until the LCR becomes 100%. Because the balance sheet total remains unchanged, the leverage ratio is not impacted. However, capital ratios of non-compliant banks increase, because the sold (non-liquid) assets were of average risk but the bought (liquid) assets get a zero risk weight. We assume that the sold assets were of average risk. Therefore, the actual impact on risk-based capital ratios may be greater than stated in Table A5.16. Because the average risk weight includes the risk weight for liquid assets while banks are likely to sell assets with a risk weight above average

Table A5.6: Sell non liquid assets, buy Level 1 assets

	LCR in %	CR in %	LR in %	Level 1 assets			Interaction with capital requirements	
				Shortfal l in bn €	shortfall in % HQLA	Surplus in bn €	CR in %	LR in %
C1	87.2	10.2	4.2	55.5	9.5	17.2	10.3	4.2
C2	101.8	9.9	2.3	33.7	7.3	48.1	9.9	2.3
C3	97.1	22.4	6.8	0.2	3.2	0	22.5	6.8
C4	111.3	8.8	3.9	27.7	3.1	118.4	8.8	3.9
C5	138.7	10.1	6.2	1.4	0.6	64	10.1	6.2
C6	87.7	11.1	4.4	4.7	21.3	1.6	11.2	4.4
C7	150.3	11.7	6.3	9.5	3.1	112.4	11.7	6.3
C8	103.5	13	3.8	2.7	3	4.4	13	3.8
C9	158.9	9.5	4.1	0	0	16.4	9.5	4.1
C10	136.2	9.6	4.1	3.9	7.1	18.1	9.6	4.1
C11	101.4	16.2	5.9	2.8	19.3	3.5	16.2	5.9
C12	131.8	8	5.4	3	9.1	10.9	8	5.4
C13	138.3	6.6	4.7	1.3	0.5	77.6	6.6	4.7
C14	91.1	15.3	11	1.1	17	0.4	15.6	11
C15	151.3	11.9	5.3	0.3	0.5	22.2	11.9	5.3
C16	129.7	13.5	9.9	0.3	2.3	3.6	13.5	9.9
C18	131.8	13.1	5.6	0	0	44.9	13.1	5.6
C19	184.8	14.4	5.8	0	0	0.6	14.4	5.8
All	112.6	9.6	4.1	148.1	4.5	564.4	9.6	4.1

Source: EU QIS sample and authors' own calculations.

Liquidity regulation requires banks to hold a minimum stock of liquid assets. Banks may extend their balance sheet in order to build up their stock; i.e. increase liquid assets with high credit quality (zero risk weight) but a lower yield without changing other assets.

The Basel working group on liquidity (WGL) assumes that banks increase their holdings of HQLA while leaving other assets (cash inflows) and liabilities (cash outflows) unchanged. As a result, liquid assets have to be funded with equity and liquidity regulation interacts with the risk-based capital ratios (via increased capital) and the volume-based leverage ratio (via increased capital and exposure), whereby capital and exposure, both increase by the same amount than liquid assets while risk weighted assets remain unchanged due to the zero risk weight for liquid assets. Table A5.7 shows the shortfall of liquid assets as stated by the WGL ('EU QIS LCR shortfall'). The shortfall can be lower, because by adding Level 1 assets banks are enabled to consider Level 2 assets in their stock of liquid assets which were formerly capped, see column 'shortfall', which results when we solve.

$$LCR = \frac{f_H \cdot w_H \cdot E + \min(2x; x + Adj)}{f_O \cdot w_O \cdot E - f_I \cdot w_I \cdot E} := 1$$

The shortfall decreases further, when banks are able to redistribute liquid assets in the system (see column 'surplus', which shows surplus liquid assets in non-compliant banks). The total shortfall therefore could be completely covered by re-distributing liquid assets across banks.

Table A5.7: Impact of buying Level 1 assets funded by equity (2010 LCR calibration)

	LCR in %	CR in %	LR in %	Level 1 assets			Interaction with capital requirements		
				shortfall 1	shortfall in % HQLA	surplus	EU QIS LCR shortfall	CR in %	LR in %
C1	87.2	10.2	4.2	103.1	17.7	17.2	103.1	13.7	5.9
C2	101.8	9.9	2.3	31.7	6.9	48.1	35.1	9.9	2.3
C3	97.1	22.4	6.8	0.2	3	0	0.2	23.8	7.2
C4	111.3	8.8	3.9	27.5	3.1	118.4	27.5	8.8	3.9
C5	138.7	10.1	6.2	1.4	0.6	64	1.4	10.1	6.2
C6	87.7	11.1	4.4	4.7	21.2	1.6	4.7	12.8	5.3
C7	150.3	11.7	6.3	9.1	3	112.4	9.1	11.7	6.3
C8	103.5	13	3.8	2.4	4	4.4	2.4	13	3.8
C9	158.9	9.5	4.1	0	0	16.4	0	9.5	4.1
C10	136.2	9.6	4.1	3.6	6.6	18.1	3.6	9.6	4.1
C11	101.4	16.2	5.9	3.1	21.2	3.5	3.1	16.2	5.9
C12	131.8	8	5.4	2.9	8.7	10.9	2.9	8	5.4
C13	138.3	6.6	4.7	1.3	0.5	77.6	1.3	6.6	4.7
C14	91.1	15.3	11	1	16.1	0.4	1	17.3	12.5

C15	151.3	11.9	5.3	0.3	0.5	22.2	0.3	11.9	5.3
C16	129.7	13.5	9.9	0.3	1.9	3.6	0.3	13.5	9.9
C18	131.8	13.1	5.6	0	0	44.9	0	13.1	5.6
C19	184.8	14.4	5.8	0	0	0.6	0	14.4	5.8
All	112.6	9.6	4.1	192.5	5.9	564.4	195.9	9.6	4.1

Source: EU QIS sample and authors' own calculations.

For some banks, this strategy may not be feasible or they may prefer other strategies. For example, in two countries banks would show capital ratios above 20% if additional liquid assets were funded by equity. However, funding the shortfall of liquid assets by liabilities is feasible only for banks which have a leverage ratio above 3%. In addition, funding liquid assets by liabilities rather than equity requires a higher level of leveraging, because liabilities will induce cash outflows as soon as their term to maturity falls below 30 days (see Table A5.8). On average, banks would be required to add more about 8% of the liquid assets they currently hold.

$$LCR = \frac{f_H \cdot w_H \cdot E + \min(2x; x + Adj)}{f_O \cdot w_O \cdot (E + x) - f_I \cdot w_I \cdot E} := 1$$

Table A5.8: Impact of the strategy to buy Level 1 assets funded by liabilities

	LCR in %	CR in %	LR in %	Level 1 assets			Interaction with capital requirements	
				Shortfall in bn €	shortfall in % HQLA	surplus in bn €	CR in %	LR in %
C1	87.2	10.2	4.2	61.6	10.6	17.2	9.9	4.1
C2	101.8	9.9	2.3	38.8	8.4	48.1	9.9	2.3
C3	97.1	22.4	6.8	0.3	3.9	0	22.2	6.7
C4	111.3	8.8	3.9	32.3	3.6	118.4	8.8	3.9
C5	138.7	10.1	6.2	1.6	0.7	64	10.1	6.2
C6	87.7	11.1	4.4	5.1	23.2	1.6	11	4.4
C7	150.3	11.7	6.3	10.8	3.5	112.4	11.7	6.3
C8	103.5	13	3.8	2.9	4.8	4.4	13	3.8
C9	158.9	9.5	4.1	0	0	16.4	9.5	4.1
C10	136.2	9.6	4.1	4.4	8	18.1	9.6	4.1
C11	101.4	16.2	5.9	1.4	9.9	3.5	16.2	5.9
C12	131.8	8	5.4	3.3	10	10.9	8	5.4
C13	138.3	6.6	4.7	1.4	0.5	77.6	6.6	4.7

C14	91.1	15.3	11	1.5	22.8	0.4	15	10.8
C15	151.3	11.9	5.3	0.3	0.5	22.2	11.9	5.3
C16	129.7	13.5	9.9	0	0	3.6	13.5	9.9
C18	131.8	13.1	5.6	0	0	44.9	13.1	5.6
C19	184.8	14.4	5.8	0	0	0.6	14.4	5.8
All	112.6	9.6	4.1	165.4	5.1	564.4	9.6	4.1

Source: EU QIS sample and authors' own calculations.

In contrast, reducing the balance sheet total by deleveraging, i.e. selling non-liquid assets and paying down short-term liabilities, increases the leverage ratio due to reduced exposure and also increases the capital ratio due to reduced risk-weighted assets, i.e. capital requirements decrease due to both the risk-based capital ratio and the leverage ratio. Regarding the LCR, only cash outflows will change:

$$LCR = \frac{HQLA}{f_0 \cdot w_0 \cdot (E - x) - f_1 \cdot w_1 \cdot E} := 1$$

Table A5.9 shows that banks which meet the LCR are able to take over all of the business (EUR 4 071 billion) which banks not fulfilling the liquidity requirement are required to cut (EUR 1 225 billion).<sup>51</sup> Note that this table overestimates the liquidity shortfall because it is assumed that banks pay down their 'average' liability ('average' in terms of maturity and counterparty). If, instead, they focused on paying down short-termed unsecured wholesale funding, less non-liquid assets than stated in Table A5.8 would have to be sold. Deleveraging might have unintended social consequences in terms of reduced lending. However, there is no evidence for reduced lending in the Basel III monitoring data. Balance sheet totals increased in most countries between June 2011 and December 2012 (based on EU QIS data). Furthermore, the change in HQLA cannot fully explain the change of the balance sheet total, meaning that neither deleveraging nor leveraging seems to be driven by liquidity requirements. As a result, there is also no evidence that banks' efforts to meet the liquidity requirements lead to reduced lending, which would require that HQLA increase while balance sheet totals remain unchanged, increase less or decrease (only C5, C6, and C12, see Diagram A5.5).

Table A5.9: Impact of the strategy sell non liquid assets, pay down liabilities

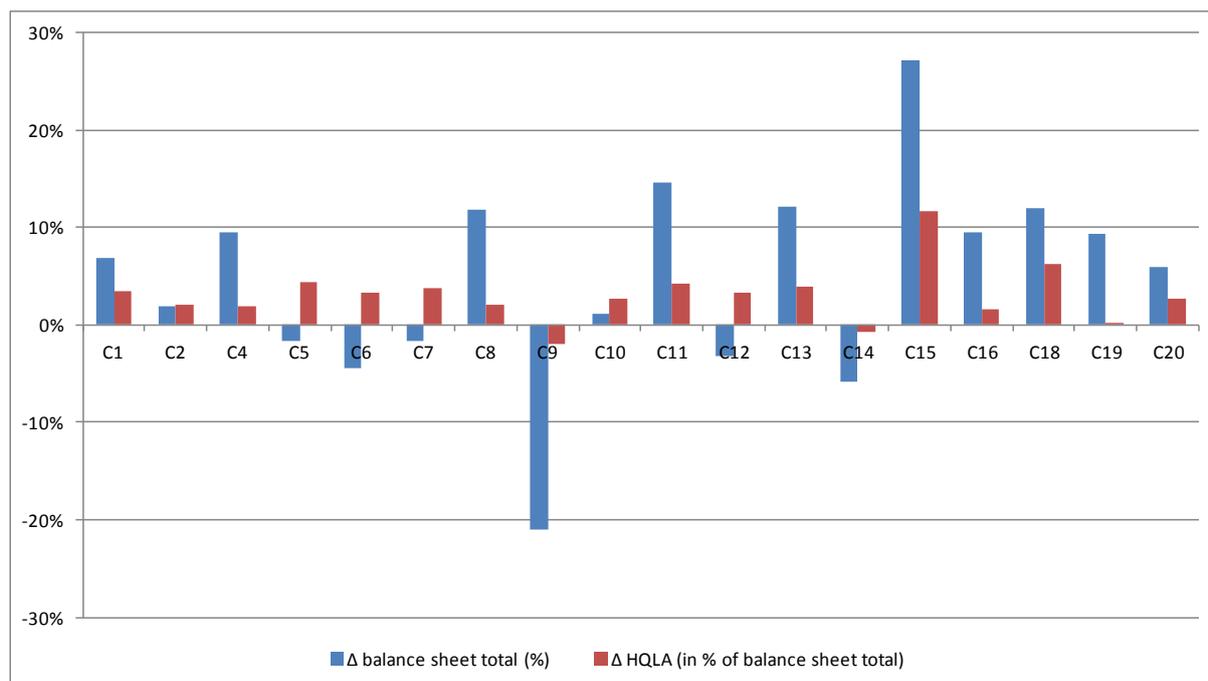
	LCR in %	Total capital ratio in %	Leverage ratio in %	Total unweighted outflows bn €	Non-liquid assets in bn €		Interaction with capital requirements	
					to be sold	covered by surplus in other banks	Total capital ratio in %	Leverage ratio in %
C1	87.2	10.2	4.2	4499.4	-382.57	138.1	11.2	4.7
C2	101.8	9.9	2.3	5554.8	-220.57	947.5	9.9	2.3
C3	97.1	22.4	6.8	39.6	-0.86	0	22.8	6.9

<sup>51</sup> The analysis does not however consider whether compliant banks hold enough capital to take over business from non-compliant banks

C4	111.3	8.8	3.9	6730.5	-184.81	664.1	8.8	3.9
C5	138.7	10.1	6.2	2227.6	-13.07	510.6	10.1	6.2
C6	87.7	11.1	4.4	280.1	-56.05	6	12.3	4.9
C7	150.3	11.7	6.3	1749	-68.44	394.8	11.7	6.3
C8	103.5	13	3.8	697.6	-14.40	32.4	13	3.8
C9	158.9	9.5	4.1	388.7	0	133.9	9.5	4.1
C10	136.2	9.6	4.1	703.7	-21.88	210	9.6	4.1
C11	101.4	16.2	5.9	92.2	-20.41	7	16.2	5.9
C12	131.8	8	5.4	449.1	-22.37	113.7	8	5.4
C13	138.3	6.6	4.7	2379.1	-18.16	626.1	6.6	4.7
C14	91.1	15.3	11	40.9	-4.00	6.3	16.5	11.9
C15	151.3	11.9	5.3	497.1	-2.87	140.1	11.9	5.3
C16	129.7	13.5	9.9	93.1	-0.13	19.7	13.5	9.9
C18	131.8	13.1	5.6	1054.1	0	149.3	13.1	5.6
C19	184.8	14.4	5.8	14.1	0	4.2	14.4	5.8
All	112.6	9.6	4.1	27490.5	-1030.60	4103.6	9.6	4.1

Source: EU QIS sample and authors' own calculations.

Diagram A5.5: Change in balance sheet total and HQLA



Source: EU QIS sample and authors' own calculations.

If banks change only the maturity or composition of their liabilities without changing the balance sheet total, risk-weighted assets or capital, banks' adjustment to the liquidity requirement does not affect the capital requirements.

#### Strategy 4: term out short-term wholesale funding

Assuming that the adjustment leaves the asset side unchanged, risk weights do not change. No savings on terms of capital requirements are associated with this strategy. With respect to unsecured interbank exposure, this strategy suggests the opposite adjustment to Strategy 3 above. As such, it would lead to increasing risk weights for those banks that provide unsecured interbank wholesale funding.

Non-compliant banks reduce the fraction of liabilities maturing within 30 days (i.e. increase the term of funding), until they get

$$LCR = \frac{HQLA}{(f_0 - x) \cdot w_0 \cdot E - f_1 \cdot w_1 \cdot E} := 1$$

Table A5.10: Increase term of funding

	LCR in %	CR in %	LR in %	Unweighted cash outflows in % of total exposure			
				Non-compliant banks		Compliant banks	
				current	change	current	surplus
C1	87.2	10.2	4.2	98.3	12	61.8	9.3
C2	101.8	9.9	2.3	65.9	-5.09	47.2	18.8
C3	97.1	22.4	6.8	80.3	-1.71		
C4	111.3	8.8	3.9	80.2	-5.77	122.5	23.1
C5	138.7	10.1	6.2	96.7	-3.94	126.6	37.8
C6	87.7	11.1	4.4	67	-12.49	212	69.2
C7	150.3	11.7	6.3	86	-7.94	228.9	206.2
C8	103.5	13	3.8	34.5	-1.91	77.4	5.9
C9	158.9	9.5	4.1			108.8	67
C10	136.2	9.6	4.1	56.2	-14.78	82.6	26.9
C11	101.4	16.2	5.9	78.6	-14.71	126.7	328.6
C12	131.8	8	5.4	79.5	-8.31	81.6	62.7
C13	138.3	6.6	4.7	93.9	-10.82	106.4	63.8
C14	91.1	15.3	11	91.2	-10.35	28.9	71.9
C15	151.3	11.9	5.3	119.7	-10.39	83.2	36.5
C16	129.7	13.5	9.9	657.3	-164.52	102.3	28
C18	131.8	13.1	5.6			101.8	51

C19	184.8	14.4	5.8			91.9	34.7
All	112.6	9.6	4.1	81.5	-0.64	105.6	43.8

Source: EU QIS sample and authors' own calculations.

Table A5.10 compares the fraction of liabilities maturing within 30 days for banks which meet the LCR (compliant banks) and do not meet the LCR (non-compliant banks). Again, the analysis is based on Basel III monitoring data and does not focus on terming out short-term wholesale funding, but on the 'average' liability. Substantial differences between maturities of liabilities in compliant and non-compliant banks are present in C6, C10, C11, C14 and C15, indicating that increasing the term of funding in order to meet the LCR could be feasible for non-compliant banks in these countries. For non-compliant banks in C1, C5, C13, C14, and C15 the liabilities which roll over within 30 days represent more than 80% of their balance sheet total, also indicating that 'terming out' funding might be a feasible or preferred way to meet the liquidity requirement rather than increasing the stock of liquid assets. However, on average, liabilities are shorter termed in compliant banks than in non-compliant banks. These findings point towards the heterogeneity of banks in the sample, showing that banks have (and choose) different strategies to meet the LCR.

Strategy 5: decrease short-term wholesale funding, increase retail deposits

By replacing short-term wholesale funding with retail deposits, banks decrease the run-off rate applied to outflows. Non-compliant banks need to decrease the average run-off rate until they get

$$LCR = \frac{HQLA}{f_o \cdot (w_o - x) \cdot E - f_l \cdot w_l \cdot E} := 1$$

Table A5.11 presents the average run-off rate applied to liabilities based on Basel III monitoring data. Only in C7, C10, C12, C14 and C16 this rate is obviously higher for non-compliant banks than for compliant banks. Further examination is required as to whether non-compliant banks might be able to change their funding structure, i.e. replace unsecured wholesale funding with retail deposits.

Table A5.11: Reduce the run-off rate applied to outflows

	LCR in %	CR in %	LR in %	Average run off rate for cash outflows in %			
				Non-compliant banks		Compliant banks	
				current	change	current	surplus
C1	87.2	10.2	4.2	20.7	-2.35	23.3	1.5
C2	101.8	9.9	2.3	21.2	-1.84	25.5	16.6
C3	97.1	22.4	6.8	28	-0.60		
C4	111.3	8.8	3.9	16.2	-1.12	17	2.9
C5	138.7	10.1	6.2	10.3	-0.39	11.9	4.9
C6	87.7	11.1	4.4	12.4	-2.21	12.6	4.1
C7	150.3	11.7	6.3	20.1	-4.53	10.9	7.7
C8	103.5	13	3.8	48.4	-3.55	17.8	1.3

C9	158.9	9.5	4.1			12.8	6.2
C10	136.2	9.6	4.1	28.9	-7.31	18.8	7.9
C11	101.4	16.2	5.9	17.8	-3.50	26.7	8.9
C12	131.8	8	5.4	17.5	-1.73	11.7	9.4
C13	138.3	6.6	4.7	7.5	-0.86	13.9	5.2
C14	91.1	15.3	11	27.2	-3.05	22.5	56
C15	151.3	11.9	5.3	8.6	-0.87	19.6	8.2
C16	129.7	13.5	9.9	31	-7.76	16.3	4.7
C18	131.8	13.1	5.6			24.3	4
C19	184.8	14.4	5.8			16.7	6.3
All	112.6	9.6	4.1	19.1	-1.97	16.4	6.0

Source: EU QIS sample and authors' own calculations.

### 5.3. The impact of increasing capital requirements on the LCR

The CRD IV raises the minimum capital requirement for banks in the EU. The impact on the LCR depends on the liabilities which are substituted by common equity. For the purpose of this analysis we assume that banks substitute the most expensive alternative. Namely, all liabilities that are eligible as capital. These instruments are phased out over a period of 10 years. As such, the impact on the LCR is negligible over the near future. In the very long term, the impact on the LCR depends on the average maturity of these assets.

Table A5.12 presents the results of the quantitative impact analysis for EU banks (as of December 2011).

Table A5.12: Capital shortfall estimates (in EUR billion)\*

	Minimum			Minimum plus buffers**		
	CET1	Tier 1	Total	CET1	Tier 1	Total
Group 1	2.2	5.7	33.0	70.4	162.5	257.5
Group 2	1143	14.1	22.0	25.9	32.6	45.2

\* Assuming full implementation of Basel III as of 31 December 2012, without regard to transitional arrangements.

\*\* Including capital charges for G-SIBs (Group 1, where applicable) and the capital conservation buffer (CCB).

Source: ISG (2013), CRD IV monitoring results as of 31 December 2012, Figure 3.

At the end of 2012, EU banks in the sample have a capital shortfall of EUR 55.0 billion (minimum) and EUR 302.7 billion (minimum plus buffers).

## Technical appendix 6: Case studies

A number of Member States have introduced quantitative liquidity regulation in the recent past; The Netherlands introduced a binding standard in 2003, the UK announced its new liquidity regime in 2010, Switzerland imposed a binding one on the two large banks and Sweden declared it would impose the LCR in 2013. These empirical studies offer valuable information and insights on the consequences of introducing binding quantitative liquidity regulation in the EU. This section of the report contains six general case studies for the Netherlands, Sweden, Switzerland, Denmark, the UK and France.<sup>52</sup> It also contains a study specifically focusing on the relationship between the liquidity profile of banks and credit pricing based on Italian data.

### 6.1. Netherlands: case study on the impact of the Dutch quantitative liquidity requirement

#### *Features of the Dutch quantitative liquidity rule DLCR<sup>53</sup>*

The Dutch quantitative liquidity rule was introduced in July 2003 and applies to all banks, clearing institutions and collective investment schemes. The rule was updated in 2004 to include certain types of central bank eligible securitisations and was again subject to a few minor changes in 2011. Banks are expected to report on a consolidated basis according to IFRS standards. Similar to the LCR, the DLCR is based on classic liquidity 'coverage' considerations, used by banks and some national supervisory authorities. Banks are required to hold an amount of unencumbered high quality liquid assets at least equal to their net cash outflows over a 30-day stress period:

$$DLCR = \text{Available Liquidity} - \text{Required Liquidity} > 0$$

Actual liquidity is defined as the stock of liquid assets minus haircuts plus recognized cash inflows weighted by degree of liquidity. Required Liquidity comprises of assumed calls on contingent liquidity lines, assumed withdrawals of deposits as well as assumed drying up of wholesale and derivative funding. Apart from cash, government bonds as well as highly rated covered bonds, the DLCR additionally allows banks to include all central bank eligible securitisations as part of their liquidity buffer. Required liquidity is defined as the assumed calls on contingent liquidity lines, assumed withdrawals of deposits as well as assumed drying up of wholesale and derivative funding.<sup>54</sup> The underlying stress test assumes a combined bank-specific and general market-wide shock. At introduction of the liquidity regime in the Netherlands, the total liquidity shortfall amounted to 850 million.

#### *Comparisons with the Basel III Liquidity Coverage Ratio (LCR)*

The Dutch liquidity regime also includes a stress scenario of 1 week. This makes it possible to reduce somewhat the risk of maturity mismatches within the 30-day stress period and, more importantly, to ensure that a certain amount of liquid assets is instantly available and under direct control of a bank's treasury. The LCR assumes in its stress scenario a 3-notch rating downgrade which is not included in the Dutch liquidity regime. The calculation itself is very similar, with the only difference being that the Dutch regime calculates the difference between actual and required liquidity while the LCR is reflected by a ratio.

---

<sup>52</sup> The EBA is grateful to the authors of the case studies.

<sup>53</sup> This section is based on Bonner and Eijffinger (2012).

<sup>54</sup> Please refer to the data appendix for more detailed information on the Dutch liquidity standard.

The eligible liquidity buffer under the Dutch regime is more diversified than the LCR buffer. Institutions can for instance include all central bank eligible securitisations. However, the haircut structure is more granular which leads on average to higher haircuts under the Dutch regime.

With respect to outflows, the main difference is that the Dutch liquidity regime does not distinguish between stable and less stable retail clients and applies on average higher outflow rates. On the inflow side, the Dutch regime, in contrast to the LCR, does not include a cap on inflows compared to outflows.

### Impact of the Dutch liquidity regulation

#### *Effect on private sector lending*

According to Bonner (2012), the Dutch quantitative liquidity rule does not lead to banks charging higher interest rates for non-financial corporates, including SMEs. The author analyses whether banks which are just above/below their minimum liquidity requirement charge higher interest rates when lending to the private sector.

With respect to lending volumes, anecdotal evidence suggests that while decreasing loan issuances are one way to compensate for liquidity deficits, the large maturity mismatches between long-term private sector lending and the short 30-day horizon of liquidity regulation avoid private sector lending to be a widely used instrument. Comparing the growth rates of several Dutch sectors, mortgages issuances as well as default rates with other European economies provides high certainty that there has not been a detrimental impact of liquidity regulation on the private sector.

Van den End and Tabbae (2012) document that in normal times Dutch banks adjust to changing liquidity situations by adjusting their liquid asset holdings, but not their lending behaviour. However, during the crisis banks with low liquid asset holdings were more inclined to adjust their (less liquid) retail lending and deposits. They conclude that a sufficient stock of liquid buffers could prevent banks being forced to curtail lending.

#### *Effect on other sectors*

According to Bonner and Eijffinger (2012), the introduction of the Dutch quantitative liquidity requirement has had an impact on the unsecured interbank money market. The findings in Bonner and Eijffinger (2012) suggest that banks which are just below their minimum liquidity requirement pay significantly higher interest rates for unsecured interbank loans with maturities longer than 30 days. Furthermore, being confronted with a binding liquidity requirement induces banks to borrow more and lend less with maturities longer than 30 days. Short-term interbank loans seem to be unaffected by liquidity regulation. With respect to monetary policy implementation, anecdotal evidence suggests that there was no large impact caused by the introduction of the Dutch quantitative liquidity regime.

#### *Maturity transformation*

For the Dutch banks that are subject to the DLCR, De Haan and Van den End (2013) find a significant empirical relationship between the stock of liquid assets and maturity transformation. Banks decide how much liquid assets to hold by taking into account their future cash flows, mostly until one year ahead. Confronting liquidity behaviour management with regulation, they find that banks, on average, hold more liquid assets against liquid liabilities than strictly required according to the DLCR. This suggests that the liquidity regulation is not a binding constraint.

#### *Lending standards*

Using the Bank Lending Survey (BLS), we conducted a few ad-hoc analyses to assess the impact of liquidity regulation on lending standards.

Our analysis reveals that non-compliance with the liquidity requirement is negatively correlated with banks' lending standards, and we cannot conclude there is a causal relationship.

#### *Are some banks more likely to be non-compliant?*

While there is no detailed analysis regarding the impact of liquidity regulation on different business models, Bonner and Eijffinger (2012) as well as Bonner (2012) provide an analysis how several bank- and time-specific variables affect the likelihood of banks being compliant with the liquidity regulation.

While both studies find some evidence that higher capital and cash-flows make banks less likely to be non-compliant, there does not seem to be a clear pattern.

Anecdotal evidence suggests that subsidiaries tend to be more often non-compliant, given their continuing dependence on liquidity support by the parent company. There is also no reason to think that the introduction of the liquidity regulation has damaged a certain business model.

### *Conclusions*

In general, the introduction of the Dutch quantitative liquidity requirement has not had any major negative effects. While there were some (intended) effects on the short-term unsecured interbank market, longer term SME lending seems to be unaffected. Looking at the performance of Dutch SMEs and banks in comparison with other European countries, a detrimental impact can be excluded.

### *6.2. Sweden*

In January 2013, Sweden implemented the LCR in its banking regulation based on the BCBS December 2010 agreement. Swedish banks have however been required to disclose the LCR in their public reporting for a number of years.

The key points for Sweden can be summarised as follows:

The Swedish case does not provide evidence for the view that the new liquidity regulation has had a negative impact on the real economy through decreased bank lending to households or non-financial companies, nor that banks have acted in a way that has negatively affected monetary policy operations.

The Swedish banks did not borrow from the Swedish central bank (the Riksbank) against non-HQLA to fulfil the LCR requirement. Instead, they mainly issued senior unsecured debt in the market and placed the proceeds with central banks which consequently increased their LCR ratios. The banks also rebalanced their liquidity buffers, from lower quality to higher, and termed out their funding, which also contributed positively to the banks' LCR.

The dynamics of the Swedish interbank and repo markets have changed somewhat compared to the period prior to the financial crisis. Still, at the moment there is no evidence that these changes have been the result of the ongoing implementation of the LCR. In fact, a large part of these changes occurred either around the time of the Lehman bankruptcy in 2008 or during the phasing out of the Riksbank's extraordinary liquidity providing measures in the second half of 2010. Although the Swedish interbank and repo markets have undergone some changes, the Swedish monetary policy operations have functioned well throughout the implementation period of the LCR.

The aim of LCR measure is, however, to make banks change their behaviour regarding liquidity management and therefore authorities should also expect some changes in financial markets, in the banks' lending conditions to the real economy and subsequently these changes would also affect monetary policy operations (but not hinder them). Though these expected changes are intended consequences of the LCR measure, they have not yet been seen in Sweden. The reason for this is partly that it currently does not cost very much for Swedish banks to fulfil the LCR requirement.

### *A brief overview of the liquidity risks in the Swedish banking sector*

The Swedish banking system is large, around four times the Swedish GDP, and also highly concentrated, with the four largest banks accounting for around 80 per cent of the banking system. Problems in an individual bank can thus quickly spread and become systemic. Since Swedish banks use the buy and hold model, 'illiquid' loans to the public are kept on the balance sheet. The four largest banks are also highly dependent on wholesale funding, with loan to deposit ratios on aggregate of around 200 per cent. Their structural maturity mismatch, measured as NSFR, is also high. In addition, short-term wholesale funding is largely provided by foreign investors. Some of these

foreign investors, for example American money market funds, have proved to retreat more than domestic investors in times of stress.

The size of the banking system, the interconnectedness and bank's dependence of wholesale funding in general and foreign currencies in particular have motivated Swedish authorities to hard-wire the positive development in the short term resilience against liquidity stress and introduce a short-term liquidity measure (LCR) ahead of the Basel III implementation.

#### *The Swedish LCR measure – a description of the liquidity regulation*

The process of implementing a quantitative liquidity measure in Sweden has been an ongoing process going on for a number of years. The Riksbank conducted liquidity stress tests using measures similar to the LCR and NSFR in the Financial Stability Report published already in December 2010. The results from these stress tests were published on a bank by bank basis. At the same time, the Riksbank started to recommend banks to be more transparent regarding their liquidity risk, not least in foreign currency. In addition, since the beginning of 2011 the largest Swedish banks have been required to report their LCR to the Riksbank and the Swedish FSA on a monthly basis. In December 2011, the Riksbank for the first time explicitly recommended banks to publicly disclose their LCR ratios. In November 2012, the Swedish FSA released the final version of the new binding metric representing the Swedish version of LCR. In January 2013, ahead of the proposed BCBS schedule, the minimum standards (LCR) were effective in regulation.

The Swedish LCR follows the 2010 LCR proposal from the Basel committee. A LCR of at least 100 per cent is required for all currencies combined, as well as in euro and US dollars separately.

In the Swedish LCR, the liquidity buffer can be used both in idiosyncratic and in systemic stress. This means that banks temporarily are allowed to fall below 100 per cent, thus not meeting the minimum requirement of the LCR.

The Swedish LCR requirement only applies to financial groups with a consolidated group level balance-sheet of at least SEK 100 billion (about EUR 12 billion). At present, eight financial institutions in Sweden are affected by this regulation. These institutions account for over 80 per cent of the lending market in Sweden.

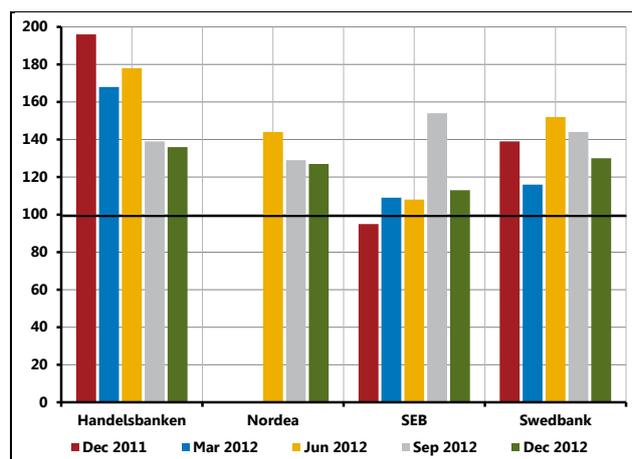
#### *Swedish banks' LCR-measures have improved, mainly due to larger liquidity buffers*

After the collapse of Lehman Brothers in 2008, Swedish banks' access to wholesale funding decreased substantially and the Riksbank had to provide extra ordinary liquidity to the banking system, both in domestic and foreign currencies. In 2010, Swedish banks were also initially negatively affected by the European sovereign debt problems and the related turbulence on the financial markets. But after the first period of stress that affected all European banks, many investors started to consider the Swedish banks as safe havens which lead to a substantial improvement in banks' access to wholesale funding.

Since the Riksbank exited the extra ordinary liquidity provision, Swedish banks have not borrowed from the Riksbank against non-HQLA to fulfil the LCR requirement. Instead, they have issued debt on the market and, mainly, placed the proceeds with central banks which have increased their LCR ratios. The banks have also rebalanced their liquidity buffers and termed out their funding which also increased the banks' LCR.

At the beginning of 2011, the Swedish large banks on aggregate had a LCR level of 60 %, but when the Swedish FSA published the first LCR consultation paper, in June 2012, all Swedish major banks fulfilled the minimum requirement of the LCR (see Diagram A6.1).

Diagram A6.1: The major Swedish banks' LCR measure (in per cent)



Sources: Bank reports and the Riksbank.

The Swedish banks have termed out the short term issued securities but it is not clear that it is an effect of the LCR implementation. The process of terming out the short term funding has been going on for over a year. This is supported by the Swedish banks' treasury departments who argue that it is partly because of the LCR-regulation. According to the LCR, when the remaining maturity on the outstanding securities is less than 30 days it will be seen in the outflows and thus the banks need to hold a liquidity buffer against that outflow to comply with the LCR requirement. However, the process seen in the Swedish banks could be a consequence of increased search for yield from investors related to the low interest environment. Swedish banks have also termed out their long term funding somewhat which will, on a smaller scale, reduce the short term outflows as well.

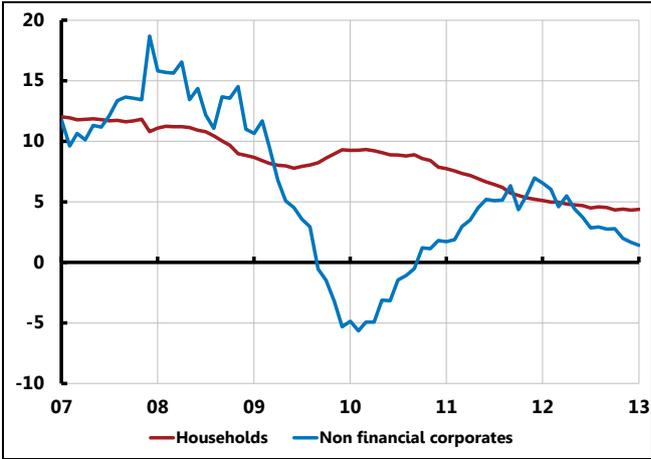
Swedish banks have not reduced their illiquid (long term) assets to fulfil the LCR requirements but instead increased their liquid assets. Thanks to beneficial access to funding the Swedish banks can in fact even issue short-term securities in US dollars and deposit the proceeds at the Federal Reserve and earn a couple of basis points in the transaction. This means that Swedish banks, at the moment, can build liquidity buffers that increase the LCR at almost no cost. As a consequence, the build-up of liquidity buffers has not affected net interest income negatively and overall profits in the banks are relative high (compared to other European banks). During 2012, the Swedish banks posted return on equity levels on average of over 12 per cent.

#### *The impact on the Swedish banks' lending to non-financial corporates and households*

The banks' lending to households has decreased from growth levels above 10 per cent in 2007 and 2008 to below 5 per cent at present (see diagram A6.2). Household borrowing has, however, been affected by other regulatory measures than LCR as well as slightly weaker macroeconomic situation. For instance, the Swedish FSA introduced a loan to value (LTV) cap on mortgages of 85 % in October 2010 which probably have contributed to the slowdown in lending growth to households. In addition to the LTV cap, in December 2010 the Swedish bankers association recommended the Swedish banks to require households to amortize on mortgages with LTV levels over 75 % which potentially also contributed to the growth decline. The banks' lending to corporates has been somewhat more volatile. After a decrease during 2009 and 2010 a positive growth followed during 2011 and 2012 (Diagram A6.2). The corporate lending is positively correlated with the development in the Swedish GDP. To sum up, it is hard to relate changes in bank lending to the implementation of the LCR.

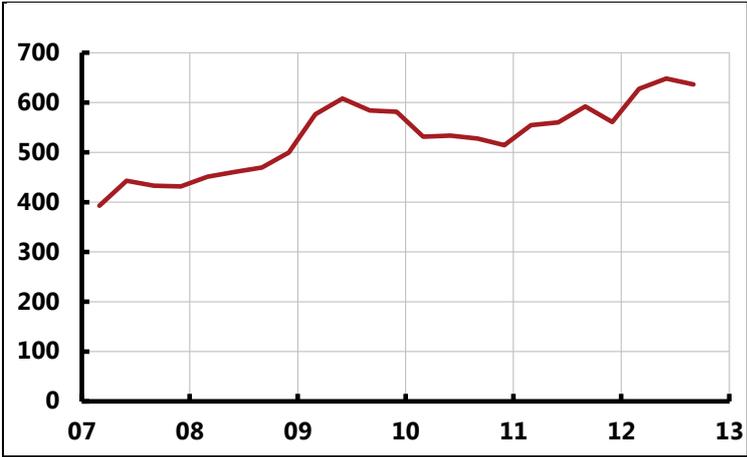
As for the corporates, there have been discussions regarding new issuance in the corporate bond market that could potentially replace the banks' lending to corporates, but according to issuance data, there is no strong evidence of such development although it is true that the outstanding securities issued have increased (Diagram A6.3).

Diagram A6.2: Financial institutions' lending to Swedish households and non-financial corporates (annual percentage change)



Source: The Riksbank.

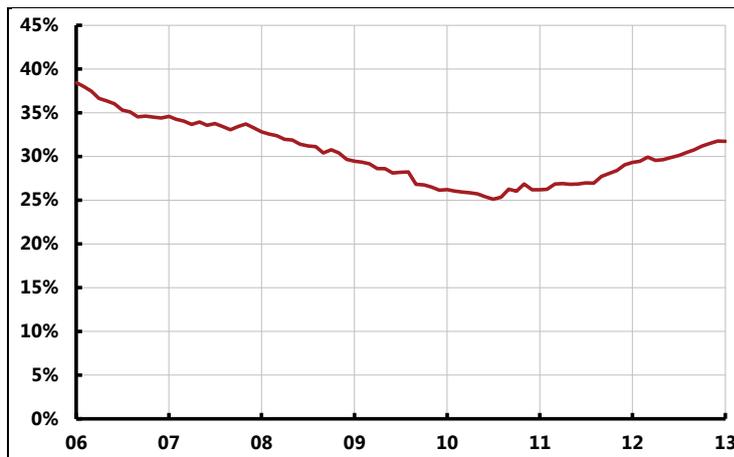
Diagram A6.3: Swedish non-financial corporates outstanding issued securities( in SEK billion)



Source: The Swedish FSA

The LCR measure takes into account the remaining maturity for loans. Loans are assumed to generate inflow, after a haircut, if the remaining maturity is less than 30 days. This gives incentives for banks to shorten the maturity. Unfortunately, no time series information on the maturities for loans to corporates is available. Instead, Diagram A6.4 shows the share of total loans that have an interest fixing over one year, which indicates that they are also long-term loans. The data do not show that banks have reduced the maturity to corporates.

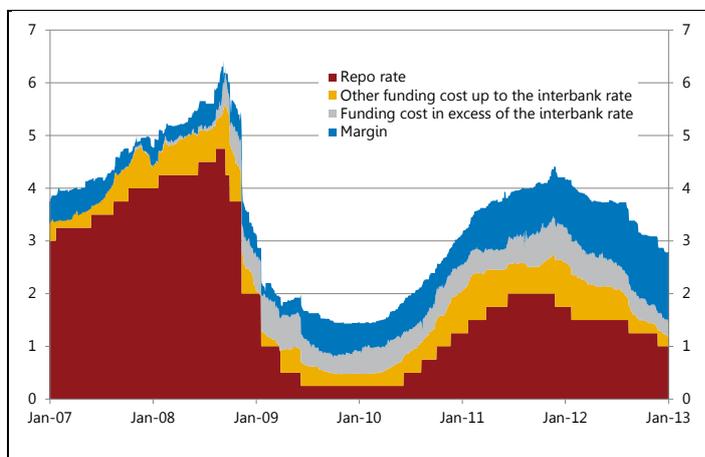
Diagram A6.4: Share of banks' loans to corporates that have an interest fixing period above one year (as % of total loans)



Source: the Riksbank.

Banks margins to household and corporates have increased somewhat over the past couple of years (according to the banks public reports). The Riksbank's breakdown of the floating rate mortgages also validates this (Diagram A6.6). There are probably several reasons for these increased margins. First, the competition on the mortgage market has weakened. Second, banks margins were squeezed the years leading up to the financial crisis. Third, banks have begun to adapt to the changes in the regulatory framework which in turn require larger liquidity buffers, longer funding and more capital (partly due to higher required capital levels as well as due to higher risk weights on mortgages). This, in total, has increased the cost which, to a large degree, has been transferred to households.

Diagram A6.6: Breakdown of a mortgage loan with a three-month fixed rate (in per cent)



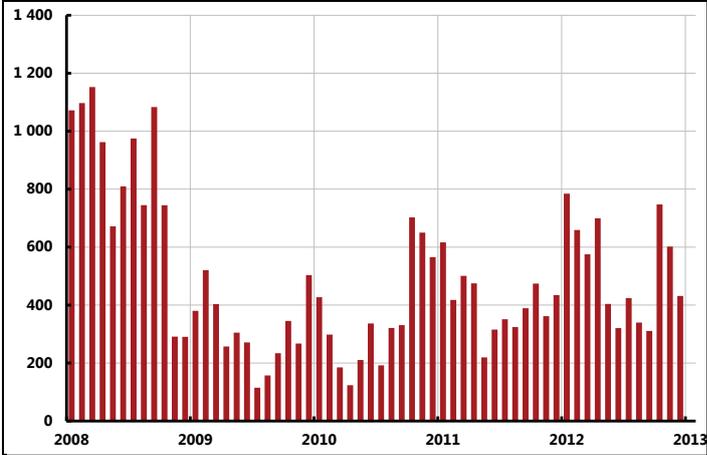
Sources: Bank reports and the Riksbank.

### Swedish money market and central bank monetary policy operations

The turnover in the overnight interbank market decreased in the aftermath of Lehman collapse in 2008 as the Riksbank provided the market with extraordinary liquidity (Diagram A6.7). After the phase-out of this liquidity provision, the turnover bounced back, albeit not to the pre-crisis level. One explanation of the lower level of activity is that the banking system is now in surplus and does not need to conduct interbank transactions to the same extent as previously, when it was in deficit. The banks have also reduced their unsecured counterparty limits against each other which have led to secured and slightly longer maturities for their short-term funding instead of unsecured overnight transactions.

Only a very small part of the interbank transactions have maturities over 30 days. Data collected by the Riksbank on the interbank market indicates that only a couple of per cent of the market transactions have maturities over 30 days. The interbank activity on longer maturities has increased slightly after 2008 but has remained fairly stable during the past couple of years.

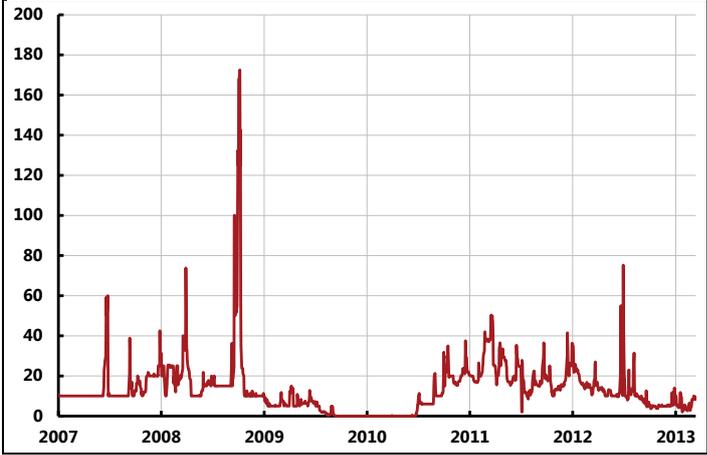
Diagram A6.7: Daily turnover in interbank overnight transactions (in SEK billion)



Note: Data includes only those financial institutions that are direct members in the Riksbank's payment system excluding the transactions with the Riksbank as counterparty. Source: The Riksbank.

After the extraordinary liquidity provisions were phased out in 2010, the difference between the shortest interbank rate (tomorrow next) and the Riksbank policy rate increased rapidly as the market was drained on liquidity (Diagram A6.8). However, during the last year, this spread has decreased to the same level as before the collapse of Lehman Brothers in 2008.

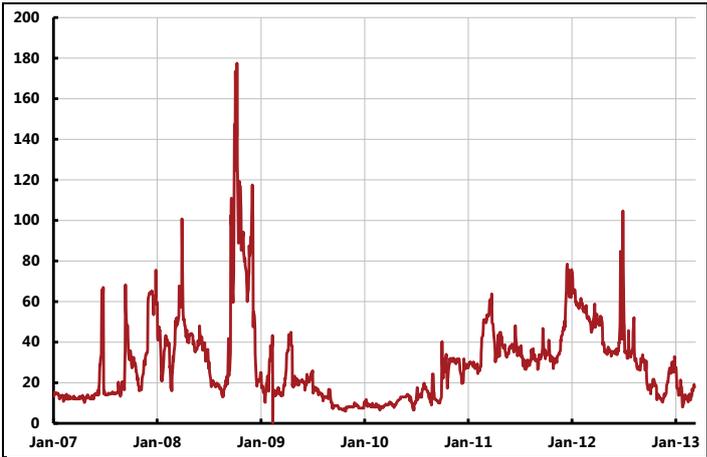
Diagram A6.8: The difference between STIBOR T/N and the repo rate (in basis points)



Source: Bloomberg

Between 2010 and 2012, the spread between one-month interbank rate and the expected policy rate increased (Diagram A6.9). Since then, this basis spread has decreased and is now at the same levels as before the Lehman Brothers collapse. These changes probably reflect a combination of changes in liquidity and counterparty risks.

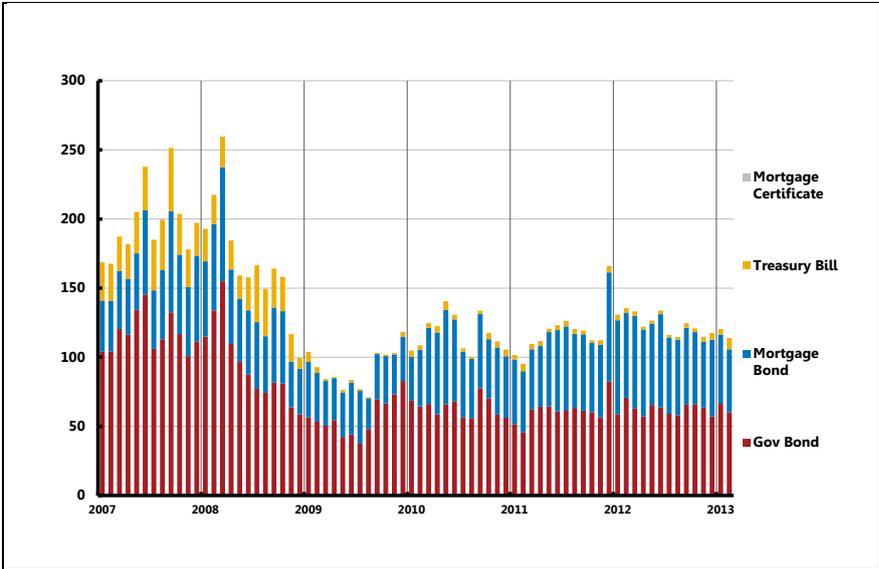
Diagram A6.9: One-month basis spread in SEK (in basis points)



Note: Basis spread 1M = STIBOR 1M – STINA 1M, STIBOR = Stockholm interbank offered rate, STINA = STIBOR tomorrow next average. Source: the Riksbank.

The Swedish repo market for mortgage bonds has functioned well with no apparent negative effect from the introduction of the LCR. After the Lehman collapse in 2008, the repo market turnover declined significantly as the Riksbank provided the market with excess liquidity. Since 2010, after the phase-out, there was no further decline in the turnover rate of repos in mortgage bonds (Diagram A6.10). Market makers in mortgage bonds markets state that the price has increased, but this is not evident in any available data. The same sources say that haircuts on mortgage bonds have remained unchanged.

Diagram A6.10: Turnover on the Swedish repo market, per month, average per day (in SEK billion)



Source: The Riksbank.

*Conclusion*

During the implementation period of LCR the turnover in the interbank market has decreased somewhat and the volatility has increased slightly. Turnover in the repo mortgage bond market is unchanged. Short term interbank rates measured to the expected policy rate have come down to pre-crisis levels and the shortest money market spread has decreased to the same level as before the collapse of Lehman Brothers. In addition, the Riksbank has been able to conduct monetary policy

operations throughout the entire period. There is little evidence that any changes to the Swedish financial market would be driven by the implementation of the LCR. In fact, most of the change in dynamics occurred either around the time of the Lehman bankruptcy in 2008 or during the phase out of the Riksbank's extraordinary liquidity measures in the second half of 2010.

The Swedish case does not provide evidence for the view that the new liquidity regulation has a negative impact on the real economy through decreased bank lending to households or non-financial companies, nor that banks act in a way that could negatively affect monetary policy operations.

The Swedish banks have not borrowed from the Swedish central bank (the Riksbank) against non-HQLA to fulfil the LCR requirement. Instead, they have issued debt on the market and placed the proceeds with central banks which have increased their LCR ratios. The banks have also rebalanced their liquidity buffers and termed out their funding which also increased the banks' LCR.

The aim of LCR measure is however to make banks change their behaviour regarding liquidity management and therefore authorities should expect some changes also in financial markets, in the banks' lending conditions to the real economy and subsequently these changes would also affect the monetary policy operations (but not hinder). Though these expected changes are intended consequences of the LCR measure, they have not yet been seen in Sweden. Partly, the reason for this is that it's presently not that costly for the Swedish banks to fulfil the LCR requirement.

### 6.3. Switzerland

#### *Features of the Swiss quantitative liquidity requirements*

The Swiss Liquidity Ordinance demands that systemically important banks have liquidity ensuring they are in a better position to absorb liquidity shocks than non-systemically important banks, and are thereby able to meet their payment obligations even in exceptionally stressful situations. To ensure the required enhanced resilience to a massive liquidity shock, the Liquidity Ordinance requires systemically important banks to also be subject to special quantitative minimum requirements and reporting obligations.

One quantitative requirement is that systemically important banks be able to use adequate liquidity reserves to compensate any 'structural liquidity gap' (difference between liquidity outflows and liquidity inflows) according to a substantial stress scenario defined by FINMA with a time horizon of 7 and 30 calendar days. The following are considered liquidity reserves: standing central bank facilities, a regulatory liquidity buffer consisting of unencumbered, freely available and liquid assets that can be realized in such situations, and – for the 30-day horizon – the extraordinary liquidity assistance provided by the SNB up to the amount for which preparations took place. Cash is not considered a liquidity reserve, but rather part of the liquidity inflows.

The Swiss liquidity requirements for the two major banks were already introduced on 30 June 2010 in light of the proven need for action, while the new international requirements of the Basel Committee were adopted only in December 2010 and are scheduled to enter into force in stages between 2015 and 2018. The current liquidity regime was agreed in the form of principles between FINMA and the two major Swiss banks, with reference to the ongoing work of the 'too big to fail' commission of experts and the Basel Committee. From a prudential standpoint with respect to measurement of liquidity risk, the special provisions represent a significant improvement compared with the overall liquidity requirements in several ways. First, the formulated minimum requirements and reporting obligations permit a much more precise measurement of the liquidity situation and a more comprehensive determination of the positions relevant to liquidity. Second, the experience from the recent financial crisis shows that the liquidity stress assumed for purposes of the existing overall liquidity requirements took only insufficient account of the liquidity outflows and the remaining refinancing options, which has been corrected in the rules for the systemically important banks. Third, the overall liquidity requirements are binding only for individual institutions. Yet, banking groups internationally operating manage their liquidity risks group-wide. Accordingly, the new rules contain binding requirements at the consolidated level, taking account of the risks of central liquidity management, and at the same time requirements at the level of the individual institution.

### *Comparisons with the Basel III Liquidity Coverage Ratio (LCR)*

The CEBS guidelines on liquidity buffers and survival periods proposed time horizons of 7 and 30 days. The international Basel approach, however, envisages only a 1-month horizon for the LCR. The characteristics of liquidity stress and the possibilities for an institution to respond to such a situation indisputably depend on the time horizon considered, which is why a minimal differentiation between a horizon of 7 and 30 days appears appropriate. This differentiation is expressed in the inflow and outflow parameters for the monetary flows that describe the stress scenario, as well as in the discount rates for the realization of assets. It is assumed that the institution must survive the first 7 days using its own resources, while afterwards the extraordinary liquidity assistance provided by the SNB will be allowable to a defined extent. However, this eligibility does not automatically give rise to an entitlement for the extraordinary liquidity assistance actually to be granted. The decision on granting assistance in individual cases is made exclusively by the SNB. The time window of 30 days should permit the bank to seize all necessary measures to regain the trust of the markets and to overcome the liquidity crisis.

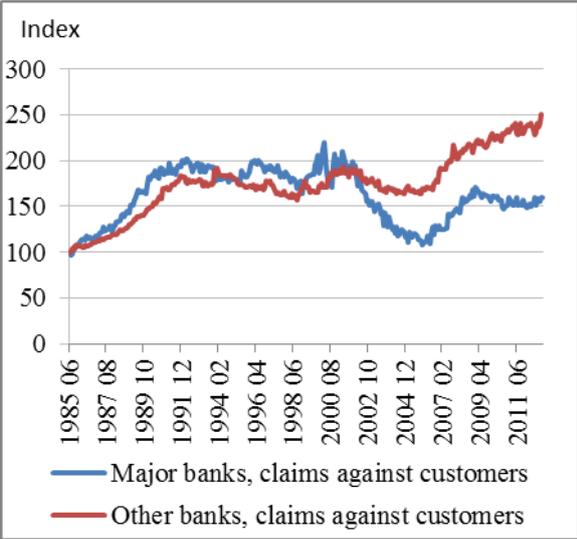
Comparing the Swiss regime for systemically important banks and the international short-term liquidity ratio LCR, it should be pointed out that the LCR is an internationally harmonised minimum standard, which cannot be viewed as a substitute for the requirements specifically tailored to the characteristics of systemically important banks in Switzerland. While the Basel Committee uses an approach for the first 30 days that is conceptually similar to the special provisions for systemically important banks described above, the international approach is not specifically tailored to systemically important banks, but rather to internationally operating banks; moreover, the underlying scenario of the Basel Committee is in principle milder than the scenario underlying the Swiss regime for systemically important banks.

The special provisions for systemically important banks in Switzerland expressly take account of the escalation procedure envisaged for systemically important banks in the case of a liquidity crisis that would be executed in a real, acute stress phase: In the 7-day window, the standing central bank facilities are allowable as liquid assets; in the 30-day window, the extraordinary liquidity assistance provided by the SNB is also allowable. On the other hand, outflow rates on the liabilities side are defined so that they are plausible for acute stress in the case of a major bank. The Basel Committee approach, in contrast, currently does not include extraordinary financing facilities by central banks as part of its concept, but in return demands less conservative outflow rates especially in regard to private and business client deposits.

### *Impact of the Swiss liquidity regulation*

While credit growth since introduction of the liquidity requirements has, on average, been lower for those banks covered by the requirements than for those not covered (Diagram A6.11), this is more likely due to the challenges posed to the major banks by the financial crisis rather than due to compliance with the liquidity requirements.

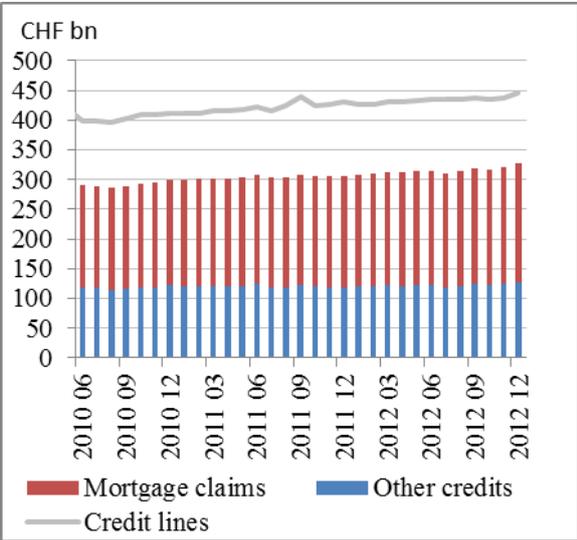
Diagram A6.11: Claims against customers of major Swiss banks (subject to the new Swiss liquidity regulation) and of other Swiss banks (not subject to the new Swiss liquidity regulation) (indexed as of Q2 1985)



Source: SNB/SIF.

This thesis is also supported by the fact that the more moderate trend of receivables from customers (adjusted by special items) began already in 2008 in the case of systemically important banks, i.e. significantly before introduction of the liquidity requirements. Since introduction of the requirements on 30 June 2010, no slowdown in the credit volumes of banks in Switzerland has been observed which can be identified as a consequence of these requirements (Diagram A6.12).

Diagram A6.12: Receivables from customers of the two major Swiss banks (subject to the new Swiss liquidity regulation) (in CHF billion)

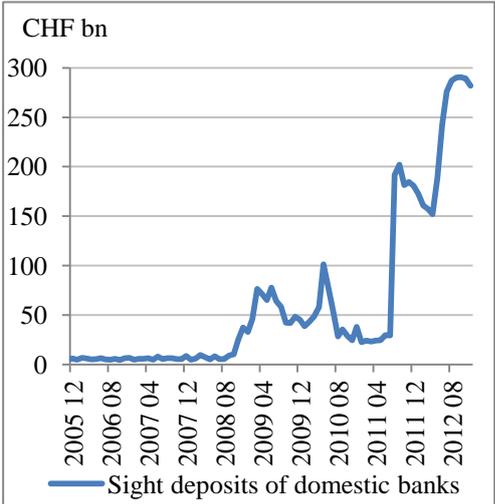


Source: SNB.

It was also seen that while a decline in loans to SMEs was recorded from 2008 to October 2010, a change in trend occurred toward the end of 2010, after which credit volume grew again. According to a (SNB) survey, the situation on the credit market eased significantly over the course of 2010. Already since the third quarter of 2009, hardly any tightening of lending criteria for business loans has been reported, and some of the tightening previously reported was even reversed in the first two quarters of 2010. In the third quarter of 2010, all banks reported unchanged lending criteria. The development of lending criteria for SME loans was similar as for business loans overall. The available data indicates that the liquidity requirements have had no noticeable negative effect on bank lending.

Meanwhile, it should be noted that the SNB’s liquidity measures have contributed to the currently comfortable liquidity situation of Swiss banks in general. The SNB’s intention announced in September 2011 in particular to counter the appreciation of the franc versus the euro has led to extraordinarily high liquidity in the Swiss banking system. For that purpose, the SNB bought a considerable volume of foreign currency, flooding the market with Swiss franc liquidity. This situation is clearly characterised by the sight deposits of Swiss banks at the SNB, which have risen by more than 850% since mid-2011 (Diagram A6.13).

Diagram A6.13: Sight deposits of Swiss banks at the Swiss National Bank (in CHF billion)



Source: SNB.

Bbefore defining a minimum EUR/CHF exchange rate, the SNB had already strongly expanded liquidity. Under these conditions, no bottlenecks arose on the Swiss credit market.

*Are some banks more likely to be non-compliant?*

The two institutions covered by the major bank requirements are in compliance.

*Conclusion*

As discussed, there are no indications that the Swiss liquidity regulation affected lending. However, the special situation of a very high liquidity supply currently exists on the market, which makes it possible to meet the liquidity requirements even without adjusting the business model to hold higher liquidity. There are also overlaps with the new capital requirements and the associated balance sheet adjustments in the banking sector, making it more difficult to assess the specific impact of the liquidity regulation.

6.4. UK

*Brief description of the UK quantitative liquidity regulation*

The introduction of the UK new liquidity regime followed a lengthy timetable, as the FSA consulted on its plans in late 2008 and the final details were published at the end of 2009<sup>55</sup>. The new regime included reporting requirements that became mandatory in mid-2010.

The quantitative element of the regime consists on firm-by-firm guidance, individual liquidity guidance (ILG), to hold a liquid assets buffer against assessment of stressed outflows. From mid-2010, ILG buffer guidance were introduced for the largest UK banks and building societies on a firm-by-firm

<sup>55</sup> FSA Policy statement 09/16 “Strengthening liquidity standards”, [http://www.fsa.gov.uk/library/policy/-policy/2009/09\\_16.shtml](http://www.fsa.gov.uk/library/policy/-policy/2009/09_16.shtml)

basis. These firms provide the majority of lending to the UK household and corporate sectors. Other firms followed.

The quantitative elements and reporting obligations of the regulation apply to all banks, building societies and larger 'full scope' investment firms. Where granted 'whole firm modifications' (see below), some branches have only liquidity reporting duties, while smaller and limited license/activity investment firms are excluded altogether from the quantitative and reporting duties.

UK liquidity requirements allow two waiver types: the 'whole firm modification' and the 'intragroup modification'. The former applies to UK branch of overseas firms that can receive some credit for liquidity held elsewhere in the firm. The latter applies to UK incorporated firms allowing a group level assessment of their liquidity resources (including UK and/or overseas entities). In both cases, the regulation requires that the relevant whole-firm or group has adequate liquidity resources to support the branch or solo-entity. Therefore, a waiver is not an outright abandonment of the regime for a firm but it could create small private benefits for some non-UK firms. Currently there are 132 (out of around 184) non-UK incorporated banks with UK branches that have been granted a 'whole firm modification'.

As explained below, liquidity levels improved before the quantitative requirements were formally set in 2010. At that time, however, the UK economy was under considerable strain, so the initial liquidity requirements were set at levels to mitigate adverse effects on bank credit supply and prevent further weakening in the economy overall. Reflecting this consideration, there was no shortfall<sup>56</sup> at introduction. At least initially, then, the absence of this shortfall requirement lessened the burden of holding higher quality liquidity.

#### *Differences with the LCR*

The quantitative aspects of the PRA (then FSA) regime and the LCR proposals are similar in nature but there are some differences in the detail. The UK regime uses two different horizons for the stress scenario: a 2 week horizon and 3 month horizon. The LCR uses instead a single 1-month horizon. In addition, the UK stress scenarios are not fully prescribed, and some of the stress factors are set from a supervisory review process and can be adjusted to some extent. In comparison, the LCR stress scenarios are much closer to being fully prescribed. The UK buffer requirements also include 'add-ons' for intraday and other risks which are not included in the LCR.

The UK regime includes a narrower range of eligible liquid assets compared to the LCR. This is broadly equivalent to the narrower Basel III 'Level 1'<sup>57</sup> asset class.

There are a number of detailed differences. For example, in the UK regime retail deposits maturing beyond the end of the stress horizon are considered to 'run'. This reflects a 'franchise viability' risk.

In certain respects, the UK regime is stricter than LCR as it assumes that all retail and corporate lending is rolled over. This choice was based on analysis showing that that had been the case with failed banks.

#### *The impact of regulation on lending and other areas*

Until October 2009, when the final liquidity management rules were announced, firms had been under supervisory pressure to improve their liquidity positions. Major UK banks had been set explicit liquid asset buffer requirements under the previous long-standing regime, but these requirements were not binding. Diagram A6.14 shows the ratio of sterling liquid assets to total assets over the period 1990 to 2012, highlighting its increase from 2007. The FSA's liquidity policy statement of 2009 explained:

---

<sup>56</sup> This is shown in Diagram A6.14 below where across the banks there was no significant shortfall from the overall ILG for all those banks.

<sup>57</sup> E.g. cash, central bank reserves, marketable zero-per cent risk weight sovereign claims and other non-zero per cent claims held for currency operation needs. See BCBS (2013) for more details.

'We have been monitoring the liquidity risk profile of major UK banks at least weekly, and in cases daily, since mid-2007. As part of our monitoring we have been assessing firms' resilience against severe stress scenarios. [...] Our monitoring shows clearly that the UK banking system has already strengthened its short-term position significantly'.

This prudential move continued as the FSA published the liquidity regulation proposals for consultation in December 2008 (which were stricter than the final policy statement). The FSA strengthened monitoring with a new liquidity reporting forms in June 2008 and January 2009.

The introduction of the quantitative elements was staggered, with most firms meeting the requirements at the time they were introduced. The FSA considered this when phasing in firm-specific liquid asset buffer requirements across all banks so as to mitigate the possible adverse effects on credit activity. It also made it clear that the liquidity requirements would be tightened at a later date when the economic conditions improved and the calibration of the Basel LCR proposals were finalised<sup>58</sup>. This phase-in period meant that there was no single point of introduction when requirements were suddenly increased, making it difficult to assess the impact of the new liquidity provisions on bank behaviour.

A significant policy element during the ILG introduction period was the repayment of the bank of England special liquidity scheme (SLS). During 2010 and 2011, UK banks repaid up to GBP 180 billion of borrowed treasury bills they had acquired under the scheme. This figure corresponds to a significant part of total UK banks' liquidity resources (see, for example, Diagram A5.14). To achieve a smooth process avoiding a refinancing 'cliff', the Bank of England and the major SLS participants discussed during 2009 Q4 and 2010 Q1 ways to prevent a potential co-ordination problem during the repayment period. Banks submitted individual voluntary repayment schedules with credible funding plans. During the second half of 2010 and first half of 2011, all banks went further than the plans repaying their drawings at a faster rate. Relatively favourable conditions in long-term funding markets which prevailed at the time helped to achieve this outcome. This shows that over the period, banks were able to increase their liquidity positions raising funds from the markets.

In addition to the new liquidity regulation, other factors at this time also drove market outcomes making it difficult to isolate the economic impact of the regulation. The turbulent economic environment prior to and after the introduction of the new liquidity regime created a number of market behavioural responses. Key ones were:

- an increase in risk aversion with respect to liquidity risk on the part of banks' management and investors;
- substantial increases in the price of wholesale funding; and
- increase in risk aversion from other non-bank economic sectors.

Other factors that also may have had an impact on banks' outflows and HQLA holdings were:

- RBS and Lloyds Banking Group partial nationalisation and restructuring<sup>59</sup>;
- extraordinary liquidity provision by central banks; and
- other balance sheet adjustment by banks due to changes to the FSA capital regime, CRD III and expectations about new requirements of CRD IV.

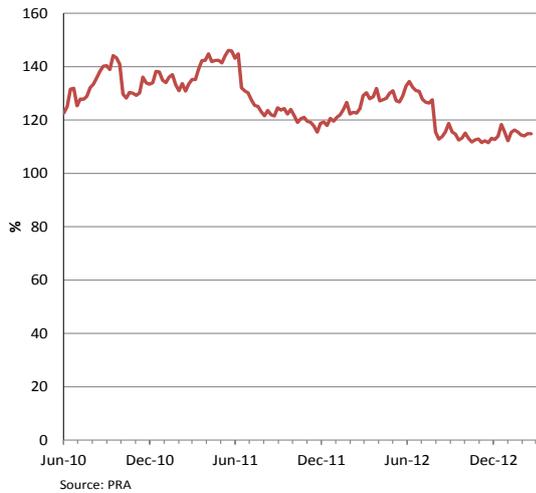
Diagram A6.14: UK liquid assets

---

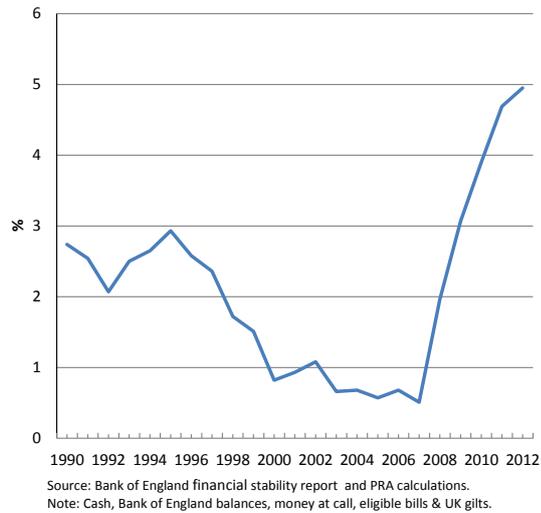
<sup>58</sup> See the FSA Liquidity Calibration Statement of November 2010. <http://www.fsa.gov.uk/library/-communication/statements/2010/calibration.shtml>

<sup>59</sup> It is important to analyse the economic impact of regulation on these conglomerates because they dominate SME lending in the UK.

Liquid assets as a percentage of ILG, large banks



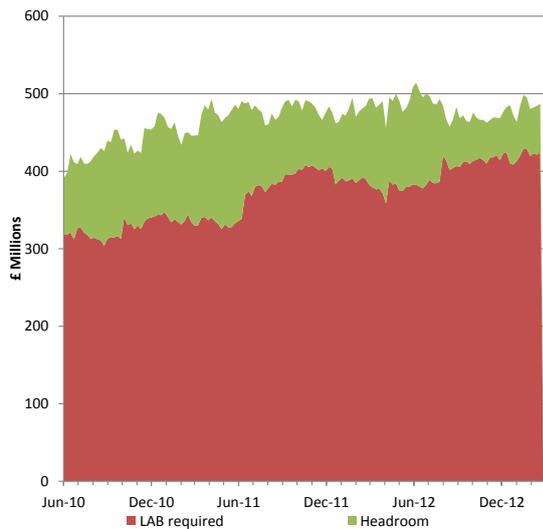
Sterling liquid assets to total asset ratio, all banks



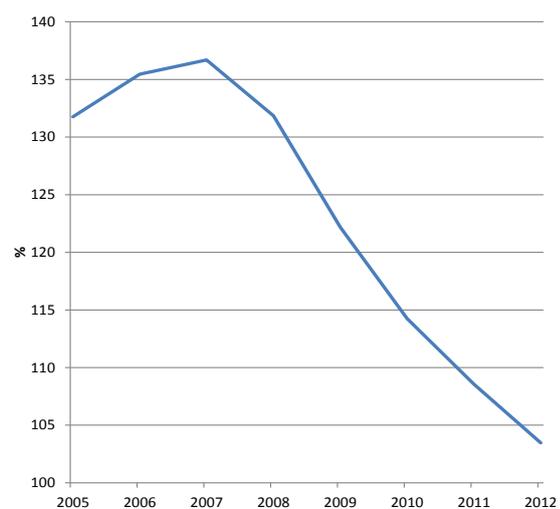
Diagrams A6.14 and A6.15 show the progress of the UK aggregate stressed outflows and headroom above the liquid asset buffer from its introduction until the first quarter of 2013. Diagram A5.15 shows that stressed outflows played a major role on the liquid asset to ILG ratio over time. This suggests that the liquid asset buffer increase between June 2010 and July 2011 may not have been due to better management of banks' liquidity resources prompted by the new liquidity regime. The diagram also shows a substantial change in balance sheet structure since the crisis with a major decrease in UK banking sector assets relative to deposits reinforcing the idea that market pressure may be a major factor on liquidity management.

Diagram A6.15: Major UK banks balance sheet change

Liquid assets and headroom



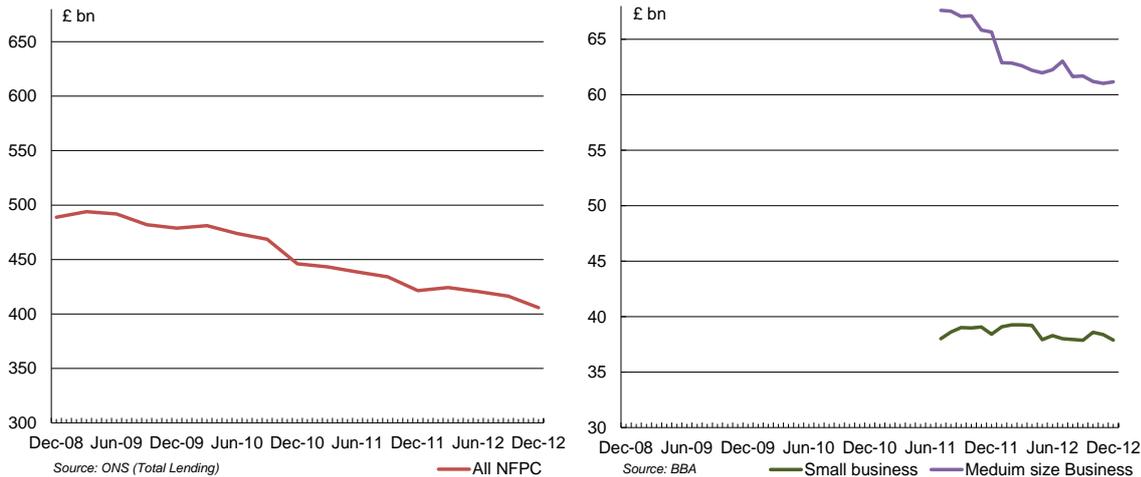
Loans to deposits ratio 2005-2012



Impact on credit to business from banks' liquidity management

Diagram A6.16 (left-hand panel) shows that from 2008, UK bank lending to non-financial corporations (NFC) has decreased steadily without a noticeable worsening at the time the quantitative element of the new liquidity regime was introduced in 2010. Diagram A6.16 (right-hand panel) shows that during 2011-2012, loans to medium-sized business<sup>60</sup> and loans to all NFPC followed a similar pattern. The diagram also shows that lending to small business was relatively flat over the last 18 months. At first glance, this evidence may suggest that changes in UK banks' liquidity management did not have a major negative effect on small business lending.

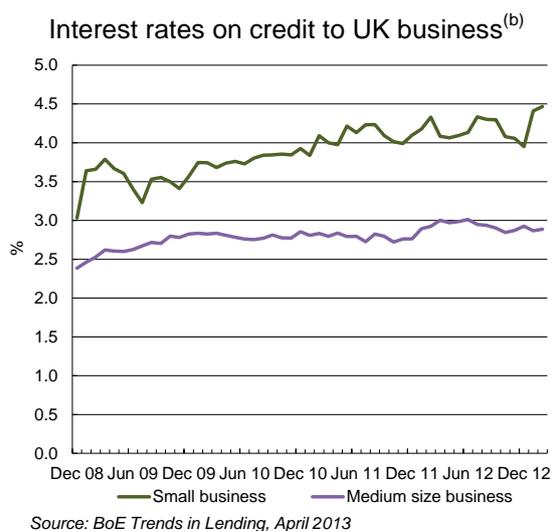
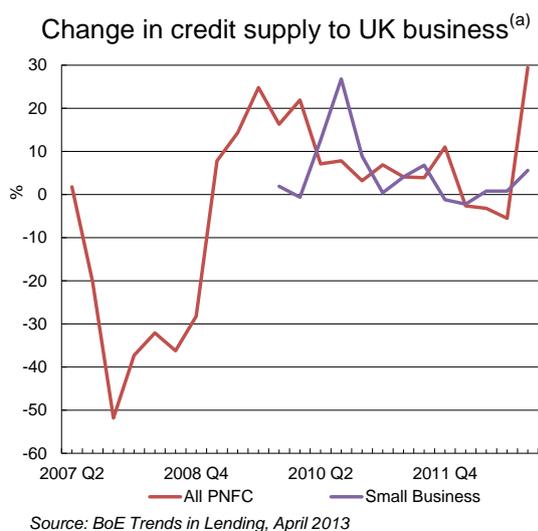
Diagram A6.16: Lending to UK businesses



To shed some light on the supply side of credit, we consider aggregate-level data from the Bank of England's 'credit conditions' survey. Diagram A6.17 shows that credit supply worsened during the crisis but remained positive during inception and as the regime developed. When the regime was consulted on at the end of 2008, corporate credit availability was low but improving. This was at the epicentre of the crisis so any change in banks' perceptions from the announcement was likely washed away by the crisis. The diagram shows that during 2010 the supply of corporate loans was perceived as increasing at the time when liquid asset buffer requirements were set for the major banks. Moreover, credit to SME borrowers was expected to improve further. Therefore, there is no evidence of a major detrimental supply-side effect.

<sup>60</sup> These data are collected by the British Bankers Association from banking sector information.

Diagram A6.17: Trends in lending survey.



Notes(s): (a) net balance of credit conditions survey respondents reporting increase or decrease in availability of lending from their institution; (b) interest rates spread over central bank base rate.

The ‘credit conditions’ survey also asked banks what factors explained the shift in lending supply. During that period the factors explaining the changes in supply, in order of importance<sup>61</sup>: banks’ risk appetite; sector-specific risks; capital market pressures; and the changing economic outlook. Other reasons such as market share objectives and tight wholesale funding conditions were consistently uncorrelated with the changes in credit supply. This suggests that risk and the economic environment have dominated the supply-side decisions by banks. However, the survey does not ask a specific question about the impact of regulation. In addition, if a bank’s risk appetite is influenced by the regulator’s risk appetite, to some extent this could facilitate a transmission channel.

Finally, in spite of the low level of official interest rates, the average spread charged by bank to businesses has increased. This increase is particularly evident for small businesses and less noticeable for medium-sized enterprises. Considering that smaller businesses might find it difficult to access alternative financing sources, it is possible that banks have to increase margins where they have greater power to do so.

*The UK empirical study: the impact of quantitative liquidity regulation on lending to the real economy*

The introduction of the new UK liquidity regulation in 2009 yields important insights regarding the impact of quantitative liquidity regulation on lending to real economy.

The UK FSA replaced the liquidity regime which cover banks, building societies, and investment firms (‘banks,’ hereinafter) effective from 1st December 2009. The quantitative elements of the new regime came into force during the period from 1 June 2010 to 1 November 2010.

Under the new regime, banks are required to hold a stock of liquid asset sufficient to cover a proportion of the net outflows that would occur in a severe two-week firm specific stress combined with a milder three-month market wide stress. This requirement, which is commonly referred to as the ILG ratio, is conceptually similar to the Basel LCR.

Although this regime is applied to all banks at the UK entity level (BIPRU12) in general, the UK FSA allows some overseas banks to apply for a Whole-firm Liquidity Modification (WFM). Banks with WFM are allowed to waive the vast majority of the UK liquidity regulations and can rely unlimited liquidity from anywhere within the firm. In addition, some banks have not been set the ILG ratio to comply with.

<sup>61</sup> This order has been derived from considering highest to lowest correlation from a statistical factor analysis of the responses.

This implementation creates two groups of banks: the ILG subject banks and banks with waivers. We evaluate the impact of the UK liquidity regulation by econometrically testing whether the average bank behavior are systematically different between these two groups after the implementation of the new regulation.

We employ the following standard, two-period difference-in-differences (DDs) estimation for repeated individual banks' data:

$$y_{i,t} = b_0 + b_1 \text{Time}_t + b_2 \text{ILG}_i + \delta (\text{Time}_t * \text{ILG}_i) + \theta_i + e_{i,t}$$

$y_{i,t}$ : dependent variable (explained in the following data section)

$\text{Time}_t = 0$ , if  $t = 2010/Q1$ ,

$= 1$ , if  $t = 2010/Q2, \dots, 2012/Q2$

$\text{ILG}_i = 0$ , if  $i$  has waiver (WFM or the ILG ratio has not been set)

$= 1$ , if  $i$  subject to the ILG

$\delta_i$ : time-invariant and maybe unobserved characteristics of  $i$

$e_{i,t}$ : error term.

Here, parameter we are interested to estimate is  $\delta$ , which represents the treatment effect of the ILG implementation. Large  $\text{var}(\theta_i)$ , due to the significant business model heterogeneity among banks, can enlarge standard error of the estimation. Since we have repeated sample for most banks, we can eliminate this effect by taking first-difference of the equation to estimate the following equation by the OLS:

$$(y_{i,t} - y_{i,t-1}) = b_1 + \delta \text{ILG}_i + (e_{i,t} - e_{i,t-1}).$$

$\delta_{\text{OLS}}$  is consistent, if the choice of the group is uncorrelated with the changes in the future error term, i.e.,  $E[\text{ILG}_i * (e_{i,t} - e_{i,t-1})] = 0$ .

We used individual banks' returns to the BOE's form BT, BE, and PL to investigate the dynamic response of following 14 variables in Sterling.

(BT) Four-quarter Sterling asset growth;

(BT) High quality liquid assets (limited to reserves and special deposits to the BOE, gilts and T-bills)/ Total assets;

(BT) Market loans, repos, and other intra-financial exposures/ Total assets;

(BT) Other loans/ Total assets;

(BT) Securities/ Total assets;

(BE) Intra-financial exposures/ Total assets;

(BE) Non-financial exposures/ Total assets;

(BE) Loans to PNCs/ Total assets;

(BT) CDs, repos and other short-term wholesale funding

(BT) Customer deposits/ Total liabilities

(BE) Wholesale funding

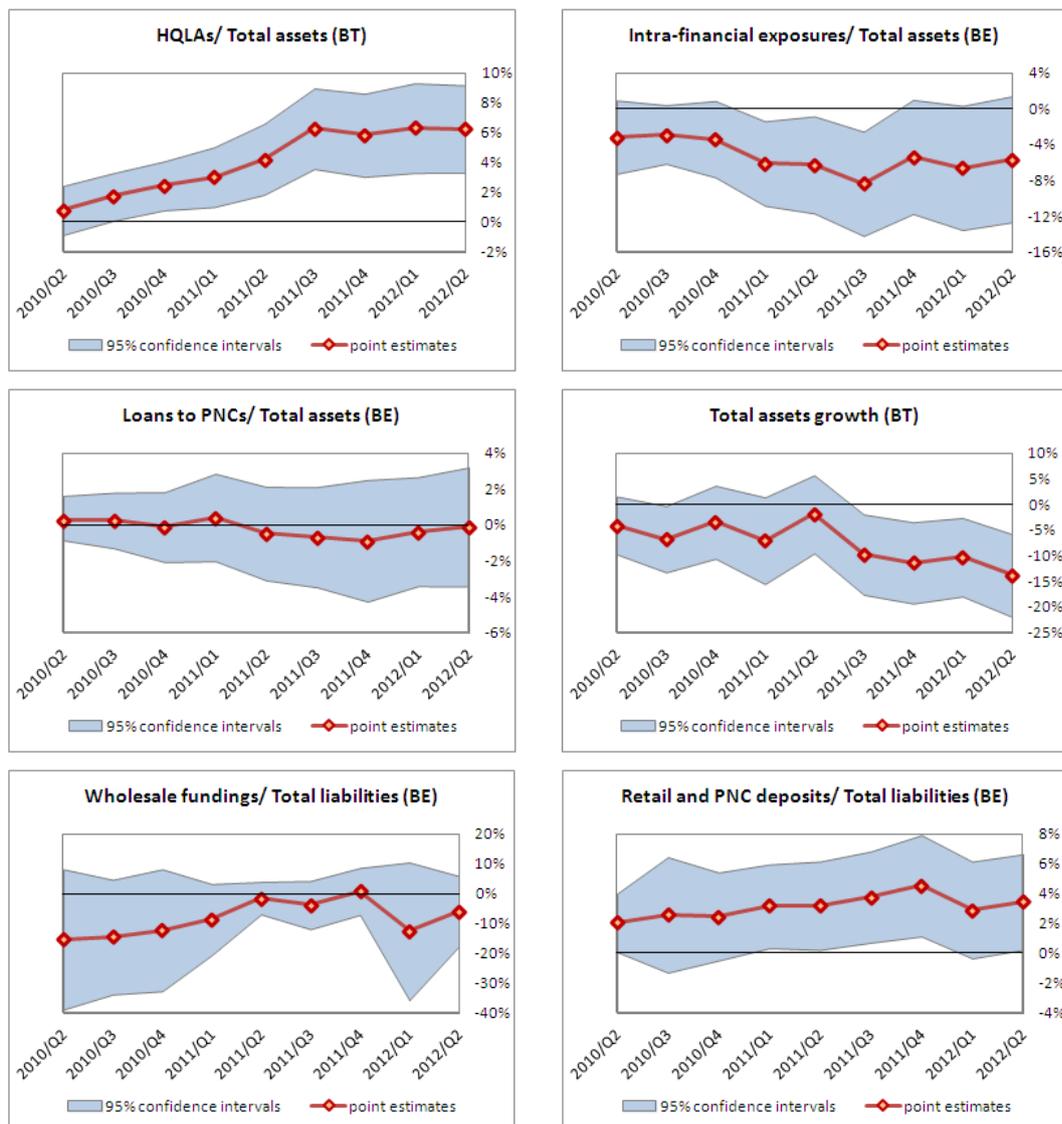
(BE) Retail and PNCs deposits/ Total liabilities

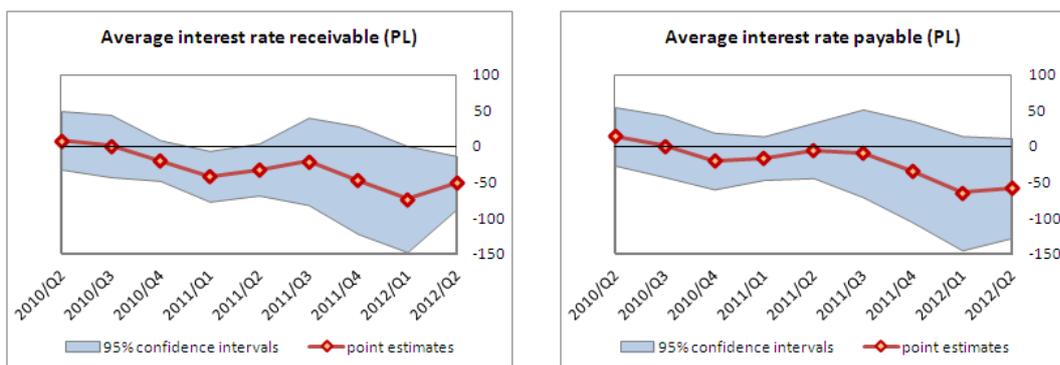
(PL) Average interest rates receivable on assets

(PL) Average interest rates payable on liabilities

The basic balance sheet information is shown on form BT, which has over 300 banks' reporting. Nevertheless, it does not allow sufficient sectoral breakdowns. Form BE allows sectoral breakdowns of BT but has some 100 banks in the sample. Form PL allows average interest rate calculation but has less than 100 banks in the sample. Roughly speaking, half of banks in BT, BE and PT are ILG subject banks. A bank was eliminated from the sample of each regression if its total assets in Sterling was (1) less than GBP 10 million; or (2) had doubled or halved from the previous year.

Diagram A6.18: Results of point estimates of various variables and the 95% confidence intervals





Source: Authors' own calculations.

## Conclusions

The evidence reviewed in the UK case study does not indicate that either the announcement or the introduction of the FSA's new liquidity regime in 2009-2010 had a detrimental impact on bank lending or otherwise on the UK economy. It is difficult to isolate the impact of the new liquidity regime from other factors present throughout the period which generated behavioural changes in banks and other market participants making it hard to conclude definitely that there was no macroeconomic impact. It appears that these economic factors played a significant role and changed the quantity and price of credit supplied. These factors include: the financial crisis, the government programmes to support financial institutions, and other changes to banking regulation. A further difficulty in assessing the impact of the regime is that it was introduced in stages for different banks also phasing in the quantitative elements. Additional work taking into account these moving factors is needed to understand the role of liquidity regulation on bank lending. For example, a formal empirical analysis controlling for these effects would help to draw firmer conclusions about the economic impact of the new UK liquidity regime.

The analysis of the UK empirical study yields the following main results which are in line with the results of Sections 2.1. and 2.2.:

- Increases in HQLA holdings and almost offsetting decreases in the intra-financial exposures.
  - Former evidence is more statistically robust than the latter evidence.
- No evidence for the reduction in the loans to private non-financial companies.
- Toward the end of the sample period, reduction in the total asset growth became more apparent and statistically significant.
- However, the results were not robust to the change in the timing of  $t=0$  (pre-ILG period). Additional outlier sensitivity checks may be needed.
- No statistically-significant evidence was observed for the reductions in short-term wholesale funding.
  - Their point estimates were in the negative territory, as expected.
- Strong evidence was observed for the increases in the retail and PNCs deposits.
- Toward the end of the sample period, reductions in the interest rate on assets became more apparent and statistically significant. However, the results were not robust to the alternative timing choices of treatments.

## 6.5. Denmark

### *Features of the Danish quantitative liquidity rule Section 152*

The Danish quantitative liquidity rule is in no way a new rule in the regulatory landscape of Danish financial institutions. In fact, it has been in place since the first half of the 20th century. The liquidity

rule applies to all banks on a consolidated basis, however the rule does not apply to specialised mortgage institutions, which are subject to a number of other rules regulating their liquidity position.

The Danish liquidity rule requires all institutions to have a general prudent liquidity-level and liquidity risk management meaning that the Danish FSA can instruct institutions as to what constitutes a prudent liquidity level and liquidity risk management.

On top of this the Danish liquidity rules require institutions to fulfil a quantitative liquidity requirement or liquidity rule. Similar to the LCR, the Danish liquidity rule is based on classic liquidity coverage considerations, where a liquidity buffer is held to counterbalance the binding liquidity requirement. The Danish FSA also has the power to increase this requirement or set new requirements if necessary stemming from the general power as to a prudent liquidity.

According to Section 152 in the Danish financial business act, banks are required to, at all times, hold an amount of unencumbered high quality liquid assets to meet the binding liquidity requirement. That is liquidity shall amount to no less than

- 15 per cent of the debt exposures that, irrespective of possible payment conditions, are the liability of the bank to pay on demand or at notice of no more than one month, and
- 10 per cent of the total debt and guarantee exposures of the bank, less subordinated debt that may be included in calculations of the capital base.

Assets, which can be included in the liquidity buffer are cash in hand, fully secured and liquid demand deposits with credit institutions and insurance companies, and equity investments of secure, easily realizable, securities and credit funds not used as collateral for a loan. This includes government bonds, covered bonds and other listed assets on a regulated market.

As a consequence of the financial crisis, the Danish FSA in 2010 introduced a so called 'supervisory diamond', requiring the Section 152 liquidity buffer to be 50 per cent or more above the binding requirement. This supervisory diamond was introduced to counteract excessive risk taking and still allow for healthy institutions to run profitable business where necessary credit to households and enterprises/businesses continues to be provided. In that way it can be argued that the concept of the supervisory diamond is a collection of simple, prudent regulatory metrics constituting a concept of constrained discretion for the banks.

#### *Comparisons with the Basel III Liquidity Coverage Ratio (LCR)*

The Danish liquidity requirement is similar to the LCR in that it requires institutions to hold a buffer of liquid assets to cover potential liquidity obligations. However, as noted above, the Danish quantitative liquidity requirement was put in place long before the development of international standards for liquidity risk management and at a time when the liquidity risk profile of financial institutions was much simpler than today. On this basis, the requirement was formulated as a very simple proportion of the banks short term liabilities or total debt liabilities. Compared to the LCR, the requirement thus has the same view as to looking at the short term liquidity risks of institutions, but there is no specification of the risks of different liability types, i.e. there are no differences in outflow rates assumed on the various liabilities, only a much more general requirement of 15 per cent of all short term liabilities.

The second part of the requirement, asking banks to hold liquid assets amounting to at least 10 per cent of total debt and guarantee exposures, can be seen as a backstop requirement given the coarse nature of the first part of the regulation. This implies that institutions are required to hold at least some amount of liquid assets, regardless of whether their very short term liquidity risks are minimal.

In addition to the broader definition of the liquidity requirement, compared to the LCR, the assets allowed to be counted in the liquidity buffer include a wider array than those allowed in the LCR. Apart from cash, government bonds as well as covered bonds and other listed assets, the Section 152

liquidity allows banks to include all central bank eligible securitisations as part of their liquidity buffer and credit lines. Generally, Danish institutions hold 60 – 70 per cent. of their liquidity buffer in covered bonds, which are a highly liquid asset class in Denmark as shown in Dick-Nielsen et.al. (2012).

The size of the liquidity requirement under current Danish law and the forthcoming LCR are, on average, of comparable magnitude, when taking into account the strengthening of the quantitative Danish liquidity rule implemented through the supervisory diamond. Danish institutions, since the requirement of 50 per cent excess coverage was put in place, have thus been used to a liquidity requirement of this size. However, clearly while the average value of the two requirements is the same, this is not necessarily the case for the individual institution. The larger impact on Danish institutions in general of the LCR comes from the tighter constraints placed on which assets may be included in the liquidity-buffer. In addition, specialised mortgage institutions in Denmark have not been required to comply with the Section 152 liquidity requirement, but have instead been required to comply with liquidity requirements tailored to their very specialised business model and the liquidity risks that may arise from here. These will now be required to comply with the LCR.

#### *Impact of the Danish liquidity regulation*

It can be difficult to observe the direct impact of the Danish quantitative liquidity requirement on lending to households and non-financial companies, as the requirement has been in place for a very long time period. However, as a supervisory measure, it has proven to be a robust and important measure in times of stress. It can currently be observed that most Danish banks live up to the requirement with a very large margin. Hence, the liquidity requirement is generally not seen as binding, at least in good times. This is partly due to the 50 per cent excess coverage requirement introduced in 2010. During the financial crisis the liquidity requirement was one of the first places where signs of trouble for individual banks became evident, when the coverage ratio typically began falling gradually. This allowed the Danish FSA to step in and intensify the supervision with respect to these institutions. Hence the requirement fulfilled its duties in stress times, by helping to identify troubled institutions and limiting the liquidity risks these were able to undertake.

#### *Conclusion*

The Danish quantitative liquidity requirement, Section 152, has been in place since the first half of the 20th century, hence it is not possible to directly observe the impact of its introduction. While the requirement is generally not binding in good times for institutions with sound liquidity risk management it has functioned as an important backstop under financial stress. The requirement itself does not appear to have a limiting impact on the general lending behaviour of Danish banks, but shows the value of quantitative liquidity requirements when institutions become troubled. As the measure differs from the LCR in that it allows a much wider array of assets to be included in the liquidity buffer, than the LCR, and as the LCR will also be in place for specialised mortgage institutions, which are not covered by the current liquidity requirement, it is not clear what the impact on the lending activity of Danish institutions from the introduction of the LCR will be.

The move from a system where covered bonds are in general used and viewed as the primary short term liquidity instrument for the financial sector, to a system where these will be limited to playing a smaller role, will have a detrimental impact on the Danish covered bond market and in turn on the pricing and amount of mortgage lending made available to households without providing any significant regulatory upside.

### 6.6. France

#### *Features of the French quantitative liquidity requirements*

The first French prudential regulation on liquidity dates back to the 1940's, and the current regulation has been in place since 1988, but was corrected in 2010 to adapt to liquidity and ALM practices in banking institutions (especially true for the advanced approach) and became more stringent.

Given that this liquidity ratio (coefficient de liquidité) was implemented first at the end of the 1980's, its impact on lending is more difficult to assess and imply that an impact analysis would be very backward oriented.

From a legal point of view, liquidity regulation is made up of two main texts:

- The Order of 5 May 2009, on the identification, measurement, management and control of liquidity risk which has taken effect from 30 June 2010 (added to by two instructions of the Autorité de Contrôle Prudentiel (ACP), one defining the standardised approach reporting set and the second clarifying the validation procedure for the advanced approach). This text, which replaced the previous Regulation No 88-01 of 22 February 1988, is the main one setting out the French arrangements for liquidity risk supervision; it is composed of a standardised approach and of an advanced approach subject to ACP's prior approval.
- The aforementioned order is supplemented by two instructions of the ACP, one defining the standardised approach reporting set, and the second clarifying the validation procedures and requirements for the advanced approach. As institutions started to prepare for the LCR from the end of 2010, the opportunity offered by the advanced approach was not taken by credit institutions; almost all of the regulated institutions follow the standard approach.
- The Regulation No 97-02 relating to internal control in credit institutions and investment firms was implemented in 1997 but amended several times to comply with international standards and European directives. These are the arrangements of the French internal control and risk management legislation which apply to liquidity risk management.

The French liquidity ratio applies to all credit institutions<sup>62</sup> on a solo basis. The advanced approach is applied at a liquidity subgroup level, subject to ACP approval, depending on the internal organisation and absence of liquidity transfers restrictions between entities belonging to the subgroup.

The ratio is a structural metric that limits maturity transformation to one month. The minimum requirement of 100% has to be complied with at any time, even when a stress occurs. The ratio has to be calculated at least monthly (end of month). The supervisor has also the power to ask an institution to calculate the liquidity ratio at other dates. More generally, ACP is empowered by law to take any other supervisory preventive actions if needed (for instance requiring a bank to put aside a given level of risk-free liquid assets).

Further reporting information is collected in addition to the binding ratio on a quarterly basis:

- A forward-looking overview of expected cash flows for the next seven days. It includes all significant elements which may affect an institution's liquidity position. The supervisor may ask to provide this overview for other periods. Flows in EUR and other currencies should be reported separately.
- Additional information on potential sources of funding, including available assets eligible as collateral for central bank operations and transactions with other counterparties, assets that could be liquidated, liquidity lines that fulfil the criteria of the Order and other available sources of funding for all currencies.
- Information on cost of unsecured wholesale funding in EUR for several maturity buckets (overnight, 1 day to 3 months, 3 months to 1 year and >1 year) is gathered. It includes the overall amount and the number of transactions for each bucket, and the amount-weighted

---

<sup>62</sup> The definition of credit institution is larger according to French law than it is in CRR: in addition to banks, all institutions that are licensed to grant credits (including factoring or leasing activities), even when they don't receive deposits, are considered as credit institutions and subject to the same set of prudential rules.

maturity of funding over 1 year. Costs of funding are measured as a spread of interest rates against a reference rate (EONIA or EURIBOR).

- A separate maturity ladder is also collected on a quarterly basis, which distributes assets, liabilities and off balance sheet commitments across time bands ranging from less than 1 month to over 5 years.

These tools complement the binding ratio as monitoring metrics.

#### *Similarities with and differences to the LCR*

The standard liquidity ratio shares similarities with the LCR as regards:

- its time horizon, the French ratio being a forward-looking ratio calculated for the next calendar month (30 days in the LCR);
- the French ratio takes into account the liquidity and credit quality of securities held by the institutions;
- weightings reflect behavioural assumptions as regards cash flows for the next period of time, regarding deposits and off-balance sheet items.

The above-mentioned advanced approach offers more similarities with the LCR, as it is designed to incentivise banks to hold a liquidity buffer made of assets which are available and could be used at any time, according to internal metrics, and are eligible to central bank operations, or can be liquidated including during a period of stress (this has to be demonstrated by the institution). These metrics have to be reviewed on a regular basis by the institution.

Each institution has to prepare its own stress scenarios, both specific and idiosyncratic, and contingency plans, based on the risk factors identified.

The advanced approach is designed for institutions capable of implementing their own internal methodologies to deal with liquidity risk. To use the advanced approach, institutions must apply to the ACP and their internal methodologies need to be authorised by the ACP subject to detailed qualitative requirements.

However, the French standard ratio is different from the LCR, as it is a static structural metric measuring and limiting maturity transformation to one month, but not a liquidity stress metric: the minimum requirement of 100% has to be complied with at any time, both in normal and stress conditions.

This ratio is designed as follows:

The numerator of the ratio comprises the treasury balance -where it is a lender position- plus assets with up to one month maturity. On the asset side, it takes into account securities weighted according to their assumed level of liquidity and market risk, and other assets eligible to Eurosystem repo transactions. The numerator is thus made of liquid assets (close to a buffer) + inflows.

The denominator comprises the treasury balance -where it is a debt position- plus liabilities up to one month maturity. On the liability side, it takes into account a portion of the deposits and an assumed run-off rate for off-balance sheet commitments. For instance, under the 'behavioural adjustments', sight deposits from retail customers are weighted at 10 per cent.

The French ratio also differs from the LCR in that it takes into account certain liquidity lines from credit institutions and other regulated entities subject to ACP prior approval. These lines have to fulfil strict criteria set by the regulation (being irrevocable within the remaining validity which should be at least six months; being immediately available on first demand of the borrower, etc).

A couple of weaknesses can be identified for the standardised approach. The advanced approach nevertheless was designed to address these weaknesses.

Within the standardised approach, the ratio is only required on a solo basis. In practice, the supervisor asks consolidated entities to submit liquidity metrics on a consolidated basis, but for reporting purposes only. The standard binding ratio is calculated for all currencies altogether, and not for each significant currency as the LCR. Therefore the supervisor has to use additional tools to monitor currency gaps, if any. It does not capture potential outflows related to derivative instruments, in case of an adverse market parameters evolution.

On the other hand, the advanced approach, which was designed for large institutions, requests to define a relevant liquidity perimeter for supervision purposes, which has then to be approved by the national authority. This approach is comparable to liquidity sub-groups mentioned in Articles 18 and 19 of the CRR.

#### *Impact assessment of the French quantitative liquidity regulation*

Was it a binding constraint in the sense that banks had a shortfall when the measure was first suggested? If so, how large was the Li-Gap (in per cent of total assets)? As explained above, due to the significant time lag and the lack of relevant available data it is not possible to evaluate the initial shortfall of liquidity caused by the French liquidity ratio back to when it was first implemented.

Did the measure reduce lending to (i) households (consumption loans); (ii) households (mortgages); (iii) large non-financials; (iv) SMEs? Did the measure increase the spreads on any of the above products? If so, by how much? Did the measure lead to tougher lending standards for the above categories? Did the measure lead to shorter maturities for the above categories? For the same reasons as above, it is not possible to measure the impact of the ratio on these indicators.

Did the measure lead to a material detrimental impact on the business and risk profile of the respective credit institutions, stability and orderly functioning of financial markets, economy, stability of supply of credit to SMEs and trade finance (including lending under official export credit insurance schemes)?

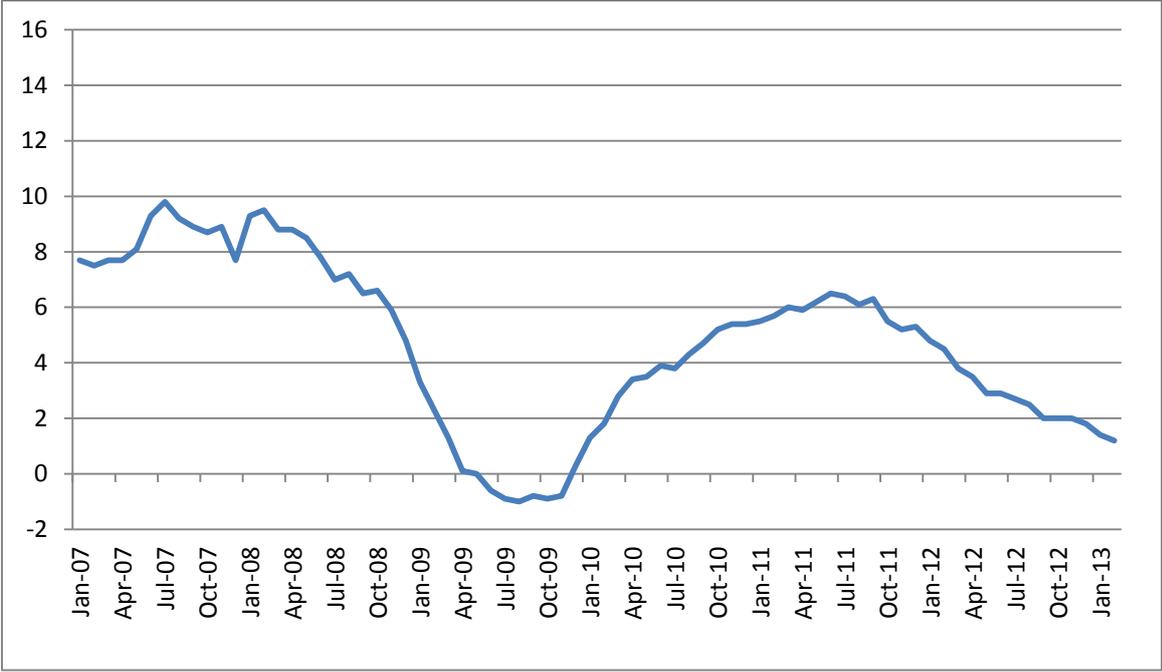
Looking backwards, the ratio proved itself quite robust during times of stress both in its previous and actual configuration, as French banks were able to face the liquidity stress that occurred since its implementation relatively well.

By including private claims eligible as collateral for Eurosystem operations, the French standard ratio also incentivises banks to finance high credit quality corporates, including SMEs. These claims are included in the ratio to the extent that they are eligible as collateral for central bank operations. This characteristic was not introduced as a response to the financial crisis but has been one of the pillars of Banque de France's monetary policy for decades. Most of French commercial and industrial corporate<sup>63</sup> are rated annually by the Banque de France based on a detailed analysis of their financial accounts, their economic environment, the regularity of their payments, etc. The rating system used is compliant with ECAI requirements of Basel standard. Only loans granted to high credit quality entities are eligible as collateral to repo transactions with Eurosystem.

Diagram A6.19: Financial institutions' lending to non-financial corporate (annual percentage change, loans declared to Banque de France's Centrale des risques, %)

---

<sup>63</sup> About 400 000 French corporate are currently rated by Banque de France. As of 31/05/2013, about 30 000 entities receive one of the highest ratings (3++, 3+), equivalent to Level 1 credit quality according to the Basel standard on solvency ratio.



Source: Banque de France.

Diagram A6.20: Financial institutions' lending to non-financial corporates (total outstanding loans, in EUR millions)

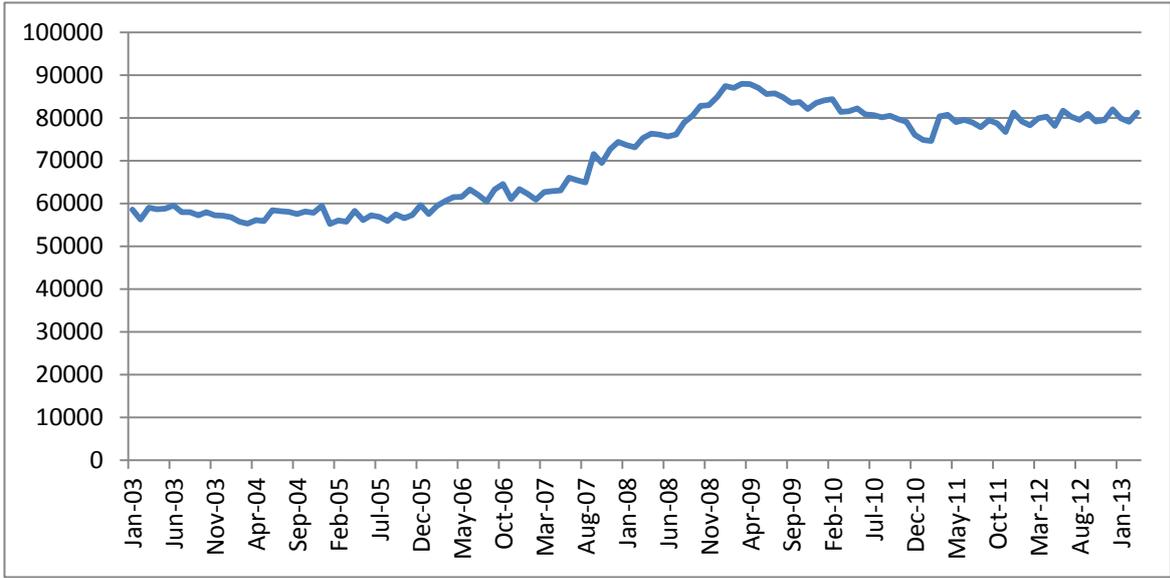
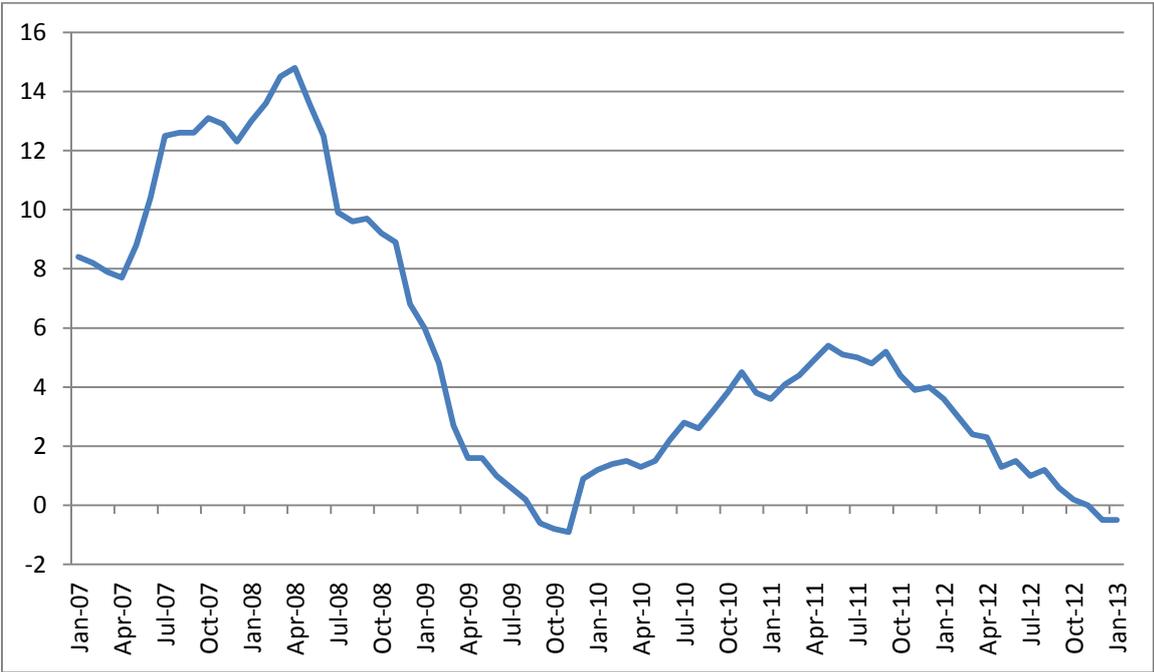
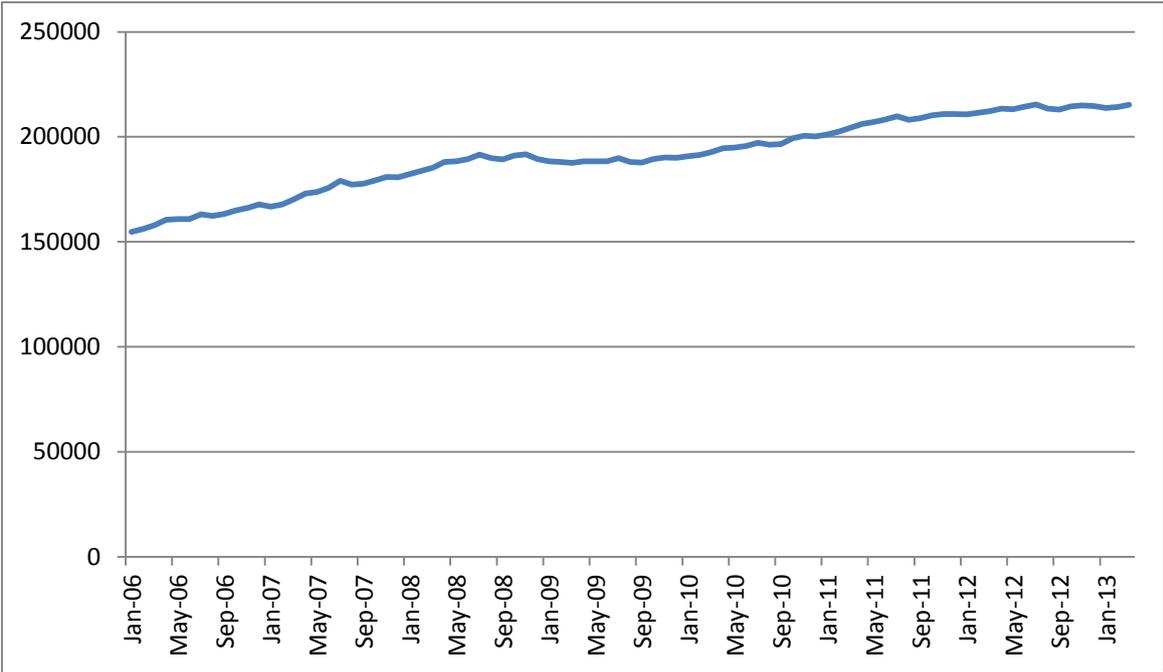


Diagram A6.21: Financial institutions' lending to SMEs (annual percentage change, loans declared to Centrale des risques, %)



Source: Banque de France

Diagram A6.22: Financial institutions' lending to SMEs (total outstanding loans, in EUR millions)



To summarise our main findings on the impact of the French liquidity ratio: in more than 20 years of existence, this ratio managed to guarantee a high level of resilience of French institutions, thanks to (i) limiting the level of transformation below one month; and (ii) widespread committed refinancing agreements concluded between institutions, which ensured that funding would be available in times of stress upon request by the receiver. It provided incentives for banks to extend lending to SMEs of a high credit quality, by recognising private claims as a source of liquidity. However, it is quite likely that the implementation of the LCR will reduce the willingness of banks to lend to SMEs and that interbank liquidity facilities will no longer act as a back-up in times of stress.

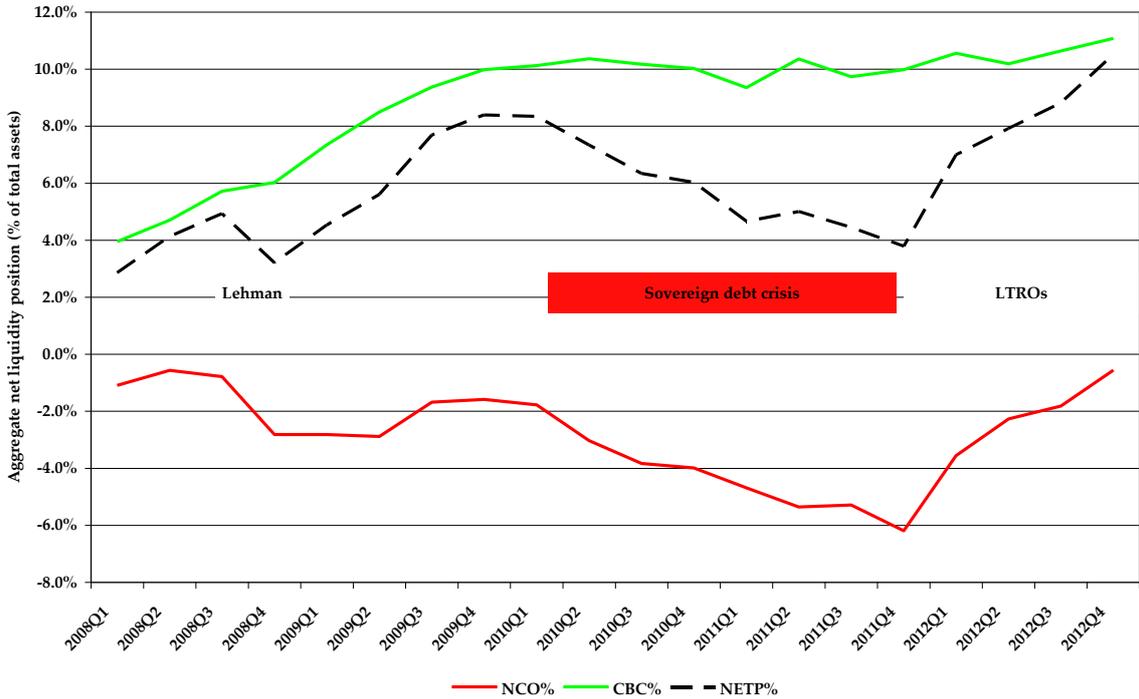
6.7. Italy: Banks' short-term liquidity and SME credit pricing: a preliminary analysis based on 2008-2012 Italian data

This section sheds some light on the relationship between banks' liquidity conditions and credit pricing, with specific focus on the borrowers nature, i.e. assessing whether the estimated relationship is different for small and medium-sized enterprises (SMEs) vs. other corporate borrowers.

To this end we use two different data sources, merging credit register lending microdata on interest rates charged on new short-term (<1 year) loans to firms with supervisory information on the net liquidity position of 12 large intermediaries, which account for about 70 percent of the total Italian banking system's assets. Even if no 'LCR-like' measure is currently enforced in Italy as a Pillar 1 requirement, the Bank of Italy has been monitoring the liquidity position of banking groups since October 2007, on a weekly basis, following a consolidated gap analysis. The monitoring spans several time buckets, up to 3 months. For the purposes of this case study the focus is set on the 1-month horizon. Liquidity data have been averaged over quarters to be merged with quarterly data collected from the credit register. Data coverage spans the period from Q1 2008 to Q4 2012.

Diagram A6.23 shows the change in the overall sample's liquidity indicator and of its two components:

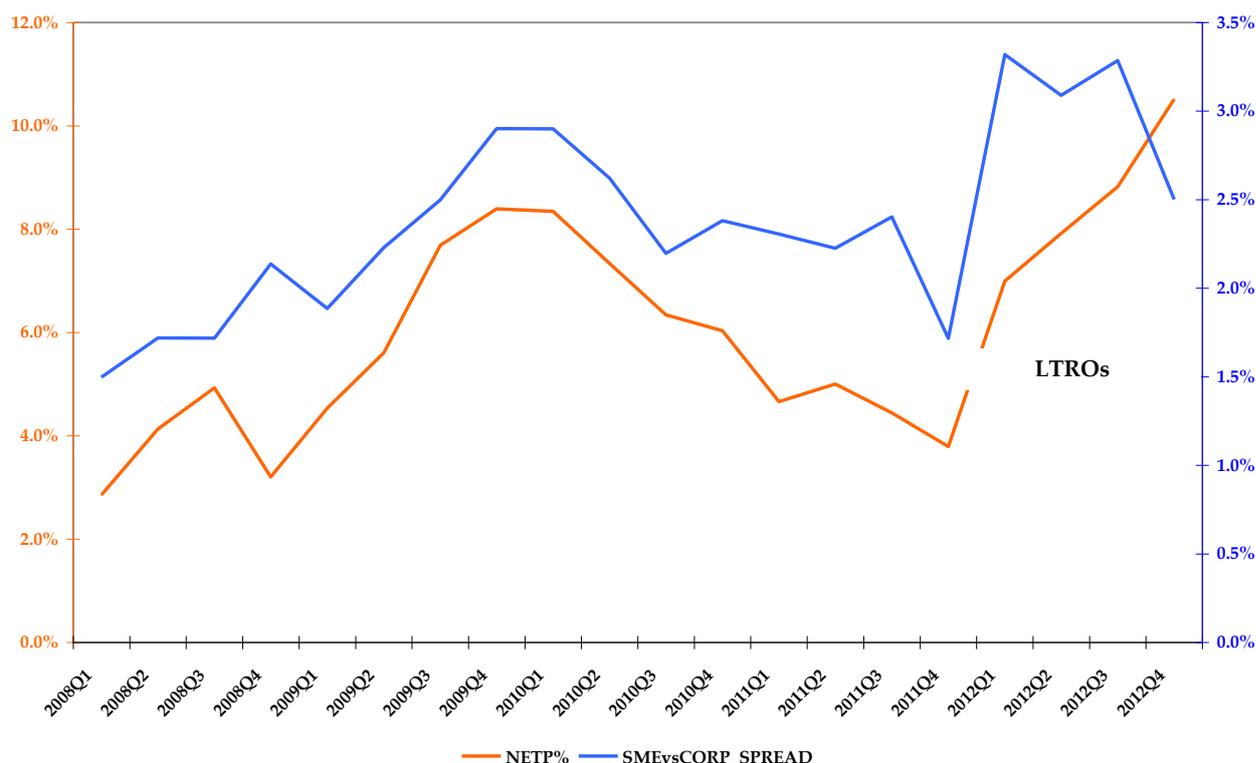
Diagram A6.23: Aggregate liquidity position (dashed) and its components for banks' sample (% of total assets)



A sharp increase in the counterbalancing capacity (CBC, from 4% to about 10% of total assets) led the overall liquidity dynamics (NETP, black dashed line) in the first two years, while the variation in the net cash outflows became the key driver afterwards, including after the implementation of the vLTROs. The latter contributed to curbing the estimated outflows by substituting shorter-term funding.

Diagram A6.24 shows once again the net liquidity position for the sample (orange line, left axis) together with the average quarterly spread in the interest rate of SME loans over other non-financial corporate exposures (blue line, right axis):

Diagram A6.24: Aggregate liquidity position (left axis) and SME-Corp. spread (right axis)



The two variables, though on different ranges, show a rather strong tendency to covariate ( $\rho=0.76$ ). With few exceptions, positive variations in the net liquidity position are associated with an increase in the spread between SME and corporate prices. Testing the robustness of this relationship after taking into account potential common drivers is the key objective of the following analysis.

We start by estimating a rather simple model for the level of the interest rate ( $P_{b,f,t}$ ) charged by bank  $b$  to firm  $f$  at time  $t$  including among the regressors a dummy for the liquidity position of banks ( $low\_liq$ ) and its interaction with the borrowers' type ( $low\_liq \cdot sme$ ). The full specification follows [1]:

$$P_{b,f,t} = \alpha + \beta_1 low\_liq_{b,t} + \beta_2 low\_liq_{b,t} \cdot sme_f + \beta_3 eonia_t + \beta_4 solvency_{b,f} + d(bank) + d(bank, sme) + d(Year-quarter) + d(Year-quarter, bank) + d(Year-quarter, sector) + \varepsilon_{b,f,t}$$

In order to estimate this model, the more comprehensive available dataset has been used.

It includes one record for each relevant (non-empty) date-bank-borrower combination. If there are multiple loans from one bank to the same borrower in the same quarter only one record per quarter per bank is kept, by weight-averaging the interest rates charged on all the new loans granted to that borrower. Borrowing firms are flagged as 'SME' vs. 'Other Corporate' by combining credit register information. The final dataset includes more than 1.5 million records over 20 quarters for 12 banks.

Banks' liquidity monitoring data have been averaged over quarters (i.e. they originally have weekly frequency) and transformed into a binary variable ( $low\_liq$ ) which is given a value equal to 1 when the weekly average of the indicator over one quarter stands below the trigger level set by the supervisor.  $low\_liq$  is then interacted with a dummy for the firm's type ( $sme$ , equals 1 if the counterparty is a small or medium firm), in order to gauge the potential systematic difference in pricing when the client is a

SME. Classification of a banks as *low\_liq* might either signal difficulties in accessing the funding market (which looks more likely in the crisis period) or the deliberate choice to reduce the indirect costs incurred by holding large liquidity buffers.<sup>64</sup>

Control variables are added to the specification as to account for the average level of the inter-bank rates over the quarter (EONIA) and the credit risk of the bank, as proxied by its solvency level (*solvency*). Further dummy variables allow to control for other time-invariant bank features (*bank*) and for macroeconomic dynamics (*year-quarter*), while the interaction between the two helps measuring idiosyncratic factors varying over time (*year-quarter, bank*). Although banks marginal funding cost is not explicitly controlled for, the inclusion of the average interbank rates, together with the individual solvency level and fixed effects for other idiosyncratic factors reduces the risk of misspecification.

The time, the dummy is also interacted with the business sector the borrowers belong to, so as to gauge industry-specific developments, which might affect the creditworthiness of the banks' counterparties.

The model has been estimated using OLS with cluster robust standard errors. Results are summarised in Table A5.1. The main variable of interest, *low\_liq°sme*, is robust to the inclusion of all of the controls (column h) and significant at the 99% level with positive sign. This suggest that on average, after controlling for unobserved bank specific features and economic cycle dynamics, *low liquidity banks charged a mark-up of about 13 bps on small and medium-sized business customers as compared with larger ones.*

Table A6.1: OLS estimation of model [1] – levels dataset

	INTEREST RATE	a	b	c	d	e	f	g	h
	LOW_LIQ	-0.00490159	-2.2484532***	-.50137458***	-.55324702***	-.3478511***	-.05464876***	-1.9202631	-2.3945707
	LOW_LIQ°SME		1.1498232***	1.1362413***	1.1586947***	.13070295***	.11147544***	.10905849***	.13636839***
	EONIA			.56362856***	.87509454***	.8886967***	.2572919***	0.16304327	-0.00022873
	SOLVENCY				.32873799***	.37266279***	.09211299***	0.00028323	0.00688675
FIXED EFFECTS	BANK					YES	YES	YES	YES
	BANK°SME					YES	YES	YES	YES
	Y/Q						YES	YES	YES
	(Y/Q)°BANK							YES	YES
	(Y/Q)°SECTOR								YES

Source: Authors' own calculations.

<sup>64</sup> In both cases it is reasonable to expect some correlation between the liquidity dummy and other regressors (i.e. banks featuring lower solvency levels might face higher funding costs, thus higher opportunity costs to hold liquidity buffers). This might raise some concern about the potential multicollinearity affecting the model but both the estimated magnitude and significance of the interest variable appear quite stable across specifications.

We then turn to investigating the relationship between variations in the supply conditions (pricing) and variations, rather than levels, in the net liquidity position of banks as a simple proxy for potential ‘short term’ effects on pricing linked to variations in the short-term liquidity profile of a bank.

In the model proposed, both the dependent variable and the regressors are represented by binary variables with a value equal to 1 whenever the underlying continuous variable increases compared with the previous quarter. The usual controls are then added to the specification [2]:

$$\Delta P(0,1)_{b,f,t} = \alpha + \beta_1 liq\_up_{b,t} + \beta_2 liq\_up_{b,t} \circ sme_f + \beta_3 eonia\_up_t + \beta_4 solvency\_up_{b,f} + d(bank) + d(bank, sme) + d(Year-quarter) + d(Year-quarter, bank) + d(year-quarter, sector) + \varepsilon_{b,f,t}$$

A different dataset, derived from the first one, has been used for estimating the model. For each period, **only borrowers who also got credit from the same bank and for the same maturity in the previous period are considered**, and the difference in the relevant variables is computed.  $\Delta P(0,1)_{b,f,t}=1$  thus means that the interest rate charged by bank ‘b’ to client ‘f’ increased from period t-1 to period t.

On the one hand this is a limit of the empirical framework, as such repeated relations are a subset of all of the transactions and the resulting dataset might be affected by some selection bias as larger firms tend to be more active than smaller ones on the credit market. On the other hand, comparing the change in credit conditions (i.e. price) over a very short time period, such as quarters, greatly reduces the probability that unobserved idiosyncratic factor, i.e. time-firm specific drivers, affect the robustness of the estimated relationship.. The dataset includes more than than 350 000 repeated relationships over 19 quarters (excluding Q1 2008).

Given the straightforward interpretation of the dependent variable as the probability  $p : [0,1]$  of observing an increase in the interest rate, a logit model has been used in this case to avoid the well-known problems which OLS would encounter in a similar setting.

Table A6.2: Logit estimation of model [2] – differences dataset

INTEREST_RATE_		a	b	c	d	e	f	g	h
UP									
	LIQ_UP	-.32673992***	-.33298177***	-.24822492***	-.24093926***	-.28288427***	-.06390955***	0.96707385	0.91469997
	LIQ_UP°SME		.05023047***	.05640759***	.05252418***	.31671597***	.23486339***	.22116023***	.10940466***
	EONIA_UP			.52978784***	.52916642***	.52848684***	.50767151***	.79329371***	.31141218**
	SOLVENCY_UP				-.16688247***	-.16894634***	.17088702***	0.36438995	0.47296257
FIXED EFFECTS	BANK					YES	YES	YES	YES
	BANK°SME					YES	YES	YES	YES
	Y/Q						YES	YES	YES
	(Y/Q)°BANK							YES	YES
	(Y/Q)°SECTOR								YES

Source: Authors' own calculations.

The estimation results, as summarized in Table A6.2, suggests that *an improvement in a bank's liquidity condition on average predicted an increase in the interest rate charged in a statistically significant way when the borrower is a small or medium sized firm.*

However, the predicted increase in probability (i.e. in the additional probability of an increase in credit price when the borrower is a SME) is very limited (Table A6.3):

Table A6.3: Marginal effect of *liq\_up°sme* (as in column h of Table 2)

	dy/dx	Std. Err.	z	P>z	[95% Conf.Interval]	
<b>LIQ_UP°SME</b>	0.0202519	0.0063231	3.2	0.001	0.007859	0.0326449

Source: Authors' own calculations.

The potential selection issue affecting the sample, with the exclusion of the smaller counterparties, might lead to underestimating the coefficient of interest. For this reason, the robustness of the estimated relationship is itself a result and suggests that further attention should be devoted to the problem.

Two main conclusions can be drawn from the empirical analysis.

Firstly, evidence has been found supporting the idea that banks featuring a weaker short term liquidity profile tend to charge higher interest rates to SME borrowers, after controlling, among the other things, for systematic differences in SME vs. other corporate pricing policies. The average estimated markup amounted to about 13 bps in the reference period.

As a further piece of evidence it has been shown, using a subsample of lender-borrower relationships occurring in two consecutive periods, that an improvement in a banks' liquidity profile (which implies incurring in an opportunity-cost) is positively associated to the probability of observing an increase in the interest rate charged to the borrower. One advantage of the empirical setting used is that the short time-interval between the observed pricing decisions reduces the risk of unobservable firm specific factor blurring the picture.

Both results seem consistent with the well-established view that SMEs enjoy lower bargaining power and are somehow more vulnerable to costly changes in banks' strategies.

One big *caveat* that has to be born in mind when interpreting all of the above results relates to sample selection issues. Credit prices are only observed for realised transactions while no data is available for those transactions which didn't take place because the conditions offered were rejected by the borrower. Details about such 'missing' transactions carry a very high information content, the loss of which very likely results in the underestimation of the relevant coefficients. Statistically robust evidences therefore deserve careful attention and further scrutiny, notwithstanding the limited economic significance.

6.8. Conclusions (tbc)

The case studies conclude that the introduction of quantitative liquidity requirements in the Netherlands, Sweden, Switzerland and the UK did not have a detrimental impact on economic growth or lending to the private sector (especially SMEs), and did not impede the implementation of monetary policy. No evidence of increasing loan spreads or tightening lending standards could be found. The

Dutch liquidity regulation did lead to a reduction of short-term unsecured interbank lending from a few banks that were constrained to comply, but short-term unsecured funding markets continued to operate. The French case study shows that it is not possible to measure the impact of the French liquidity regulation on lending to households, SMEs, and large non-financials and on credit spreads. It did not have a negative impact on the money market, as interbank deposits are included in the liquidity buffer under French regulation.

In the Netherlands, Sweden, Switzerland and the UK, banks complied with liquidity regulation without incurring detrimental incremental costs. In Sweden and the UK banks mainly adjusted by increasing liquid assets without reducing lending to the real economy. The Swiss case study shows that the interaction between capital and liquidity regulation implies similar balance sheet adjustments (reduction of traded assets with relatively high risk weights in favour of liquid traded assets with lower risk weights).

The case studies are very informative for the assessment under Article 509(1) of the CRR. However, important caveats remain and the experience of these six countries cannot be seen as a proxy for the other countries in the EEA. The global economic and financial crisis since 2007 renders it difficult to single out the impact of liquidity regulation on the items outlined in Article 509(1) of the CRR. The measures taken in response to the crisis (expansive fiscal policy, bank rescue packages, non-standard central bank policies) and the reform of global financial regulation (Basel 2.5, Basel III) have – sometime conflicting, sometime complementary – effects on the lending to the real economy, banks' business models and risk profiles, and financial market stability. But Article 509(1) of the CRR limits the EBA's mandate to whether the LCR is likely to have a material detrimental impact on the items in question. The case studies in this chapter do not suggest that this would be the case.

## Technical Appendix 7: Assessing potential quantitative constraints of EU banks' long-term funding capacity

7.1. Potential quantitative constraints on EU banks' long-term funding capacity

7.2. Potential impact of the LCR on the supply of loans to the real economy

So far, the analyses conducted for this report did not reveal any quantitative constraints on EU banks' long-term funding capacity nor a material detrimental impact of the LCR on the supply of loans to the real economy. Nevertheless, further efforts will be undertaken for the next annual report regarding the long-term funding capacity of EU banks and to uncover empirical evidence of a material detrimental impact of the LCR on the supply of bank lending.

## Technical Appendix 8: The interaction between the LCR and monetary policy implementation

Article 509(1) of the CRR mandates the EBA to assess the interaction between the LCR and the implementation of monetary policy in its report to the EU COM. It is aware that other fora at the Eurosystem level and at the BCBS level address similar questions; this chapter, therefore, focuses on the positions expressed by the central banking community at the global level. The chapter draws on published and unpublished material from the central banking community such as ACP/BdF (2012), BCBS (2013a, 2013b), BIS 2012), Cœuré (2012, 2013), Debelle (2011), ECB (2012b), ECB (2013), ECB (2013b), Stein (2013). Furthermore, the EBA closely cooperates with these institutions.

The BCBS set up a dedicated Task Force (TFL) to study the role of central bank facilities in the LCR. It focuses on (i) potential changes to disclosure recommendations of non-HQLA, but central bank eligible assets, (ii) the expansion of the eligibility of central bank committed liquidity facilities from jurisdictions with insufficient liquid assets to all jurisdictions, and (iii) the concrete implementation of such a recalibration of the LCR, if deemed appropriate. The first preliminary recommendations have been tabled to the BCBS in June 2013. Final recommendations are expected at the end of 2013.

In 2011, the Eurosystem mandated a joint Monetary Operations Committee (MOC) and Financial Stability Committee (FSC) Task Force on the impact of the Basel III liquidity risk regulation on the recourse of banks to Eurosystem monetary policy recommendations and related effects on financial markets (LR-MPO). The main recommendations of the LR-MPO were (i) that minimum reserve requirements should not be considered HQLA and (ii) that the Eurosystem should set up a joint MOC/FSC Basel III Monitoring Group (MG B III) to monitor the impact of the LCR (and the NSFR) on the implementation of monetary policy in the Euro area. The first report of the group was tabled to the MOC and the FSC in March 2013 (ECB 2013). At this stage data collection is the main focus of the report. A survey conducted by the group (ECB 2013, Annex 2, p. 2) found that “[t]he majority of the remaining [all 16 NSAs/NCBs in the sample except NL] supervisors replied that no impact from the introduction of liquidity regulation has been observed. The replies were unanimous with regard to the impact on the implementation of monetary policy: all responses were negative.” This finding is corroborated by the case studies in Technical Appendix 6. Box 1 below provides a summary of the main results of the MG B III report:

### **Box 1: Main results of the First Regular Monitoring Exercise of the Impact of Basel III Liquidity Regulation on Eurosystem monetary policy operations and financial markets**

The main aim of the report was to assess whether banks’ fulfilment of the new liquidity standards has so far had any impact on monetary policy operations and transmission channels of monetary policy. The results have to be assessed with caution, however, given that it is very difficult, using aggregate data, to disentangle the effects of the financial crisis from the impact of the Basel III liquidity rules on banks’ behaviour and on Eurosystem operations. Additional caveats are that neither the LCR nor the NSFR are binding for euro area banks yet (although national liquidity regulations, to various binding degrees, have been in place for some time in most euro area countries) and that important details on the calibration of the LCR have been decided only recently (in January 2013) while a review of the NSFR is planned for 2014.

All in all, the report aimed at measuring two key effects from the LCR on *monetary policy operations*: **(i) first**, whether the demand for central bank refinancing may increase and potentially lead to the build-up of more excess reserves with the central bank than would otherwise be the case; and **(ii) second**, whether banks have a greater incentive to use non-high quality liquid assets (HQLA) as collateral in monetary policy operations. As concerns *monetary policy transmission*, the report looks at whether the liquidity demand related to the fulfilment of the new standards might reduce the central bank’s ability to steer the short-term interest rates. In addition, it assesses whether banks’ compliance with the NSFR could make loan supply less sensitive to changes in the stance of monetary policy, thus impairing the bank-lending channel of monetary policy transmission. To measure these effects, the report looks at indicators of participation in Eurosystem operations, aggregate bank-based indicators (to examine trends in the structural balance sheet composition) and market indicators. A relatively long time period has been examined, from January 2007 to December 2012.

As regards **central bank operations**, the report finds:

(1) Evidence of a **shift of euro refinancing into vLTROs** which may reflect banks' increased demand for longer-term refinancing beyond the 30-day LCR threshold (as such funding will not compute as a cash outflow and thus improves banks' LCRs). At the same time, this shift towards vLTROs is also likely to reflect precautionary demand for Eurosystem credit in the context of the financial crisis. MRO refinancing with non-HQLA could thus be an attractive way of improving the LCR. The hypothesis that the liquidity standards could lead to more aggressive bidding behaviour by LCR-constrained banks, which would be reflected in higher allotment rates, remains untested as all ECB refinancing operations since the beginning of the observation period for Basel III standards have been conducted through a fixed-rate full allotment;

(2) **Anecdotal evidence** from two countries points to national liquidity regulations **affecting the recourse to the standing facilities**, mainly via an increase in the deposit facility. Through the LCR, central bank deposit facilities with an overnight maturity qualify as HQLA. Given that this treatment is equivalent to an interbank deposit the LCR is not expected to lead to an increase in the use of the deposit facility.

(3) As regards **collateral composition**, aggregate data does not provide evidence of an increase in the use of non-HQLA as collateral in monetary policy operations in recent years. This may reflect the fact that the definition of HQLA was still subject to changes until the January 2013 LCR recalibration. Rather, collateral patterns seem instead mainly related to relative collateral scarcity in the presence of a fast growing amount of refinancing, to the loss of value in a crisis environment and to the consequent need to catch up using riskier eligible assets (e.g. credit claims).

Regarding **bank-based indicators** at aggregate level, the report finds that as of June 2012:

(1) **Banks' LCR values show a rising trend** from the December 2011 observations. This is partly related to the new calibration rules, fulfilment of market expectations/peer pressure, and the three-year vLTROs;

(2) **No evidence of a general decline in banks' ratio of short-term bank debt over total liabilities**, which would be expected as longer maturities increase a bank's LCR, and short-term debt is treated less favourable under the NSFR. Observed declines of this ratio in some banks seem largely driven by financial market conditions instead of regulatory reasons; and

(3) **Slight evidence of an increase in the ratio of non-MFI deposits to total liabilities**, which would be expected given the non-favourable treatment of interbank deposits and short-term debt bonds under Basel III. However, it is difficult to conclude whether this may reflect convergence to the funding composition that will be efficient under the new liquidity rules or also be related to the turmoil in financial markets.

**Lastly, the analysis of market-based indicators is also not conclusive.** The observed contraction trend in unsecured lending for longer tenors, mainly driven by increased credit and liquidity risk perception, is not facilitating the substitution of short-term funding by longer-term funding from banks with an LCR shortfall. Moreover, the steepening of the money market yield curve seems mainly related to heightened risk perceptions and it is difficult to distinguish any impact of the new liquidity rules in this respect.

Three broad principles form the basis of this section:

1. Banks should not be enabled or even incentivised to arbitrage liquidity regulation via central bank operations.
2. Liquidity regulation should not have unintended negative consequences on central banks' ability to implement monetary policy.
3. The EBA is not mandated with providing recommendations to central banks regarding their monetary policy implementation framework.

### 8.1. The financial stability perspective

The standard rationale behind liquidity regulation is (i) to internalise negative externalities and (ii) to avoid moral hazard.

Negative externalities mean that banks' excessive liquidity risk can have substantial negative ramifications for other market participants, financial markets, society and central banks (inter alia Rochet 2008). Banks' optimal choice of liquidity risk exposure and liquidity risk-bearing capacity deviates from the social optimum. In order to incentivise banks to realign their liquidity management with the social optimum, liquidity regulation has to be binding at the margin. The internalisation of the externality implies that the price effects of liquidity regulation are intended. As a consequence, the

price of liquidity in the economy adjusts; i.e. the social costs of liquidity are factored into spreads for committed lines and loans for households and non-financial companies. These become more expensive and the entire economy allocates liquidity more efficiently. The under-pricing of liquidity (and credit and other) risks is a common feature of credit booms and was particularly prevalent in the build-up of the current crisis (Goodhart 2008, Trichet 2009, Sharma 2011, Tarullo 2012, ECB 2013d). Setting a floor for liquidity risk costs in loan pricing is, thus, an important consecutive function of liquidity regulation. As such it contributes to avoiding excessive loan growth and the ensuing misallocation of capital.

Moral hazard implies that banks are incentivised to take excessive liquidity risk: they know that if the risks materialise the public will bear the costs, and if not, banks pocket the profits from excessive maturity and liquidity transformation (Stein 2013). In the current crisis, central banks had to provide extraordinary liquidity support to banks and entire banking systems (Emergency Liquidity Assistance). This constitutes a form of liquidity insurance for individual banks or the banking system. Unless this insurance is actuarially fairly priced for each individual bank, it will lead to moral hazard and gambling for resurrection. Banks' individual expected marginal costs of individual liquidity problems are below the social marginal costs and banks feature socially excessive levels of liquidity risk (inter alia Freixas et al. 2003). In order to avoid moral hazard, central banks take an approach of "constructive ambiguity" to their lender of last resort function. That requires banks to self-insure against liquidity shocks; i.e. the lender of last resort function cannot always be counted on in liquidity stress tests or contingency funding plans (ECB 2008).

What does this imply for the liquidity regulation?

First, banks should not be enabled or even incentivised to arbitrage liquidity regulation via central bank operations (ECB 2012b, Coeure 2013) (especially during times of very accommodative liquidity policies; once these were discontinued, more aggressive bidding by banks in standard open market operations might emerge).

Second, and essentially, a very broad range of eligible liquid assets in the LCR (e.g. allowing central bank eligibility as sufficient criterion for eligibility in the liquidity buffer) corresponds to the assumption of a committed liquidity line of the central bank (BCBS 2013a). Without pricing these quasi-committed lines appropriately, regulation would be ineffective. The private marginal costs of illiquidity for the bank are not equal to the social marginal costs and the bank is not incentivised to reduce its level of liquidity risk tolerance to the socially optimum level. Liquidity regulation does not, therefore, achieve its purpose. For liquidity regulation to bind at the margin, only assets that are expected to be liquid on private markets should be eligible under the LCR. Alternatively, the liquidity line provided by the central bank needs to be priced (Stein 2013, Coeure 2013) to equal the opportunity costs of holding liquid assets (government bonds, covered bonds, or non-financial corporate bonds of very high credit quality). Debelle (2011), however, argues that banks should only be charged the average of historical (stressed and unstressed) one-month liquidity premium, which the Reserve Bank of Australia estimates at around 15 bps. The drawdown must be collateralised (standard CB eligible collateral plus self-secured mortgages at high haircuts which are allowed to reduce cross-holdings of bank liabilities in the system) and banks pay 25 bps above the central bank's target rate for the drawn amount (in addition to the 15 bps for the total commitment).

Stein (2013) also argues that the variations of the maximum amount of central bank lines in the LCR and its price might be varied over the financial cycle to yield "...a stabilizing macro-prudential effect." This option is also being currently investigated at the BCBS. The pricing of central bank liquidity insurance could take different forms, such as (1) an outright fee (e.g. imposed by the Federal Reserve Bank of Australia), (2) limiting eligible collateral to HQLA, (3) raising haircuts to proxy the opportunity costs of liquid assets or (4) set up a different pricing scheme for non-HQLA i.e. illiquid assets. The discussion at the BCBS TFL found that the operationalisation of committed central bank liquidity facilities involves a surprisingly large number of choices. In particular, the TFL studies how the appropriate operational details, i.e. fees and collateral haircuts, should be set and where in the HQLA such facilities should be recognised. It was pointed out that the characteristics should be set in such a

way that avoids undue reliance on central bank liquidity funding of banks' balance sheets. The EBA discussed central bank committed lines in the context of the RTS on derogations for eligible currencies under Article 419(5) of the CRR. Like the BCBS TFL, it found that pinning down the details of such lines is challenging: (i) it is unlikely that central banks can unconditionally commit to disburse liquidity even if the solvency of the institution is put in question; (ii) unless access to the liquidity line is restricted to times of stress, it could be used to endogenise the supply of central bank money, which impedes the implementation of monetary policy; (iii) the time for which liquidity is granted under the line needs to be sufficiently long to ensure that the HQLA is available for 30 days rolling, for a sufficient time span, (iv) the maximum amount of usage of the central bank commitment requires reliable estimates of banks' justified demand for liquid assets and their availability in the respective currency. To avoid banks from using the committed line as a substitute for central bank standard operations, the drawing could be restricted to the conditions defined under Article 509(1)(h) of the CRR. The current proposal of the BCBS does not suggest such a restriction.

## 8.2. The monetary policy perspective

In most EU member states (except the Czech Republic) a structural liquidity deficit prevails; i.e. without central bank operations the outstanding volume of central bank reserves would not cover banks' demand for these reserves. Often, that demand is increased by minimum reserve requirements for banks. The purpose of the minimum reserve requirements is to stabilise the demand for central bank money and to ensure that banks participate in the central bank operations which are necessary to implement monetary policy. As a consequence, liquidity regulation should not be a disincentive to banks participating in such operations, be they liquidity providing or liquidity absorbing. (Also, qualitative liquidity regulation allows banks to factor "standard monetary policy operations" into their liquidity management and into their contingency funding plans, e.g. CEBS 2009). The following section shows that the LCR is not neutral with respect to monetary policy implementation.

A broad set of eligible collateral (beyond HQLA) in conjunction with 0% run-off rates of all central bank repos, enables banks to arbitrage the LCR via central bank operations in all countries that conduct open market operations in a broader set of assets than HQLA.

There is not much published literature available: Cœuré (2012, 2013), Bech/Keister (2012), Bindseil/Lamoot (2011) and Schmitz (2011, 2013), and some unpublished reports by the international community of central banks (i.a. ACP/BdF 2012, BIS 2012, ECB 2012b, 2013, 2013b):<sup>65</sup>

First, they find that the definition of LCR-eligible high quality liquid assets (HQLA) provides incentives to submit non-HQLA, central bank eligible assets at central bank open market operations. This is particularly relevant for unsecured bank bonds, asset-backed securities (ABS), and credit claims. Central bankers are also concerned about incentives for banks to arbitrage liquidity regulation via central bank operations (e.g. Cœuré 2012, 2013). Differences in treatment between repos with central banks compared to other market participants distort bank behaviour in central bank operations. This could lead to more banks participating in central bank operations, changes to banks' bidding behaviour in open market operations, shifts of demand from short-term (<30 days) to longer-term operations (>30 days), incentives to post lower-quality collateral with central banks and changes of the determinants of the demand for central bank reserves. This may complicate the implementation of monetary policy by central banks; i.e. the target market rate (e.g. EONIA) is more likely to deviate from the policy objective (e.g. minimum bid rate). The central bank would face higher credit and liquidity risk of posted collateral, which central banks could address by increasing haircuts, for example. The combination of preferential treatment of central bank operations and of factoring the lender of last resort function into liquidity regulation would encourage arbitrage between qualitative liquidity regulation and central bank operations. The extent of this arbitrage depends on the associated costs; very low opportunity costs of holding large excess reserves reinforce the incentive. The haircuts of

---

<sup>65</sup> The following analysis focuses on an LCR of 100 per cent; during the phase-in period incentives might differ or be less pronounced.

central banks are often more granular than those in the LCR. In some cases case they can be higher. Thus, the collateral used in LCR arbitrage via the central bank is influenced by the haircuts applied by the central bank on eligible collateral. For regulatory arbitrage to work, banks would use collateral that receives lower haircuts at the central bank than in the LCR; i.e. non-HQLA. However, a recent ECB study (ECB 2013) and the joint MOC/FSC Basel III Monitoring Group report finds no evidence that the introduction of the LCR would already lead to more banks participating in open market operations, changing bidding behaviour, or shifting to longer-term operations.

The European and, especially, the euro unsecured money markets feature much lower volumes and significantly shorter maturities than before the crisis (ECB 2013c). This is due to a number of factors: Banks decrease their reliance on unsecured, short-term funding and shift towards secured funding, the European central banks provide ample liquidity and do so over longer periods (through outright asset purchases and vLTROs), the main lenders on the unsecured money market become more risk aware and cut their unsecured exposure to European banks (e.g. US money market funds).<sup>66</sup> It is unlikely that the LCR contributes much to the explanation of the current situation on European unsecured money markets.<sup>67</sup>

Nevertheless, the LCR aims at disincentivising banks' reliance on unstable funding sources such as unsecured money market funding with tenors below one month. At the same time it provides incentives for banks to lend over tenors below one month. As such, the functioning of the market will be determined largely by the behaviour of non-bank market participants (e.g. insurance companies, money market funds). This in turn will be a function of the confidence in the European banking sector. "In fact, the regulation [the LCR] is expected to bring on 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, creating the conditions for a better functioning of the money markets." (Coeure 2013, p. 7).

Second, more banks are expected to participate in the main refinancing operations in these non-LCR eligible liquid assets.

Third, banks would face disincentives to lend and/or borrow on the unsecured money market. The experience of high fragility of the unsecured money market after August 2007 constitutes the *raison d'être* for the LCR; providing incentives for banks to shift to more stable funding sources is its objective. Nevertheless, the literature argues that this is likely to have consequences for monetary policy implementation. The unsecured short-term money market could lose its allocation and distribution function for liquidity in the Euro area.

Fourth, not only volumes on the unsecured money market, but also the respective interest rates, are likely to be affected. The reduction of liquidity in the unsecured money market could question the role of EONIA in monetary policy implementation. The spread between interest rates on the secured and the unsecured money market would increase. The slope of the yield curve could increase at the short end. The interest rates at the short end could become more volatile and, thus, their information content concerning the liquidity stance of the system could decrease.

The following points have received less attention in the literature so far: Fifth, the LCR imposes a 50% roll-over rate on loans to the real economy, but also to central banks. The purpose of this rule is to reduce the likelihood of a credit crunch for the real economy. Some supervisors interpret banks' term deposits with central banks as loans to central banks and impose a 50% roll-over rate on those. This discourages banks from participating in liquidity-absorbing monetary policy operations. Therefore, the

---

<sup>66</sup> Jackson, Sims (2013), Heider et al. (2009), Morris, Shin (2010), Eisenschmidt, Tapking (2010), ECB (2013).

<sup>67</sup> During the phase-in period incentives are different, as banks can increase their LCR by unsecured short-term money market funding (60% coverage required) which are then invested in HQLA (100% eligible, irrespective of the underlying funding tenor). In the long term the ECB (2013, p. 89) concludes that "[t]he 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.'

roll-over rate of 50% should not be imposed on banks' term deposits with central banks. The intention behind the rule – i.e. to avoid a credit crunch – is not applicable to loans to central banks. The latter are not subject to a credit crunch, when banks do not role their term deposits. The GHOS recalibration of 6 January 2013 does take this into account and reduces the roll-over rate on exposures central banks to 0% (BCBS 2013a, p. 36). We suggest that this recalibration is also accounted for in Article 412(2)(a) of the CRR.

Sixth, the treatment of central bank reserves in the LCR is left to individual jurisdictions. Central bank excess reserves are the most liquid assets in an economy. As such they are clearly eligible in the liquidity buffer. The treatment of central bank minimum reserve requirements in the liquidity buffer depends on their role in the monetary policy implementation framework of central banks. Some central banks (e.g. Eurosystem) impose minimum reserve requirements to determine and to smooth the demand for central bank reserves in open market operations. This facilitates the estimation of the maximum allotment volume for open market operations, as minimum reserve requirements are backward looking, i.e. fully determined for the next maintenance period. They are a binding constraint for banks over the maintenance period. In these systems minimum reserve requirements are imposed solely for monetary policy purposes. If they are drawn, they have to be replenished before the end of the maintenance period. This constitutes a contractual cash-outflow for the respective bank and increases its net-cash-outflows. Thus, the net impact on the liquidity shortfall in EUR would be negligible, as long as the 75% cap on inflows is not binding. In other systems, minimum reserve requirements are explicitly motivated as liquidity reserves for the banking system. As such, they are only effective when their usability is ensured. In other words, if a bank faces an idiosyncratic liquidity shock, the minimum reserve requirement is relaxed for this bank and can draw on the funds to cover net outflows. In the latter case, minimum reserve requirements are functionally a constitutive component of the liquidity buffer. In the former they are not; they are encumbered for monetary policy purposes (ECB 2012b). As such, the treatment of minimum reserve requirements in quantitative liquidity regulation should be determined according to their economic purpose.

Table A8.1: The impact of the non-eligibility of minimum reserve requirements on banks' HQLA

	Total CB reserves EUR billion	Net withdrawable CB reserves EUR billion	Net withdrawable as % of total CB reserves	Net withdrawable as % of total liabilities	Non- withdrawable as % of total liabilities
C1			89	3.99	0.49
C2			93	3.55	0.26
C3			93	6.74	0.51
C4			94	7.04	0.42
C5			64	1.45	0.82
C6			50	1.49	1.49
C7			87	4.67	0.69
C8			99	1.13	0.02
C9			89	4.66	0.57
C10			50	2.18	2.18
C11			91	4.74	0.48
C12			63	1.64	0.98
C13			84	5.8	1.1
C14			6	0.24	4.05
C15			100	8.51	0
C16			36	1.39	2.5
C17			77	2.21	0.67
♦ C18			98	6.91	0.13
C19			-7.66	-0.08	1.1
C20			17	1.18	5.62
C21			-10.82	-0.06	0.57
Total / Wtd. Avg.	1515	1360	90	4.64	0.53

Source: EBA voluntary exercise, Q4 2012 q4. The table net withdrawable CB reserves refers to the data reported by banks. It has to be noted, however, that the exact methodology regarding the calculation of this position is still under discussion. It deviates from the data provided by NCBs in the Euro area, because it rests on data provided by banks. Thus, an IT bank that reports consolidated data includes withdrawable reserves at NCBs across all subsidiaries. The consolidated number is reported under IT. The local NCB on the other hand would focus on the withdrawable CB reserves held on its accounts only.

Total central bank reserves account for EUR 1 515 billion, of which EUR 1 360 billion or 90% can be drawn if required (table A8.1). Banks' excess reserves at central banks account for about EUR 1 360 billion and constitute about 36% of banks' stock of liquid assets. Banks might have to substitute drawable central bank reserves once central banks attempt to return to pre-crisis liquidity policies, e.g. discontinuation of vLTROs and Quantitative Easing (QE) (although, presumably, central banks will only return to pre-crisis policies when the economic situation and banks' capacity to manage liquidity risk are both stronger). Does that imply that banks would have to increase their HQLA by EUR 1 360 billion? Such crude approximations are misleading, as they do not take into account the following issues:

- Lower excess reserves are accompanied by lower asset encumbrance. The impact of a reduction of excess reserves on the LCR may depend on the composition of collateral. Indeed, as proposed by the BCBS (2013), banks may be allowed to report pledged HQLA as unencumbered, if collateral is pooled and enough non-HQLA collateral is available. Banks are allowed to assume that first posted non-HQLA is encumbered and subsequently HQLA. The numbers vary greatly across countries. The countries with high remaining volumes of outstanding vLTROs feature a relatively high share of non-HQLA in pledged collateral. Increases in unencumbered collateral are likely to have a relatively small impact on the LCR, according to the analysis of Eurosystem aggregated collateral data.<sup>68</sup>
- Under pre-crisis liquidity conditions central banks estimated the expected demand for central bank reserves at their target policy rate. These estimates together with the estimates of autonomous factors<sup>69</sup> (e.g. changes in banknote circulation or government deposits) and other factors (e.g. Secondary Market Program) formed the basis for fixing the maximum allotment volume for open market operations. Before the crisis the demand for excess reserves was usually fairly marginal; since the beginning of the crisis it is positive. How a return to pre-crisis monetary policy implementation, higher interest rates, and the LCR itself will affect the demand schedule for central bank reserves is crucial for analysing the impact on LCR compliance.
- The distribution of excess reserves differs substantially from the distribution of vLTRO participation and early repayments; banks which still have large vLTRO exposure hold little excess reserves, according to our analysis.<sup>70</sup> These are mostly the consequence of liquidity inflows into banks in core countries with little (remaining) exposure to vLTROs (RBC Capital Markets 2013). Given the 0% run-off rate of central bank repos, the large contractual outflows due at the maturity of the vLTROs are not included in the LCR at all. So the LCR unrealistically assumes that these transactions are rolled. The impact on the LCR of the contractual repayment of the vLTROs depends on the funding mix chosen by banks to fund the repayment of the vLTROs.

At this stage reliable estimates by the international community of central banks regarding the impact of a potential return to pre-crisis liquidity policy on banks' LCR compliance are not available. As soon as results will become available, i.e. from the Eurosystem's Basel III Monitoring Group (B III MG), they will be incorporated in next year's report. Similarly, bank-level data analysis on the distribution of collateral and vLTRO exposure is expected from B III MG in 2014, too. ECB (2013, Box 2, pp. 82) concludes that "[i]n 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."

---

<sup>68</sup> The analysis is based on confidential Eurosystem data and cannot be published in this report.

<sup>69</sup> Conceptually, the entire structural liquidity deficit should be accounted for (not only minimum reserves and autonomous factors), although for practical data reasons this may be difficult.

<sup>70</sup> The analysis is based on confidential Eurosystem data and cannot be published in this report.

Given that the combination of data from the EBA voluntary exercise and from the Eurosystem was not possible for this report, the EBA conceptually investigates various alternatives to gauge the order of magnitude of the impact of the maturing of the LTRO:

- The first alternative assumes that banks repay their remaining vLTRO exposure by running down excess reserves. However, the remaining vLTRO exposures are concentrated in four banking systems and outstrip excess reserves by a factor of 25, so this alternative is not possible at the current juncture.
- As a second alternative banks could raise secured funding in the market to substitute for CB funding. As collateral they could use the assets that are currently encumbered by the vLTRO which exceed the volume of the vLTRO by  $1/(1-\text{average haircut})$ . Whether this alternative is realistic depends on the respective banks' market access and their funding costs. The impact on their LCR depends on the composition of currently encumbered collateral; i.e. the higher the quality of this collateral, the lower the impact on the LCR. Otherwise, if the Eurosystem continues to provide full allotment, banks can also fund themselves via MROs and 3-month LTROs. This would keep the LCR unchanged. (Similarly, if the vLTRO is rolled – as assumed by the LCR – there is no impact on the LCR.)
- The third alternative assumes that banks gain access to the unsecured funding market and issue long-term debt to substitute central bank funding. This would reduce their LCR by the corresponding increase in 30-day net-cash-outflows, as unsecured funding has a 100% outflow rate under the LCR.
- The fourth option could be to sell the assets that banks funded by vLTROs. This could reduce their respective LCRs, if the assets sold were HQLA.

At the current juncture it is difficult to foresee market conditions at the time the vLTRO matures. Nevertheless, assuming that the respective banks can adopt a mix of the alternatives the overall impact on the gross liquidity short-fall is very low, if the respective banks can fund on the unsecured market at competitive rates (e.g. in October 2013 the costs of the vLTRO exceed one year EONIA). The overall impact on the gross liquidity short-fall is highest, if the respective banks substitute their CB funding by unsecured over-night interbank deposits. Ultimately, the impact depends on the confidence the market has in the respective banks.

Positive excess reserves have implications for monetary policy implementation. In such a context, minimum reserve requirements do not constitute binding constraints for banks any more. They lose their monetary policy function (stabilising demand for central bank reserves; Schmitz 2013). A reduction of minimum reserve requirements could increase available HQLA for banks' liquidity risk management. How this would impact on the LCR depends on banks' reactions to such a reduction: If banks reduce their demand for central bank money, their unencumbered collateral increases. This increases the LCR in countries with narrow definitions of central bank eligibility. In other cases, the impact is lower, as a wider set of assets becomes unencumbered. If banks do not reduce their demand for central bank reserves, their excess reserve increases proportionally to the decrease in minimum reserve requirements, excess reserves increase and banks' HQLA increase. Relatively high minimum reserve requirements are usually accompanied by relatively broad set of eligible collateral and vice versa.

Whatever decision is taken, the treatment of minimum reserves in HQLA and of the respective central bank operations in the outflow section of the LCR test must be consistent (a general principle that is also emphasised in BCBS 2013b). If central bank operations are conducted in HQLA only, the net impact of a 100 or 0% run-off factor of central bank operations on the cumulative liquidity buffer is then negligible. However, if the set of eligible collateral at the central bank is wider than HQLA, the run-off factor makes a difference for the liquidity position of the bank: if banks face a non-negligible minimum reserve requirement at the central bank and post non-HQLA assets as collateral, a 100% run-off factor implies a cash outflow that is not counterbalanced by a respective securities inflow. Functionally,

minimum reserves solely motivated by monetary policy considerations are exogenous to the banking sector; it should neither feature in HQLA nor as an outflow in the LCR.

Banks are incentivised to arbitrage the LCR via central banks if operations with the central bank exceeding the minimum reserve requirement receive preferential treatment vis-a-vis collateralised operations with other market participants based on the underlying collateral. The calibration of the LCR should avoid such regulatory arbitrage.<sup>71</sup>

The 0% run-off rate for central bank repos assumes that central bank repos are always rolled by central banks. It was intended by the GHOS recalibration in January 2013 to ensure that central bank repos are treated identically to outright asset purchases by central banks. Fears of an unlevel playing field between banks operating under different monetary policy frameworks are discussed in ACP/BdF (2012). The corresponding unwind of short-term repos ( $\leq 30$  days) always count as outflow under banks' LCR. This is not the case for longer-term repo operations, say three months, one and three year repos, and/or outright asset purchase programs (e.g. Eurosystem, Bank of England, US Federal Reserve); such operations either affect banks' LCR only in the last 30 days before maturity (long-term repo) and/or does not have an impact on banks' LCR at all (outright asset purchases). So the ACP/BdF note concludes that a non-zero run-off rate of central bank operations beyond the structural liquidity deficit could pose a disadvantage for banks in currency areas with short-term repos as predominant implementation instrument. Many other central banks in G-20 countries accept only HQLA as eligible collateral, such that banks cannot arbitrage the LCR via the central bank, unless central bank repos are treated differently from repos with other market participants. A detailed report on central bank frameworks of monetary policy implementation by the BCBS (2009) shows that most central banks in the G-20 implement monetary policy by manipulating interbank money market interest rates through open market operations (OMOs), although details differ: Out of the 14 central banks described in BCBS (2009) 6 feature obligatory minimum reserve requirements (MRR); under their standard monetary policy framework, 9 conduct open market operations in HQLA only. Out of these, 7 also restrict collateral under their lending facility to HQLA only. The most common instruments are repos; two central banks focus on FX market transactions, and three complement them by outright purchases of eligible assets. If central banks buy Level 2 and Level 2B assets, a non-zero run-off rate of central bank operations beyond the structural liquidity deficit could pose a disadvantage for EU banks.<sup>72</sup> The changing scale and composition of collateral posted at central banks is documented in BIS (2013). The report looks at the collateral frameworks of and usage at 16 central banks in G-20 countries (AU, CA, EA, FR, DE, IN, IT, JP, KR, MX, SG, ES, SE, CH, UK, US). It finds (i) that collateral frameworks differ across the central banks in the sample, (ii) that most central banks modified their collateral framework in due course of the crisis (e.g. additional asset classes/issuer types/currency denominations, new risk management tools), and (iii) that the amount and composition of collateral changed substantially between June 2007 and July 2012. According to the report, central banks with extremely narrow eligibility (i.e. domestic government bonds) are the Reserve Bank of India and the Monetary Authority of Singapore; central banks with very broad eligibility are the Eurosystem, the Swedish Riksbank, and the Swiss National Bank. Pledged collateral varies accordingly: in some central banks (i.e. India, Japan, Korea, Mexico) government bonds dominate pledged collateral; in others (i.e. Sweden, Switzerland) private sector financial debt dominates, while in the Eurosystem private sector financial debt and non-marketable instruments amount for the largest shares. For central banks with broader eligibility the BIS report observes that during stress times the composition of collateral shifts towards less liquid assets, mainly due to the freezing of repo markets in these assets (i.e. private sector financial bonds). Banks then keep liquid assets for market repos and pledge less liquid assets for central bank repos. Since 2009 central banks across the world engage in outright

---

<sup>71</sup> Although LCR arbitrating via the central bank will be reduced, this proposal will not completely avoid it, as longer term (> 30 days) operations with the central bank using non-HQLA as collateral would still be attractive in view of no good alternatives to do this via private markets.

<sup>72</sup> The precise definition of the structural liquidity deficit differs across central banks. We therefore stick to the more general term, but it is important to notice that factors like changes in banknote circulation or government deposits at central banks are included. For example, in the euro area it is defined as 'repo liquidity deficit'."

asset purchases and long-term repos (US Federal Reserve, Swiss National Bank, Bank of England, Eurosystem). However, individual banks always have the option to sell their assets in outright sales, irrespective of the jurisdiction (although not at an aggregate level). But more importantly, the LCR is non-neutral with respect to monetary policy frameworks, precisely because their respective liquidity risk implications are different: while repos are bank liabilities (contractual cash-outflow); an outright purchase is not.

### 8.3. In-depth discussion of Committed Liquidity Facilities as HQLA from a Eurosystem perspective

At their January 2013 meeting, the GHoS agreed on certain areas of further work on the LCR that will continue in 2013. “Central bank refinancing always benefit from 100% roll-over rate no matter the quality of the assets used in the transaction. 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.” (Coeure 2013, FN 12) The BCBS was asked to examine the treatment of central bank facilities and whether there is “the capacity for assets that are eligible for central bank operations to play a role within the LCR framework”.<sup>73</sup> The purpose of this work is to ensure that the LCR responds appropriately to the provision of liquidity support by central banks, and does not unintentionally hinder banks from making use of these facilities as and when needed. At the same time it was recalled that the LCR must ensure that the treatment of central bank facilities is consistent with the long-established principle that central banks should act only as lenders of last resort and not as lenders of first resort.

The BCBS set up a task force (TFL) to assess, inter alia,

the potential for wider use of a pre-paid committed liquidity facility, of the type currently envisaged for jurisdictions with insufficient high quality liquid assets.<sup>73</sup> The task force was mandated to assess the following questions:

Should the facilities be available to all jurisdictions or continue to be limited to those jurisdictions with insufficient high quality liquid assets? If yes, both in normal times and times of stress?

If made available to a wider group of jurisdictions:

- How should the appropriate features (e.g. fee; pledging of assets; haircuts) for contractual committed liquidity facilities be set? Should the features vary over time or economic conditions (e.g. crisis vs. non-crisis)?
- Where within the structure of HQLA should the facility be recognised?

The TFL was asked to provide a report on these questions to the BCBS in 2013.

This section discusses from the Eurosystem monetary policy perspective the rationale for setting up a committed liquidity facility (CLF). In addition, it provides some considerations on the questions raised by the BCBS concerning the implementation and calibration of the CLF, particularly within the monetary policy framework used by the Eurosystem. Section II briefly discusses the elements of the LCR from the perspective of monetary policy operations which lead to an interaction between monetary policy and liquidity regulation. It also contains some considerations on these issues from the regulatory perspective. Section III describes the broad characteristics of the CLF and how this could be calibrated so as to address some of the concerns on the interaction between LCR and monetary policy. The final section provides some conclusion and briefly discusses some further considerations.

Regulatory perspective on the three areas of potential interaction between liquidity regulation and monetary policy:

---

<sup>73</sup> BCBS (2013), Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring, January paragraph 58.

Differences in asset eligibility for central bank operations and LCR: From a regulatory perspective the difference in the sets of eligible assets is a reflection of the perceived characteristics of the assets. Given that not all central bank eligible assets have been assessed to exhibit the desirable characteristics (i.e. limited market liquidity and stress resilience) necessary for their inclusion in HQLA there is difference between central bank and LCR eligible assets. Central bank eligibility as a sufficient criterion disagrees with the LCR objective to encourage banks to self-insure (i.e. before turning to the central bank) against liquidity risk.<sup>74</sup> It should be noted that , as a result of the criticism on the insufficient recognition of central bank eligibility as a sufficient criterion, the LCR revisions agreed in 2013 also included an additional level of liquid assets (Level 2B). This widening of HQLA increases the LCR by up to 15 percentage points which is the limit placed on these assets. It should be noted that a further widening of the definition of HQLA risks watering down the liquidity regulation to the extent that it becomes a non-binding requirement. According to the latest QIS, the majority of banks in the euro area already fulfil the LCR minimum requirement based on the January 2013 calibration.<sup>75</sup> However, ECB (2013e) outlines the fact that the diversity of liquidity situations and monetary policy implementation frameworks, combined with an LCR that does not take these differences into account, can have negative repercussions. The ECB (2013d) suggests that “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).” (p. 82).

#### Committed Liquidity Facility (CLF)

A CLF is a facility provided by the central bank to commercial banks under which the central bank contractually commits to lend against collateral for a fee. In the January 2013 LCR text the CLF is one of the three options available to jurisdictions faced with insufficient HQLA. As a result of the limited amount of HQLA, banks in these jurisdiction are either not able to meet the LCR minimum requirement or in the case where the available amount is close to banks' required amount, meeting the LCR could severely affect the market functioning of these assets. As a consequence, the BCBS agreed to permit three options for an alternative treatment: (1) a contractual committed liquidity facility; (2) foreign currency HQLA to cover domestic currency liquidity needs, and (3) the use of additional Level 2 assets with a higher haircut.

According to the LCR rules text, a CLF must, in principle<sup>76</sup>, fulfil the following characteristics:

- Structured as contractual arrangements between the central bank and the commercial bank with a maturity date that falls outside the 30-day window.
- Contract must be irrevocable prior to maturity.
- Contract must not allow ex-post credit decision by the central bank.
- A fee must be charged regardless of amount, if any, borrowed by commercial bank.

The fee should be set such that both the banks using the CLF and banks not using the CLF have similar financial incentives to reduce their exposure to liquidity risk, i.e. the no-arbitrage principle should hold. In practice this means that the price is expected to be neutral in that the effective yield on non-HQLA assets is not higher (once adjusted for credit and liquidity risks) than HQLA assets.

<sup>74</sup> This objective is explicitly denied in Banking Stakeholder Group (2012) which is the reason why it arrived at different conclusions: “The aim of the Liquidity Coverage Ratio is not to enable banks to withstand liquidity pressures on their own and to survive through stressed scenarios without supervisory support.”

<sup>75</sup> Based on preliminary estimates by the Impact Study Group for data reported in June 2012, Group 1 and 2 banks exhibited average weighted LCR ratios of 125 and 158 %.

<sup>76</sup> Some of these requirements might be relaxed in practice. For example, with regard to the irrevocability nature of the CLF the Reserve Bank of Australia's CLF commitment is contingent on the requesting bank having positive net worth in the opinion of the RBA, having consulted with the national supervisor (APRA). Thus, in the event of an exceptional/significant deterioration in a bank's net worth, it may be well possible for a central bank to reject the commitment to lend.

In addition, further technical discussions on the CLF have led to a consensus that the CLF should count towards HQLA up to a limit only.

Therefore, the following three parameters for the CLF are key:

- $\alpha$  the fee for the commitment, or in other words subscribing to the CLF,
- $\beta$  the rate for drawing on the CLF,
- $L$  the limit for the CLF to count towards HQLA.

The calibration of these three parameters determines whether and how the CLF would be used by banks to meet the LCR. Before turning to these calibration issues, the objectives of the calibration need to be clarified. Against the background of the discussion on the areas of interaction between the LCR and monetary policy, for the euro area a CLF could be calibrated (a) to limit an increased demand for central bank funding for regulatory purposes and (b) to take the “natural” (by construction) reliance on central bank funding into account. Besides these specific objectives, the calibration should generally ensure consistency with the operational framework for monetary policy implementation.

#### A CLF to limit an increased demand for central bank funding

Under (a), the CLF would need to be calibrated in a way that banks have an incentive to use the CLF when they need liquidity for LCR purposes. It is important to note the distinction between actual liquidity which banks obtain through standard monetary policy operations and regulatory liquidity which is only used for the LCR. While the former can be used for regulatory purposes, regulatory liquidity as long as it refers to the undrawn commitment obtained under the CLF cannot be used for banks’ cash management. Hence, the CLF needs to be calibrated to incentivise banks’ use of the committed line without effectively drawing on the line. This can be achieved via the fees  $\alpha$  and  $\beta$ . In order to incentivise the use of the undrawn commitment, the fee  $\alpha$  could be set at or below the cost of central bank funding (for instance at the spread between the minimum bid rate and the deposit facility rate). Moreover, the calibration needs to avoid that the LCR is arbitrated via making use of a CLF commitment that is cheaper than acquiring HQLA. To achieve this objective, the pricing of  $\alpha$  would also need to satisfy the opportunity cost condition, i.e. that  $\alpha$  is at least as expensive as holding actual HQLA. This calibration would be in line with avoiding the central bank from being the lender of first resort. To restrain actual drawing of the CLF, the penalty rate  $\beta$  will need to be set sufficiently high. From an LCR perspective, the committed but undrawn CLF already counts as HQLA and therefore drawing on the CLF will not change the LCR. Drawing on the CLF would thus only occur for non-LCR reasons and hence it is not necessary for banks to draw the CLF for LCR purposes. This could be achieved for the euro area by setting  $\beta$  at least equal to the rate charged under the marginal lending facility.

Overall, such a calibration could deter an increased demand in central bank funding up to the CLF limit and, subsequently, a possible upward pressure on tender rates. This calibration could lead to results that are in line with the principle that the central bank should not be the lender of first resort.

While intuitively simple, the calibration also needs to consider a host of additional elements. Some of the elements are (i) whether the CLF is available at all times or only in stress times, (ii) determination of the limit to which the CLF is committed, (iii) inclusion of the CLF in HQLA and (iv) the calculation of the opportunity cost to price the commitment fee.

#### On the availability of the CLF

The question on the availability has been extensively debated by the TFL. While some members did not perceive a CLF as helpful to address the interactions between liquidity regulation and monetary policy, others argued that for a CLF to effectively contribute to deterring an increase in demand for central bank funding stemming from regulatory purposes, a CLF should be available at all times. In addition, some TFL members favoured a CLF that was available only during stressed times.

Arguments to make a CLF available at all times:

- a CLF if priced consistently across jurisdiction may contribute to achieving an international level playing field;
- may reduce stigma effects associated with central bank standing facilities;
- may reduce the incentive to pledge non-HQLA with the central bank;

Arguments to make a CLF available only during stressed times:

- a CLF during episodes of stress may limit hoarding of liquidity, fire sales of illiquid assets and the related negative consequences for the functioning of financial markets;
- is more in line with the LCR objective to incentivise self-insurance by banks during normal times;
- the provision of a CLF may encourage banks to actually use their pool of liquid assets during stressed times;

Arguments against making a CLF available at all:

- The irrevocable nature of a CLF is not compatible with the monetary policy framework of several jurisdictions. For instance, the Eurosystem retains the right and discretion to suspend, limit or exclude a bank's access to monetary policy instruments on the ground of prudence, or following an event of default;
- calibration of the CLF parameters is complex; given the range of monetary policy frameworks and structure of financial markets may lead to a more uneven level playing field;
- broader use of a CLF may not successfully address the interactions between liquidity regulation and monetary policy;
- may complicate the implementation of monetary policy;
- may exacerbate moral hazard by making central bank support explicit and even increase reliance on central bank funding;
- inclusion of a CLF in the LCR during normal times waters down the LCR standard;
- it is not clear why a CLF if used only during stressed times needs to be included in the LCR regulation, given that a central bank can set up any facility to act as a lender of last resort

The rationale for having a CLF in particular in stress times was also reflected in the discussions of the TFL under BCBS, which aimed at formalising a restricted-CLF which is available at all times but with a restrictive pricing during normal times.

#### On opportunity cost pricing

To ensure a level playing field between BCBS member countries it was agreed that the pricing of the CLF should be based on the opportunity cost of holding non-HQLA rather than HQLA. The notion behind this idea is that a bank using the CLF can hold (and pledge) non-HQLA collateral to obtain the committed liquidity facility. In order to maintain the level playing field between such a bank and a bank that holds HQLA, i.e. without recourse to the CLF, the commitment fee should equalise the spread difference between HQLA and non-HQLA. As observed during the financial crisis, spreads for a range of non-HQLA assets typically peak and can thus not serve as a benchmark for the calculation of opportunity costs. Hence, opportunity cost pricing should be based on normal periods. As a possible reference, a portfolio of non-HQLA but central bank eligible securities could be used to obtain a benchmark for the calculation of the spread. However, given the difference in central banks' collateral frameworks basing a reference portfolio on non-HQLA but central bank eligible assets will potentially lead to an uneven level playing field. It should also be noted that the pricing of the CLF will also need to be consistent with the implementation of monetary policy which may at times not allow pricing the CLF on the basis of opportunity cost.

#### The limit of the CLF

With regard to the limit of the CLF, most TFL members favoured a tight limit on the CLF with some suggesting 5% of HQLA during stressed times. One specific proposal to take into account the proportional reliance of the central bank, suggested calculating the limit on the basis of the structural liquidity deficit. Thus, the limit would be defined as follows:

$$\text{Limit} = x * (\text{liquidity deficit of the banking system vis-à-vis the central bank}) * (\text{bank's total assets}) / (\text{total assets of the banking system in the monetary area})$$

Calibration of the proposal

The proposal requires defining and/or obtaining data on:

- The liquidity deficit,
- Bank's total assets,
- Total assets of the banking system,
- The value of the parameter "x".

The concept of repo liquidity deficit (RLD) is defined as the net need of the banking system (in a given jurisdiction) for central bank refinancing in the form of repo operations. It is largely determined by factors beyond the control of both the central bank and the commercial banks ("autonomous factors"), although it is reflected on the central bank's balance sheet<sup>77</sup>. The repo liquidity deficit equates the required net provision of central bank funding for the banking system to face balanced liquidity conditions. In the case of the euro area this is defined as the daily average (over a one-month period for instance) of net liquidity needs of the banking system:

$$RLD = NetAF + RR - SHMPP$$

Where NetAF are net autonomous factors, RR are reserve requirements and SHMPP are securities held for monetary policy purposes. For the Eurosystem, NetAF are the sum of liquidity-providing and liquidity-absorbing factors. On the liquidity-absorbing side, these are banknotes in circulation and deposits placed with central banks by government entities, while on the liquidity-providing side there are assets denominated in euro not related to monetary policy (i.e. investment) and net foreign assets.

The figure should be computed and provided by the central bank to the relevant banking supervisory authority. Such a figure is in any event regularly computed by the central bank when calibrating its supply of liquidity to its banking system. While the RLD may vary on a daily basis<sup>78</sup>, it is fairly stable in the case of the Eurosystem over a reserve maintenance period (ca. a month period). In economies where it varies at higher frequencies, e.g. because of seasonal effects, averages could be taken over longer periods of time, e.g. over yearly periods, and such longer period averages could thus be used in all jurisdictions if preferred. In stressed times, the RLD may display a somewhat higher level than in normal times owing to various possible factors, as witnessed in the current financial crisis.

The bank's total assets (BTA) would be derived from the bank's balance sheet, which the relevant banking supervisory authority would have access to.

Total assets of the banking system (TABS) would be derived from balance sheet figures of banks in a given banking system and could be computed by the banking supervisory authority.

The parameter "x" should be equal to 1 in order to take into account that, on an aggregate basis, the banks in a structural liquidity deficit environment have to rely more on central bank funding by the exact amount of the liquidity deficit, compared to banks in an environment without liquidity deficit. It should be noted that, under normal circumstances, individual banks do not have a uniform and constant recourse to central bank funding over time, in particular because some banks are, in view of their business models and ways of operating, more cash rich than others.

<sup>77</sup> See also section on 'central bank as liquidity providers to banks' in Bindseil/Lamoot (2011).

<sup>78</sup> Variations in net liquidity needs are mainly driven by variations in autonomous factors as minimum reserve requirements are expected to remain unchanged over a reserve maintenance period.

Linking the amount of additionally usable non-HQLA to the total assets of a bank in relation to the total assets of its banking system may not be optimal, but could be a transparent and straightforward solution. A further refinement, more complex but possibly more realistic, could also take into account intra-banking system flows of liquidity, for example as observable via Target2 in the euro area.

To sum up, there has been an intensive debate on the usefulness of the CLF in the BCBS's taskforce on the interaction between the LCR and monetary policy. The views among the members are mixed, particularly with regard to the question when a CLF should be available, i.e. at all times, only stressed times or not at all. Given the complexities of calibrating a CLF that addresses the unintended consequences of liquidity regulation on monetary policy without leading to an uneven playing field, other avenues should also be explored. These could include a reduction in the roll-over rates for central bank funding on the regulatory side but may also deserve considerations from the perspective of monetary policy operations.

### 8.3. Conclusions

The published and unpublished positions expressed by the central banking community at the global level, the literature, and the LCR data analysis in chapter 6 yield the following implications for the recalibration of the LCR:

First, the working group of the BCBS on the interaction between the LCR and monetary policy (BIS 2012) agreed on six recommendations to the BCBS: (i) ensure usability of the buffer under stress; (ii) develop international minimum LCR disclosure standards; (iii) strengthen monitoring metrics and include capacity to borrow from central banks; (iv) these should also include central bank collateral; (v) require banks' Contingency Funding Plans to contain the preparedness to borrow from the central bank under its standard liquidity management operations/facilities; (vi) remove ambiguity regarding minimum reserve requirements.

Second, the analysis suggests that the treatment of central bank exposure should be consistent across the components of the LCR – net cash-outflows (i.e. repos with the central bank) and HQLAs (i.e. minimum reserves and excess reserves). Eurosystem eligible collateral is broader than HQLAs, so that the treatment of central bank reserves and the run-off factor of central bank repos can have a substantial impact on banks' LCR. If banks face a minimum reserve requirement at the central bank and post non-tradable assets as collateral, a 100% run-off factor implies a cash outflow that is not counterbalanced by a respective securities inflow. In its recommendation, 6 BIS (2012, p. 8) clarifies that minimum required reserves are only HQLA "... to the extent that the central bank policies allow them to be drawn down in time of stress." Minimum reserves solely motivated by monetary policy considerations are exogenous to the banking sector; it should neither feature in HQLA nor as an outflow in the outflow section.

#### *Consistent treatment of central bank operations in cash-outflows and HQLA and consistent treatment of central bank repos and other repos*

Within the international community of central banks there is broad agreement that preferential treatment of central bank repos provide incentives for banks to arbitrage the LCR via central bank operations. Thus, the following improvement of the calibration of the LCR should be thoroughly analysed: operations with the central bank up to the bank's minimum reserve requirements should receive a 0% run-off in cash outflows. Operations with the central bank exceeding the minimum reserve requirement should be treated like all other collateralised operations with other market participants based on the underlying collateral; 0% run-off for repos in Level 1 assets, 15% for repos in Level 2 assets, 50% run-off factor for Level 2B assets and 100% for non-HQLA. This calibration is in compliance with the BIII GHOS 2013 calibration (which defines a minimum standard and thus provides national legislators with the option to adjust run-off rates between 0% and 100% for necessary transactions for monetary policy implementation and opportunistic transactions for regulatory arbitrage). It reduces incentives for LCR arbitrage via central bank facilities. It also ensures a level

playing field between banks operating in jurisdictions with high minimum reserve requirements vis-à-vis those operating in countries without (or low) minimum reserve requirements. The US Fed, the OCC, and FDIC propose a run-off rate for all central bank repos that is equal to that for repos with other market participants. Nevertheless, its applications might face technical challenges due to collateral pooling in many Eurosystem countries and needs to be investigated thoroughly. It would have to be assessed how different run-offs for central bank funding would interplay with the current central bank haircuts at EU central banks, and in some cases also valuation markdowns, applied to collateral posted in monetary policy operations. Moreover, the impact on EU banks' LCR levels will be studied, especially for banks with significant reliance on central bank funding.

However, revisions of the LCR (BCBS 2013a) increase the inconsistency of treatment of central bank exposure even further and incentivise regulatory arbitrage of liquidity regulation via central bank operations.

Third, the treatment of exposure to central bank in cash-inflows should be treated consistently with cash-outflows and with HQLA. In particular, term deposits at the central bank should be treated as inflows at maturity; they should not be treated as loans (with positive roll-over rates). The latter aims at avoiding a credit crunch for the real economy; this does not apply to term deposits at central banks.

*The extension of committed central bank facilities to all jurisdictions could be consistent with the objectives of the LCR, but their design is very challenging in detail and might not be consistent with monetary frameworks.* Fourth, the BCBS TFL is currently investigating the option to extend the alternative liquid asset regime to all countries (beyond jurisdictions with insufficient liquid assets) with respect to the eligibility of committed central bank lines as HQLA. There has been an intensive debate on the usefulness of the CLF in the BCBS's taskforce on the interaction between the LCR and monetary policy. The views among the members are mixed, particularly with regard to the matter of when a CLF should be available, i.e. at all times, only stressed times or not at all. For liquidity regulation to achieve the internalisation of externalities these lines have to be priced. The price has to be set at the level of opportunity costs of holding HQLA in order not to incentivise banks to reduce their HQLA and to avoid the public from bearing banks' excessive liquidity risk. The fee has to take into account that banks have to hold eligible collateral to access the committed line. The discussions at the BCBS TFL and the EBA found that pinning down the details of such lines is challenging and that they are likely to be inconsistent with central banks' policies (counterparties, risk, collateral): e.g. it is unlikely that central banks can unconditionally commit to disburse liquidity even if the solvency of the institution is put in question; yet, it is notoriously difficult to establish the solvency of a stressed bank beyond reasonable doubt under time pressure (Stein 2013). Also, such lines could have implications on central banks' collateral management and policies. Similarly to the treatment of other components of the liquidity buffer banks would be allowed to draw the liquidity line under Article 414 of the CRR (i.e. notification of competent authorities and submission of compliance restoration plan). Should there be consensus on such measures, their detailed features would need to be designed carefully to avoid banks' balance sheets being funded increasingly via central banks. Given the complexities of calibrating a CLF that addresses the unintended consequences of liquidity regulation on monetary policy without leading to an uneven level playing field other avenues should also be explored as a priority.

Bearing these deliberations in mind the current status (as of 1 October 2013) of the development at international level is the following:

In January 2013 the BCBS set up a dedicated Task Force (TFL) to study the role of **central bank committed liquidity facilities (CLFs)** in the LCR. It focuses on (i) potential changes to disclosure recommendations of non-HQLA but central bank eligible assets, (ii) the expansion of the eligibility of central bank committed liquidity facilities from jurisdictions with insufficient liquid assets to all jurisdictions, and (iii) the concrete implementation of such a recalibration of the LCR, if deemed appropriate. **The discussion at the BCBS TFL found that the operationalisation of CLF involves a large number of complex choices. In particular, the TFL studied how the appropriate**

**operational details, i.e. fees and collateral haircuts, should be set and where in the HQLA such facilities should be recognised.** It was pointed out that the characteristics should be set in such a way that avoids undue reliance on central bank liquidity funding of banks' balance sheets (e.g. due to the 0% run-off rate of central bank funding). **Views among the TFL members were mixed and none of the proposals for change received majority support.** Views differ particularly with regard to the matter of when a CLF should be available i.e. at all times, only stressed times or not at all. The first preliminary recommendations based on a compromise proposal of the TFL co-Chairs were presented to the BCBS in June 2013. The Committee agreed to work further on the proposed R-CLF by the co-Chairs and to work out the terms of the R-CLF. At the September 2013 meeting, a number of BCBS members supported or did not oppose the inclusion of a RCLF into the LCR framework as an optional tool. The RCLF proposal will be reviewed again by the BCBS with the aim of finalising it at the end of 2013 and will be subsequently submitted to GHoS in January 2014. With regard to the terms of the CLF, the current proposal foresees:

- a low/moderate price for the commitment fee, which must be the greater of 50 basis points, or the difference in yields on the assets used to secure the RCLF (normally non-HQLA) and the yield on a representative portfolio of HQLA (as set out in Article 5(5) to (7) of the draft RTS on derogations in accordance with Article 419(5) of the CRR and in Section 3.4 above);
- that the drawing fee, the type of collateral and haircuts will be determined by national authorities;
- that the limit will be provided by treating the committed liquidity obtained under the RCLF as Level 2B assets (which can be a maximum of 15% of the total HQLA, within a 40% cap on Level 2 assets).

## Technical Appendix 9: The definition of established operational relationship, of retail deposits in point (2) of Article 411, in particular the appropriateness of introducing a threshold on deposits of natural persons

### 9.1. The definition of established operational relationship for non-financial customer as referred to in Article 422(3)(c) of the CRR

In the CRR text, deposits are defined as operational when they are held to obtain clearing, custody or cash management or other comparable services from the institution. There is also a second “layer” of operational deposits, which is established operational relationship other than that mentioned above.

To ensure a common approach across all European banks it is necessary to have an accurate definition of established operational relationship. It is important that the definition is not subjective, which may cause misinterpretations by banks and lead to misrepresentation in the banks' LCR values.

For non-financial depositors which are defined as having an established operational relationship with the bank it is expected that it is less likely that these customers will withdraw the deposits when the LCR stress scenario unfolds. Hence one assumes no more than a 25% out-flow on these deposits.

#### Operational deposits in the CRR

Article 422(3) of the CRR states that institutions should multiply liabilities resulting from deposits that have to be maintained:

(a) by the depositor in order to obtain clearing, custody or cash management or other comparable services from the institution;

(c) by the depositor in the context of an established operational relationship other than that mentioned in point (a);

by 5% in the case of point (a) to the extent to which they are covered by a Deposit Guarantee Scheme in accordance with Directive 94/19/EC or an equivalent deposit guarantee scheme in a third country and by 25% otherwise.

It is also acknowledged that clearing, custody or cash management or other comparable services covers only such services to the extent that they are rendered in the context of an established relationship on which the depositor has substantial dependency. They should not merely consist in correspondent banking or prime brokerage services and the institution should have evidence that the client is unable to withdraw amounts legally due over a 30-day horizon without compromising its operational functioning.

#### Operational deposits in Basel III

In Basel III operational deposits are defined as deposits generated by clearing, custody and cash management activities. Furthermore it is stated that these are activities that lead financial and non-financial customers to place, or leave, deposits with a bank in order to facilitate their access and ability to use payment and settlement systems and otherwise make payments. The customer must have a substantive dependency with the bank and the deposit is required for such activities.

To qualify as operational deposits, the deposits must be by-products of the underlying services provided by the banking organisation and not sought out in the wholesale market in the sole interest of offering interest income. And the deposits must be held in specifically designated accounts and priced

without giving an economic incentive to the customer (not limited to paying market interest rates) to leave any excess funds on these accounts.

### Differences between the CRR and Basel III

Operational deposits in Basel III are defined only as deposits generated by clearing, custody and cash management activities, which is the same as in Article 422(3)(a) of the CRR. However, in Basel III these types of deposit are more explicitly defined and the types of activities that may generate operational deposits are described. In Basel III there is no broader definition on the established operational relationship, comparable to Article 422(3)(c) of the CRR.

### Survey evidence

Liquidatum (2012) conducted a survey in August 2012 to obtain a wider understanding of the issue on the definition of operational deposits as defined in Basel III, because some banks have felt that the definition is sufficiently subjective to cause misrepresentation in banks' LCR values. The survey was completed by 13 banks from various jurisdictions.

Only two of the banks in the survey were confident that the definition is sufficiently specific to ensure a common approach across banks in defining operational deposits.

In the 2013 calibration of Basel III there has been some clarification on the definition of operational relationship. This relates only to deposits generated by clearing, custody and cash management activities.

The banks in the survey suggested different improvements to the definition of operational relationship; these are some of the suggested criteria:

- Transaction/volume based assessment
- Scorecard matrix
- Correspondent banking
- Define specific products

The criteria below are used to a different degree (only two banks use all three criteria) by the banks to define operational deposits:

- Substantive dependency
- Exclude excess funds
- Exclude price sensitive deposits

In the survey, 12 of the banks define operational dependency by qualitative criteria, taking into account the services the depositors consume. While seven of the banks define operational dependency by type of account, they mainly use current accounts. Eight of the banks intend to use a scoring system for the services the depositors use to recognise the customers that have dependency.

### Criteria for defining established operational relationship

The EBA suggests the following definition of established operational relationship: To be defined as an established operational relationship there must be evidence that the client is unable to withdraw amounts legally due over a 30 day horizon without compromising their operational functioning. And the depositor must have a substantial dependency to the bank. This applies for deposits generated for clearing, custody or cash management or other comparable services, and for other types of

operational deposits. Furthermore, in order to qualify as operational deposits it should be the same criteria as in Basel III that requires the deposits to be by-products of the underlying services provided by the banking organisation and not sought out in the wholesale market in the sole interest of offering interest income. And that the deposits must be held in specifically designated accounts and priced without giving an economic incentive to the customer to leave any excess funds on these accounts. As such, the operational balance can be expected to be relatively stable over time and insensitive to changes of the rate of interest offered by the bank relative to the broader market.

The following criteria could be used to identify which deposits can qualify as deposits with an established operational relationship in accordance to Article 422(3)(c) other than those generated for clearing, custody or cash management:

- The relationship with the client has persisted for at least 24 months.
- The deposits are highly liquid, i.e. only current/transaction accounts can be included. Time deposits, savings deposits, brokered deposits are excluded.
- The bank should present evidence to the NSA upon request that the deposit is vital for the client's operations, i.e. the client has a substantive dependency with the bank and the deposit is required for its activities.
- The client is unable to withdraw amounts legally due over a 30-day horizon, without compromising its operational functioning. Evidence should be presented at any time upon request of the NSA based on data spanning at least 24 months.
- Only the deposit base is treated as operational balance. It is defined as the balance necessary to make use of the service of which the deposit is a by-product. Excess funds are treated as non-operational. Non-operational balances are considered all balances in excess of the average 5 day rolling cumulative net-cash outflow over the preceding 90days.
- The deposit is held in specifically designated accounts and priced without giving an economic incentive to the customer to leave any excess funds on these accounts.
- These services include: Direct or indirect access to national and international payment services, security trading/depository services.

Further, as a filter criteria banks should exclude the following deposits:

- Deposits that are collected on the wholesale market in the sole interest of offering interest income, i.e. the deposit formally is a by-product of another service, but the service is hardly used. The deposits pay interest rates that are at least 5 bp below the prevailing rate for wholesale deposits with comparable characteristics (maturity and other deposit contract features).
- Price sensitive deposits, i.e. deposit balances that display significant co-movements with interest rates are excluded.
- Deposits when a significant portion of the deposits are provided by a small proportion of customers (i.e. concentration risk).
- All balances in excess of the average 5-day rolling cumulative net-cash outflow over the preceding 90 days are considered non-operational.
- the deposit is formally a by-product of another service, but the service is hardly used. The deposits pay interest rates that are at least 5 bps below the prevailing rate for wholesale deposits with comparable characteristics (maturity and other deposit contract features).

-

## 9.2. Definition of retail deposit in Article 411(2) of the CRR, in particular the appropriateness of introducing a threshold on deposits of natural persons

Retail deposits are defined in Article 411(2) of the CRR as a liability to a natural person or to an SME, where the natural person or the SME would qualify for the retail exposure class under the Standardised or IRB approaches for credit risk, or a liability to a company which is eligible for the treatment set out in Article 153(4) and where the aggregate deposits by all such enterprises on a group basis do not exceed EUR 1 million.

Article 411(2) of the CRR, therefore, give a threshold on high value deposits of SMEs on EUR 1 million on an aggregate level/group basis, but not including natural persons. These high value deposits are then subject to a higher outflow rate than regular retail deposits, which have either an outflow rate of 5 % or 10%.

Article 422(5) defines the outflow rates for other types of deposits, and is most likely to set the outflow rate for high value deposits of SMEs that exceed EUR 1 million. The outflow rate for high value deposits will then be 40%, and the amount that is covered by a DGS will have an outflow rate of 20%. The outflow rate on this category was previously 75%, it was lowered in the Basel III 2013 calibration, and therefore in the CRR.

Certain types of deposits are considered more likely to be withdrawn in a combined idiosyncratic and market-wide stress scenario, including high value deposits that may be more sensitive in a stress scenario than regular retail deposits. High value deposits are more often managed by sophisticated clients and are generally not placed for transactional purposes, but based on investment criteria. In addition, high value deposits contribute to the concentration of the deposit base in institutions and over-reliance on such deposits can compromise the stability of the deposit base.

Under Article 421(3) of the CRR, taking into account the behaviour of local depositors as advised by competent authorities, EBA is required to issue guidelines by 1 January 2014 on the criteria to determine the conditions of application of paragraphs 1 and 2 of Article 421 in relation to the identification of retail deposits subject to different outflows and the definitions of those products for purposes of liquidity reporting.

To address the mandate outlined in Article 421(3) of the CRR, EBA surveyed national competent authorities regarding the behaviour of local depositors, in particular during stress periods. Regarding institutions' experience of retail depositors' behaviour during stress events, EBA's analysis found that most institutions experienced increased outflows during periods of stress, ranging from a low to a moderate level of retail deposit withdrawals.

EBA issued a consultation paper in August 2013 where it was asked about characteristics of high value deposits. Several of the responses highlighted that high value deposits are very much linked to the degree of sophistication of customers such that the higher the value of a deposit the more likely it is to be professionally managed. Some responses considered that retail deposits over EUR 1 million should be defined as high value deposits.

Some respondents also stated that these types of sophisticated depositors tend to have a strong relationship with the bank and questioned whether high value deposits can explain expected higher outflow rates, arguing lack of practical evidence and correlation between them.

For the identification of retail deposits subject to higher outflows a set of risk factors is established in the GL. These risk factors are derived from the feedback of the EBA's survey of competent supervisors. The prominent characteristics displayed by retail deposits that can lead to higher outflows include factors such as volatility, volume of the deposit, relationship with the customer, distribution channel, currency of the deposit and yield.

According to the guidelines institutions should consider as high value deposits those which fulfil all the following requirements:

(a) they exceed the lower of one of the following two amounts:

- (i) EUR 100 000 or
- (ii) the local deposit guarantee scheme amount

(b) they are lower than EUR 500 000.

Institutions should consider as very high value deposits those of at least EUR 500 000.

High value deposits as an explanatory factor stem from the Survey to Competent Authorities concerning, inter alia, observations on retail deposit outflows in times of stress during the recent crisis.

To conclude, high value depositors of both natural persons and SMEs are deemed more responsive to market-wide and idiosyncratic stress than regular retail depositors and should therefore be subject to higher outflow rates. Therefore the EBA guidelines on retail deposits subject to different outflow rates should be taken into consideration in the delegated act.

Under the guidelines, institutions should consider as high value deposits those which fulfil all the following requirements:

000 or(b) they are lower than EUR 500 000.

Institutions should consider as very high value deposits those of at least EUR 500 000. Therefore, the EBA guidelines on retail deposits subject to different outflow rates should be taken into consideration in the delegated act.

### 9.3. The need to introduce a new retail deposit category with a lower outflow rate (Article 411 of the CRR)

Point (g) of Article 509 of the CRR requires the EBA to assess the case for introducing a new category of retail deposits against the backdrop of (i) specific characteristics of such deposits that could justify a lower outflow rate and (ii) taking into account international developments. The following paragraphs develop criteria that could justify such specific treatment and subsequently evaluates them against the background of regulatory developments and trends in Deposit Guarantee Schemes (DGS).

#### Specific characteristics that could justify a lower outflow rate

It is the EBA's understanding that the mandate in point (g) of Article 509 (2) mirrors the reduction of the outflow rate for certain types of insured retail deposits from 5% to 3% agreed by the GHOS in January 2013. As the emphasis is on the insurance aspect, EBA's analysis will focus exclusively on that aspect and particularly on conditions for DGS.

The introduction of explicit deposit guarantees aims at reducing the risk of bank runs in times of crisis. Most recently, this could be observed in quick-fix amendments to existing schemes, notably the increase of coverage levels, by governments when the financial crisis hit in 2008. One of the few available empirical studies of the effect of deposits insurance and deposit flows is provided by Karas, Pyle and Schoors. They apply a difference-to-difference estimator to identify the effect of deposit insurance on depositors' behaviour on a data set from Russia where deposit insurance was introduced in the middle of the period covered by the study. Furthermore, insurance was only introduced for households, but not firms, which enables the authors to distinguish between a 'treated' (i.e. covered by insurance) and a 'non-treated' group, as well as between pre- and post 'treatment' periods. Depositors' behavior is observed in terms of quantities (i.e. withdrawals) and prices (i.e. depositors demanding an interest-rate premium from perceived to be riskier than others ). The study finds evidence that deposit insurance diminishes depositors' sensitivity to bank risk, including in times of financial crisis. Translating this into the Basel III framework, this could point at reduced outflow rates for insured deposits.

However, the study does not provide insights into particular criteria for DGS that determine depositors' behaviour. In 2010, the EU Commission proposed a legislative package to enhance deposit guarantee protection in order to increase confidence in financial services. In its impact assessment, the EU Commission analyses a number of options for the design of a DGS. The following specifications are deemed to be most suitable in order to enhance depositor confidence and, in turn, lead to potentially reduced volatility of the deposit base:

- Fixed level of protection of Euro 100 000,
- Precisely defined coverage,

- Reducing the payout deadline to seven days,
- Schemes would have to build up a fund over time for repayments,
- Ex-ante as well as ex-post contributions by banks,
- Contributions include risk-based elements.
- No setting-off of depositors liabilities against their claims.

Negotiations on this legislative package are still on-going. The existing heterogeneous framework of some 40 different schemes existing in Member States can, however, not be regarded as matching the above specifications.

### International developments

The Basel Committee included in its rules on the LCR a specific category of retail deposits which could receive a run-off rate of 3% (instead of 5% or 10%, respectively). One other criteria is that these deposits need to be insured by an effective DGS. The BCBS requires the following criteria to be met by an effective DGS:

- Ability to make prompt payouts (without a specification of 'prompt'),
- Clearly defined coverage,
- High public awareness,
- Formal legal powers of the deposit insurer to fulfill its mandate and operational independence,
- Periodic collection of levies on banks (pre-funding element),
- Adequate means of ensuring ready access to additional funding.

These features are also reflected in the 18 core principles for effective DGS developed jointly by the International Association of Deposit Insurers and the Basel Committee of 2010.

The EBA does not regard the existence of current deposit insurance on its own as sufficient to allow for a reduced 3% outflow rate for covered deposits. However, the above six criteria should be met as a minimum in order for such a reduction to be considered.

To this end, EBA welcomes particularly the legislative initiative taken by the EU Commission to enhance and harmonise European DGS. It should be noted that, since the proposal has not yet been adopted, the collection of funds in Europe has not yet started in a comparable fashion and existing DGS differ significantly in that respect in particular.

In conclusion, the EBA agrees on the merits of a specific outflow category for deposits insured by an effective DGS, but does not see the need to introduce a reduced outflow category for retail deposits before the adoption of the legislative package on DGS, which would move EU DGS into the direction of becoming effective, as required by the BCBS. The distribution of stable deposits across banks and/or countries will be analysed based on 2012 q4 data for the next version of this report to be presented to SCRePol in November.

# Technical Appendix 10: Mechanisms for the grandfathering of government guaranteed bonds issued to credit institutions as part of Government support measures with EU state aid approval

In drafting the CRR Article 509(1) report for the Commission, the EBA are tasked with assessing, amongst other specifications, the following:

*(m) mechanisms for the grandfathering of government guaranteed bonds issued to credit institutions as part of Government support measures with EU state aid approval, such as bonds issued by the National Asset Management Agency (NAMA) in Ireland and by the Spanish Asset Management Company in Spain, designed to remove problem assets from the balance sheets of credit institutions, as assets of extremely high liquidity and credit quality until at least December 2023.*

The purpose of this issues note is to provide some background information on these bonds and to outline the grandfathering mechanism deemed necessary to be included in the Article 509(1) Impact Assessment report for the Commission.

## 1. Recitals

Recitals 107 to 109 of the Capital Requirements Regulation contain further detail on these bonds and give direction to the Commission to permit institutions, when calculating the liquidity requirements in accordance with Part Six of the CRR, to treat these bonds as assets of extremely high liquidity and credit quality until their contractual maturity:

*(107) Bonds issued by the National Asset Management Agency (NAMA) in Ireland are of particular importance to the Irish banking recovery and their issue has been granted prior approval by the Member States, and approved as a State aid by the Commission as a support measure introduced to remove impaired assets from the balance sheets of certain credit institutions. The issuance of such bonds, a transitional measure supported by the Commission and the ECB, is an integral part in the restructuring of the Irish banking system. Such bonds are guaranteed by the Irish government and are eligible collateral with monetary authorities. The Commission should address specific grandfathering mechanisms of transferable assets issued or guaranteed by entities with Union State aid approval, as part of the delegated act which it adopts pursuant to this Regulation to specify the liquidity coverage requirement. In that regard the Commission should take into account the fact that institutions calculating the liquidity coverage requirements in accordance with this Regulation should be permitted to include NAMA senior bonds as assets of extremely high liquidity and credit quality until December 2019.*

*(108) Similarly, the bonds issued by the Spanish Asset Management Company are of particular importance to the Spanish banking recovery and are a transitional measure supported by*

*the Commission and the ECB, as an integral part in the restructuring of the Spanish banking system. Since their issuance is provided for in the Memorandum of Understanding on Financial Sector Policy Conditionality signed by the Commission and the Spanish Authorities on 23 July 2012, and the transfer of assets requires approval by the Commission as a State aid measure introduced to remove impaired assets from the balance sheets of certain credit institutions, and to the extent they are guaranteed by the Spanish government and are eligible collateral with monetary authorities. The Commission should address specific grandfathering mechanisms of transferable assets issued or guaranteed by entities with Union State aid approval as part of the delegated act which it adopts pursuant to this Regulation to specify the liquidity coverage requirement. In that regard the Commission should take into account the fact that institutions calculating the liquidity coverage requirements in accordance with this Regulation should be permitted to include Spanish Asset Management Company senior bonds as assets of extremely high liquidity and credit quality until at least December 2023.*

(109) *On the basis of the reports which EBA is required to submit and when preparing the proposal for a delegated act on liquidity requirements, the Commission should also consider if senior bonds issued by legal entities similar to NAMA in Ireland or the Spanish Asset Management Company, established for the same purpose and of particular importance for bank recovery in any other Member State, should be granted such treatment, to the extent they are guaranteed by the central government of the relevant Member State and are eligible collateral with monetary authorities.*

## 2. Background

### **NAMA**

The National Asset Management Agency (NAMA) is an asset management company established by the Irish Government in November 2009 as a key part of the solution to the banking, property and economic problems. Its primary purpose has been to acquire loans from participating credit institutions of systemic importance to the Irish economy<sup>79</sup> with the objective of repairing their balance sheets and improving the availability of credit. Loans with a total nominal value of approximately EUR 74 billion have been transferred to NAMA by the participating institutions. NAMA paid EUR 32 billion to participating institutions for these loans by issuing Government-guaranteed bonds<sup>80</sup>. These bonds provide valuable liquidity to these institutions and are either placed with the ECB as eligible collateral or retained on balance sheet. The Common Eurosystem Pricing Hub (CEPH) calculates a theoretical value for these bonds for the purpose of pledging them in open market operations<sup>81</sup>. A valuation haircut of 1.5% is currently applied to these bonds when pledged as collateral with the Central Bank for Eurosystem refinancing operations. The three banks holding NAMA bonds currently have EUR 25.4 billion of NAMA bonds on their balance sheets. These banks have total assets of EUR 282 billion. Total assets of all Irish resident credit institutions is EUR 786 billion.<sup>82</sup>

---

<sup>79</sup> Due to restructuring in the Irish banking sector, three institutions hold the NAMA bonds (AIB, Bank of Ireland and permanent tsb).

<sup>80</sup> 95% is Senior Debt, 5% is Subordinated Debt.

<sup>81</sup> The CEPH valuation in August 2013 was 99.97873

<sup>82</sup> Central Bank of Ireland Statistics 30/06/2013

The NAMA balance sheet is to be fully run off and all Senior bonds in issuance to be fully repaid by the end of 2019. NAMA is currently on target to achieve its Senior Bond redemption target of EUR 7.5 billion (25% of original issuance) by the end of 2013<sup>83</sup>. The estimated debt reduction target is as follows:

<b>NAMA Senior Bonds</b>		
<b>Estimated Debt Reduction Targets</b>		
	<b>% Debt Reduction</b>	<b>Nominal Outstanding</b>
Original Issuance:		EUR 30 bn
31 Dec 13	25%	EUR 23 bn
31 Dec 15	40%	EUR 18 bn
31 Dec 17	80%	EUR 6 bn
31 Dec 18	95%	EUR 2 bn
31 Dec 19	100%	EUR 0 bn
Source: NAMA Business Plan		

**SAREB**

Asset Management Company for Assets Arising from Bank Restructuring is a company responsible for managing assets transferred by four nationalised Spanish financial institutions and by financial institutions which in the judgment of the [Bank of Spain](#) require restructuring or winding up in accordance with Spanish Law 9/2012<sup>84</sup>. It was established in 2012 to acquire property development loans from these banks in return for government guaranteed bonds, primarily with a view to improving the availability of credit in the economy. This for-profit company has been designed in such a way that the transfer of problematic real-estate-related assets by banks is made on the basis of prudent valuations, in order to ensure the profitability of the company over its maximum 15-year lifetime. The volume of assets transferred to SAREB – taking into account only the portion corresponding to Group 1 and Group 2 banks – is EUR 51 billion. Under no circumstances, as stipulated by Royal Decree, will the volume of assets transferred exceed EUR 90 billion. A valuation haircut of 1.5% is currently applied to these bonds when pledged as collateral with the Banco de España for Eurosystem refinancing operations<sup>85</sup>. The eight institutions holding SAREB bonds currently have EUR 51 billion of these bonds on their balance sheets. These banks have total assets of EUR 864 billion. Total assets of all Spanish resident credit institutions is EUR 3.705 billion.

<sup>83</sup> Source – NAMA 2012 Annual Report published 30 May 2013. [Link to NAMA report](#)

<sup>84</sup> Eight Spanish institutions hold SAREB bonds - BFA-Bankia, Catalunya Caixa, NCG Banco-Banco Gallego, Banco de Valencia, BMN, Liberbank, Caja3, Ceiss.

<sup>85</sup> As at 27/8/13, the six SAREB bonds used as collateral in the Eurosystem have a valuation range of between 98.02 and 99.29 once haircuts are applied.

The SAREB balance sheet is to be fully run off and all Senior Bonds in issuance to be fully repaid by the end of 2027. SAREB has set, in its business plan, a senior redemption target of EUR 25.3billion (50% of original Issuance) by the end of 2017. The estimated debt reduction target is as follows:

<b>SAREB Senior Bonds</b>		
<b>Estimated Debt Reduction Targets</b>		
	<b>% Debt Reduction</b>	<b>Nominal Outstanding</b>
Original Issuance:		€51 bn
31 Dec 17	50%	€25 bn
31 Dec 22	80%	€10 bn
31 Dec 27	100%	€0 bn
Source: SAREB Business Plan		

**Other legal entities**

Other Member States may, as part of their restructuring programmes, establish legal entities similar to NAMA in Ireland or the Spanish Asset Management Company. These entities were not established by the time political agreement was reached on CRR/CRDIV but it was agreed to include a provision to cover the possibility of their establishment.

**3. Grandfathering mechanisms**

CRR recitals 107 - 109 recommend that the Commission address specific grandfathering mechanisms for government guaranteed bonds issued to credit institutions as part of Government support measures with EU state aid approval, such as bonds issued by the National Asset Management Agency (NAMA) in Ireland and by the Spanish Asset Management Company in Spain. The EBA are to assess these mechanisms in the report to be submitted to the Commission under Article 509(1) of the CRR by 1 January 2014.

**3.1** To address the grandfathering mechanisms outlined in Article 509(2)(m) and Recitals 107 – 109 of the CRR, the following is proposed:

As these instruments are:

- I. transitional measures,
- II. supported by the Commission and the ECB,
- III. approved as state aid measures,
- IV. guaranteed by the respective Member State(s), and
- V. eligible collateral with monetary authorities,

the following grandfathering mechanism should apply:

- a) Senior bonds issued by the National Asset Management Agency (NAMA) in Ireland, by the Spanish Asset Management Company (SAREB) in Spain and by other legal entities, similar to NAMA or SAREB, subject to meeting the above criteria, should be grandfathered as assets of extremely high liquidity and credit quality until the bonds are fully repaid in accordance with the relevant legal entities redemption plan.

The value of these bonds to be reported as liquid assets should be subject to an appropriate haircut, to reflect the haircut assigned to the securities as collateral in liquidity operations of ESCB central banks.

## Technical Appendix 11: Definition of Shari'ah-compliant financial products as an alternative to assets that would qualify as liquid assets for the purposes of Article 416, for the use of Shari'ah-compliant banks

Article 509 of the CRR requires EBA to include in its report an assessment of 'the definition of Shari'ah-compliant financial products as an alternative to assets that would qualify as liquid assets for the purposes of Article 416, for the use of Shari'ah-compliant banks.

This report considers what Shari'ah compliant financial products may be available and whether these are likely to meet the liquid asset requirements set out in the CRR (Articles 416-418). A number of the provisions set out in the articles are likely to prevent Shari'ah-compliant assets from being considered eligible and therefore prevent Shari'ah compliant banks from complying with the liquidity coverage requirement. We set out a proposed definition of the Shari'ah compliant products that may qualify as liquid assets for use of Shari'ah compliant banks only, along with proposed haircuts and caps on the proportion of buffer represented.

The key difference from a prudential regulation point of view between a Shari'ah compliant bank and a conventional bank is that the Shari'ah compliant bank may not hold interest bearing assets. This means that Shari'ah compliant banks cannot rely on assets conventionally considered liquid to mitigate its liquidity risks or to meet the liquidity coverage requirement.

Whilst there are relatively few EU regulated banks (6) whose entire operations are Shari'ah compliant the sector is growing and with this in mind we have provided a definition of assets that will support an increased population of Shari'ah-compliant banks in the future.

### What is a Shari'ah-compliant bank?

Islamic banking is a mode of finance consistent with the high level principles of Shari'ah, or Islamic law. A key tenet of this is that money itself has no intrinsic value, it is merely a medium of exchange. It is not permissible to lend money at interest, and debt can only be bought and sold at par. The emphasis in Islamic finance is instead on partnership and profit/loss sharing arrangements, whilst avoiding trade and investment in what are considered to be socially detrimental activities (gambling, alcohol, tobacco, etc.).

We propose the following definition for a Shari'ah-compliant bank: a bank whose entire operations are structured in accordance with Islamic commercial jurisprudence and its investment principles.

### Liquidity risk in Islamic banks

Islamic banks generally face the same liquidity risks as conventional banks, with the risk of sudden, unexpected withdrawal of funds leaving the bank unable or only able at excessive cost to meet its liabilities as they fall due. In terms of more general risks, analysis suggests that Islamic banks are not inherently more or less risky as a function of being Shari'ah-compliant, but rather that their risk profile will vary as a function of their business model. In particular, by observing a specialised mandate they may be more exposed to counterparty concentration risk (which feeds into liquidity concentration risk),

and by virtue of being newer and smaller than more established peers, they may take longer to achieve economies of scale and become profitable.

The mitigation of liquidity risk in Shari’ah compliant banks is made more difficult by the limited number of assets available to them. Shari’ah-compliant banks may not hold assets conventionally considered to be liquid due to the interest bearing nature of those assets. The identification of Shari’ah-compliant liquid assets is therefore a key challenge, and whilst Shari’ah-compliant assets represent a good “store of value”, (although it might be difficult to obtain some sukuk during a stress situation, it might be quite easy to sell them off) and many issuances are heavily over-subscribed, the secondary markets in Shari’ah-compliant assets are not as developed as those for conventional assets.

Figure 1: stylised balance sheet of a Shari’ah-compliant bank

Assets	Liabilities	
Cash Balances	Current/saving deposits	
Financing Assets	Investment accounts	Similar to term deposits but profit sharing - the investor’s money is not guaranteed
Investment Assets		
Fee based services	Reserves	
Non-banking assets	Shareholder equity	

What Shari’ah-compliant assets are available?

There are two main types of Shari’ah-compliant products: profit and loss sharing instruments (PLS) and financial certificates, which are known as “sukuk”. There are two types of profit and loss sharing contracts: musharakah and mudarabah. The musharakah contract allows the joint ownership of property or of a commercial enterprise. The parties agree on the capital shares that both give to a project. Both parties are involved in the implementation and management of the project and profits are divided according to the terms agreed in the contract. Losses are allocated in proportion to the capital contributed.

Under a mudarabah contract, the owner of capital gives money to another party, who manages that money to make a profit, the profit is shared between the parties on a percentage basis.

There are also “trade-based” or “asset-based” contracts; these entail a fee or a mark-up on the price of the goods that are bought with the funds supplied. The cash flows generated by the contract tend, in fact, to replicate those that are typical of a conventional bank loan.

Sukuk are defined by the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) as certificates of equal value representing undivided shares related to the ownership (and not debt) of tangible assets, usufruct and services or to the ownership of the assets of particular

projects or a special investment activity, which are held in trust for sukuk-holders. To be Shari'ah-compliant, sukuk must be capable of being owned and sold legally.

#### How many Shari'ah-compliant institutions are there?

There are currently six Shari'ah-compliant banks in the EU, although the sector is growing and there are many such banks operating worldwide. The six EU banks are the Islamic Bank of Britain, Gatehouse Bank, Abu Dhabi Islamic Bank (UK) Limited, Bank of London and The Middle East plc, European Islamic Investment Bank plc, QIB (UK) plc. The Islamic Bank of Britain and ADIB (UK) Ltd are retail focused and the rest are wholesale focused. The banks are all regulated in the UK and are of relatively low systemic significance.

#### What attributes do Shari'ah-compliant products have that mean they do not meet the liquidity requirements of the CRR?

Annex 1 sets out the CRR Article 416, 417 and 418 text on the reporting of liquid assets and considers in detail the inter-relation with Shari'ah-compliant products, highlighting those provisions that mean the Shari'ah-compliant products would not be considered liquid under the CRR.

In summary, Shari'ah-compliant assets are unlikely to meet the criteria for being reported as liquid assets because:

- They are not denominated in the currency of the third country that issues them
  - The majority of sovereign sukuk issuance is in US Dollars
- The secondary market in sukuk is generally not active
  - Investors tend to buy and hold and issuances are normally oversubscribed. We understand however that bid prices are available, i.e. buyers can be found, which indicates that sukuk are a good store of liquidity value.
- Shari'ah-compliant assets are not eligible collateral for standard liquidity operations of a central bank in a Member State.

Additionally, the denomination of the liquid assets cannot be consistent with the distribution by currency of liquidity outflows, as the majority of issuance is in USD.

A qualitative assessment of why it is necessary to include Shari'ah financial products as liquid assets for Shari'ah institutions, the positive and negative impacts on this for their business, other credit institutions' business and the wider sector, market and economy in general.

While Islamic banking currently accounts for a small proportion of the European finance sector, it is a growing market and Islamic banks are exposed to the same liquidity risks as conventional financial institutions. It is therefore important that the liquidity coverage requirement is applied to Shari'ah-compliant banks and assets are identified that are Shari'ah compliant and represent sufficient liquidity value. As set out above, in the absence of specific provisions, Shari'ah compliant assets are unlikely to qualify as liquid under the CRR and Islamic firms will therefore be unable to comply with a liquidity coverage requirement. This may lead to an inconsistent approach between conventional and Islamic firms with regard to liquidity risk management and could be a barrier to growth and entry to the sector.

Developing an approach to the definition of liquid assets specific to Shari'ah-compliant banks that differs from the general definition may give rise to level playing field concerns. Conventional firms may argue that Shari'ah compliant banks are being allowed a preferential treatment and question why assets that can be considered liquid for Shari'ah-compliant banks are not considered liquid for other firms. In addition, a separate treatment for these firms arguably leads to an inconsistent liquidity coverage requirement measure as comparison of the liquidity coverage requirement across the Islamic and conventional sectors will be difficult given that the assets held against similar risks are different.

However, not developing proposals specific for Islamic firms will also give rise to level playing field concerns. Islamic firms, by their very nature, can only invest in Shari'ah-compliant assets, in the absence of provisions allowing Islamic firms to meet liquidity coverage requirement by holding Shari'ah-compliant assets, these firms will not have viable business models as they will not be able to meet financial regulations. To ensure a level playing field, the definition of liquidity assets for the purpose of meeting the liquidity coverage requirement in the EU should recognise Shari'ah-compliant assets. Additionally there may be arguments that failure to recognise Shari'ah-compliant assets that can be used to meet the liquidity coverage requirement may give rise to equality issues.

Arguments that there are level playing field issues introduced through specific provisions for Shari'ah-compliant banks to the detriment of conventional firms are weak as conventional firms are likely to be able to recognise a wider range of liquid assets in their liquidity buffers and we have identified no evidence that a liquidity buffer of Shari'ah-compliant assets is less costly than a liquidity buffer of conventional assets.

## 1. Proposal

We propose a definition of Shari'ah-compliant financial products as an alternative to assets that would qualify as liquid assets for the purpose of Article 416, for the use of Shari'ah-compliant banks only. We also briefly outline two alternative approaches.

### Proposal

#### *Glossary*

**Shari'ah-compliant bank:** a bank whose entire operations are structured in accordance with Islamic commercial jurisprudence and its investment principles.

**Sukuk** certificates of equal value representing undivided shares in the ownership of tangible assets, usufructs and services or (in the ownership of) the assets of particular projects or special investment activity and that comply with Islamic commercial jurisprudence and its investment principles. [FN: This definition is based on paragraph 2 of page 307 of Shari'ah Standards for Financial Institutions 2008, published by the Accounting and Auditing Organisation for Islamic Financial Institutions.]

#### *Liquid assets*

1. A Shari'ah-compliant bank should report the following as liquid assets unless excluded by paragraph 2 and only if the liquid assets fulfil the conditions in paragraph 3:

### Extremely High Quality Liquid Assets

(a) cash and exposures to central banks to the extent that these exposures can be withdrawn at any time in times of stress. As regards deposits held with central banks, the competent authority and the central bank should aim to reach a common understanding regarding the extent to which minimum reserves can be withdrawn in times of stress;

(b) sukuk issued by or guaranteed by sovereigns, central banks, PSEs, the Bank for International Settlements, the International Monetary Fund, the European Central Bank and European Community, or multilateral development banks, and satisfying the following condition:

- assigned a 0% risk-weight under Chapter 2, Title II of Part III of the CRR ;

Sukuk falling under [above] may represent up to 100% of a Shari'ah-compliant bank's liquid assets buffer and will be subject to no haircut.

High Quality Liquid Assets (may represent up to [40]% of a Shari'ah-compliant bank's liquid assets buffer)

(c) sukuk issued by or guaranteed by sovereigns, central banks, PSEs, the Bank for International Settlements, the International Monetary Fund, the European Central Bank and European Community, or multilateral development banks, and satisfying the following condition:

- assigned a 20% risk weight under Chapter 2, Title II of Part III of the CRR;

(d) sukuk not issued or guaranteed by sovereigns, central banks, PSEs, the Bank for International Settlements, the International Monetary Fund, the European Central Bank and European Community, or multilateral development banks, and satisfying the following condition:

- not issued by a financial institution or any of its affiliated entities;
- have a long-term credit rating from a recognised ECAI of at least AA- or in the absence of a long term rating, a short-term rating equivalent in quality to the long-term rating

Sukuk falling under [above] may represent up to [100]% of a Shari'ah-compliant bank's level 2 assets in its liquid assets buffer and will be subject to a [15% x factor]% haircut.

(e) Other sukuk issued by or guaranteed by sovereigns, central banks, PSEs, the Bank for International Settlements, the International Monetary Fund, the European Central Bank and European Community, or multilateral development banks.

Sukuk falling under [above] may represent up to [50]% of a Shari'ah-compliant bank's level 2 assets in its liquid assets buffer and will be subject to a [50 x factor]% haircut.

(f) Other sukuk that satisfy all of the following conditions:

- not issued by a financial institution or any of its affiliated entities;
- have a long-term credit rating from a recognised ECAI of between A+ and BBB- or in the absence of a long term rating, a short-term rating equivalent in quality to the long-term rating

Sukuk falling under [above] may represent [25]% of a firm's level assets in its liquid assets buffer and will be subject to a [50 x factor]% haircut.

(g) Shares or units in CIUs may be treated as liquid assets up to an absolute amount of EUR 500 million in the portfolio of liquid assets of each institution provided that the requirements in Article 132(3) are met and that the CIU, apart from derivatives to mitigate interest rate or credit or currency risk, only invests in liquid assets as referred to in paragraph 1 (as adapted for Shari'ah-compliant banks) of this Article.

(The next section shows the CRR text that it is necessary to waive in order for the above proposals to be compliant with the CRR text)

2. The following should not be considered liquid assets: (...)

3. A Shari'ah-compliant bank should report assets that fulfil the following conditions as liquid assets:

(a) they are unencumbered or stand available within collateral pools to be used for the obtaining of additional funding under committed but not yet funded credit lines available to the institution;

(b) they are not issued by the institution itself or its parent or subsidiary institutions or another subsidiary of its parent institutions or parent financial holding company;

~~(c) their price is generally agreed upon by markets participants and can easily be observed in the market, or their price can be determined by a formula that is easy to calculate based on publicly available inputs and does not depend on strong assumptions as is typically the case for structured or exotic products;~~

~~(d) they are eligible collateral for standard liquidity operations of a central bank in a Member State or if the liquid assets are held to meet liquidity outflows in the currency of a third country, of the central bank of that third country;~~

~~(e) they are listed on a recognised exchange or they are tradable on active outright sale or via a simple repurchase agreement on approved repurchase markets. These criteria shall be assessed separately for each market.~~

### **Operational requirements for holdings of liquid assets**

A Shari'ah-compliant bank should only report as liquid assets those holdings of liquid assets that meet the following conditions:

(b) they are legally and practically readily available at any time during the following 30 days to be liquidated via outright sale or via a simple repurchase agreement on approved repurchase markets in order to meet obligations coming due. Liquid assets referred to in point of Article 416(1)(c) which are held in third countries where there are transfer restrictions or which are denominated in non-convertible currencies should be considered available only to the extent that they correspond to outflows in the third country or currency in question, unless the institution can demonstrate to the competent authorities that it has appropriately hedged the ensuing currency risk;

(c) the liquid assets are controlled by a liquidity management function;

(d) a portion of the liquid assets except those referred to in points (a), (c) and (e) of Article 416(1) is periodically and at least annually liquidated via outright sale or via simple repurchase agreements on an approved repurchase market for the following purposes:

(i) to test the access to the market for these assets;

(ii) to test the effectiveness of its processes for the liquidation of assets;

(iii) to test the usability of the assets;

(iv) to minimise the risk of negative signalling during a period of stress;

(e) price risks associated with the assets may be hedged but the liquid assets are subject to appropriate internal arrangements that ensure that they are readily available to the treasury when needed and especially that they are not used in other ongoing operations, including:

(i) hedging or other trading strategies;

(ii) providing credit enhancements in structured transactions;

(iii) covering operational costs.

~~(f) the denomination of the liquid assets is consistent with the distribution by currency of liquidity outflows after the deduction of inflows.~~

#### Alternative 1

National competent authorities may have discretion to determine Shari'ah-compliant assets that may be used, by a Shari'ah-compliant bank only, for the purpose of meeting the liquidity coverage requirement. This is likely to lead to inconsistency of approach across the single market especially should the number of Shari'ah-compliant firms increase in the coming years.

#### Alternative 2

Shari'ah-compliant banks are made exempt from the liquidity coverage requirement. Given that Shari'ah-compliant assets are unlikely to be considered eligible as liquid assets under the requirements set out in the CRR without specific treatment, it may be more appropriate to exempt such banks from the liquidity coverage requirement. Such an approach would help maintain the consistency of application of the liquidity coverage requirement itself but may lead to inconsistency of liquidity regulation between the Islamic and conventional sectors.

# Technical Appendix 12: Cross-border intra-group liquidity flows

## Introduction

The CRR/CRD IV texts<sup>86</sup> (the Capital Requirements Regulation - 'CRR' - and the Capital Requirements Directive - 'CRD') set out prudential and reporting requirements for liquidity.

Pursuant to Article 509(2)(d), EBA should in the report to the European Commission on the impact of a liquidity coverage requirement, which is due by 31 December 2013, assess the provision of specific lower outflow and/or higher inflow rates for intra-group flows, specifying under which conditions such specific in- or outflow rates would be justified from a prudential point of view and setting out the high level outline of a methodology using objective criteria and parameters in order to determine specific levels of inflows and outflows between the institution and the counterparty when they are not established in the same Member State. In accordance with Articles 422(10) and 425(6) EBA should develop draft regulatory technical standards and submit them to the Commission by 1 January 2015 to specify these objective criteria for the application of the referred preferential treatment.

Pursuant to Recital 105 of the CRR a potential intra-group financial support could arise under stress conditions when some of the institutions belonging to the same group could experience difficulties in meeting their payment obligations. Although this support should not be taken for granted beforehand, these potential liquidity flows may be eligible for preferential inflow and outflow rates under the necessary safeguards and subject to agreement among competent authorities when the liquidity requirement becomes a binding measure. This is explicitly foreseen in Recital 106 of the CRR which in turn states that such specific preferential treatment should be narrowly defined and linked to the fulfillment of a number of stringent and objective conditions.

Taking into account these Recitals, this report describes the conditions to be fulfilled and the high level outline of a methodology (objective criteria and parameters) to apply a preferential treatment on cross border intra-group liquidity flows. Specific rates are not provided at this stage, as empirical data to substantiate their determination are not sufficiently available. In the course of the production of the report referred, EBA has conducted two surveys.

One was launched in November 2012 and sent to national supervisors. Responses from 21 countries were received. The main feedback here was: i) most institutions participate in the EBA QIS exercise only on a consolidated basis. This deprives EBA from sufficient empirical information to assess the impact derived from the application of a preferential treatment in the framework of intra-group flows; ii) it was anticipated that institutions would apply in the first instance for the waiver to meet liquidity coverage requirements on a solo basis provided for by Article 8 preferably to a preferential treatment

---

<sup>86</sup> <http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2013:176:SOM:EN:HTML>

iii) many jurisdictions conveyed their view that conditions for a waiver under Article 8(1) and (3) should also be considered objective criteria for a PT.

The other one was sent to the industry in February 2013. 109 questionnaires from 23 countries were received. The main feedback here has been:

- a majority of banks stated in the survey that intra-group liquidity flows prove to be more stable than third party flows especially during the crisis;
- that there is strong support for a symmetrical treatment of all intra-group flows in order to avoid situations where liquidity becomes locked up (liquidity traps).<sup>87</sup> Banks overwhelmingly consider the preferential treatment as a possibility to partially correct the “flawed” asymmetrical treatment of certain flows in the LCR. They target especially the committed credit and liquidity lines they would like to have recognised in liquidity inflows and, as such, act as a substitute for local liquidity buffers.

#### Rationale behind the preferential treatment of cross-border intra-group flows

Under Article 6(4) and 11(3) of the CRR, the new liquidity coverage requirement applies – as other prudential requirements – on an individual and consolidated basis for all types of institutions (credit institutions and investment firms<sup>87</sup>) among the Union, regardless of size or business models. The reasoning behind this uniform application is to ensure harmonisation in the area of liquidity regulation and to strengthen the resilience of the European banking sector against possible liquidity shocks.

Regarding the composition and the computation of the LCR, this uniform application could have influences on short-term intra-group transactions. This could be especially true for institutions with a high level of short-term intra-group positions within their balance sheets. Valid examples could be institutions whose liquidity is managed centrally at a group- or sub-group level or whose day-to-day operational liquidity management is partially or fully carried out on their behalf by other members of the group (e.g. nostro accounts management).

This type of institutions could have set their liquidity management and operational structure to use cross-border intra-group synergy effects in order to ensure cost effectiveness throughout the banking group. As the LCR provides – as a baseline scenario – the same treatment for transactions among institutions, irrespective of whether the counterparties are members of the same group, it is possible that some institutions would be required to alter their liquidity management or operational structure to comply with the LCR, even if their liquidity risk management is not deemed weak or they have built adequate liquidity positions.

The CRR introduces in Article 8(1) and (3) of the CRR the possibility for the involved competent authorities, subject to application in accordance with Article 21, to waive the application of liquidity requirements to individual institutions subject to stringent conditions and the individual agreement of all competent authorities involved. In such cases, a liquidity sub-group is formed and compliance with

---

<sup>87</sup> Which are authorised to provide the investment services and activities listed in point (3) and (6) of Section A of Annex I to Directive 2004/39/EC

some or all of CRR Part VI (Liquidity) obligations at the individual level can be waived, while compliance at the level of the liquidity sub-group will be required. This waiver has the potential to facilitate liquidity management across a banking group. On a cross-border basis, there can be, however, situations where such a waiver is not desirable for one of the involved competent authorities and therefore the application is disapproved. The motivation for the refusal may include for example that one CA does not see such a waiver as appropriate due to prudential reasons and therefore involved CAs cannot agree on the elements under Article 8(3).

The CRR text provides another option via Articles 422(8) and 425(4) to accommodate these strongly linked cross-border intra-group entities by introducing the possibility to apply, within the LCR, a specific treatment on intra-group liquidity flows. This specific treatment which is subject to the fulfillment of stringent and objective conditions may be applied by the involved CAs. In fact, it can be seen as a preferential treatment of cross-border intra-group liquidity flows which recognises that intra-group liquidity, when all the necessary safeguards are in place, is likely to be more stable than third party flows within the liquidity coverage requirement-defined stress scenario.

Once the liquidity coverage requirement is defined and becomes binding, thus creating a context of harmonised liquidity requirements, the reason why a CA would potentially be willing to grant a PT instead of a waiver permitting the formation of liquidity sub-groups will include a consideration of the range of potential risks that would arise. Under a PT, the involved institutions still have to comply with the liquidity coverage requirement, calculated according to all the underlying stress assumptions on a solo level, which would not necessarily be the case under the waiver provided by Article 8. Furthermore, the CA could also see the PT as more appropriate for entities which adequately operate their own local treasury and liquidity risk management functions or for entities which do not have an appropriate access to wholesale funding markets.

#### Major concerns of the preferential treatment

A range of concerns were raised during the course of work to consider the preferential treatment.

A key concern has been that the preferential treatment may be granted on the basis of a less strenuous set of criteria and competent authority agreements compared to those that are to apply to the formation of cross-border liquidity sub-groups, as provided by Article 8 of the CRR. Related to this were comments seeking respect for the underlying intention of the preferential treatment to support efficient and effective liquidity and treasury management. For example, the desire was that the preferential treatment should not be seen as a route by which institutions might avoid their responsibilities to manage liquidity risk management on a prudent basis, and to avoid compliance with their individual and consolidated level obligations contained in the CRR Part VI liquidity regulations. It was suggested that, as the preferential treatment could provide similar economic benefits to those provided by the Article 8 waiver, similar levels of prudential comfort should be sought via the criteria and competent authority agreements to be reached in relation to the preferential treatment.

The liquidity soundness of the institutions (both the liquidity provider and receiver) have been identified as an important factor. Commentators noted that the preferential treatment did not have the power to release institutions from their obligation to comply with the CRR Part VI liquidity regulations at the individual level. In connection with this point, a number of detailed comments were made including: (i) the need to be alerted to attempts by firms to artificially inflate their individual liquidity coverage requirements by means of a web of committed lines and preferential treatments; (ii) concerns

regarding potential concentration of funding sources and the composition of the liquid assets buffer; (iii) that data from the CRR liquidity reporting may be a source of data to assist in more detailed considerations on metrics.

Commentators noted that the criteria and possible metrics/parameters will need to be capable of considering intra-group transactions across the range of institution types that are within the scope of the CRR Part VI liquidity regulations. For example, the situation of firms that are members of institutional protection schemes and investment firms will need to be considered.

Commentators proposed that careful consideration will be needed to identify the appropriate range of criteria and metrics to be applied in support of the preferential treatment. Some concerns were raised that a mechanistic approach to considering the preferential treatment would be undesirable, for example there may be wider supervisory concerns that may be relevant to competent authorities when making their assessments.

Commentators asked that the durability and dependability of the relevant intra-group transactions in a stress be included in considerations to develop the criteria; also, that the perspective of the competent authorities of both the liquidity provider and the liquidity receiver be respected.

It was also noted that the CRR drafting provided the option to consider that the preferential treatment may be considered on a 'corresponding symmetric or more conservative' basis. It was also noted that the CRR text is drafted in the form of a competent authority discretion (Competent authority may), rather than an obligation to grant the preferential treatment.

### Scope of application

The preferential treatment described in this report can only be applied between two intra-group institutions which operate on a cross-border basis between Member States. Referring to Articles 422(8)(a) and 425(4)(b) of the CRR, the PT on such a cross-border basis may be granted if the counterparty is either:

- a parent or subsidiary institution of the institution or another subsidiary of the same parent institution;
- linked to the institution by a relationship within the meaning of Article 12(1) of Directive 83/349/EEC;
- an institution falling within the same institutional protection scheme as referred to in Article 113(7);
- the central institution or a member of a network compliant with Article 400(2)(d).

As per Recital 106 of the CRR, the preferential treatment should be applied where no waiver is granted as provided for in Article 8 of the CRR. Accordingly a preferential treatment has no place between institutions which have been granted such a waiver and constitute a liquidity sub-group, as the liquidity coverage requirement in such cases would apply only at liquidity sub-group level. It should also not prevent from being deemed feasible the application of a preferential treatment to the

transactions between a liquidity sub-group itself and other institutions of the same group not included in the liquidity sub-group or between two liquidity sub-groups of the same group.

### Eligible cross-border intra-group transactions for the preferential treatment

The scope for eligible cross-border intra-group transactions within the single market on which a PT can be applied is defined by the CRR in Article 422 (outflows) and Article 425 (inflows) thereof. As a consequence, the preferential treatment is limited to a number of intra-group liquidity outflows and inflows.

### Eligible transactions for a PT

#### Eligible intra-group liquidity outflows

Article 422(8), by derogation from Article 422(7), provides competent authorities with the possibility to apply a lower outflow percentage on a case-by-case basis where the institution and the depositor are established in the same Member State. Article 422(9) allows the preferential treatment to be granted where the institution and depositor are established in different Member States.

As Article 422(7) refers to all other liabilities that do not fall under paragraphs 1 to 5 of Article 422, all (intra-group) liabilities regrouped under these paragraphs can already be excluded for the specific intra-group treatment. These exclusions are:

- 1) liabilities resulting from the bank's own operating expenses (Article 422(1));
- 2) liabilities resulting from secured lending and capital market driven transactions (Article 422(2));
- 3) liabilities resulting from operational deposits (Article 422(3));
- 4) liabilities resulting from deposits by non-financial clients (Article 422(5)).

It is clear that point (2) of these exceptions already excludes a lot of existing intra-group transactions, namely all repo transactions performed on an intra-group basis. Taking into account these exceptions, the only possible eligible intra-group liquidity outflows could be derived solely from the following transactions:

- a) liabilities resulting from unsecured intra-group deposits that become due or callable in the 30-day liquidity coverage requirement horizon;
- b) undrawn committed credit and liquidity facilities granted to intra-group entities;
- c) outflows expected from derivatives contracts on a net basis across counterparties.

It should also be added that, pursuant to Article 422(8)(c), a PT for intra-group liquidity outflows can be granted only if a corresponding symmetric or more conservative (lower) inflow is applied by the liquidity provider.

#### Eligible intra-group liquidity inflows

Article 425(4), by derogation from Article 425(2)(g), provides competent authorities with the possibility of applying a higher inflow percentage on a case-by-case basis where the institution and the counterparty are established in the same Member State. Article 425(5) allows preferential treatment to be granted where the institution and counterparty are established in different Member States.

As Article 425(2)(g) refers only to undrawn committed credit and liquidity facilities, the focus for a preferential intra-group treatment has to be solely on undrawn committed credit and liquidity facilities on the inflows side.

It should also be added that, pursuant to Article 425(4)(c), a PT for intra-group inflows can be granted only if a corresponding symmetric or more conservative (higher) outflow rate is applied by the liquidity provider.

### Preferential treatment on committed intra-group credit and liquidity lines

Among the eligible intra-group liquidity flows, it has been found that the flows emanating from committed credit and liquidity<sup>88</sup> lines seem to be the most appropriate and valuable flows for a preferential treatment of cross-border intra-group liquidity flows. As detailed hereafter, there are indeed prudential and market reasons not to consider other eligible flows for a preferential treatment.

### Prudential reasons

#### 1. Prudential reasons not to consider lower outflow rates for unsecured intra-group deposits

The argument to lower the outflow rate for unsecured intra-group deposits would be the higher probability of roll-over of deposits of affiliates' deposits than those of external banking counterparties, reflecting the liquidity support brought by the intra-group liquidity provider. Potentially there is an argument that could be made to consider historical behaviour of such deposits during periods of stress. However, as the liquidity coverage requirement assumes an idiosyncratic and a market-wide liquidity shock, it would not be prudentially tenable to apply a PT on the outflows of these intra-group deposits because of their maturing and unsecured nature. Notwithstanding the fact that the physical cash is held by the receiver, the deposit can be withdrawn within the 30-day period of the liquidity coverage requirement. Furthermore, an institution cannot legally enforce a roll-over of these deposits and, consequently, the outflow rate of these intra-group deposits should be the same as the rate applicable to inter-bank deposits or other wholesale counterparties, depending on the underlying counterparty type.

#### 2. Prudential reasons not to consider lower outflow rates for derivatives flows

Derivatives outflows are mainly of two different natures:

- a) They reflect the market valuation changes on derivatives, leading to additional cash or collateral to be posted for collateralisation.

---

<sup>88</sup> A liquidity facility is defined as any committed, undrawn back-up facility that would be utilised to refinance the debt obligations of a customer in situations where such a customer is unable to rollover that debt in financial markets (e.g pursuant to a commercial paper programme, secured financing transactions, obligations to redeem units, etc.).

- b) They reflect the valuation changes on posted collateral securing derivative transactions, leading to additional collateral to be posted.

The level of derivatives outflows is not dependent on the nature and the liquidity management framework of the two parties of the derivative transaction, but purely on the expected evolution of financial market prices which can be highly volatile. As such, the fact that the related parties have no influence on the level of these outflows shows the inappropriateness of these transactions for a PT<sup>89</sup>.

Furthermore, as the derivative cash flows will be reported on a net basis (inflows can offset outflows) the application of the PT will be difficult to handle.

### Market reasons

Regarding the preferential treatment, it has been noted that there is an absence of interest from the banking industry to focus on intra-group flows other than committed credit and liquidity lines.

On 18 February 2013, a bank survey regarding the PT was launched in which 108 banks from 23 European countries participated. The outcome of this survey was that banks would overwhelmingly apply for a preferential treatment for committed credit and liquidity lines which are treated asymmetrically in the standard LCR and would not be interested in asking for a preferential treatment for other flows. As the initiative to apply for a PT is initiated by the bank, it does not make much sense to define a preferential treatment that would remain - if acceptable from a regulatory point of view - mainly theoretical.

### Conditions and objective criteria

All of the following conditions and criteria have to be satisfied before a PT is implemented and on an on-going basis. In addition to these conditions, there have to be reasons to expect a higher inflow from these credit and/or liquidity lines over the next 30 days even under a combined idiosyncratic and market-wide stress scenario.

### Low liquidity risk profile of the liquidity provider and receiver

The liquidity provider and receiver within the preferential treatment have to fulfill the following conditions:

Compliance with the minimum requirement of the liquidity coverage requirement as well as any liquidity related pillar 2 measures on an on-going basis and for at least the previous 12 months. Here the ability of the liquidity provider and receiver to continue to comply with the liquidity coverage requirement on an on-going basis is necessary. The liquidity coverage requirement has to be calculated under the assumption that the preferential treatment has already been applied.

---

<sup>89</sup> It should also be considered that in accordance with Regulation No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties (CCPs) and trade repositories (TRs) (EMIR) central clearing with full collateralisation would be required for certain classes of OTC derivatives also among financial intra-group counterparties. Once implemented, this would further narrow down the scope of eligible derivative transactions, as only unsecured transactions are eligible to preferential treatment.

As the liquidity coverage requirement becomes binding in only 2015, the 12-month liquidity coverage requirement compliance period can be compensated by either the compliance of local liquidity requirements or the computed liquidity coverage requirement compliance during the liquidity reporting period. Regarding the phasing-in period with progressive levels of the minimum requirement, compliance should be assessed according to the then respective valid minimum requirements of the liquidity coverage requirement.

Inherent within such an assessment may be the competent authority's consideration of the systemic importance of the institutions, both at the national and EEA/EU level. The implications of the PT should be fully considered in this regard. This consideration is understood within the scope of the necessary agreement between competent authorities on a full understanding of the implications of a PT in analogy with the same requirement defined for the application of the waiver as per Article 8(3)(f).

Where an institution does not meet, or expects not to meet the minimum requirement of the liquidity coverage requirement, as well as any liquidity related to pillar 2 measures, as part of the immediate notification and restoration plan required under Article 414 of the CRR, the institution should also outline therein to the competent authorities the implication of this failure on the corresponding PT counterparty.

The involved competent authorities should assess the restoration plan and decide on the continuation of the PT.

#### Legally binding agreements and commitments between group entities

Institutions applying for a preferential treatment should have in place legally binding agreements and commitments which cover all of the following points:

- i. The credit and/or liquidity line is an unsecured committed line which is legally and practically available and enforceable at any time on a cross-border basis. It has to be specifically earmarked for the preferential treatment and available when required/on demand.

Institutions should have conducted a legal review confirming that the legal, binding and enforceable aspects of this line are valid in all relevant jurisdictions also under stress. They should repeat this review on a regular basis and should draw on an external legal opinion. The CAs should be informed of these reviews.

In this regard, it must be considered that, pursuant to Article 8 of the CRR, by 1 January 2014 the Commission should report to the European Parliament and the Council on any legal obstacles which are capable of rendering impossible the provision of an intra-group free movement of funds to enable them to meet their obligations as they come due.

- ii. The currency of the line has to be contractually defined in a form that the funding is usable for the liquidity receiver.
- iii. Any drawdown of the credit and/or liquidity line cannot be called by the liquidity provider during the following 30 days in order to avoid that the drawdown is considered as a short-term loan within the liquidity coverage requirement.

- iv. The amount and the cost of the committed credit and/or liquidity line are clearly specified in the contract. The amount of the facility needs to be unchangeable without the prior consent of the relevant competent authorities.
- v. The agreements and commitments do not contain any clause that would allow the liquidity provider to:
  - a. require any conditions to be fulfilled before the liquidity is provided;
  - b. withdraw from its obligations to fulfil these agreements and commitments;
  - c. change the terms of the agreements and commitments without prior approval from the involved competent authorities.
- vi. The credit and/or liquidity line has no maturity and the notice period for cancellation is at least six months. When notice is given, the institutions should immediately notify the CAs and submit a transition plan which will guarantee compliance with the liquidity coverage requirement without the PT on cross-border intra-group transactions.

### Liquidity risk management

The liquidity risk profile of the liquidity receiver or provider has to be considered adequately in the liquidity risk management of the counterparty:

- i. The provider should monitor and have oversight of the liquidity position of the receiver at least on a daily basis. In case of correspondent banking, the monitoring and the supervision of the liquidity position of the receiver may be limited to the balances of the vostro accounts of the liquidity receiver.
- ii. The implications of the PT have to be fully considered and integrated into their contingency funding plans, which should take into account potential impediments to the transfer of such liquidity, and assess the time needed to implement such a transfer. The liquidity provider will need to show that it can be reasonably expected to continue to provide the liquidity facility even in times of stress and, in doing so, that there is no unacceptable impact on its own position. The contingency plan of the liquidity provider should ensure that its liquidity recovery plan does not rely on the liquidity expected to honour the committed credit and/or liquidity line of the liquidity receiver.
- iii. The funding plan of the liquidity provider has to take into account the PT in order to ensure its ability to provide the necessary liquidity on a longer-term basis.

### Minimum local liquidity buffer

CAs agree about the determination of minimum amounts of liquid assets to be held by the liquidity receiver.

In any case the minimum local amount of liquid assets has to cover at least the total retail deposits' run-offs as defined within the liquidity coverage requirement.

### Methodology

Under Article 509(2)(d) of the CRR EBA should assess the conditions and the high level outline of a methodology – using objective criteria and parameters - to apply a preferential treatment on cross border intra-group liquidity flows.

Under Article 20 of the CRR, when an institution applies for the preferential treatment on cross-border intra-group transactions, competent authorities should work together in full consultation for the purposes of determining whether the criteria for specific intra-group treatment are met. Competent authorities should do everything within their power to reach a joint decision on the assessment of the criteria and the determination of the specific intra-group treatment. In the absence of a joint decision, the competent authorities responsible for the supervision of the subsidiaries on individual basis should make their own decisions, unless the matter has been deferred to EBA. In such a case, the competent authorities responsible for supervision on individual basis should make their own decision in conformity with the decision of the EBA.

In developing the outline of the methodology to apply the preferential treatment it is assumed that – in the absence of different advice from the competent European legislative bodies – EBA's binding decision pertains exclusively to the fulfillment of the objective criteria. As a consequence, although the involved competent authorities must acknowledge that the criteria are met, they still retain the power to object to – for different prudential reasons – the preferential treatment.

Based on these assumptions, EBA deemed preferable at this stage to focus its work on developing the objective criteria.

They represent the bulk of the methodology: in a context of stress where intra-group liquidity support cannot be taken for granted, the objective criteria represent the necessary safeguards under which competent authorities can be adequately confident that the receiving entity could count on the group support and that this would not negatively impact the stability of the provider, even under circumstances of stress.

The objective criteria are therefore intended to be a discussion ground for the involved competent authorities: as they pertain, for example, to the liquidity risk profile of the liquidity provider and the liquidity management structure of the institutions involved, as a matter of fact, competent authorities will be required to enter the discussion, analyse in depth the liquidity position of the group and try to find an agreement on the application of the preferential treatment.

Under Article 509(2)(d) the methodology should include the definition of specific inflow and outflow rates to be applied and parameters.

As to the definition of specific inflow and outflow rates, EBA does not intend to propose any specific rates at this stage, due to insufficient empirical data. It should be considered that both of the surveys launched last year were aimed chiefly at testing the appetite for supervisors and institutions for the preferential treatment and at identifying possible objective criteria by drawing from previous experience. In addition, although a large number of European institutions participate in the EBA

voluntary monitoring exercise on liquidity requirements, the majority submit data on a consolidated basis only: therefore adequate data on cross-border flows are not available at this stage<sup>90</sup>.

For the same reasons, specific quantitative parameters have not yet been proposed, but they will nevertheless be evaluated once data become available.

EBA has nevertheless given some consideration to possible inflow/outflow rates. Under Article 422(8)(c) on outflows, competent authorities can grant a preferential treatment to intra-group cross border flows, provided that a “corresponding symmetric or more conservative inflow is applied by the depositor”; in the same vein, Article 425(4)(c) states that a preferential treatment on inflows can be granted provided that a “corresponding or more conservative outflow is applied by the counterparty”.

Having these caveats in mind, the treatment of credit and liquidity lines currently envisaged in the CRR could be taken as an example. Under Article 424(5)(c), institutions are required to report the maximum amount that can be drawn from facilities extended to credit institutions, which could be – only for the sake of this exemplification - assimilated to a 100% outflow. On the inflow side, the institutions benefiting from the facilities cannot consider any inflow deriving from them.

Articles 422 and 425 give the competent authorities the possibility either to break the existing asymmetry and propose a symmetrical treatment instead, or to agree on a different (but still preferential) level of asymmetry.

Therefore, assuming that a 100% outflow factor is applied to the institutions providing cross-border credit and/or liquidity facilities to other group entities, competent authorities could agree on higher LCR inflow rates than 0% applied to the receiving institutions of these facilities. Inflow rates below 100% will preserve a certain level of asymmetry and inflow rates of 100% will implement a symmetrical treatment. In any cases, supervisors can never agree on an inflow rate for the receiving entity higher than the outflow rate for the provider.

As already mentioned, at this stage it is deemed premature to provide any indication on specific inflow/outflow rates. Nevertheless, EBA will continue analysing these issues once appropriate data become available.

---

(90) It should be recalled, remindedreminded that, under Article article 415(1), complemented by the EBA technical standard set out in Article according to article 415(3)(a), all March 31, 2014, all EU institutions, as of 31 March 2014, will submit their liquidity coverage requirement data on an individual basis every month. Specific lines have been included in the reporting template to address issues pertaining to intra-group flows. Therefore, as of next year EBA should have the necessary data to substantiate specific inflow/outflow rates to be included, if relevant, in the draft RTS to be presented to the Commission by 1 January 2015, in accordance with Articles 422(1) and 425(6) of the CRR.

## Technical Appendix 13: Definition of stress

As part of the EBA's report to the Commission under Article 509(2)(j) of the CRR , EBA is to also assess 'the definition of circumstances of stress, including principles for the use of the stock of liquid assets and the necessary supervisory reactions under which institutions would be able to use their liquid assets to meet liquidity outflows and how to address non-compliance'.

The EBA derived from this mandate several aspects on which it should focus its work:

- the definition of circumstances of stress
- principles on how the stock of liquid assets may be used
- the necessary supervisory reactions
- when and under which circumstances these reactions may be deemed appropriate
- how to address the situation of an institution whose liquidity coverage requirements falls below the minimum required level under circumstances of stress

This draft section of the report contains general principles to guide competent authorities on how to address use of the liquid assets buffer by institutions and how to assess circumstances of stress. Consequently such guidance, while conscious of moral hazard implications, indirectly clarifies for institutions the conditions under which use of its liquidity buffer may be appropriate, as well as what its obligations towards competent authorities are.

### **I- Definition of circumstances of stress**

#### *Definition of circumstances of stress*

Generally speaking, a stress could be defined as a sudden change in market conditions which questions the institution's ability to meet its contractual obligations and provide liquidity in order to mitigate potential reputation risks. A stress may be due to numerous factors related, inter alia, to the overall financial and economic environment (e.g. monetary policy objectives, level of confidence/volatility observed in markets' behaviour, level of the overall credit provision to the economy versus overall demand, etc.) which makes it hard to define ex ante. It usually stems from events which stand outside of the institution's scope of decision and happens very suddenly, making it very difficult to foresee.

However, the Basel LCR standard provides for general overall events which can materialise circumstances of stress. Paragraph 19 of the Basel standard gives a broad overview of the stress:

- (a) The run-off of a proportion of retail deposits
- (b) A partial loss of unsecured wholesale funding capacity, including wholesale deposits and other sources of contingent funding such as received committed or uncommitted liquidity or credit lines
- (c) A partial loss of secured, short-term funding

- (d) Additional outflows resulting from a downgrade of by up to three notches
- (e) Increase market volatilities affecting the value of collateral or its quality and creating additional needs of collateral
- (f) Unscheduled draws on liquidity and credit facilities
- (g) Potential need to buy-back debt or honour non-contractual obligations

Circumstances of stress may therefore be operationalised by using these events as indicators of a stress.

Following a principles-based approach, no consideration about the significance of this event or its magnitude should be set in advance, owing to the fact that weightings included in the LCR were conceived so that the buffer should cover fully the net outflows expected over the period. A single indicator of stress could therefore lead an institution to use its liquid assets, seeing its requirement falling below the required level, albeit in a marginal way.

A run-off of retail deposits of less than 3%, for instance, could be considered as a stress which may oblige an institution to use its liquid asset buffer. Use of the liquidity buffer would depend on the rate or pace of decrease, under which time horizon it happens and whether it is a market or an idiosyncratic shock.

In a similar way, as soon as one or more of the above-mentioned indicators is verified, circumstances of stress could be met. Therefore, circumstances of stress could be considered as met by the NCAs if at least one of these events occurs, in line with a principles-based approach the EBA agreed to.

In addition, these indicators could be complemented by several advanced indicators of a liquidity stress, such as increasing costs of wholesale funding, which would ultimately lead an institution not to renew its short-term secured funding or unsecured funding.

The occurrence of these indicators may lead ultimately to the requirement falling below its required level. This is also the case for potential funding difficulties in foreign currency, which would be reflected in an inconsistent level of liquid assets held to meet net liquidity outflows in that currency. This would also affect the level of liquidity coverage requirement.

Therefore, deteriorating patterns in other additional indicators may provide useful information as to whether an institution is facing a potential or actual liquidity stress. Other indicators include:

- the volume of interbank loans;
- the roll-over of funding developments;
- its cost of funding;
- an indicator of liquidity hoarding: level of deposits at central banks;
- the use of central bank standing facilities and open-market operations (both regular and long-term );
- additional collateral needs following a change in market practices or a depreciation of the posted collateral;
- the encumbrance level and its developments.

This information should be available to central banks and to the competent authorities, either through the liquidity coverage requirements templates (Article 415(3)(a) of the CRR), the additional monitoring metrics (Article 415(3)(b) of the CRR) or the reporting on asset encumbrance (Article 100 of the CRR). It could complement the analysis of the circumstances of stress affecting a specific institution, especially in a case where an institution expects not to meet its liquidity coverage requirement in the future. Such information could also constitute a significant indicator of market-wide tensions, but

occurrence of such indicators may not constitute sufficient reasons for an institution to use its liquid assets.

Notwithstanding the establishment of such indicators that may serve to indicate circumstances of stress, it is acknowledged that they are not an exhaustive set.

In addition, competent authorities should also ensure that institutions are able to monitor the indicators of stress that are relevant for their activities, funding profile and business model. It is planned that this would be incorporated within the liquidity risk management system, as defined in Article 86 of the CRD.

However, these indicators should not be subject to any additional reporting on a regular basis in normal times.

#### *Stress affecting the numerator of the ratio*

In practice, the events described so far only affect the denominator of the liquidity coverage requirement. However the requirement may also fall below the required level due to other factors, such as a loss of value of part or all of the liquid assets included in the buffer, i.e. factors affecting the numerator.

Article 416(7) of the CRR states that assets which cease to fulfil the corresponding eligibility requirements may be maintained in the buffer for an additional period of 30 days. This could prevent the requirement from falling immediately below the required level. Nevertheless, in this case an institution should be obliged under Article 414 of the CRR to notify its competent authority that its ratio is likely to fall below the required level.

In this case, circumstances of stress should also include any elements, such as a shock affecting a given category of liquid assets, or a downgrade affecting a limited part of the liquid asset buffer of an institution, rendering the asset ineligible for inclusion in the buffer.

Such events, even if they do not strongly affect the liquidity coverage requirement of an institution, could potentially explain why a ratio fell below the mandatory level.

#### *Time horizon of a stress*

Circumstances of stress should be appreciated as backward-looking by the competent authority in order to determine whether the institution has been subject to a liquidity shock. Therefore, this assessment should not be focused on a 30-day horizon.

A less severe stress, or a continuous decrease in the level of the requirement due to events identified above, could also be considered as a circumstance of stress. For instance, an institution having an initial liquidity coverage requirement of 110% (whose buffer equals to 110 and net outflows equal to 100) is facing a relatively slow run-off of corporate wholesale funding (10% each month from initial stable corporate funding of 100). After two months, the liquidity coverage requirement falls to 98.5% if lost funding is entirely covered by liquid assets (-19), while after one month the requirement was still above 100% (104.2%).

In this respect, the competent authority should be able to analyse ex-post whether the criteria defining circumstances of stress were met over a longer than 30 day horizon.

## **II- Principles on how the stock of liquid assets may be used**

### *Usability of the buffer under circumstances of stress as a principle*

Usability of the buffer is the cornerstone of the LCR, as mentioned in the Basel standard: “The standard requires that, absent a situation of financial stress, the value of the ratio be no lower than 100% on an ongoing basis because the stock of unencumbered HQLA is intended to serve as a defence against potential onset of liquidity stress. During a period of financial stress however, banks may use their stock of HQLA, thereby falling below 100%, as maintaining the LCR at 100% under such circumstances could produce undue negative effects on the bank and other market participants”. The principle of usability was repeated by the GHOS in its January 2013 declaration.

This implies that the buffer of liquid assets should be maintained in order to have a ratio at least equal to 100% in normal times.

In normal times, institutions may choose to hold liquid assets above the mandatory level to cover further net liquidity outflows. In this case they are free to dispose of these assets without any specific obligation. Immediate notification to the supervisor and the subsequent assessment applies only when the liquidity coverage requirement falls below the required level.

#### *Notification to the supervisor*

Upon a partial or total use of the buffer, an institution has to notify the competent authority immediately.

In practice, Article 414 of the CRR states that an institution should immediately notify the competent authority when it does not meet or expects not to meet its liquidity coverage requirement. This notification is established so that the competent authority may without undue delay take the appropriate supervisory measures and/or action.

In times of immediate stress, it is indeed very likely that an institution would first use part or all of its liquid assets to meet its obligations, notably in order to mitigate reputational risks, and immediately notify its competent authority thereafter.

This notification is required to inform the competent authority about ongoing issues, but it does not imply that usability of the buffer should be subject to prior approval or authorisation by the competent authority. Competent authorities and regulators should ensure that institutions are able to use their liquid assets if they are bound to do so in order to meet their obligations, regardless of the measures that could be taken by the supervisor once it has been notified by the institution.

Competent authorities should also make sure that institutions are able to monitor on a permanent basis their level of liquidity coverage requirement, as well as the indicators of stress presented in Section I, that are relevant to their activities, funding profile and business model. This should be done through the liquidity risk management system, as defined in Article 86 of the CRD.

#### *Assessment of the circumstances of stress*

The assessment of the circumstances of stress should be done ex post by the competent authority, and always on an individual basis, even during a market-wide shock, as institutions may be affected in different ways and magnitudes depending on their business models, systemic importance and funding strategies.

In practice, however, this individual assessment should not prevent competent authorities from issuing general guidance for all institutions during a market-wide shock (see section on measures of the supervisor).

Contrary to a systemic liquidity stress, an idiosyncratic liquidity shock might result from either unwise management or strategic decisions of a particular institution, or from an unexpected downturn in the market conditions or a combination of these factors. In assessing circumstances of idiosyncratic stress, the supervisor should consider only events that remain outside of the decision power of a given institution, in order not to favour moral hazard. The liquidity buffer does constitute a reserve of liquidity in times of stress and should not be included in the regular management of liquidity by an institution.

In order to appreciate whether the use of the liquid asset buffer is justified or not, circumstances of stress should be appreciated according to the following criteria:

-they result from factors that are external to an institution's own decisions

-they are unexpected - the institution is not able to mitigate or reduce the scope of these events, at least under a short-term horizon.

Only the competent authorities have the required competence, level of expertise, information and powers to assess and determine (i) whether indicators of circumstances of stress were met for an individual institution, and (ii) whether this stress was due to external factors or to inappropriate decisions taken by an institution. The competent authority should then as a next step determine what the most suitable measures are and plan to restore the liquid asset buffer, taking into account the actual causes of stress.

If the ratio of a consolidating or sub-consolidating institution falls below the required level, or if it expects not to meet this level, it is very likely that at least one of the individual entities of the consolidated or sub-consolidated group would not meet the requirement either, or would be confronted with a deteriorating liquidity position while not being subject to Part 6 requirements on a solo basis. In this case, the competent authority should also assess whether circumstances of stress are met at the consolidated or sub-consolidated level. This assessment, however, would depend largely on the individual situation of one or several entities of the group or sub-group.

### **III - Appropriate supervisory measures on how to address non-compliance**

As set out in Article 412(3) of the CRR, institutions may use the buffer of liquid assets required to fulfill the liquidity coverage requirement to meet their obligations under stressed circumstances.

In accordance with Article 414 of the CRR an institution should, when not complying with the liquidity coverage requirement and stable funding requirement as set out in the Articles 412 and 413 of the CRR respectively, "immediately notify the competent authorities and should submit without undue delay to the competent authorities a plan for the timely restoration of compliance'[...].' As appropriate, the institution should report daily by the end of each business day unless the competent authority authorises a lower reporting frequency and a longer reporting delay. In so doing, the competent authorities should take into account the individual situation of an institution and the scale and complexity of the institution's activities. Furthermore they should monitor the implementation of the restoration plan and should require a more speedy restoration plan if appropriate.

The Provisions set out in the CRR incorporate what are considered the most important points:

- Immediate notification.
- Set up of a restoration plan.
- Close contact between institutions and supervisors.

But these points should be extended and specified to provide guidance to competent authorities and harmonise processes across Member States.

The Basel III Liquidity Coverage Ratio framework of January 2013 can serve as a basis.

Paragraph 18 provides some general guidance in the form of principles:

- Supervisors should assess conditions at an early stage, and take actions if deemed necessary, to address potential liquidity risk
- Supervisors should allow for differentiated responses to a reported LCR below 100%. Any potential supervisory response should be proportionate with the drivers, magnitude, duration and frequency of the reported shortfall
- Supervisors should assess a number of firm- and market-specific factors in determining the appropriate response, as well as other considerations related to both domestic and global frameworks and conditions. Potential considerations include, but are not limited to:
  - a) The reason(s) that the LCR fell below 100%.
  - b) The extent to which the reported decline in the LCR is due to a firm-specific or market-wide shock.
  - c) A bank's overall health and risk profile, including activities, positions with respect to other supervisory requirements, internal risk systems, controls and other management processes.
  - d) The magnitude, duration and frequency of the reported decline of HQLA.

The potential for contagion to the financial system and additional restricted flow of credit or reduced market liquidity due to actions to maintain an LCR of 100%.

- e) The availability of other sources of contingent funding, such as central bank funding, or other actions by prudential authorities.

Supervisors should have a range of tools at their disposal to address a reported LCR below 100%. Banks may use their stock of HQLA in both idiosyncratic and systemic stress events, although the supervisory response may differ between the two.

At the very least, a bank should present an assessment of its liquidity position, including the factors that contributed to its LCR falling below 100%, the measures that have been and will be taken and the expectations on the potential length of the situation.

If appropriate, supervisors could also require actions by a bank to reduce its exposure to liquidity risk, strengthen its overall liquidity risk management, or improve its contingency funding plan.

However, in a situation of sufficiently severe system-wide stress, effects on the entire financial system should be considered. Potential measures to restore liquidity levels should be discussed, and should

be executed over a period of time considered appropriate to prevent additional stress on the bank and on the financial system as a whole.

Supervisors' responses should be consistent with the overall approach of the prudential framework.

To conclude on principles laid down in the Basel Text, it is important to investigate the type of stress – idiosyncratic or market-wide – an institution is faced with. Supervisory actions should be proportionate with the drivers, magnitude, duration and frequency of the reported shortfall. Their impacts have to be seen in a system-wide context.

From a legal point of view, competent authorities may take measures under Article 102 and use their powers under Article 104 of the CRD in the event of a breach of the liquidity coverage requirement set out in Article 412 of the CRR. This provision should serve as a basis for supervisory measures to be adopted, if applicable.

Supervisors should also consider the possibility of imposing prudential charges on individual institutions which face a potential or actual non-compliance of their ratio.

Some specific supervisory measures after the assessment of banks' restoration plans could be:

- a) Request structural increase of – preferable long term funded – stock of eligible liquid assets;
- b) (external) audit of liquidity risk management and measurement;
- c) increase frequency / granularity of data requirements;
- d) consider/discuss change of business model;
- e) impose restrictions on maturity or currency mismatches between assets and liabilities;
- f) in case of one-sided funding strategy and high concentration in type of funding: require diversification expressed in targets and limits with regard to shares of various types of funding;
- g) limit encumbrance level;
- h) limits on currency mismatch in funding;
- i) limitation of lending.

In order to discover potential liquidity shortfalls, banks with a significant liquidity coverage requirement decrease (e.g. at least -25% in comparison to the previous month or at least -10% in each of the last 3 consecutive months) can be subject to a closer monitoring by their supervisor, in particular if there is a real hazard that they will not comply with the liquidity coverage requirement in the future. Supervisors should at least strengthen the contact to the banks.

When considering which supervisory measures it should resort to, the supervisor should also define an appropriate time schedule for their implementation. By doing so, the supervisor should consider, among other things, the potential effects of these measures on the institution and on the financial

system as a whole, and the overall approach of the prudential framework. It should ensure that potential measures actually prevent additional stress on the institution and the financial system as a whole.

If the liquidity coverage requirement of a consolidating or sub-consolidating institution falls below the required level or if the institution expects not to meet this level, it is very likely that at least one of the individual entities of the consolidated or sub-consolidated group would not meet the requirement either. Therefore, the competent authority should also take into account the consolidated or sub-consolidated level of the liquidity coverage requirement before taking the appropriate measures. By doing so, the authority should also take into account liquidity management practices of the group or sub-group, in order to determinate what the most efficient and appropriate level to implement its measures would be.

In the case of a cross-border institution using its liquidity buffer, the competent authority responsible for the supervision of the entity should liaise with the other authorities in charge, in line with the principles of coordination and cooperation defined under Article 117 of the CRD.

## References

- ACP/BdF (2012), The Liquidity Coverage Ratio and Central Banks' Balance Sheet Proposals for the modification of the Liquidity Coverage Ratio, unpublished note submitted to the BCBS ECC, Paris. [unpublished]
- Acharya Viral, S.Viswanathan (2010), 'Leverage, Moral Hazard and Liquidity,' Journal of Finance, forthcoming.
- Acharya, V., H. Shin, T. Yorulmazer (2011), Crisis Resolution and Bank Liquidity, Review of Financial Studies, 24(6), 2166-2205.
- Abouhossein, L. (2011), All eyes on funding: LCR, the next undiscounted regulatory headwind, JP Morgan, London.
- Aisen, A., M. Franken (2010), Bank Credit During the 2008 Financial Crisis: A Cross-Country Comparison, IMF Working Paper 10/47, Washington.
- Allen, F., A. Babus, E. Carletti (2011), Asset Commonality, debt maturity and systemic risk, Journal of Financial Economics, forthcoming.
- Allen, F., D. Gale (2004a), Financial fragility, liquidity and asset prices, Journal of the European Economic Association, 2(6), 1015-1048..
- Allen, F., D. Gale (2004b), Financial intermediaries and markets, Econometrica, 72(4), 1023-1061.
- Balasubramanyan, L., D. D. VanHoose (2012), Bank Balance Sheet Dynamics under a Regulatory Liquidity-Coverage-Ratio Constraint, Federal Reserve Bank of Cleveland WP 12-09, Cleveland.
- Banking Stakeholder Group (2012), New Banking Liquidity Rules: Dangers Ahead, London.
- BCBS (2009), MC Compendium Monetary policy frameworks and central bank market operations, Markets Committee, Basel. <http://www.bis.org/publ/mktc03.pdf>
- BCBS (2010), An assessment of the long-term economic impact of stronger capital and liquidity requirements, Basel.
- BCBS (2012), Instructions for Basel III monitoring, <http://www.bis.org/bcbs/qis/biiiimplmoninstr.pdf>.
- BCBS (2013), Group of Governors and Heads of Supervision endorses revised liquidity standards for banks, press release, <http://www.bis.org/press/p130106.pdf>
- BCBS (2013a), Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools, <http://www.bis.org/publ/bcbs238.pdf>.
- BCBS (2013b), Liquidity stress-testing: a survey of theory, empirics and current industry and supervisory practices PDG/13/43, Basel Committee of Banking Supervision WP 24, Basel. [http://www.bis.org/publ/bcbs\\_wp24.pdf](http://www.bis.org/publ/bcbs_wp24.pdf)
- BCBS (20013c), Literature review of factors relating to liquidity stress – extended version PDG/13/44, Basel Committee of Banking Supervision WP 25, Basel. [http://www.bis.org/publ/bcbs\\_wp25.pdf](http://www.bis.org/publ/bcbs_wp25.pdf)
- BIS (2012), ECC working group on central banking lending and liquidity regulations, Basel. [unpublished]
- BIS (2013), Central bank collateral frameworks and practices, A report by Study Group established by the Markets Committee, Basel. <http://www.bis.org/publ/mktc06.pdf>
- Bech, M., T. Keister (2012), On the liquidity coverage ratio and monetary policy implementation, BIS Quarterly Review, December, 49-61. [http://www.bis.org/publ/qtrpdf/r\\_qt1212g.pdf](http://www.bis.org/publ/qtrpdf/r_qt1212g.pdf)
- Berrospide, J, R. Meisenzahl, D. Sullivan (2012), Credit line use and availability in the financial crisis: the importance of hedging, Board of Governors of the Federal Reserve System, Finance and Economics Discussion Series, no 2012-27

Bindseil, U., J. Lamoot (2011), The Basel III framework for liquidity standards and monetary policy implementation, Humboldt-Universität zu Berlin SFB 649 Discussion Paper 2011-041, <http://sfb649.wiwi.hu-berlin.de/papers/pdf/SFB649DP2011-041.pdf>

Bonfim, D., M. Kim (2012), Liquidity risk in banking: is there herding? Banco de Portugal WP, Lisbon.

Bonner, C. (2012), Liquidity Regulation, Funding Costs and Corporate Lending, DNB Working Paper, 361 (<http://econpapers.repec.org/paper/dnbdnbwpp/361.htm>)

Bonner, C., S. Eijffinger (2012), The Impact of the LCR on the Interbank Money Market, DNB Working Paper, 364 (<http://econpapers.repec.org/paper/dnbdnbwpp/364.htm>)

Brunnermeier, M. (2009), Deciphering the 2007-08 Liquidity and Credit Crunch, Journal of Economic Perspectives, 23(1), 77-100. 27

Brunnermeier, M. and L. Pedersen (2009), Market liquidity and funding liquidity, Review of Financial Studies, 22(6), 2201-2238.

Brunnermeier, M., A. Crockett, C. Goodhart, A. Persaud, H. Shin (2009), Geneva Report: The fundamental principles of financial regulation.

Cipriani, M., A. Martin, B. M. Parigi (2013), Money Market Funds Intermediation, Bank Instability, and Contagion, Federal Reserve bank of New York Staff Report No. 599, New York.

Coeure, B. (2012), The importance of money markets, speech at the Morgan Stanley 16th Annual Global Investment seminar, Tournettes, Provence, 16 June 2012 <http://www.ecb.int/press/key/date/2012/html/sp120616.en.html>.

Committee for the Global Financial System (CGFS) (2013), Asset encumbrance, financial reform and the demand for collateral assets, CGFS Papers No. 49, Basel, <http://www.bis.org/publ/cgfs49.pdf>.

Committee of European Banking Supervisors (CEBS) (2009), Report on Supervisors' Lessons Learnt - A Liquidity Risk Perspective, CEBS 2009 107, London.

Committee of European Banking Supervisors (CEBS) (2010), Guidelines on Liquidity Cost Benefit Allocation, <http://www.eba.europa.eu/cebs/media/Publications/Standards%20and%20Guidelines/2010/Liquidity%20cost%20benefit%20allocation/Guidelines.pdf>

Cornett, M. M., J. J. McNutt, P. E. Strahan, H. Tehranian (2012), Liquidity risk management and credit supply in the financial crises, Bentley University WP.

Correa, R., H. Sapriza, A. Zlate (2012), Liquidity shocks, dollar funding costs, and the bank lending channel during the European sovereign crises, Board of Governors of the Federal Reserve System, Washington.

Dagher, J. C., K. Kazimov (2012), Banks' liability structure and mortgage lending during the financial crises, IMF WP, Washington.

de Haan, L., J. W. van den End (2013), Banks' response to funding liquidity shocks: lending adjustment, liquidity hoarding and fire sales, Journal of International Financial Markets, Institutions and Money, forthcoming.

de Haan, L., J. W. van den End (2012), Bank liquidity, the maturity ladder, and regulation, De Nederlandsche Bank WP 346, Amsterdam.

Delechat, C., C. Nehao, P. Muthoora, S. Vtyurina (2012), The determinants of banks' liquidity buffers in central America, IMF WP 12/301

Diamond, D., P. Dybvig (1983), Bank runs, deposit insurance, and liquidity, Journal of Political Economy, 91(3), 401-419.

Diamond, D., R. Rajan (2001), Liquidity risk, liquidity creation and financial fragility: a theory of banking, *Journal of Political Economy*, 109(2), 287-327.

Diamond, D., R. Rajan (2001), Banks and liquidity, *American Economic Review*, 91(2), 422-425.

DeBelle, G. (2011), The Committed Liquidity Facility, Speech by the Assistant Governor of the Reserve Bank of Australia to the APRA Basel III Implementation Workshop 2011, Sydney.

EBA (2012), Results of the Basel III monitoring exercise as of 30 June 2011, London.

EBA (2013), Results of the Basel III monitoring exercise based on data as of 30 June 2012, London.

EBA (2013a), Consultation on draft Guidelines on retail deposits subject to different outflows for purposes of liquidity reporting (EBA/CP/2013/34).

ECB (2008) EU banks' liquidity stress tests and contingency funding plans, Frankfurt.

ECB (2012), Liquidity regulation as a prudential tool, ECB Financial Stability Review, Frankfurt.

ECB (2012b), The impact of the Basel III liquidity risk regulation on the recourse of banks to Eurosystem monetary policy operations and related effects on financial markets, Final Report by the Task Force on the impact of Basel III liquidity risk regulation on the recourse of banks to Eurosystem monetary policy operations and its effects on financial markets, Frankfurt. [unpublished]

ECB (2013), Liquidity Regulation and Monetary Policy Implementation, Monthly Bulletin, April, Frankfurt, 1-17.

ECB (2013a) Euro area financing environment (Q4 2012): Financing conditions, balance sheet developments, credit intermediation and Bank Lending Survey, Frankfurt.

ECB (2013b), First regular monitoring exercise of the impact of Basel III liquidity regulation, Report by the Monitoring Group on Basel III, Frankfurt. [unpublished]

ECB (2013c), Euro money market study 2012, <http://www.ecb.europa.eu/pub/pdf/other/euromoneymarketstudy201212en.pdf?9f56e7ec4e3c248b50b51db290ef05f3>

ECB (2013d), Corporate finance and economic activity in the Euro area, Structural issues report 2013, Task Force of the Monetary Policy Committee of the European System of Central Banks, Occasional Papers Series No. 151, Frankfurt, <http://www.ecb.europa.eu/pub/pdf/scpops/ecbocp151.pdf>

ECB (2013e), A limited recognition of central bank eligible non-encumbered currently non-HQLA in a revised nominator of the LCR, Monetary Operations Committee

Eisenschmidt, J, J. Tapking (2009), Liquidity Risk Premia in Unsecured Interbank Money Markets, ECB Working Paper 1025, Frankfurt.

Elliott, D.J. (2009) Quantifying the Effects on Lending of Increased Capital Requirements. Pew Financial Reform Project. The Brookings Institution.

Elliott D., Salloy S. & Santos A.O. (2012) Assessing the Cost of Financial Regulation, IMF Working Paper.

Elliott, J., S. Mitra (2012), The reform agenda: An interim report on progress toward a safer financial system, IMF WP, Washington.

Farhi, E., M. Golosov, A. Tsyvinski (2009), A theory of liquidity and regulation of financial intermediation, *Review of Economic Studies*, 76(3), 973-992.

Farhi, E., J. Tirole (2012), Collective Moral Hazard, Maturity Mismatch, and Systemic Bailouts, *American Economic Review*, 102(1), 60—93.

Financial Services Authority(2008), Strengthening Liquidity Standards, 08/22, London.

Freixas, X., B. M. Parigi, J.-C. Rochet (2003) The lender of last resort: a 21st century approach, ECB Working Paper Nr. 298

- Gale, D., T. Yorulmazer (2011), Liquidity hoarding, mimeo
- Giavazzi, F, Giovannini, A (2010) Central Banks and the Financial System Working Paper n. 425
- Gonzales-Eiras, M. (2004), Banks' Liquidity Demand in the Presence of a Lender of Last Resort, mimeo.
- Gorton, Gary (2009), Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007, paper prepared for the Federal Reserve Bank of Atlanta's 2009 Financial Markets Conference, May.
- Goodhart, C. A. E. (2008), The background to the 2007 financial crisis, *International Economics and Economic Policy* 4, 311-46.
- Hartmann-Wendels, T., A. Pfingsten and M. Weber (2007), *Bankbetriebslehre*, Springer, Berlin.
- Heider, F, M. Hoerova, C. Holthausen, (2009), Liquidity hoarding and interbank market spreads: The role of counterparty risk, ECB Working Paper No 1126, Frankfurt.
- Hempell, H.S., Kok, C. S. (2010), The impact of supply constraints on bank lending in the euro area crisis induced crunching? ECB working paper 1262, Frankfurt
- Ho K., Ishii J. (2011), Location and Competition in Retail Banking.
- Houben, A., J. W. Slingenberg (2013), Collateral scarcity and asset encumbrance: implications for the European financial system, Banque de France, *Financial Stability Review*, No. 17, 197-206.
- IIF (2012), Specific impacts of regulatory change on end-users, Washington.
- Ioannidou, V., M. F. Penas (2010), Deposit Insurance and Bank Risk-taking: Evidence from Internal Loan Ratings, *Journal of Financial Intermediation*, 19(1), 95-115
- Jackson, C., M. Sim (2013), Recent developments in the sterling overnight market, Bank of England Quarterly Bulletin 2013 Q3, 223-232.
- Kiyotaki, N., Moore, J. (1997), Credit Cycles, *Journal of Political Economy* 105 (2), 211–248
- Kwan, S. H. (2010), Financial Crisis and Bank Lending, Federal Reserve Bank of San Francisco Discussion Paper, San Francisco.
- Liquidatum (2012), Defining Operational deposits - A peer review of 13 banks, representing Australia, Europe, North America and Emerging Markets, London.
- LR-MPO Task Force (2012), The impact of the Basel III liquidity risk regulation on the recourse of banks to Eurosystem monetary policy operations and related effects on financial markets, SEC/GovC/X/12/189a, Frankfurt.
- Macroeconomic Assessment Group (2010a), Assessing the Macroeconomic Impact of the Transition to Stronger Capital and Liquidity Requirements, Interim Report.
- Macroeconomic Assessment Group (2010b), Assessing the Macroeconomic Impact of the Transition to Stronger Capital and Liquidity Requirements, Final Report.
- Mariathasan, M., O. Merrouche (2011), Recapitalization, credit and liquidity, European University Institute, Florence.
- Modigliani F.,L. Modigliani (1997), Risk-Adjusted Performance.
- Morris, S., H. S. Shin (2009), Illiquidity Component of Credit Risk', mimeo, Princeton University, available at <http://www.princeton.edu/hsshin/www/IlliquidityComponent.pdf>.
- Perotti, E., J. Suarez (2011), A Pigovian Approach to Liquidity Regulation, *International Journal of Central Banking*, 7, 3-41.
- Rochet, J.-C. (2008) Liquidity regulation and the lender of last resort, Banque de France *Financial Stability Review*, Special issue on liquidity No. 11, 45-52.

- Rochet, J. C. (2004), Macroeconomic shocks and banking supervision, *Journal of Financial Stability*, 1(1), 93-110.
- Rochet, J. C., X. Vives (2004), Coordination failures and the lender of last resort: was Bagehot right after all?, *Journal of the European Economic Association*, 2(6), 1116— 1147.
- Scharler, J., F. Sindermann (2012), Do banks lend less in uncertain times?, University of Innsbruck WP, Innsbruck.
- Schmitz, S. W., M. Latzer (eds.) (2002), *Carl Menger and the Evolution of Payment Systems: From Barter to Electronic Money*, Edward Elgar, Cheltenham
- Schmitz, S. W., G. E. Wood (eds.) (2006), *Institutional Change in the Payments System and Monetary Policy*, Routledge, London
- Schmitz, S. W., A. Ittner (2007), Why central banks should look at banks' liquidity risk management, *Central Banking Vol. XVII No. 4*, 32-40.
- Schmitz, S. W. (2011), The Implementation of Basel III Liquidity Standards in CRD IV, The 2011 Forum on Basel III Implementation, July 12, Zurich. <http://www.univie.ac.at/ivc/mitarbeiter/schmitz/Zurich2011.ppt>
- Schmitz, SW (2013), The Impact of the LCR on the Implementation of Monetary Policy, *Economic Notes Vol. 42 No. 2*, 135-170.
- Schneider, Y., B. Fischer, P. Zenhäusern, S. Vaterlaus (2012), *Bankenregulierung im internationalen Vergleich*, Metrobasel.
- Sharma, V. K. (2011) Identifying systemic risk in global markets – lessons learned from the crisis, Address by Mr V K Sharma at the 2nd Pan Asian Regulatory Summit – Identifying Systemic Risk in Global Markets Lessons learned from the crisis: Asian regulators' views on what have they done to contain the building up of systemic risk and to prevent the recurrence of future crisis – organised by Thomson Reuters, Singapore, 28–29 September
- Stein, J. C. (2012), Overheating in Credit Markets: Origins, Measurement, and Policy Response, Speech at the symposium 'Restoring Household Financial Stability after the Great Recession: Why Household Balance Sheets Matter', St. Louis.
- Stein, J. C. (2013), Liquidity Regulation and Central Banking, Speech at the Symposium 'Finding the right balance', Federal Reserve Bank of Richmond, Charlotte.
- Tarullo, D. K. (2012) Shadow Banking After the Financial Crisis, Remarks by Member Board of Governors of the Federal Reserve System via Satellite to the Federal Reserve Bank of San Francisco Conference on Challenges in Global Finance San Francisco, Calif., June 12
- Tirole, J. (2011), Illiquidity and all its friends, *Journal of Economic Literature*, 49(2), 287-325.
- Trichet, J.-C. (2009), (Under-)pricing of risks in the financial sector, Speech by Jean-Claude Trichet, President of the ECB delivered at the Coface Country Risk Conference 2009 Carrousel du Louvre, Paris, 19 January
- Van den End, J.W., M. Tabbæ (2012), When liquidity risk becomes a systemic issue: Empirical evidence of bank behaviour, *Journal of Financial Stability* 8(2), 107–120.
- Vazquez, F., P. Federico (2012), Bank funding structures and risk: Evidence from the global financial crises, IMF WP, Washington.
- Vitaly M. Bord, V. M., J. A. C. Santos (2011), Banks liquidity and cost of liquidity for corporations, Federal Reserve Bank of New York.
- Vives, X. (2011), Strategic Complementarity, Fragility, and Regulation, CEPR Discussion Paper No. 8444.

Volk, B. (2013), Special report: Snapshot European agencies and supranational entities, Deutsche Bank, London.

Weber, B., S. W. Schmitz (2011), „Varieties of helping capitalism. Politico-economic determinants of bank rescue packages in the EU during the recent crisis’, *Socio-Economic Review* 9 (4), 639-69

zeb/ (2013), Aktuelle Herausforderungen im Liquiditätsrisikomanagement – Fokus LCR und Liquiditätskostenverrechnung, Wien/Münster

# Data appendix

## Data appendix 1: Can publicly available BLS data contribute to the analysis of the impact of the LCR on SME lending?

### Bank Lending Survey (BLS)

Article 509(1) of the CRR mandates the EBA with assessing the potential materially detrimental impact of the LCR on SME credit supply. Data availability on SME loans is, however, limited as national statistics on bank lending often do not differentiate between loans granted to SMEs and other non-financial corporations.

In this note we analyse whether the Bank Lending Survey<sup>91</sup> (BLS) could represent a valuable source for information on changes in SME loan growth in the context of this report. Since 2002 Q4 quarterly results are available at the ECB's statistical Data Warehouse for Austria, Germany, Spain, Italy, Luxembourg, the Netherlands and Portugal. Belgium, Ireland and France publish their results via their NCBs. For Cyprus, Estonia, Malta and Slovenia data is not available for the entire time period (as they joined the Eurozone later). All of these available time series were analysed. Some non-Euro countries conduct similar surveys.<sup>92</sup> However, major drawbacks of the BLS survey are the limited public availability of results and their qualitative<sup>93</sup> nature.

### SME credit standards & impacting factors

The BLS contains information on how the bank's credit standards as applied to the approval of loans or credit lines to enterprises have changed over the past three months and what factors contribute to these changes.<sup>94</sup> In all Eurozone countries credit standards for SMEs appear to be tighter in 2012 than in 2002. What contributed to the tightening of SME credit standards? The BLS questionnaire differentiates between the following factors:

- Perception of risk
  - Expectations regarding general economic activity
  - Industry or firm-specific outlook
  - Risk on the collateral demanded
- Cost of funds and balance sheet constraints
  - Costs related to the bank's capital position (can involve the use of credit derivatives, with the loans remaining on the bank's balance sheet)
  - The bank's ability to access market financing (e.g. money or bond market financing, including true-sale securitisation)
  - The bank's liquidity position
- Pressure from competition
  - Competition from other banks
  - Competition from non-banks
  - Competition from market financing

First, BLS data reveal that credit standards evolve quite heterogeneously across countries. Second, the contribution of the above factors to observed credit standards differ over time and countries. The recent ECB study on "Euro area financing environment (Q4 2012)"<sup>95</sup> states "Cross-country heterogeneity in financing conditions remains elevated and points to persisting constraints in some jurisdictions or parts of the economic landscape" (ECB 2013a). It is emphasised that cross-country

---

<sup>91</sup> <http://www.ecb.int/stats/money/surveys/lend/html/index.en.html>

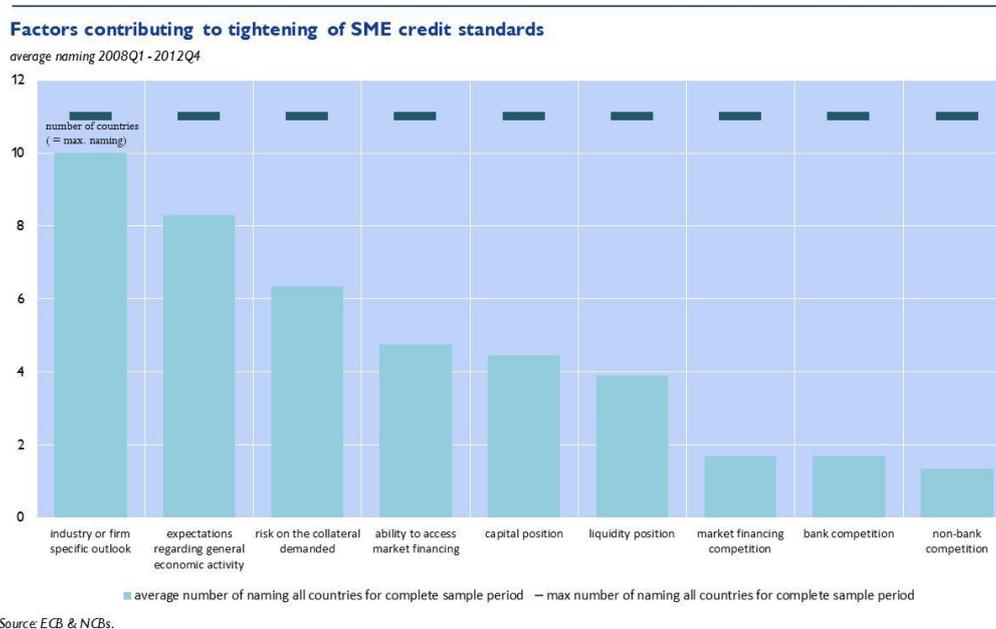
<sup>92</sup> For example: UK, Hungary, Czech Republic, Denmark, Latvia, Lithuania and Slovakia. Because these surveys differ in the methodologies applied and partly cover very short time periods, comparability is limited.

<sup>93</sup> Subjectivity might be a downside of this data set.

<sup>94</sup> Predefined (qualitative) responses on the credit standard change range from 'tightened considerably', 'considerably', 'tightened somewhat', 'somewhat', 'remained basically unchanged', 'unchanged', 'eased somewhat/somewhat/somewhat' to 'eased considerably/considerably/considerably'.

heterogeneity is particularly high regarding the credit access of SMEs<sup>95</sup>, where specific vulnerabilities in financing are strongly binding for some countries.<sup>96</sup>

The following graph illustrates the average number of countries naming the respective factor as contributing to SME credit standard tightening between 2008Q1 and 2012Q4, while the green bar illustrates the maximum number of namings<sup>97</sup>.



The main factors contributing to the tightening of SME credit standards across countries and time are related to **banks' perception of risk**<sup>98</sup>: *industry or firm specific outlook*, *expectations regarding the general economic activity* followed by *risk on the collateral demanded*.

These are followed by factors indicating the **impact of costs of funds and balance sheet constraints**: *bank's ability to access market financing* (e.g. money or bond market financing, including true-sale securitisation), *bank's capital position* and *banks' liquidity position*; whereas **pressure from competition** is of minor relevance for tightening SME credit standards.

Can we draw any conclusions from the available BLS data concerning the impact on liquidity constraints? The effect of *banks' ability to access market financing* and *banks' liquidity position*<sup>99</sup> are time varying, with the greatest impact on the credit standard tightening in 2008 and Q4 2011. It can be followed that the effect was greatest at the peak of the financial crisis.<sup>100</sup>

Ad hoc questions (that address the effect Basel III capital requirements may have on banking policy) are regularly a part of the BLS, the last time being in January 2013. **Capital regulatory**

<sup>95</sup> A strong issuance activity in 2012 indicates a substitution from loans in environment of tight bank lending policies – a circumventing opportunity available for larger companies.

<sup>96</sup> ECB (2013)

<sup>97</sup> Data is available for the whole time period for those 11 countries: Austria, France, Germany, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovenia and Spain.

<sup>98</sup> The January 2013 BLS confirms that risk perceptions factors are those contributing the most to credit supply tensions. The impact of the various factors on banks' SME credit standards in the Euro area is presented in the Annex.

<sup>99</sup> There are no signs that questions regarding the liquidity situation (LCR, NFSR) under EU-QIS (which is conducted twice a year in Q2 and Q4) have an influence on the reported impact of banks' liquidity position on credit standards in the BLS.

<sup>100</sup> The observation of varying impact of the bank's access to market finance and liquidity complies with the results of Hempell and Kok (2010), who analysed the impact of supply constraints on the bank lending on basis of the BLS. They are regressing potential factors on the development of loans to non-financial corporations. 'Access to market financing' and 'banks' liquidity positions are insignificant for the non-crisis period (crisis period is from 2007Q3 to 2009Q4). 'This could serve as an indication that banks' liquidity conditions and access to wholesale funding had no, or very limited, relevance for bank lending to non-financial corporations in the pre-crisis period and was, by contrast, highly relevant for banks in the crisis period.'

**requirements**<sup>101</sup> have not been a major factor for SME credit standard development yet. The question captures only capital requirements of the Basel III framework set out in CRD IV (July 2011) and does not provide information on liquidity requirements. In all three surveys including the one from July 2012, more than 90% of responding banks did not report tightening SME credit standards due to new regulatory requirements. In January 2013 15 % of the banks reported that credit standards have been tightened somewhat.

**Based on BLS ad-hoc questionnaires, no specific information for assessing the impact of the LCR on SME lending standards is available.** The impact of *banks' ability to access market financing* and *banks' liquidity position* on SME lending standards corroborates the findings of the survey of the empirical literature regarding the negative impact of liquidity shocks on lending.

Table DA1.1: Impact of various factors on banks' SME credit standards in the Euro area (changing composition), diffusion index

	Impact of expectations regarding general economic activity	Impact of industry or firm specific outlook	Impact of risk on the collateral demanded	Impact of capital position	Impact of ability to access market financing	Impact of liquidity position	Impact of bank competition	Impact of non-bank competition	Impact of market financing competition
2008Q1	19	20	9	5	10	6	-1	1	2
2008Q2	24	26	9	6	9	4	-1	1	1
2008Q3	34	34	18	10	13	8	6	4	4
2008Q4	42	40	23	13	15	11	3	2	2
2009Q1	30	35	20	8	10	8	4	3	3
2009Q2	22	23	13	4	3	0	2	1	1
2009Q3	14	18	7	2	-2	-4	-2	-1	-1
2009Q4	6	12	6	3	-1	-4	-2	0	0
2010Q1	5	10	2	3	1	-3	-3	-1	-1
2010Q2	5	7	5	3	6	3	-4	0	0
2010Q3	3	5	4	3	2	1	-3	-1	-1
2010Q4	4	2	3	2	1	0	-4	-1	-1
2011Q1	5	3	2	2	4	3	-3	0	0
2011Q2	5	4	3	2	3	3	-3	-1	-1
2011Q3	7	9	3	3	6	4	-1	-1	0
2011Q4	19	18	10	8	12	14	0	0	0
2012Q1	7	8	3	2	0	1	-5	0	0
2012Q2	11	11	5	4	1	1	-2	0	0
2012Q3	14	14	3	3	0	-1	-1	0	1
2012Q4	11	12	4	3	0	0	0	0	0

<sup>101</sup> Under 'regulatory capital requirements' the BLS sums up the regulatory framework ('Basel III') published by the Bank for International Settlements, as well as those resulting from the EBA and any other specific national regulations concerning banks' capital and liquidity requirements that have recently been approved or are expected to be approved in the near future.

The diffusion index is defined as the difference between the weighted sum of the percentages of banks responding “contributed considerably to tightening” and “contributed somewhat to tightening,” and the weighted sum of the percentages of banks responding “contributed considerably to easing” and “contributed somewhat to easing”. The diffusion index is weighted according to the intensity of the response, giving lenders who have answered “considerably” a weight twice as high (score of 1) as lenders having answered “somewhat” (score of 0.5).

Source: ECB

Data appendix 2: Full list of banks in the Loan Pricing Corporation's Dealscan (LPC) used in Technical appendix 3.4.1. part C.

Name	Country
Belfius Bank & Insurance SA/NV [ex-Dexia Bank Belgium SA/NV]	BE
Dexia Bank SA	BE
Fortis	BE
KBC Bank	BE
Banco Santander (Suisse) SA	CH
Banque Cantonale de Geneve [BCGE]	CH
Banque Cantonale du Valais	CH
Banque Cantonale Vaudoise	CH
Banque Internationale de Commerce	CH
Basler Kantonalbank [BKB]	CH
CIC Banques	CH
CIC Credit Industriel et Commercial	CH
CIC Credit Mutuel	CH
CIC Lyonnais de Banque	CH
Credit Suisse	CH
FIBI Bank Ltd	CH
Kantonalbank of Zurich	CH
Luzerner Kantonalbank	CH
UBS	CH
Zurcher Kantonalbank [ZKB]	CH
Baden-Wuerttembergische Bank AG [BW-Bank]	DE
Bankhaus Lampe KG	DE
Bayerische Hypo-und Vereinsbank AG	DE
Bayerische Landesbank GZ	DE
BayernLB	DE
BHF Bank AG	DE
Bremer Landesbank Kreditanstalt Oldenburg GZ	DE

Commerzbank	DE
DekaBank	DE
Deutsche Apotheker-und Arztebank	DE
Deutsche Bank AG	DE
Deutsche Postbank AG	DE
Deutsche Schiffsbank AG	DE
Dresdner Bank AG	DE
DZ Bank AG	DE
Handelsbanken	DE
HSN Nordbank AG	DE
Hypothekenbank Frankfurt AG [Ex-Eurohypo AG]	DE
HypoVereinsbank	DE
IKB Deutsche Industrie Bank AG	DE
ING BHF-Bank AG [Frankfurt]	DE
KfW	DE
Kreissparkasse	DE
Landesbank	DE
Landessparkasse zu Oldenburg	DE
Norddeutsche	DE
NordLB Group	DE
Oldenburgische Landesbank	DE
Portigon AG [ex-WestLB AG]	DE
Sal Oppenheim jr & Cie KGaA	DE
Siemens Credit Corp	DE
Sparkasse KoInBonn	DE
Volksbank Oberberg eG	DE
Westdeutsche Genossenschafts-Zentralbank eG [WGZ-Bank]	DE
WGZ Bank	DE
Arbejdernes Landesbank	DK
Danske Bank A/S	DK
FIH Erhvervsbank A/S	DK
Jyske Bank	DK
Nordea Bank AB	DK
Nykredit Bank AS	DK

Agricultural Bank of Greece SA [ATE]	EL
Alpha Bank AE	EL
Banque Nationale de Grece	EL
EFG Telesis Finance SA	EL
Emporiki Bank of Greece SA	EL
Geniki Bank of Greece SA [Ex-General Bank of Greece SA]	EL
National Bank of Greece SA	EL
Banco Bilbao Vizcaya Argentaria SA	ES
Banco Cooperativo Espanol SA	ES
Banco de Sabadell SA	ES
Banco Espanol de Credito SA [Banesto]	ES
Banco Popular Espanol SA	ES
Banco Sabadell	ES
Banco Santander	ES
Banco Urquijo SA	ES
Banco Valencia	ES
Banesto	ES
Bankia	ES
Bankinter SA	ES
BBVA	ES
Bilbao Bizkaia Kutxa [BBK]	ES
Caixa Catalunya International Finance Ltd	ES
Caixa Galicia	ES
Caixa Geral de Depositos SA [CGD]	ES
Caixa Nova	ES
Caixa San Fernando	ES
Caixabank	ES
Caja de Ahorros de Galicia	ES
Caja de Ahorros del Mediterraneo SA [US]	ES
Caja de Avila SA	ES
Caja de Badajoz	ES
Caja de Segovia SA	ES
Caja Espana de Inversiones	ES
Caja Madrid [Caja de Ahorros y Monte de Piedad de Madrid SA]	ES

Caja Navarra	ES
Caja Rural del Duero	ES
Caja Vital Kuxta	ES
Centrobanca SpA	ES
El Monte	ES
Grupo Banco Popular	ES
Ibercaja	ES
ICO [Instituto de Credito Oficial]	ES
Kutxa	ES
La Caixa [La Caja de Ahorros I Pensions de Barcelona]	ES
Liberbank SA	ES
Unicaja	ES
Banque Commerciale pour le Marche de l'Entreprise SA [BCME]	FR
Banque de L' Economie du Commerce et de la Monetique	FR
Banque de l'Economie du Credit Mutuel	FR
Banque Federative du Credit Mutuel [BFCM]	FR
Banque Populaire des Alpes	FR
BNP Paribas	FR
BRED Banque Populaire SA	FR
Caisse Regionale de Credit Agricole Mutuel de Paris et d'Ile de France	FR
CDC Ixis	FR
Credit Agricole	FR
Credit Agricole d'Ile-de-France [CADIF]	FR
Credit du Nord	FR
Credit Industrial et Commercial	FR
Credit Mutuel	FR
Groupe Caisse d'Epargne	FR
Le Credit Lyonnais SA [LCL]	FR
Natixis SA	FR
SG Corporate & Investment Banking	FR
Societe Bordelaise de CIC	FR
Societe Generale SA	FR
Allied Irish Bank	IE
Bank of Ireland	IE

Governor & Co of the Bank of Ireland	IE
Banca Carige SpA	IT
Banca Cassa di Risparmio di Firenze SpA [Carifirenze]	IT
Banca di Legano SpA	IT
Banca di Roma SpA	IT
Banca d'Intermediazione Mobiliare IMI SpA [Banca IMI]	IT
Banca Monte dei Paschi di Siena	IT
Banca Monte Paschi Belgio SA	IT
Banca Nazionale del Lavoro SpA [BNL]	IT
Banca OPI SpA	IT
Banca Popolare dell'Emilia Romagna SCRL [BPER]	IT
Banca Popolare di Bergamo-Credito Varesino (BPB-CV)	IT
Banca Popolare di Milano SCaRL	IT
Banca Popolare di Novara SCaRL	IT
Banca Popolare di Sondrio SCRL [BPS]	IT
Banca Popolare di Vicenza SCaRL	IT
Banco Akros SpA	IT
Banco di Sardegna SpA	IT
Banco di Sicilia SpA	IT
Banco Guipuzcoano SA	IT
Banco Popolare Societa Cooperativa Scrl	IT
Bipop Carire SpA	IT
Capitalia SpA	IT
Credito Bergamasco SpA	IT
Intesa Sanpaolo SpA	IT
IntesaBci SpA	IT
MCC SpA [Ex-Mediocredito Centrale]	IT
Mediobanca	IT
Sanpaolo	IT
UniCredit	IT
Unione di Banche Italiane ScpA [UBI Banca]	IT
Bank of Tokyo-Mitsubishi	JP
Mizuho	JP
Nomura	JP

Norinchukin Bank	JP
Sumitomo	JP
UFJ	JP
Banque & Caisse d'Epargne de I'Etat Luxembourg	LX
Banque et Caisse d'Epargne de L'Etat Luxembourg [BCEE]	LX
Banque Generale du Luxembourg SA [BGL]	LX
Banque LBLux SA	LX
HVB Banque Luxembourg SA	LX
ABN AMRO Bank NV	NL
Artesia Banking Corp	NL
Bank Nederlandse Gemeenten NV [BNG]	NL
Banque Artesia Nederland NV	NL
Cooperative Centrale Raiffeisen-Boerenleenbank BA [Rabobank International]	NL
Hollandsche Bank-Unie BV	NL
ING Bank	NL
ING Capital LLC	NL
NIBC Bank NV	NL
Rabobank	NL
DNB ASA	NW
Eksportfinans ASA	NW
Fokus Bank ASA	NW
Allgemeine Sparkasse Oberosterreich Bank AG	OE
Bank Austria	OE
Bank fur Tirol und Vorarlberg AG	OE
BAWAG PSK [Bank fur Arbeit und Wirtschaft und Osterr'che Postsprkase AG]	OE
Erste Bank AG	OE
Investkredit Bank AG	OE
Kommunalkredit International Bank Ltd	OE
Oberbank AG	OE
Oesterreichische Volksbanken AG [OeVAG]	OE
Osterreichische Volksbanken AG [OVAG]	OE
Raiffeisen	OE
Millennium Bank NA	PL
Banco BPI SA	PT

Banco Comercial Portugues SA [BCP]	PT
Banco Espirito Santo SA [BES]	PT
SEB AG	SD
SEB Merchant Banking AB	SD
Skandinaviska Enskilda Banken AB [SEB]	SD
Svenska Handelsbanken	SD
Swedbank	SD
Abbey National Treasury Services Plc	UK
Alliance & Leicester	UK
Bank of Scotland Plc	UK
Barclays	UK
Clifford Chance LLP	UK
Clydesdale Bank Plc	UK
Co-operative Group Ltd	UK
HSBC	UK
Lloyds	UK
Royal Bank of Scotland	UK
Standard Chartered	UK

### Data appendix 3: Business model data – impact of the scenarios on gross liquidity shortfall relative to baseline

Long-term	Baseline	Scenario 1	Scenario 2a	Scenario 2b	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8
Group 1: Well diversified large cross-border banks with substantial capital market activities (non-member of ESBG and EACB)										
Liquidity shortfall in EUR mio	39.41	39.41	8.82	-	39.41	39.41	770.56	39.41	16.04	17.60
Change from baseline (in %)		0.0%	-77.6%	-100.0%	0.0%	0.0%	1905.18	0.0%	-59.3%	-55.4%
Group 2: Saving and loan associations (member of the European Savings Banks Group (ESBG), including apex institutions)										
Liquidity shortfall in EUR mio	19.93	19.93	13.38	0.37	15.27	19.90	51.49	19.62	10.53	11.05
Change from baseline (in %)		0.0%	-32.9%	-98.1%	-23.4%	-0.2%	190.18	-1.6%	-47.2%	-44.6%
Group 3: Co-operative banks (member of the European Association of Co-operative Banks (EACB), including apex institutions)										
Liquidity shortfall in EUR mio	98.44	96.19	74.23	2.01	98.44	86.76	227.60	98.35	93.26	44.99
Change from baseline (in %)		-2.3%	-24.6%	-98.0%	0.0%	-11.9%	131.28	-0.1%	-5.3%	-54.3%
Group 4: Pass-through financing banks (non-member of ESBG and EACB)										
Liquidity shortfall in EUR mio	5.15	2.93	5.15	5.08	5.15	5.15	5.15	5.15	5.43	3.62
Change from baseline (in %)		-43.0%	0.0%	-1.3%	0.0%	0.0%	0.0%	0.0%	5.5%	-29.8%
Group 5: Leasing and factoring banks (non-member of ESBG and EACB)										
Liquidity shortfall in EUR mio	-	-	-	-	-	-	-	-	-	-
Change from baseline (in %)										
Group 6: Mortgage banks and building societies (non-member of ESBG and EACB)										
Liquidity shortfall in EUR mio	7.74	7.32	6.96	2.00	7.00	7.37	13.59	7.74	6.52	6.51
Change from baseline (in %)		-5.5%	-10.1%	-74.2%	-9.5%	-4.7%	75.6%	0.0%	-15.7%	-15.9%

N.B.: Orange: reduction of the gross shortfall in the respective business group of 75% or more (if maximum reduction below 75 than maximum). Red: increase of gross shortfall of 100% or more.

Group 7: CCP, securities trading house, custodian institutions (non-member of ESBG and EACB)										
Liquidity shortfall in EUR mio	19.38	18.32	19.38	2.23	19.38	18.56	19.76	5.82	23.91	5.30
Change from baseline (in %)		-5.5%	0.0%	-88.5%	0.0%	-4.2%	2.0%	-70.0%	11.4%	-72.6%
Group 8: Auto banks, consumer credit banks (non-member of ESBG and EACB)										
Liquidity shortfall in EUR mio	3.26	2.18	1.94	0.77	3.26	3.24	5.62	3.26	3.03	1.57
Change from baseline (in %)		-100.0%	-40.5%	-76.5%	0.0%	-0.5%	72.3%	0.0%	-7.0%	-51.7%
Group 9: Merchant banks (specialized in trade finance, non-member of ESBG and EACB)										
Liquidity shortfall in EUR mio	0.03	-	0.03	0.01	0.03	0.03	0.03	0.03	0.03	-
Change from baseline (in %)		-100.0%	0.0%	-79.3%	0.0%	0.0%	0.0%	0.0%	0.0%	-100.0%
Group 10: Private banks (non-member of ESBG and EACB)										
Liquidity shortfall in EUR mio	7.83	7.73	6.93	-	7.64	7.64	8.43	7.81	7.31	7.21
Change from baseline (in %)		-1.3%	-11.5%	-100.0%	-2.4%	-2.4%	7.7%	-0.3%	-6.6%	-7.9%
Group 11: Shari'ah compliant banks										
Liquidity shortfall in EUR mio	0.01	-	0.01	-	-	0.01	0.01	0.01	0.01	-
Change from baseline (in %)		-100.0%	0.0%	-100.0%	-100.0%	0.0%	93.2%	0.0%	0.0%	-100.0%
Group 12: Other well diversified [predominantly nationally active] banks (non-member of ESBG and EACB)										
Liquidity shortfall in EUR mio	54.76	54.34	41.07	5.66	54.66	52.50	150.97	54.69	32.79	26.31
Change from baseline (in %)		-0.8%	-25.0%	-89.7%	-0.2%	-4.1%	170.7%	-0.1%	-40.1%	-51.9%
Group 13: Other specialized credit institutions (non-member of ESBG and EACB)										
Liquidity shortfall in EUR mio	7.60	7.49	4.20	0.72	7.51	7.56	18.25	7.60	7.56	6.56
Change from baseline (in %)		-1.4%	-44.8%	-90.6%	-1.2%	-0.5%	140.1%	0.0%	-0.6%	-13.7%
All banks										
Liquidity shortfall in EUR mio	263.54	255.85	182.07	18.83	257.75	248.13	1,271.46	249.48	206.42	130.72
Change from baseline (in %)		-2.9%	-30.9%	-92.9%	-2.2%	-5.8%	382.5%	-5.3%	-21.7%	-50.4%

N.B.: Orange: reduction of the gross shortfall in the respective business group of 75% or more (if maximum reduction below 75 than maximum). Red: increase of gross shortfall of 100% or more.