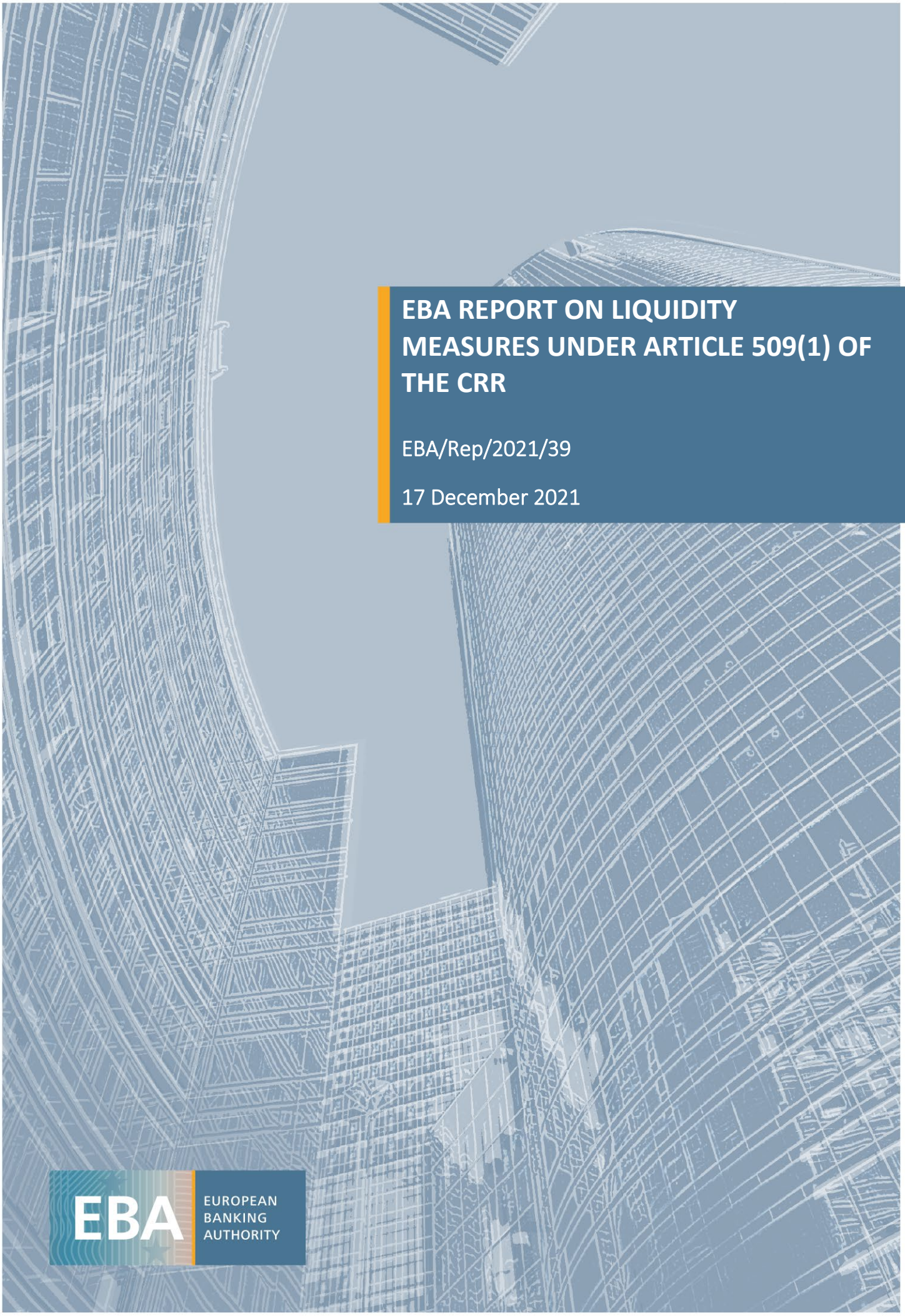

EBA REPORT ON LIQUIDITY MEASURES UNDER ARTICLE 509(1) OF THE CRR

EBA/Rep/2021/39

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EBA EUROPEAN BANKING AUTHORITY

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Abbreviations

CCP	central counterparty
CET1	Common Equity Tier 1
CHF	Swiss franc
COREP	Common Reporting
CRR	Capital Requirements Regulation
DR	Delegated Regulation
EBA	European Banking Authority
ECB	European Central Bank
EHQCB	extremely high-quality covered bond
ESRB	European Systemic Risk Board
EU	European Union
EUR	euro(s)
FINREP	Financial Reporting
FX	foreign exchange
GBP	pound sterling
GDP	gross domestic product
GSIIs	global systemically important institution
HQCB	high-quality covered bond
HQLA	high-quality liquid asset
LCR	liquidity coverage ratio
NFC	non-financial company
NP	net profit
OLS	ordinary least squares
O-SII	other systemically important institution
Pr	probability
QE	quantitative easing
SMEs	small and medium-sized enterprises
TLTRO	targeted longer-term refinancing operation
USD	United States dollar

Executive summary

The objective of the report is to monitor banks' short-term liquidity risk profiles.

This report provides an update of the European Union (EU) banks' compliance with the liquidity coverage ratio (LCR), defined as the stock of high-quality liquid assets (HQLAs) over the net liquidity outflows arising during a 30-calendar-day stress period. The analysis is based on Common Reporting (COREP).[1]

On average, the LCR is well above the minimum requirement and has continued to increase although with some signs of stabilisation during 2021. This was driven by an increase in net outflows that compensate investment in HQLA assets.

At the end of June 2021, the weighted average LCR across the sample of EU banks stood at 176%, well above the minimum LCR requirement of 100%. Compliance with the ratio has steadily improved since September 2016 when data first became available.[2] There was a significant increase in the LCR in the second half of 2020 and a slight stabilisation during the first semester of 2021, as the banks' holdings of HQLAs were offset by the growth of net liquidity outflows. The increase in HQLA has been mainly driven by the additional liquidity extended by the ECB and other EU central banks. This has boosted the already high levels of excess of liquidity that banks record as holdings of central bank reserves. Only one bank in the monitoring sample had LCR levels below 100% in June 2021. As allowed by the regulation, this institution made use of its liquidity buffer during times of stress, resulting in the LCR dropping below 100%[3]. Every other bank in the sample showed LCR levels well above the minimum requirement. The average LCR level of global systemically important institutions (GSIIs) stood at 152% and that of other systemically important institutions (O-SIIs) at 184%. The weighted average LCR of the remaining banks was even higher, at 244%. The average LCR level for the majority of the countries was within the 100-200% range. These averages mask some important differences in individual banks' LCR levels across the sample and across countries, where a significant dispersion is observed.

Specific funding structures could drive different LCR

The observation that LCRs tend to be well above 100% holds across business models. However, the compositions of the ratios differ. Some business models whose funding originates

[1] The report is provided under Article 509(1) of the Capital Requirements Regulation (CRR). The objective of the report is to monitor and evaluate the liquidity coverage requirements under Commission Delegated Regulation (DR) (EU) 2015/61.

[2] First reference date for which COREP data, based on the LCR DR, is available.

[3] The possibility of making use of liquid assets during times of stress (resulting in an LCR below 100%) is foreseen under Article 412(1) of the CRR (and Article 4(3) of the LCR DR) as maintaining the LCR at 100%, which, under such circumstances, could produce undue negative effects on the credit institution and other market participants.

compositions across business models.

predominantly from wholesale markets show higher net liquidity outflows and tend to fulfil their LCR targets by holding higher amounts of HQLAs.

Many banks have an underlying currency mismatch in their overall LCR. LCR levels in US dollar and in pound sterling are generally lower.

Many EU banks finance part of their assets in a different currency than the one in which the assets are denominated. This gives rise to an inherent risk of currency mismatch in the overall LCR. Regulation requires banks to ensure that the currency distribution of their liquid assets is consistent with the currency distribution of their net liquidity outflows. Among the significant (foreign) currencies, the US dollar (USD) and the pound sterling (GBP) are those that show the lowest LCR levels for EU banks. As the ability of banks to swap currencies and to raise funds in the foreign exchange markets may be impaired during times of stress, significant currency mismatches should be closely monitored by competent authorities. Where needed, competent authorities should use their discretion to restrict currency mismatches by setting limits on the net outflows denominated in significant reporting currencies.

There is some evidence that higher LCR levels foster more bank lending, though not very robust.

The analysis of the potential impact of the LCR regulation on bank lending shows that a statistically significant relationship can be identified between the level of the LCR and the probability of banks increasing their lending activity. After controlling for additional variables such as the level of capital and the non-performing loan ratio, this relationship is however no longer statistically significant.

Based on current data, the effect of the unwind mechanism seems limited.

As regards the LCR unwind mechanism, in the observed period and with the available samples of credit institutions (including non-significant and local banks that have started to report COREP data to the EBA only from December 2021), it was not possible to detect any material impact on the level of the LCR. In aggregate terms, the unwind mechanism has an effect on the determination of the adjusted amount of Level 1 assets, and this effect can be positive or negative, whereas the effect on the LCR is mostly null.

These findings seem to be due to the banks' use of Level 1 EHQCB far more than the regulatory minimum of 30% of the overall liquidity buffer. This makes it unlikely that other HQLA categories would also show surpluses over the respective caps. However, this situation may reflect current special conditions on the funding markets (e.g. the ample liquidity provision by central banks through long-term refinancing operations) which may be discontinued in the future.

Introduction

As part of the mandate in Regulation (EU) No 575/2013 (CRR), the European Banking Authority (EBA) monitors and evaluates the liquidity coverage requirements on an annual basis (pursuant to Article 415(1)). The EBA takes into account the potential impact of these requirements on the business and risk profiles of banks, on the stability of financial markets, on the economy and on the stability of the supply of bank lending (Article 509(1) of the CRR). The current report is the eight publication of the EBA report under Article 509(1) and the sixth publication since the introduction of the minimum liquidity coverage standards in 2015.

This report presents a detailed analysis of the short-term resilience of banks' liquidity risk profiles. It also reports on the liquidity risks that banks face in various significant foreign currencies.[4] As in the previous reports, the analysis is based on COREP data. The sample covers 298 banks (346 banks including subsidiaries) in 27 EU Member States and two European Economic Area / European Free Trade Association states that report COREP data to the EBA on a regular basis.[5] The sample of this year's report has therefore increased significantly in comparison to previous reports, due to the EUCLID project which allows the EBA to collect COREP data for all institutions registered in the EU.

The report includes a detailed assessment of the LCR key components (HQLA and net liquidity outflows). The analysis of currency mismatches investigates whether the banks' liquidity coverage in foreign (and significant) currencies differs from their overall LCR.

The bank sample covers both globally active and other significant institutions (GSIIs and O-SIIs), as well as 'other banks'. The report also provides breakdowns by different business models across the EU. In terms of total assets, the sample covers approximately EUR 27.5 trillion (EUR 28.5 trillion including subsidiaries) or, on average, 88.5% of the total assets of the EU banking sector.[6] Country data should be interpreted with caution as differences in the representativeness of the sample across countries may affect data comparability.[7] Aggregated figures in this report are based on COREP data reported at the highest level of consolidation, with the exception of the analyses concerning banks' business models and country breakdowns,[8] which also include subsidiaries of EU parent institutions.[9] Unless stated otherwise, all average figures are weighted.

[4] See definition of significant and foreign currency in Section 0.

[5] Banks included in the sample not only reported LCR COREP data but also Financial Reporting (FINREP) data (amount of total assets). Banks that do not report the amount of total assets in FINREP have not been included in the analysis.

[6] The information on total assets of the EU has been obtained from the Statistical Data Warehouse of the European Central Bank (ECB).

[7] See Table 16: Total asset coverage by country (in percentage) for more details regarding the coverage by country.

[8] To ensure confidentiality, figures by country breakdown are shown only if there are at least three banks that reported data in each specific country.

[9] The number of banks by country breakdown included in the different analyses is provided in the Annex.

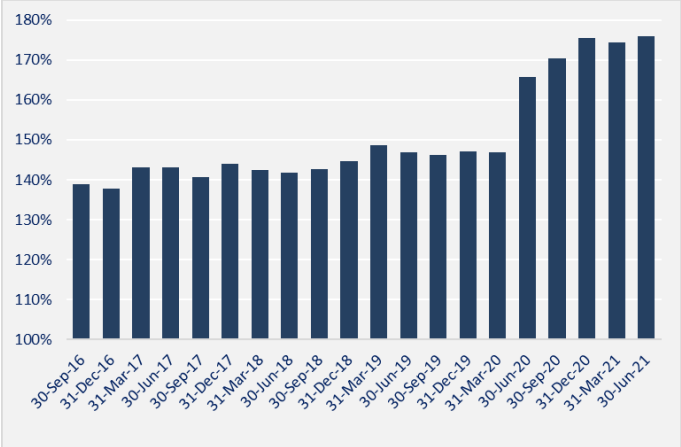
Analysis of the LCR and its components

Trends in the LCR

Liquidity coverage requirements are intended to ensure banks' short-term resilience to potential liquidity disruptions. Banks should hold liquid assets to cover net liquidity outflows over a stress period of 30 calendar days and should maintain an LCR of at least 100%.[10] The LCR minimum requirement was set at 60% on 1 October 2015 and it reached 100% at the end of the implementation period on 1 January 2018.

An analysis of the evolution of the LCR over time[11] shows that banks have made significant efforts to increase the level of the LCR and to reduce the shortfall in liquid assets. Banks entered the COVID-19 crisis in good shape. In December 2019, the weighted average LCR for the sample of banks used for this report was 147.0% (Figure 1). The weighted average LCR increased to 176.0% in June 2021, showing signs of stabilisation in the first semester of 2021. These results indicate that, for a large part owing to the additional liquidity support provided by the monetary authorities, adverse effects of the COVID-19 crisis on the LCR levels had not materialised by June 2021.

Figure 1: LCR evolution (weighted average)

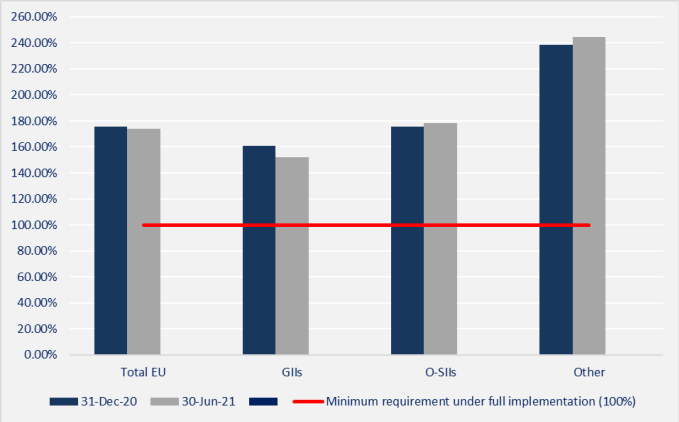


[10] In accordance with Article 412 of the CRR and Article 4(3) of the Commission Delegated Regulation (EU) 2015/61, credit institutions can make use of their liquid assets to cover their net liquidity outflows under stressed circumstances, even if such a use of liquid assets may result in their liquidity coverage ratio falling below 100% during such periods. However, as further specified in Article 414 of the CRR and Article 4(4) of the Commission Delegated Regulation (EU) 2015/61, where credit institutions do not meet or expect not to meet the requirement, including during times of stress, they shall immediately notify the competent authorities and shall submit, without undue delay, to the competent authorities a plan for the timely restoration of compliance.

[11] The time series uses a consistent sample of 99 banks (excluding subsidiaries; results are shown for total EU, GSIIs and O-SIIs). Analysis showing two reference dates (December 2019 and June 2020) is based on a consistent sample of 116 banks. The results are reported in terms of volumes or in changes from previous period reference dates. In all other analyses, the sample is the same as was used in the cross-sectional analyses, which includes all banks that submitted data by the latest reporting date.

During 2021, LCR levels stabilised driven by GSIIs banks which reduced their LCR levels from 160.8% to 151.9% offsetting the increase shown for other categories (O-SIIs and 'other banks'). O-SIIs and 'other banks' have increased their LCRs from 175% to 184% and from 238% to 244%, respectively. Moreover, the LCR dispersion across 'other banks' is greater than across GSIIs and O-SIIs. This reflects the heterogeneity of banks in the group classified as 'other' in terms of size and business model.

Figure 2: Weighted average LCR across bank groups (GSIIs, O-SIIs and others)



The evolution of the LCR levels can be better understood by looking at the evolution of its components. The increase in the LCR ratio between December 2019 and December 2020 can mostly be attributed to a significant increase in the liquid assets (HQLA) component while the net outflows remained relatively stable. Between December 2020 and June 2021 the HQLA component continued to increase but this effect was offset by the increase in net outflows for GSIIs and O-SIIs. (Figure 3)

Figure 3: Evolution of the numerator and the denominator of the LCR, September 2016 = 100% — balanced sample

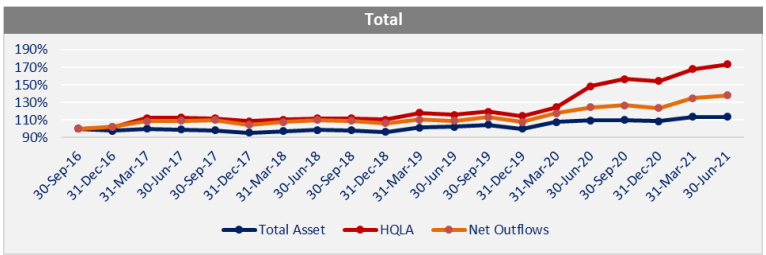
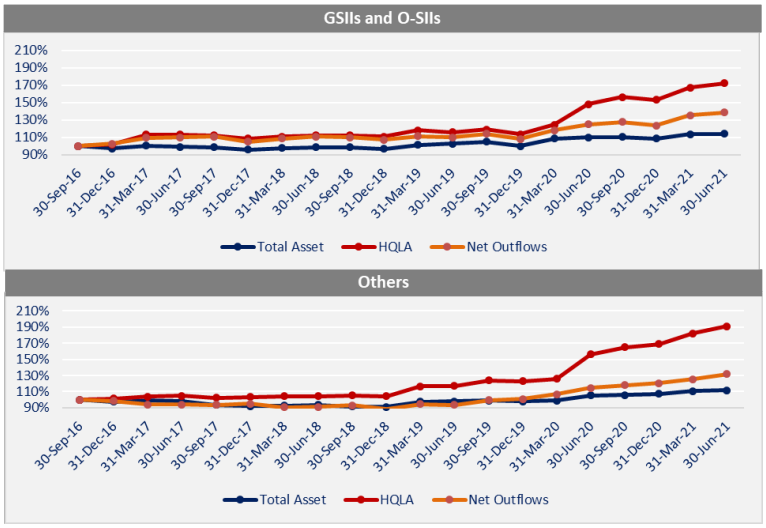


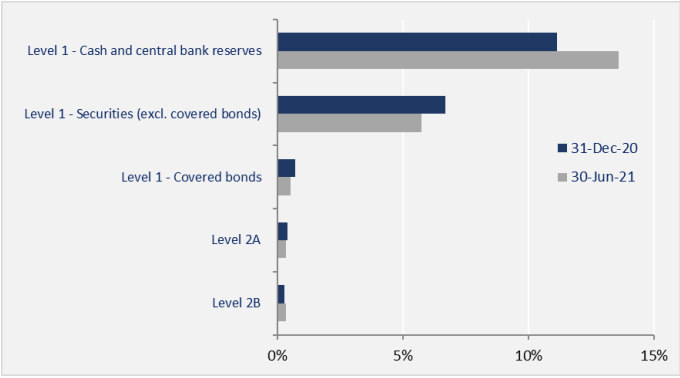
Figure 4: Evolution of the numerator and denominator of the LCR by bank group, September 2016 = 100% — balanced sample



The analysis of the composition of HQLA and net outflows gives more insights into the drivers of the changes in HQLAs and net outflows.

Figure 5 shows the evolution of such composition between December 2020 and June 2021. The increase in cash and central bank reserves explains the meaningful increase in HQLA. Amid the COVID-19 crisis, central banks in the EU have eased banks' access to funding by adding to their lending facilities or resuming or increasing the scale and the scope of their asset purchase programmes. While the duration of the asset purchase programmes launched in2020 currently extends at least until 2023, in 2021 new lending facilities were also made available for institutions. The access to liquidity via central bank operations carried out by the ECB and other EU central banks has generated additional excess liquidity that has been placed by the banks on the ECB current account and deposit facility.[12]

Figure 5: Evolution of the composition of liquid assets (post-weight and before the cap) relative to total assets — balanced sample



The increase in HQLA levels has been offset by a significant increase in the net liquidity outflows for GSIIs and O-SIIs. The increase in the net liquidity outflows can be understood by looking at the

[12] See box Interactions between non-standard monetary policy measures and the LCR liquidity buffer.

evolution of outflows and inflows. On average, cash outflows (post-weight) represent approximately 15.4% of total assets in December 2020 and 16.4% in June 2021 (Figure 6). This increase was partially offset by an increase in cash inflows (post-weight and before cap) over total assets which increased from 8.4% in December 2020 to 9.0% in June 2021 (Figure 7).

The increase in outflows as a share of total assets was mainly driven by an increase in outflows from non-operational deposits (e.g. short-term deposits from financial customers), which increased the most from 4.8% to 5.3% and remained the main component of the cash outflows. Non-operational deposits and excess operational deposits combined constitute 6.7% of total assets. Other outflows and excess operational deposits also increased significantly (from 2.5% to 2.8% and from 1.2% to 1.4% respectively).

The increase in inflows in all categories adds up to an increase between +0.1% and +0.2% in aggregate inflows in the sample of banks.

Figure 6: Evolution of the composition of cash outflows (post-weight) relative to total assets — balanced sample

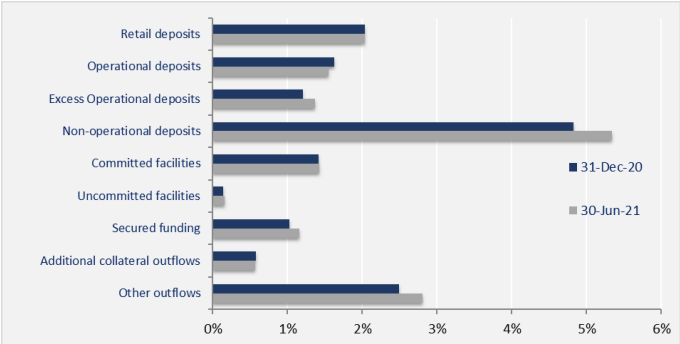


Figure 7: Evolution of the composition of cash inflows (post-weight and before cap) relative to total assets — balanced sample

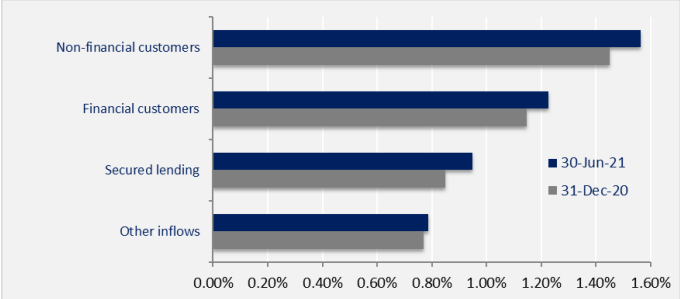
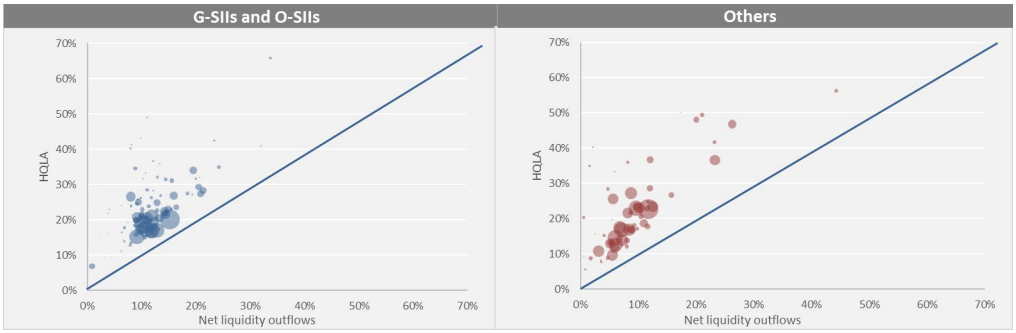


Figure 8 shows the interaction between HQLA and net liquidity outflows at the individual bank level. The parameters are expressed as a share of total assets, and the size of the bubble indicates the banks' weight in terms of total assets. The bigger the bubble, the larger the bank and the greater the weight it takes in the weighted average values. The 45° line indicates equality between HQLA and net liquidity outflows, i.e. when the LCR is 100%.

Most banks in the sample are located above the line, suggesting that they have LCR levels that are adequately above the minimum requirement.

In terms of their position with respect to the 45° line, GSIIs and O-SIIs present a higher dispersion, as some of them show very high HQLA holdings and net liquidity outflows over total assets ratios.

Figure 8: HQLA and net liquidity outflows (as a share of total assets) by group of banks (as of June 2021)



The efforts that banks have made to increase their LCR levels are also reflected in the evolution of the liquidity shortfall (Figure 9),[13] which, based on the fully loaded LCR minimum requirement (100%), has decreased from over EUR 27 billion in September 2016 to no shortfall[14] since June 2020, for the balanced sample of banks[15]. Consequently, the number of banks with an LCR below 100% also declined, from eight in September 2016 to no bank with a shortfall since June 2020.

Since September 2016, banks that were already compliant with the LCR minimum requirement have further increased their surplus, suggesting ongoing efforts to strengthen their liquidity profiles. As a result, in recent years, most banks in general have shown an LCR level well above the 100% minimum requirement. This is the situation for almost all countries in the EU and for all groups of banks.[16]

[13] The shortfall calculated in this report is the sum of differences between the net liquidity outflows and the stock of HQLAs for all banks with an LCR below the minimum requirement. The calculation of shortfall does not account for the offsetting effect of the aggregate surplus arising from those banks that already meet or exceed the minimum requirement. Therefore, no reallocation of liquidity between individual banks or within the banking system is assumed.

[14] Note that the time series analysis showing volumes is based on a consistent sample of banks that submitted data for all reporting dates.

[15] As of June 2021, one bank showed an LCR shortfall of 25M€. This bank has not reported data to the EBA consistently since September 2016 and it is therefore not included in Figure 9 and Figure 10.

[16] See the EBA Report on liquidity measures (reference date December 2018) - Box: Why EU banks report LCRs that are well above the minimum requirement?

Figure 9: Evolution of the liquidity shortfall (EUR billion) — balanced sample

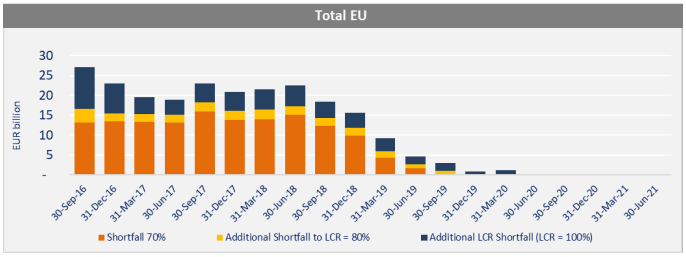
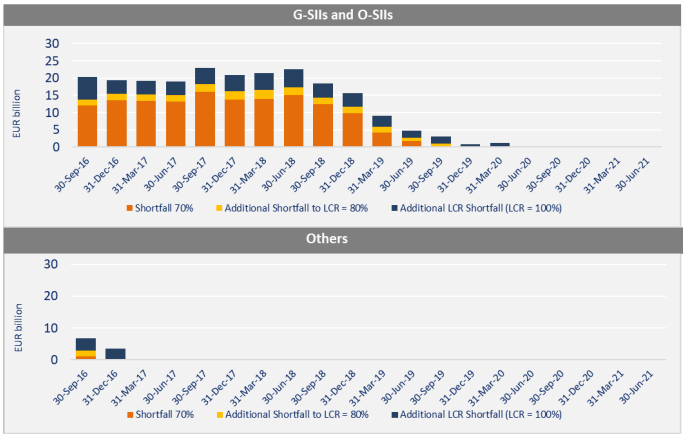
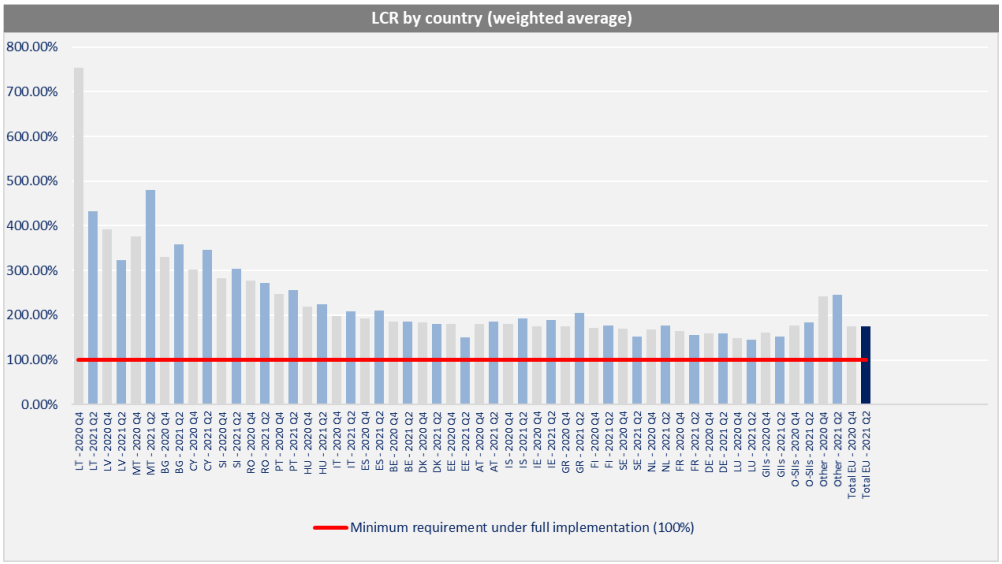


Figure 10: Evolution of the liquidity shortfall by bank group (EUR billion) — balanced sample



Differences are also found when analysing the weighted average LCR levels across countries. The majority of countries have LCR levels between 100% and 200% as of June 2021. Nevertheless, some countries present very high average LCR levels, such as Lithuania, Latvia, Malta, Bulgaria, Cyprus or Slovenia, with weighted average ratios above 300%. Romania, Portugal and Hungary have ratios higher than 200% and no country presents average LCR levels lower than 100%.

Figure 11: LCR across countries — balanced sample



Out of 29[17] countries, 15 reported an increase in their average LCR ratios between December 2020 and June 2021. For the majority of countries, this increase is driven by an increase in HQLA due to the upward trend in the amount of cash and central bank reserves that can be attributed to the enhanced access to central banks funding during the COVID-19 crisis.[18] For three countries, the large increase in LCR levels arises from a reduction in the amount of net-cash outflows, driven mostly by a decrease in net outflows. The 10 countries that reported a decrease in their average LCR ratios saw an increase in their net liquidity outflows. The significant decrease in the average LCR ratio of Lithuania (from 754% to 433%) is driven by one bank that carried out liquidity management operations between December 2020 and June 2021: The high LCR level in December 2020 was due to the transfer of liquidity funds from the parent company to the subsidiary in Lithuania. These funds were transferred back to the parent company in June 2021, returning the LCR levels of the Lithuanian subsidiary back to normal size.

Figure 12: LCR dispersion across countries — balanced sample

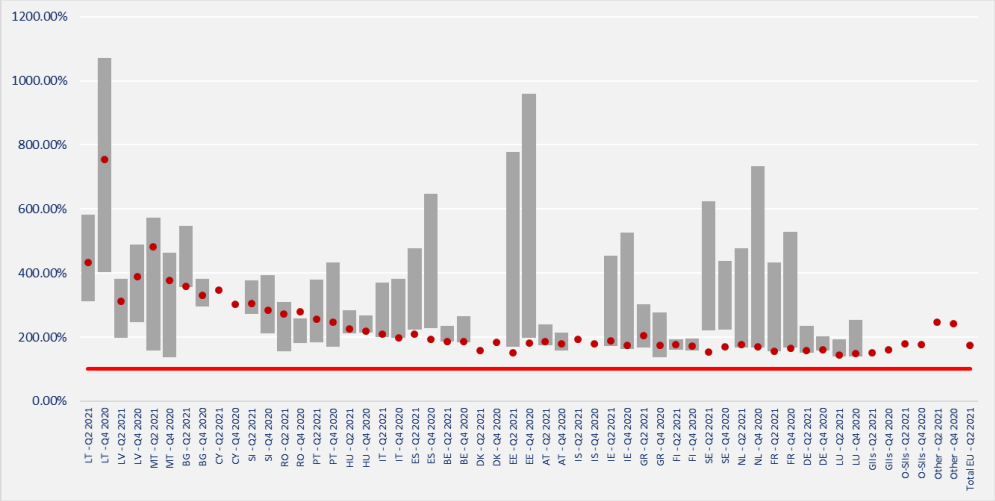


Figure 12 shows the dispersion of the LCR across countries. The top line of the grey box shows the 75th percentile, whereas the bottom line of the grey box shows the 25th percentile.[19] The red points represent the weighted average LCRs.[20] The figure shows that there is dispersion in the banks' LCR levels even within countries. As of June 2021, Estonia is the country with the highest dispersion, followed by Malta. In many countries, the weighted average point tends to be closer to the 25th percentile, meaning that larger banks within the country have lower-than-average LCRs.

[17] 27 EU Member States and 2 European Economic Area / European Free Trade Association states. No country results are shown for the Czech Republic, Slovakia, Poland, Croatia and Norway as fewer than 3 banks reported data for the two reference dates shown in the analysis.

[18] See box: Interactions between non-standard monetary policy measures and the LCR liquidity buffer

[19] A percentile is the value of a variable below which a certain percentage of observations fall. For example, the 25th percentile is the value below which 25% of the observations are found.

[20] For confidentiality reasons, for countries with between three and four observations, only the weighted average LCR is shown.

Composition of liquid assets

Regulation differentiates between assets of extremely high liquidity and credit quality (Level 1 assets) and assets of high liquidity and credit quality (Level 2 assets). Level 1 assets may comprise, *inter alia*, cash and central bank reserves, as well as securities in the form of assets representing claims on or guaranteed by central or regional governments, local authorities or public sector entities. The EU regulation, unlike the Basel III framework, also considers promotional banks' assets as being in the Level 1 liquidity buffer. In addition, it provides for greater recognition of extremely high-quality covered bonds (EHQCBs), which may be included in Level 1 assets (unlike the Basel III framework).

Level 2 assets are divided into Level 2A and Level 2B assets. Level 2A assets are considered to be more liquid than Level 2B assets and, therefore, are subject to lower haircuts. The EU framework allows Level 2 assets to include exposures in the form of high-quality covered bonds (HQCBs), certain non-residential mortgage-backed securities, as well as units or shares in collective investment undertakings.

Figure 13 shows the composition of liquid assets as a share of total assets by country as of June 2021. The bulk of liquidity buffers consists of Level 1 assets in the form of cash, central bank reserves and securities (also EHQCBs). GSIIs and O-SIIs, on average, tend to hold higher shares of central bank reserves and lower levels of securities (including EHQCBs) than 'other banks'. Overall, the average liquidity buffer (before the application of the cap on liquid assets) is approximately 20.4% of total assets for all banks and for GSIIs and O-SIIs and 21.2% for 'other banks' (Figure 13).

Article 17 of the LCR DR sets the minimum requirements for the composition of the liquidity buffer by asset category. A minimum of 30% of the liquidity buffer is to be composed of Level 1 assets, excluding EHQCBs. Aggregate Level 2 assets should not account for more than 40%, and Level 2B assets should not account for more than 15% of a bank's total stock of HQLAs.

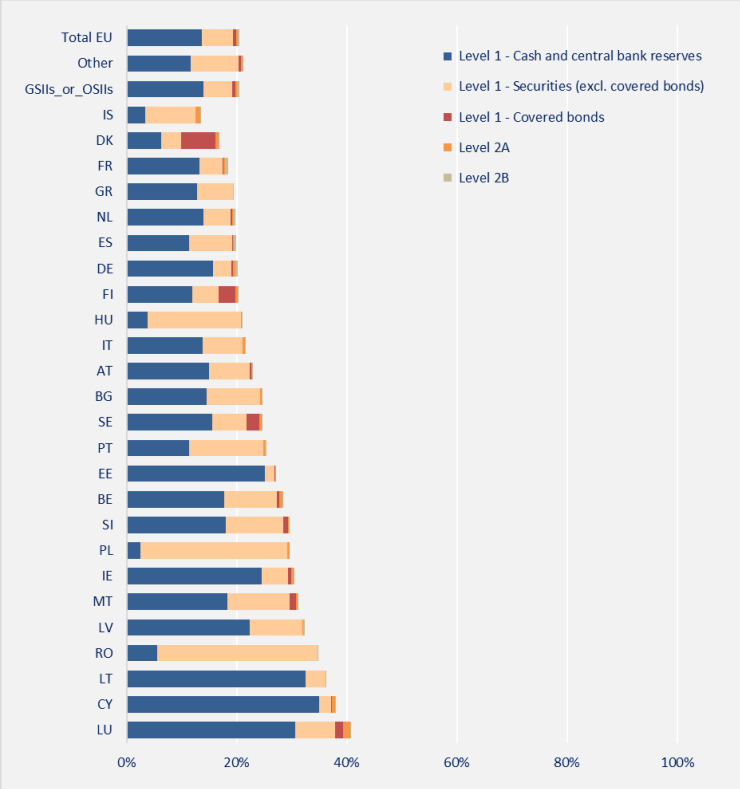
On average, liquid assets before the above-mentioned caps consist mainly of Level 1 assets (more than 97%, or more than 94% when excluding EHQCBs, of the total liquidity buffer).

Within Level 1 assets, the share of securities (28%) is slightly lower than the share of cash and reserves (66%). On average, EHQCBs represent a proportion of around 2.5% for all categories (GSIIs and O-SIIs and 'other banks'). Eligible assets in Level 2 assets represent only around 3% of the total liquidity buffer for all banks.

The composition of the liquid assets depends largely on the business models of the institutions and also reflects differences across EU countries. While liquidity buffers comprise mainly Level 1 assets in all countries, banks in 80% of the countries rely largely on cash and central bank reserves; banks in 20% of the countries rely on Level 1 securities (excluding covered bonds). On average, Lithuania and Ireland are the countries with a larger share of cash and central bank reserves in their total liquidity buffer (88% and 81% of the total liquidity buffer), whereas Poland, Romania and Hungary have the biggest share of Level 1 securities (between 90% and 81% of the total liquidity buffer).

Covered bonds contribute significantly to the liquidity buffer in Denmark (38% of the total liquidity buffer), Finland (15%) and Sweden (9%).

Figure 13: Composition of liquid assets (post-weight and before the cap) relative to total assets (as of June 2021)



Interactions between non-standard monetary policy measures and the LCR liquidity buffer

Monetary policy operations can have direct implications for banks' liquid asset holdings. This is because liquidity provided by central banks is commonly held in the form of exposures to central banks (withdrawable central bank reserves or other assets representing claims on or guaranteed by central banks), which are currently one of the major components of banks' liquidity buffers. The evolution of liquidity buffers since 2015 has indeed been influenced by the ECB's targeted longer-term refinancing operations (TLTROs) and the asset purchase programme in the euro area, as well by the quantitative easing (QE) or asset purchase programmes carried out by other EU central banks.[21]

Amid the COVID-19 crisis, central banks in the EU have eased banks' access to funding by strengthening lending facilities and resuming or increasing the magnitude and scope of their asset purchase programmes (APPs).

The ECB set up its Pandemic Emergency Purchase Programme (PEPP), a temporary programme (to last until the end of March 2022 at least) for the purchase of public and private sector assets, to a total amount of EUR 1,850 bln. The PEPP was first launched in March 2020 to purchase EUR 750 bln and was expanded in June 2020 by an additional EUR 600 bln. In December 2020, in view of the economic fallout from the resurgence of the pandemic, the PEPP was further expanded by an additional EUR 500 bln with an extended horizon to at least March 2022.[22] Additionally, the APP was reinforced with an additional EUR 120 bln envelope (on top of the EUR 20 bln net monthly purchases announced in September 2019) to be spent by the end of 2020. In relation to its long-term lending facilities, the ECB improved the conditions of the third targeted longer-term refinancing operations (TLTRO-3), introduced weekly longer-term refinancing operations (LTROs) and implemented pandemic emergency longer-term refinancing operations (PELTROs).[23] The PELTROs were introduced to ensure that sufficient liquidity is provided to banks for lending purposes throughout the pandemic period. On 30 April 2020, the ECB decided to conduct a series of seven PELTROs, and on 10 December 2020 it was communicated that an additional series of four PELTROs would be offered. Additionally, the ECB has temporarily eased the collateral requirements to facilitate the availability of eligible collateral for eligible counterparties to participate in the aforementioned liquidity-providing operations.[24]

[21] The proceeds of the central bank asset purchases add to the banks' liquidity buffers insofar as the central bank acquires the assets from the banks. However, in QE operations the central banks are not restricted to the use of banks as counterparties but can purchase assets from a broader set of counterparties.

[22] See the ECB press release on the PEPP (18 March 2018) and the subsequent communication on the PEPP expansion (4 June 2020 and 10 December 2020).

[23] See the ECB press release on the additional LTROs, the easing of the TLTRO-3 conditions and the additional APP envelope (12 March 2020). See also the press release on further easing of TLTRO-3 conditions (30 April 2020) and the ECB press release on the PELTROs (30 April 2020). See also the latest ECB press release on further easing of TLTRO-3 conditions and decision to introduce 4 additional PELTROs (December 2020).

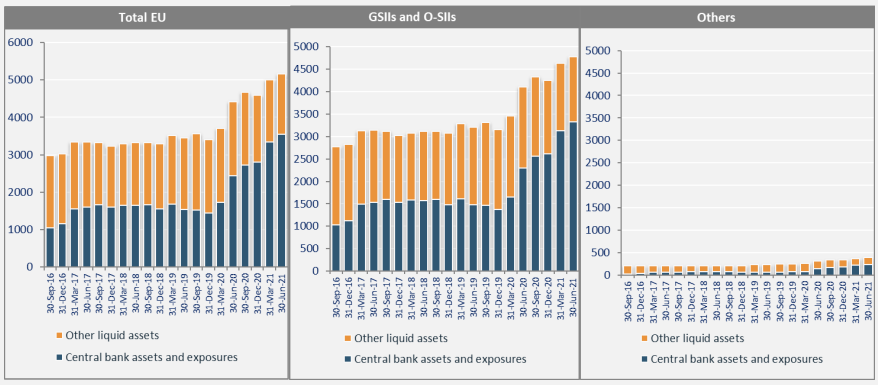
[24] See the ECB COVID-19 related measures.

Further measures included the reactivation of currency swap lines and enhancement of existing swap lines with different central banks.

Similar policy packages were implemented in several member states outside the euro area.[25]

This additional central bank funding provided explains the increase in the contribution to the LCRs of central bank assets and exposures from December 2019 to June 2021. The relative increase in central bank funding between December 2019 and June 2020 amounts to 67% for GSIIs and O-SIIs and 94% for the rest of the sample. An additional 45% increase for GSIIs and O-SIIs and 63% for the rest of the sample took place between June 2020 and June 2021 (Figure 14).

Figure 14: Evolution of central bank assets and exposures over time (EUR billion) — balanced sample



Repayments in central bank credit operations, in particular from TLTRO III, will reduce the amount of central bank reserves in the system and – depending on the collateral used by the banks – may have a negative effect on banks' LCR. Moreover, a future slowdown and ultimately unwinding of (net) asset purchases would reduce the supply of central bank reserves and may lead to a downward trend in central bank assets.

Under a scenario where the excess liquidity would be gradually drained by the central banks, the banks would have to modify their funding strategies and, where necessary, the composition of their HQLAs in order to retain their liquidity buffers.

[25] See IMF for an extensive list of the monetary measures adopted in each country.

Composition of outflows and inflows

Net liquidity outflows are defined as the difference between liquidity outflows and liquidity inflows and are required to be positive.[26] Liquidity outflows are calculated by multiplying the outstanding balances of various categories or types of liabilities and off-balance-sheet commitments by the rates at which they are expected to run off or be drawn down.[27] Liquidity inflows are assessed over a period of 30 calendar days. They comprise only contractual inflows from exposures that are not past due and for which banks have no reason to expect non-performance within 30 calendar days. To prevent banks from relying solely on anticipated liquidity inflows to meet their LCR, and to ensure a minimum level of liquid assets holdings, the amount of inflows that can offset outflows is generally capped at 75% of total liquidity outflows. However, unlike the Basel LCR standard, the EU LCR regulation provides certain exemptions to this cap, either full or partial, although these are subject to a prior approval by competent authorities[28] and require compliance with certain conditions established in the regulation. These include a potential exemption for intragroup and intra-institutional protection scheme flows as well as exemptions for banks that specialise in pass-through mortgage lending or in leasing and factoring businesses. In addition, banks that specialise in financing the acquisition of motor vehicles or in consumer credit loans may apply a higher cap of 90%.

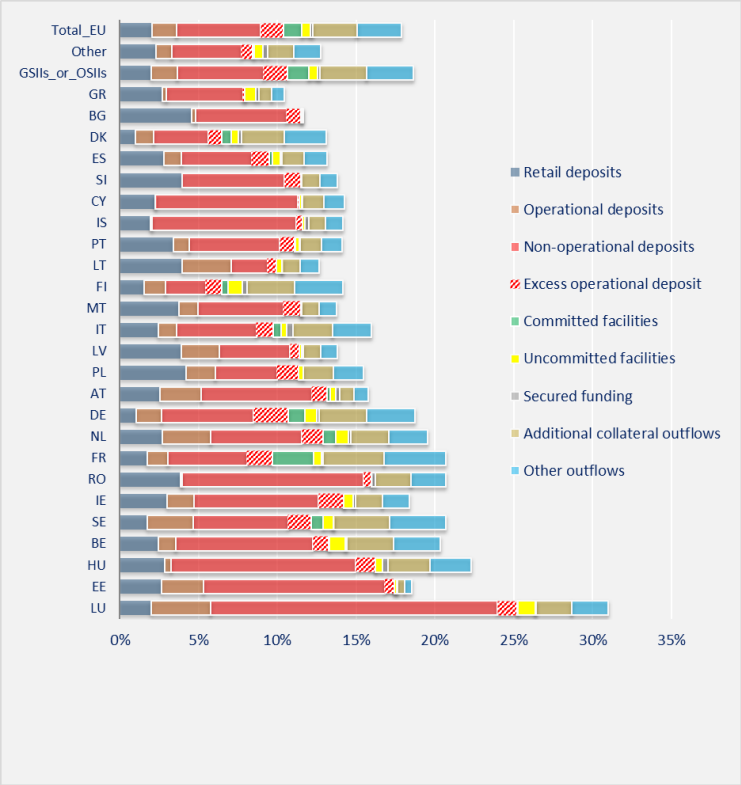
As of June 2021, on average, cash outflows (post-weight) represent approximately 16.4% of total assets of the banks in the sample. GSIIs and O-SIIs present a higher share (17.1%) than 'other banks' (11.9%). The share of outflows from retail deposits of total assets is similar for both groups of banks (around 2% of total assets). However, relative to total cash outflows, 'other banks' present a higher share of retail deposits (19.2% of total cash outflows compared with 11.6% of total cash outflows for GSIIs and O-SIIs). As expected, for both groups of banks (GSIIs and O-SIIs and 'other banks'), the main component of the cash outflows is non-operational deposits (e.g. short-term deposits from financial customers), which tend to have higher run-off rates and account for 4.4% of total assets for ´other banks´ and 5.5% of total assets for GSIIs and O-SIIs. Excess operational deposits account for 0.9% for ´other banks´ and 1.5% for GSIIs and O-SIIs. A similar composition of outflows is found when analysing results by country.

[26] Article 20 of the LCR DR.

[27] Article 22(1) of the LCR DR.

[28] Article 33 of the LCR DR.

Figure 15 Composition of cash outflows (post-weight) relative to total assets (as of June 2021)



Furthermore, banks should take into account an additional outflow that corresponds to the collateral needs that would result from the impact of an adverse market scenario on credit banks' derivative transactions and other contracts, in case these are considered to be material.[29] The share of additional collateral outflows in total assets is around 0.6% of the total assets for both groups of banks.

As described above, the recognition of liquidity inflows is, in the absence of exemptions, limited to 75% of total liquidity outflows.[30] In this sample, two banks benefited from a higher cap of 90% and one bank benefited from a full exemption of certain inflows from the cap.

[29] Article 423(3) of the CRR and Article 30(3) of the LCR DR.

[30] Article 33 of the LCR DR (with the approval of the competent authority, specialised credit banks may be subject to a cap of 90% on inflows, and these banks may be fully exempt from the cap on inflows if their main activity is leasing and factoring business).

Figure 16: Composition of cash outflows (pre-weight) relative to total assets (as of June 2021)

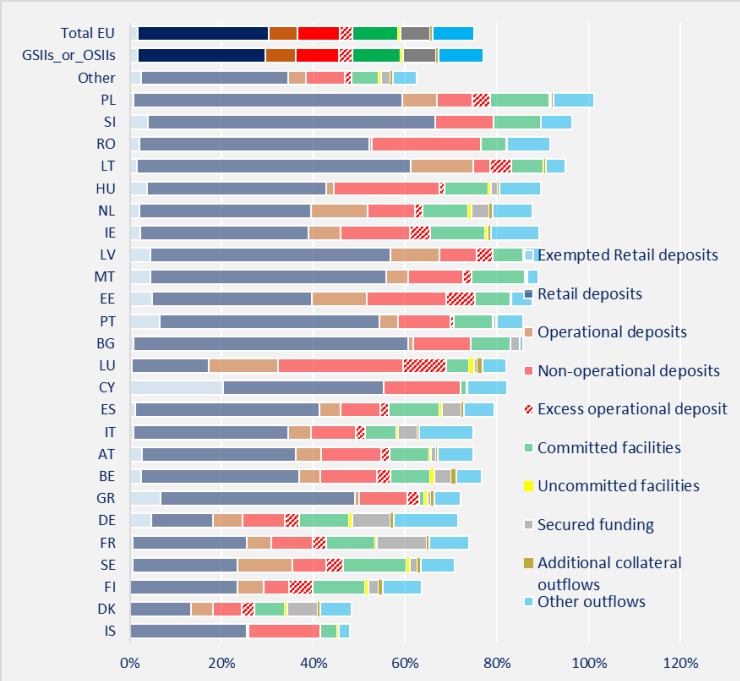


Figure 16 shows the share of cash outflows (pre-weight) over total assets. As expected and due to the high haircuts applicable to this category of outflows, outflows from retail deposits become the category with the highest share over total assets before the application of weights (around 30% of the total assets for all categories of banks). For both groups of banks, 2% corresponds to retail deposits that are exempted from the calculation of LCR outflows. The share of retail deposits exempted from the calculation of LCR outflows becomes important in some countries like Cyprus (20% of total assets).

Assessment of secured funding transactions with central banks[31]

Central bank-related funding transactions have to be backed by eligible collateral. This means that they are considered to be secured funding transactions that affect the LCR through their effects on an institution's stock of encumbered (posted collateral) and unencumbered (raised liquidity minus posted collateral) assets. If the remaining maturity of the transactions is less than 30 calendar days, there may be additional effects from the reimbursement of the secured loan on the institution's cash flows and, via the unwind mechanism, the stock of HQLA. However, unlike interbank secured funding transactions, no cash outflows will be assigned to transactions where the lender is a domestic central bank. The underlying rationale is that, in times of stress, the central bank is expected to roll over any secured funding transactions, as long as the relevant collateral is central bank eligible, disregarding the LCR liquidity quality of these assets pledged as collateral.[32] In contrast, secured transactions with other counterparties are subject to an outflow depending on the liquidity quality of the underlying collateral. In terms of the LCR, the impact of this differentiated treatment is significant where collateral is less liquid: An outflow rate of 0% is applied to all transactions with domestic central banks, whereas in the case of transactions with other counterparties an outflow rate of 100% of the amount due is applied.

As of June 2021, 125 banks reported secured funding transactions with some type of counterparty maturing within 30 days. Of these, 35 reported secured funding transactions with a central bank (19 were either GSIIs or O-SIIs, and 16 were classified as 'other banks').

Given the preferential treatment of secured funding transactions with central banks in the determination of the net cash outflows, some banks may benefit from the difference between the list of central bank eligible assets for collateral and liquid assets in terms of liquidity coverage requirements. Banks that benefit from this treatment are those that use less-liquid assets as collateral to draw central bank funding. While an outflow rate of 0% is applied to these transactions with central banks, an outflow rate that is equivalent to the haircut of the underlying collateral is applied to transactions with other counterparties (e.g. 0% if the transactions are backed by Level 1 assets excluding covered bonds, 7% if collateralised by Level 1 covered bonds, and up to 100% if collateralised by non-HQLAs).

In line with previous reports, the composition of the collateral posted for secured funding transactions maturing within 30 days[33] with central banks presents material differences across banks. For GSIIs and O-SIIs, a large part of the collateral posted for these transactions is Level 1 assets, excluding EHQCBs (90% of the total in December 2020 and 94.5% in June 2021). The

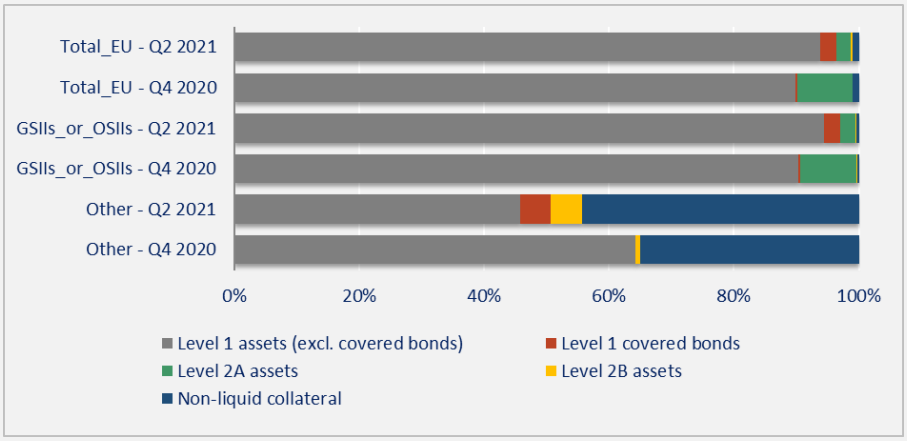
[31] It should be noted that the assessment of SFT with central banks only covers part of the outstanding ECB operations, as the TLTROs are out of scope, and that the collateralisation shown in the chart is not representative of the general collateralisation of the ECB's credit operations.

[32] Still, these transactions affect the calculation of the unwinding of secured funding and lending transactions, which is relevant for the calculation of the cap on liquid assets. The latter may be relevant if the bank (i) conducts a significant amount of short-term central bank operations, (ii) provides less liquid collateral and (ii) has reinvested the cash received into illiquid assets.

[33] Information from COREP 73, which includes information on expected outflows in the following 30 days.

Level 1 covered bonds and the non-liquid collateral represent only 0.3%/8.9% and 2.6%/3% (December 2020/June 2021) of the total collateral posted, respectively. On the contrary, for 'other banks', the share of the collateral posted for these transactions that is Level 1 was 64% in December 2020 and 45% in June 2021. Nevertheless, results should be interpreted with caution as only 16 'other banks' reported secured funding transactions with a central bank in June 2021.

Figure 17: Composition of collateral posted for secured funding transactions with central banks maturing within 30 days — balanced sample



Banks would report higher cash outflows if they were to conduct secured funding transactions via interbank repurchase agreement (repo) markets. Nevertheless, the amount of repo transactions in the total assets for this category of banks is small, so the overall impact of such a change would still be limited.

The new LCR delegated regulation[34] applicable from 30 April 2020 introduced a corrigendum to the unwind mechanism with the aim of further recognising the role of the central bank in situations of stress. Indeed, under Article 17(4), the competent authority may, on a case-by-case basis, waive the application of the unwind mechanism.[35] Section 'The unwind mechanism of the LCR' provides further information on the impact of the introduction of such mechanism.

Cash inflows relative to total assets for GSIIs and O-SIIs are 4.7% of total assets. This share is higher than for 'other banks' (3.2%). (Figure 18)

The results by country show heterogeneity in the composition of inflows, with 17 countries showing a higher share of financial customer cash inflows, 3 countries showing a higher share of inflows from secured lending and 4 countries showing a higher share of other inflows.

[34] COMMISSION DELEGATED REGULATION (EU) 2018/1620 of 13 July 2018 amending Delegated Regulation (EU) 2015/61.
[35] Article 17(2) and (3)

Figure 18: Composition of cash inflows (post-weight and before the cap) relative to total assets (as of June 2021)

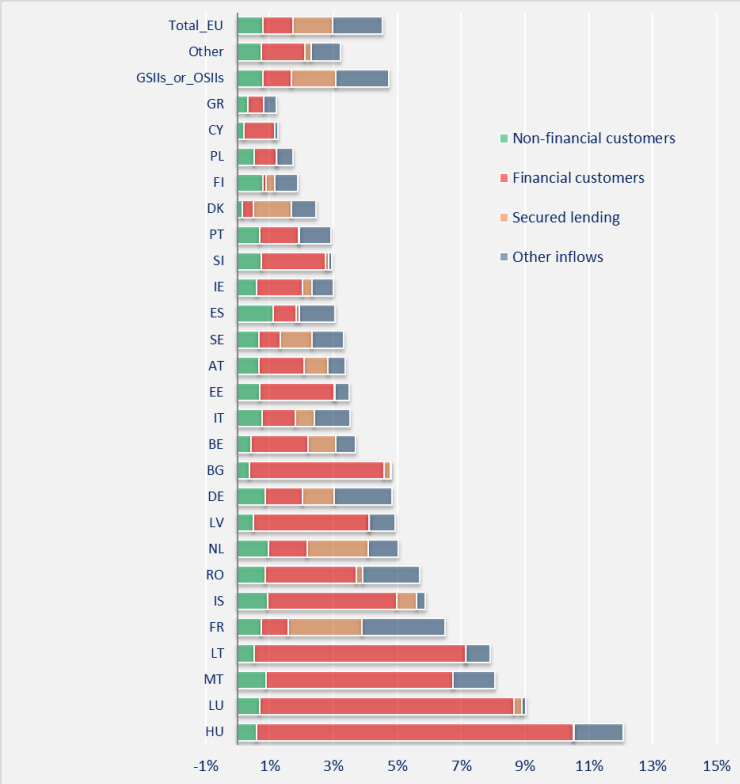


Figure 19 summarises the parameters of the LCR and shows the offsetting effect between outflows (indicated in dark blue) and inflows (indicated in grey) and then illustrates the extent to which the liquidity buffer exceeds the level of net liquidity outflows (portion above the dotted line).

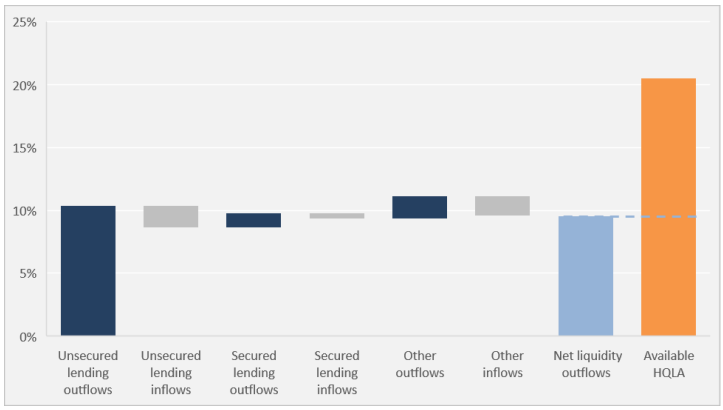
The largest component reducing the LCR is outflows stemming from unsecured lending. This is in line with expectations, for two reasons: First, unsecured funding, especially non-operational deposits, constitutes a large part of banks' outflows; and second, the applicable outflow rates for these financial products are high.

More specifically, outflows stemming from unsecured lending amount to around 10% of total assets. Within this category, non-operational deposits – including excess operational deposits (which have high run-off rates)[36] – are the most important category (6.7% of total assets). Operational and retail deposits (which have lower run-off rates) account for only 3.6% of total assets.

Only about 1.7 percentage points of unsecured lending (outflows) as a share of total assets is offset by inflows in the same category. Proportionally, the offsetting in this category is much lower than in the secured lending category.

[36] Article 28 of the LCR DR.

Figure 19: Dynamics of the liquidity buffer, outflows and inflows (as a share of total assets)



The low share of outflows from secured funding relative to total assets (1.2%) is driven by two aspects:

- Secured funding transactions that are conducted with the central banks receive a 0% outflow rate (irrespective of the liquidity quality of the underlying collateral), hence the column in Figure 19 for outflows from secured lending represents only secured transactions with counterparties in the interbank market.

- In addition, on average, most secured funding transactions that are conducted with other counterparties (and that fall into the LCR time horizon) are secured by liquid assets, and those transactions are subject to lower outflow rates (e.g. 0% outflow rate for secured funding transactions backed by Level 1 assets, and 15% outflow rate for secured funding transactions backed by Level 2A assets).

The final column represents the liquidity buffer that banks hold to meet their net liquidity outflows and also shows that banks hold, on average, an excess liquidity buffer of 10.9% of their total assets.

Analysis of the LCR by business model

The impact of the LCR may also differ depending on bank-specific business models, mostly because banks with different business models tend to follow different funding strategies. Therefore, the categorisation of banks by business model used in this report[37] also takes into account their specific funding structures. Table 1 indicates the main sources of funding that are generally used by banks under different business models, according to the aforementioned categorisation. Nevertheless, this list is not comprehensive and other sources of funding may be used by specific business models. Some of the business models defined in this report cannot be linked to any specific source of funding. If this is the case, the relevant row has been greyed out in Table 1.

Table 1: Main sources of funding by business model

Business model		Main sources of funding			
		Deposits from retail clients	Wholesale funding	Derivatives	Covered bonds
Universal banks	Cross-border universal banks	✓	✓	✓(+)	×
	Local universal banks	✓	✓	✓(-)	×
Retail-oriented banks	Consumer credit banks				
	Cooperative banks	✓	×	×	×
	Savings banks	✓	×	×	×
	Mortgage banks	✓	×	×	×
	Private banks				
	Custodian banks				
Corporate-oriented	Corporate-oriented				
Other - specialised banks	Custodian banks				
	Pass-through	×	×	×	✓
	Public development banks				
	Other specialised banks				

Cross-border universal banks and local universal banks both use derivatives products as a source of funding, although this type of funding is generally more common for cross-border universal banks. In Table 1, if a source of funding appears with a cross for a specific business model, it means that banks of that specific business model are generally less likely to obtain funding from that specific source. Custodian banks have a specific funding structure that relies predominantly on client operational deposits. The operational deposits are kept by clients at custodians for payment and securities settlement purposes.

A different funding strategy will determine the structure of the banks' liabilities and could affect their LCR levels via the net liquidity outflows that are linked to those liabilities (the denominator of the LCR). Indeed, the comparison between two banks with exactly the same size and composition of total assets but with different funding structures will (evidently) show different LCR levels. If a bank sources its funding predominantly from retail deposits, it shows a lower level of net liquidity

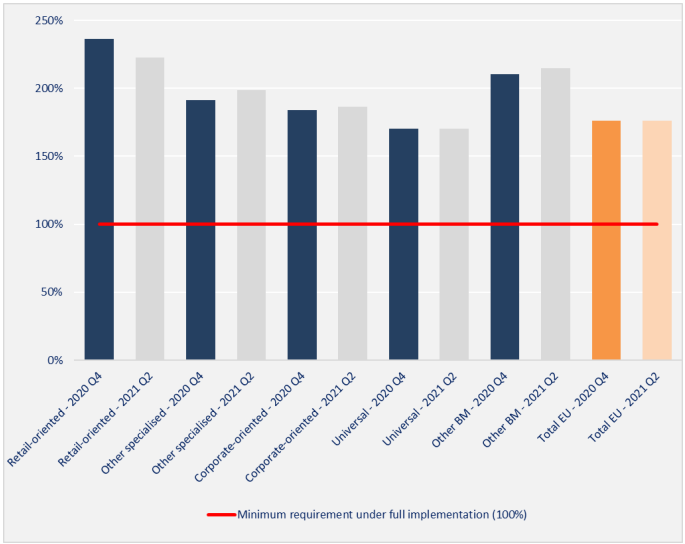
[37] See Table 6 in Annex 1 (business model categorisation).

outflows than if the bank relies on wholesale funding. This is because the latter type of funding is subject to higher run-off rates.

Data confirms that there is a wide dispersion in the LCRs across different business models in the EU banking sector (Figure 20). A sample of 329 banks was used to analyse the impact of the LCR requirement across different business models. Subsidiaries are included in the analysis to take into account the diversity of business models within the overall banking groups (subsidiaries with the same business model as their parent company have been excluded from the analysis to avoid double counting). One caveat to the analysis is the representativeness of the sample, since there is a high concentration of banks in some business models while there are only few banks in some of the others.[38] Results should therefore be interpreted with caution and should be contrasted with the sample size of the relevant business model category.

For all business models, the LCR exceeds, on average, the minimum requirement of 100%. Retail-oriented banks (an average LCR of 236% in December 2020 and 223% in June 2021) present the highest LCRs, well above the EU average. Universal banks (composed of large banks) show the lowest LCR (170%), below the EU average in June 2021 (LCR of 176%).

Figure 20: LCR across business models — balanced sample

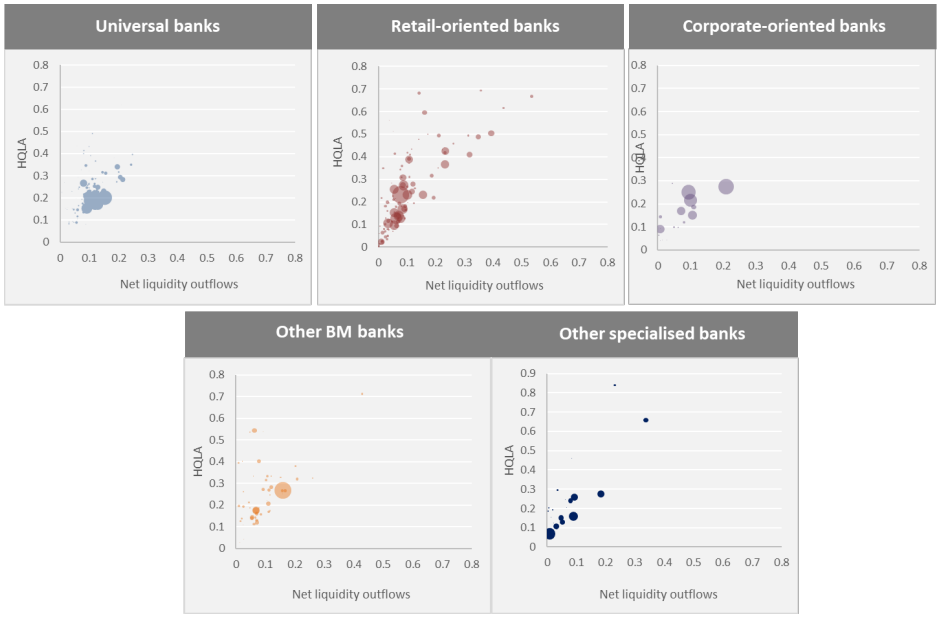


Nevertheless, looking only at LCR levels, it is difficult to understand the implications of the different business models. The ratio of HQLA to net liquidity outflows shows which business models tend to primarily achieve their target LCR levels by adjusting HQLA levels as opposed to those that pursue their LCR levels by adjusting net liquidity outflows. Universal banks show HQLA ranges from 10% to 30% of total assets and ratios of net liquidity outflows to total assets of between 10% and 20%. Other business models, such as retail-oriented banks, show a higher dispersion (with HQLA ranging

38 Custodian banks, mortgage banks and pass-through banks are the business models with lower representation. The sample broken down by business model category is shown in Table 10 in the Annex. The definitions of the business models are presented in Table 12 in the Annex.

from 5% to 70% of total assets and ratios of net liquidity outflows to total assets ranging from 5% to 60%).

Figure 21: HQLA and net liquidity outflows (as shares of total assets), per business model[39] (as of June 2021)



The composition of liquidity outflows may help to explain whether the structure of the LCR is influenced by the business model. Figure 22 shows the comparison between the composition of eligible LCR outflows before and after the application of haircuts. For cooperative banks, mortgage banks and savings banks, the data confirms that the highest share of outflows is related to retail deposits (51%, 49% and 46% respectively). This means that these business models see the highest reductions in outflows after the application of haircuts.

For cross-border universal banks and local universal banks, the data confirms that the share of wholesale funding is also important. For these banks, the share of non-operational deposits over total assets is 9.4% and 9.5% respectively. As these business models also have an important share of retail deposits (26% and 39% respectively), they benefit from a strong reduction in outflows after the application of haircuts, although this reduction is proportionally less significant than for those business models that obtain higher shares of retail funding. Corporate-oriented banks also have a meaningful proportion of wholesale funding (the share of non-operational deposits in total outflows is 10.6%) and committed facilities (the share over total outflows is 7.9%). As a result, the reduction of liquidity outflows after the application of haircuts is somewhat less important for this business model than for those with higher shares of retail deposits.

[39] The size of the bubble indicates banks' weights in terms of total assets. The bigger the bubble, the larger the bank and the greater the weight it takes in the weighted average values within the same business model.

Public banks, custodian banks and pass-through banks show the lowest reductions of outflows after the application of haircuts. These business models do not have (or have very low levels of) outflows related to retail deposits that fall within the scope of the LCR, i.e. the 30-calendar-day time horizon.

Figure 22: Comparisons of pre- and post-weight cash outflows relative to total assets, per business model

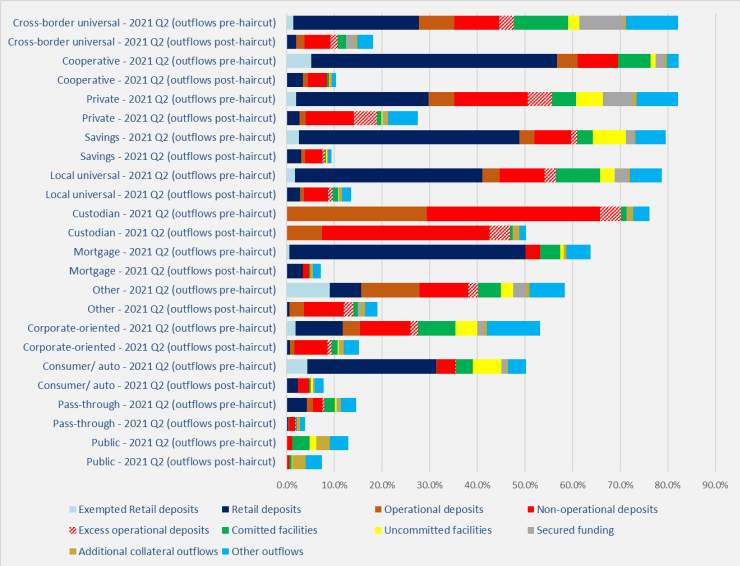
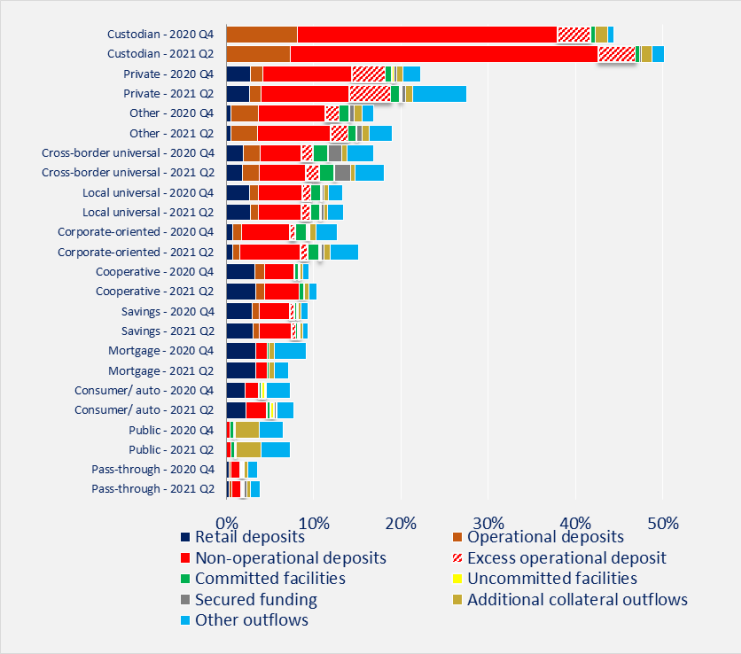


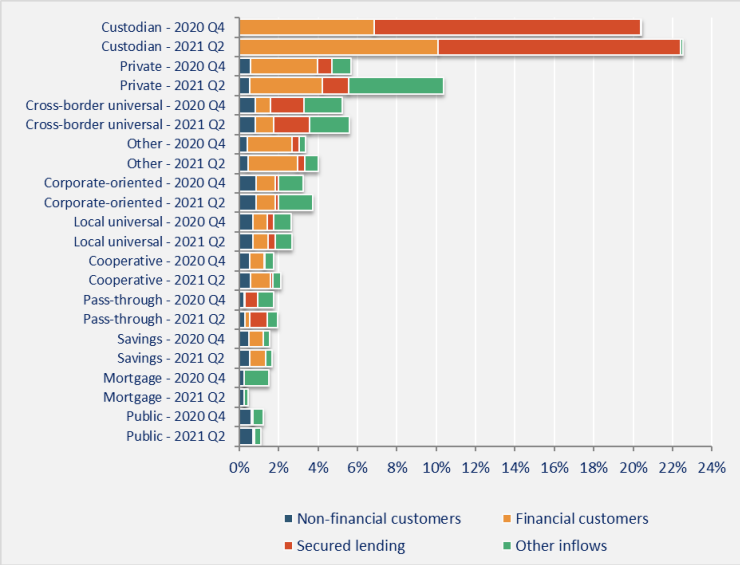
Figure 23 shows the evolution of cash outflows (post-weight) between December 2020 and June 2021. The amount of cash outflows with respect to total assets increased between the two reference dates for the majority of business models whereas the composition remained stable. Private banks, custodian banks and cross-border universal banks experience the most important increase between the two reference dates. The driver of this increase is non-operational deposits in the case of custodian banks (outflows as a share of total assets increased from 30% to 35%) and other outflows in the case of private banks (outflows as a share of total assets increased from 2% to 6%). The increase in cross-border bank outflows cannot be attributed to one single outflow category as the various categories of outflows are driving the increase.

Figure 23: Composition of cash outflows (post-weight) relative to total assets by business model — balanced sample



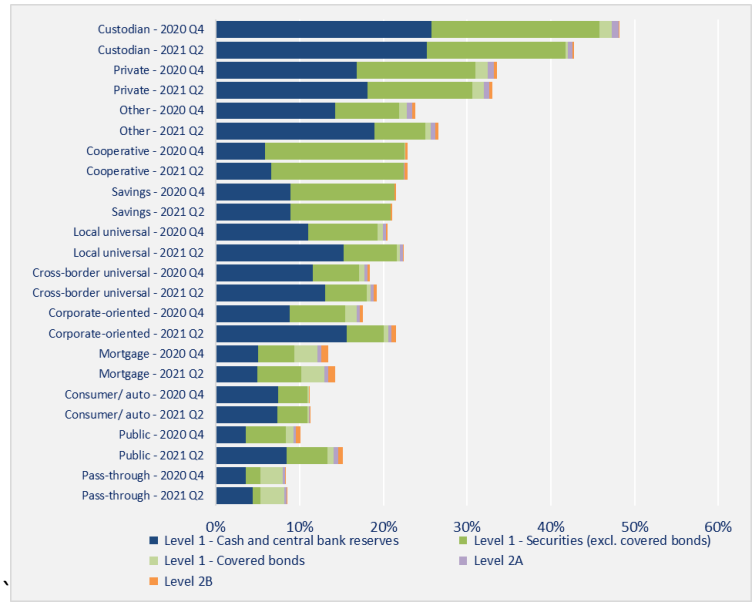
The share of cash inflows (post-weight and before the cap) relative to total assets is, on average, less than 6% across business models, except for custodian banks (around 20% for the two reporting dates) and private banks (which increased the share in total inflows from 6% in December 2020 to 10% in June 2021).

Figure 24: Composition of cash inflows (post-weight and before the cap) relative to total assets, per business model — balanced sample



Taken together, as of June 2021, the composition of liquid assets per business model (Figure 25) and the overall high level of the LCR confirm that the liquidity buffer is of high quality (as defined in the CRR). The composition of HQLAs shows a high share of Level 1 assets in all business models, and HQLAs constitute a similar share (between 10% and 50%) of total assets across most business models. Pass-through banks show the lowest share of HQLAs (around 8% over total assets) and use a higher proportion of Level 1 covered bonds than the remaining business models, in line with the specific funding structure of this business model. For most categories of business models, cash and central bank reserves account for the higher share of total assets, except for cooperative banks and savings banks, for which Level 1 securities are the main component.

Figure 25: Composition of liquid assets (post-weight and before the cap), relative to total assets, per business model — balanced sample



LCR — analysis of currency mismatch

Rationale for the analysis

Banks regularly finance their assets in a currency that is different from that in which the assets are denominated. There are several reasons for this, ranging from diversification, price and supply factors to structural drivers.

In the aftermath of the global financial crisis, currency mismatch in funding and the liquidity of asset buffers became important aspects to consider. In 2011, the European Systemic Risk Board (ESRB) published two recommendations focusing on foreign currency lending (ESRB/2011/1) and significant currency-denominated funding of credit banks (ESRB/2011/2). In addition, Article 8(6) of the LCR DR requires banks to ensure that the currency denomination of their liquid assets is consistent with the distribution by currency of their net liquidity outflows. Where appropriate, competent authorities may require credit institutions to restrict currency mismatches by setting limits on the proportion of net liquidity outflows in a currency that can be met during a stress period and by holding liquid assets not denominated in that currency.

In normal times, it is expected that banks can easily swap currencies and can raise funds in foreign currency markets. However, the ability to swap currencies may be constrained during stressed conditions (as seen during the financial crisis). For instance, counterparty credit risk and currency-specific liquidity risk can cause significant dislocations in foreign exchange (FX) swaps markets, preventing the smooth transfers of liquidity internally from one currency to another.

During the COVID-19 crisis, central banks have taken actions to mitigate the effect of potential constraints to swap currencies by establishing or re-establishing temporary central bank currency swap lines. These swap lines were further extended during 2021.[40] These swap lines let central banks of one country exchange their domestic currency reserves for those of the central bank of a foreign country, thus ensuring that central banks in different countries can provide funds to banks in foreign currencies in all circumstances. The swaps between the two central banks are then reversed after a pre-specified period.

Such arrangements may temporarily allow banks to mitigate their currency-related liquidity risks, as they will be able to make use of the swap lines. Nevertheless, the duration of the swap line arrangements may change in the upcoming years and it cannot be taken for granted that they will remain in place. Therefore, it is useful to study whether currency-related liquidity risk exists in the EU banking sector. Moreover, the analysis of the overall maturity mismatch and liquidity coverage between assets and liabilities across all currencies is useful to disentangle and assess possible large funding/outflow risks for some specific currencies. The risk profile of an institution in a specific currency could be blurred by different maturity mismatches across currencies and therefore LCR

[40] See press release announcing the extension of temporary US dollar liquidity swap lines through March 2021 and also through December 2021.

reports broken down by significant currencies allow for monitoring of the inherent currency risk in the institution's LCR.

The analysis below uses an indicator of the LCR ratio to compare total figures across all currencies against figures per individual significant (foreign) currency[41] (limited to euro, US dollar and pound sterling). The indicator is the liquidity buffer over net cash outflows developed per significant currency and it studies any currency patterns in the liquidity profiles of banks. The analysis sheds light on the banks' liquidity coverage and stable funding by individual significant currencies.[42]

Analysis of the parameters of the LCR by significant currencies

The objective is to test whether there are any currency-specific patterns in the liquidity profiles of banks. The indicator demonstrates whether the difference between the ratio of the liquidity buffer and net cash outflows for a specific foreign currency is more pronounced than the same ratio for all currencies.

$$LCR\ by\ currency = \frac{Liquidity\ buffer_{currency}}{Outflows_{currency} - Min(Inflows_{currency}, 0.75 \times Outflows_{currency})}$$

Where currency = reporting currency (all currencies), euro, US dollar, pound sterling.

Currency mismatches in EUR

A total of 52 banks (of which 30 are GSIIs/O-SIIs and 22 are 'other banks') reported euro as a significant (foreign) currency. There is some evidence of a different pattern when euro is the significant currency. 16 banks out of the 30 banks classified as GSIIs and O-SIIs presented an LCR_{EUR} lower than the $LCR_{all\ currencies}$, but only 9 banks presented an LCR_{EUR} below 100%. 14 out of the 22 banks classified as 'other banks' presented an LCR_{EUR} lower than the $LCR_{all\ currencies}$, but only 4 banks presented an LCR_{EUR} below 100%. These banks are located north-west of the diagonal line in Figure 26. The size of the bubble in this figure indicates the banks' weight in terms of total assets. The bigger the bubble, the larger the bank.

[41] Article 415(2) of the CRR indicates that a currency is considered significant if the currency-denominated liabilities are higher than 5% of total liabilities. The analysis is limited to foreign significant currencies, meaning that only significant currencies that are different from the legal currency in the country of origin of each individual bank are included, i.e. a UK bank with positions in euros, pounds sterling and US dollars over 5% of total liabilities will be considered in the analysis only for euros and US dollars but not for pounds sterling.

[42] The results are presented at an anonymised institution level and at aggregated level. An institution is included in the analysis under a specific indicator only if the relevant data is available for the total figures in the reporting currency and in at least one of the significant (and foreign currencies).

Figure 26: Liquidity buffer over net cash outflows where the significant currency is euro (*x*-axis) compared with the same indicator for the reporting currency (all currencies; *y*-axis)

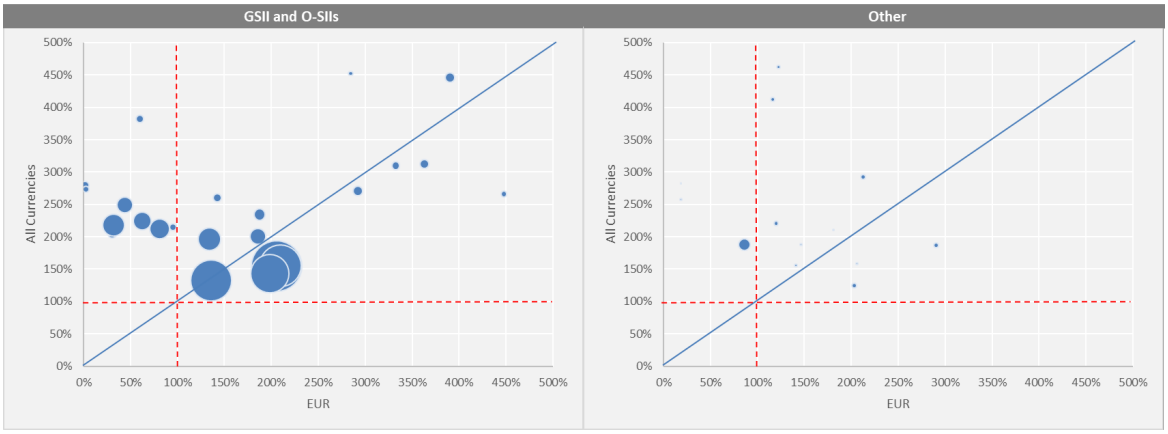


Figure 27 shows the evolution of the proportion of banks in the sample with LCR_{EUR} below $LCR_{all\ currencies}$ (blue line) and the proportion of banks in the sample with LCR_{EUR} below 100% (orange line). The chart shows a significant fluctuation over time in the relationship between LCR_{EUR} and $LCR_{all\ currencies}$. The proportion of banks with LCR_{EUR} below 100% has decreased from 25% in September 2016 to 18% in June 2021.

Figure 27: Evolution of the comparison between the positions in LCR in EUR and LCR in all currencies — balanced sample [43]

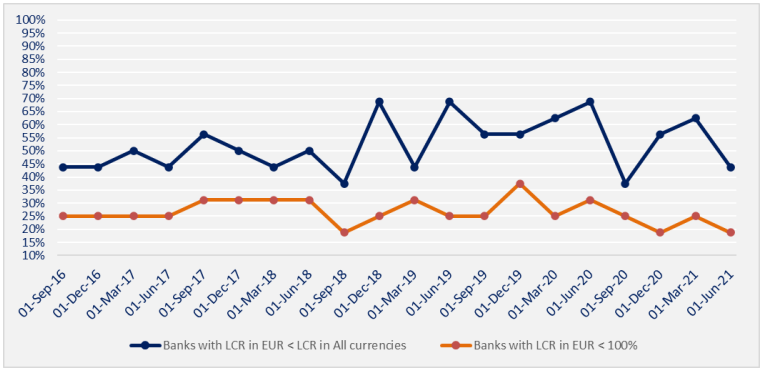


Figure 28 analyses the evolution of the weighted average level of LCR_{EUR} and $LCR_{all\ currencies}$ for a balance sample of banks. Since September 2016, LCR_{EUR} has been on average higher than the average $LCR_{all\ currencies}$. Figure 29 shows the evolution of the distribution[44] of LCR_{EUR} and $LCR_{all\ currencies}$ between September 2016 and December 2020/June 2021. It can be observed that the dispersion in LCR levels has reduced since December 2016 but more significantly for $LCR_{all\ currencies}$ than for LCR_{EUR}.

[43] Results based on a consistent sample of 16 banks that reported LCR_{EUR} data across reference dates.

[44] Some considerations need to be taken into account when interpreting distribution graphs in this section: The blue bars represent the $LCR_{all\ currencies}$ while the orange bars represent LCR_{EUR}. The top line of the blue/orange box shows the 75th percentile, whereas the bottom line of the blue/orange box shows the 25th percentile. The top line outside the box represents the maximum observation while the bottom line outside the box represents the minimum observation.

Figure 28: Evolution of average LCR in EUR vs average LCR in all currencies — balanced sample

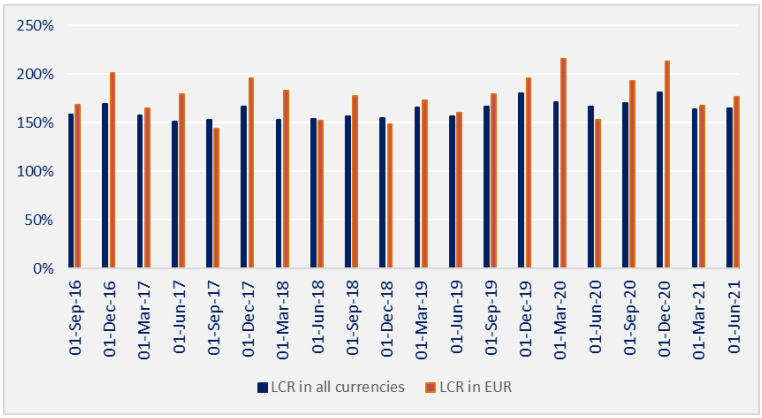
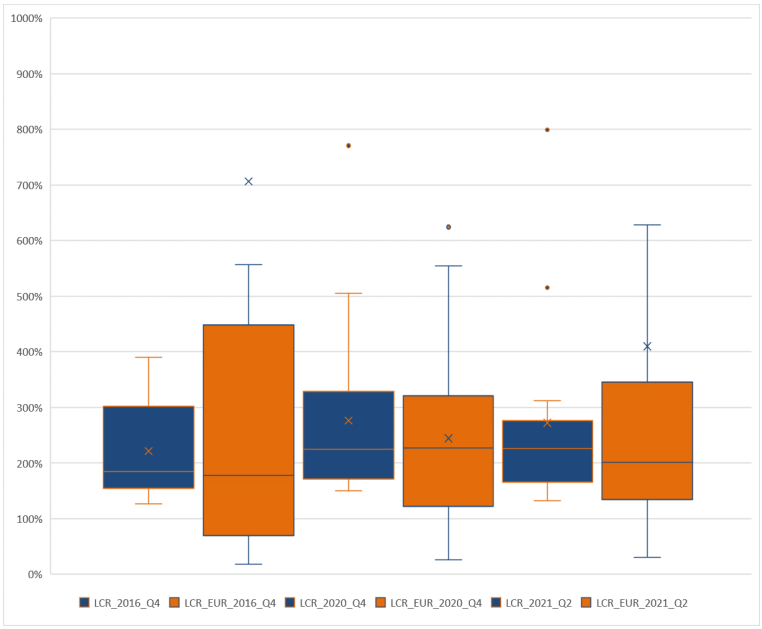


Figure 29: Evolution of the distribution of the LCR in EUR vs the distribution of the LCR in all currencies — balanced sample



Currency mismatches in USD

A total of 109 banks (of which 58 are GSIIs/O-SIIs and 51 are 'other banks') reported US dollar as a significant (foreign) currency. There is clear evidence of a different pattern when US dollar is the significant currency. 45 banks out of the 58 banks classified as GSIIs and O-SIIs banks presented an LCR_{USD} lower than the $LCR_{all\ currencies}$, many of them with LCR_{USD} close to 0%. 43 banks out of the 51 banks classified as 'other banks' presented an LCR_{USD} lower than the $LCR_{all\ currencies}$; many of them also showed LCR levels close to 0%. In total, 62 banks showed an LCR_{USD} close to zero. These banks are located north-west of the diagonal line in Figure 26. The size of the bubble in this figure indicates the banks' weights in terms of total assets. The bigger the bubble, the larger the bank.

Figure 30: Liquidity buffer over net cash outflows where the significant currency is US dollar (*x*-axis) compared with the same indicator for the reporting currency (all currencies; *y*-axis)

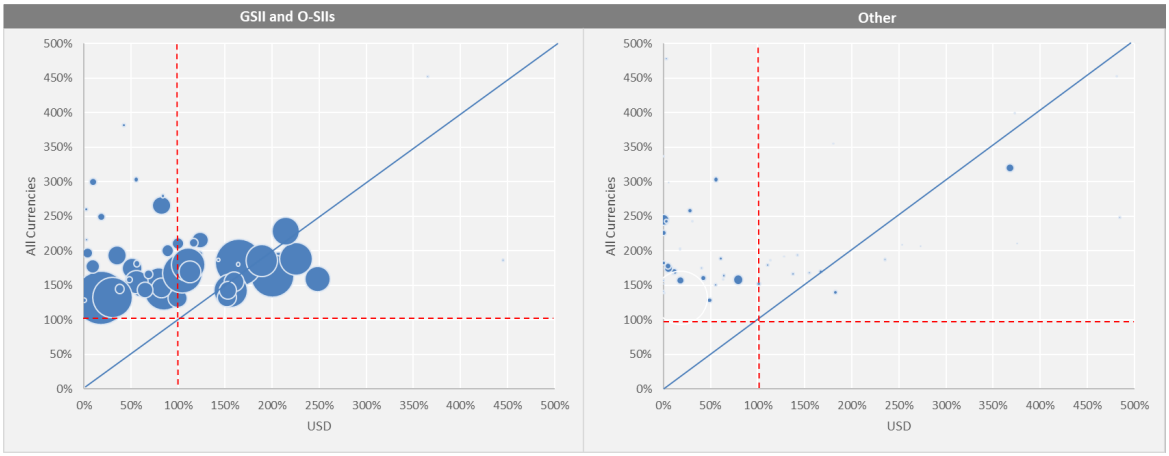


Figure 31 shows the evolution of the proportion of banks in the sample with LCR_{USD} below $LCR_{all\ currencies}$ (blue line) and the proportion of banks in the sample with LCR_{USD} below 100% (orange line). Since September 2016, there is a tendency of a reduction in the number of banks that have LCR_{USD} below $LCR_{all\ currencies}$. This tendency changed between December 2019 and September 2020, as a higher percentage of banks in the sample reported LCR_{USD} below $LCR_{all\ currencies}$. Since September 2020, the tendency changed again and there has been a reduction in this percentage of banks. The proportion of banks with an LCR_{USD} below 100% also reduced between September 2016 and June 2021.

Figure 31: Evolution of the comparison between the positions in LCR in USD and LCR in all currencies — balanced sample [45]

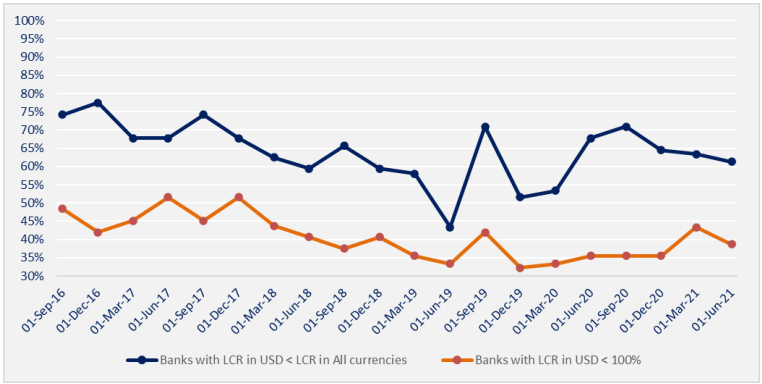


Figure 32 analyses the average level of LCR_{USD} and $LCR_{all\ currencies}$. Since September 2016, the average LCR_{USD} level has been lower than the average $LCR_{all\ currencies}$ level. The difference between the two ratios reduced significantly between June 2018 and March 2020 but has increased since then. The increase in the gap between the two variables is driven by, on one hand, the upward tendency of the $LCR_{all\ currencies}$ driven by the central bank funding operations carried out in 2020 and 2021. On the other hand, LCR_{USD} showed a decreasing tendency since March 2020 until the last reporting date (June 2021) even if central banks' measures, such as USD swap lines, have alleviated any

[45] Results based on a consistent sample of 32 banks that reported LCR_{USD} data across reference dates.

potential stress in the USD funding market.[46]. On June 2021 the average LCR_{USD} was 88.6%, thus below 100% and significantly below the $LCR_{all\ currencies}$ (158%).
Figure 33 shows the evolution of the distribution[47] of LCR_{USD} and $LCR_{all\ currencies}$ between September 2016 and December 2020/June 2021. A greater dispersion in the LCR_{USD} levels can be observed across different reporting dates. The median and the 25th percentile is always lower for the LCR_{USD} levels while the minimum observation is 0% for all the reporting dates.

Figure 32: Evolution of average LCR in USD vs average LCR in all currencies — balanced sample

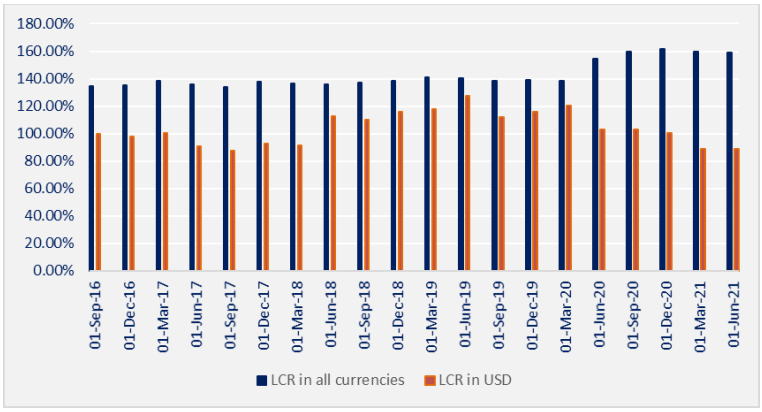
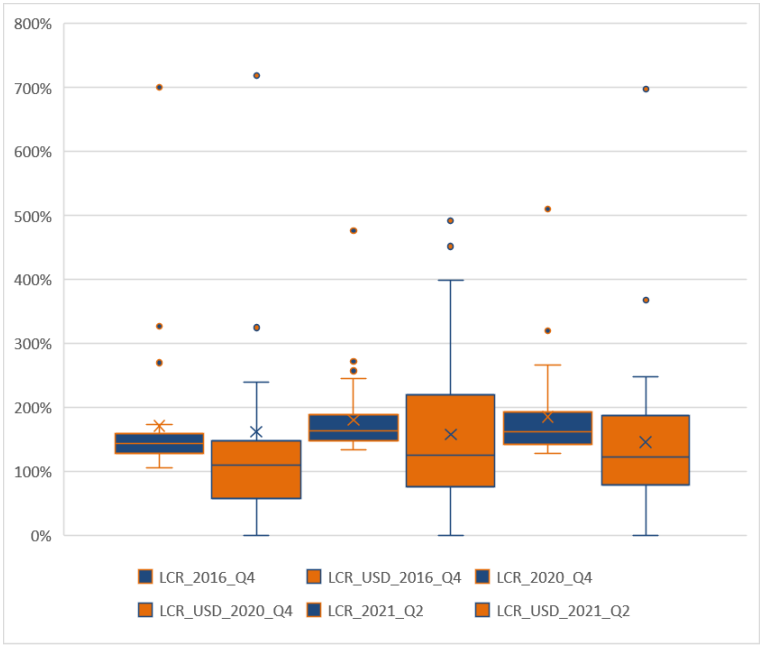


Figure 33: Evolution of the distribution of the LCR in USD vs the distribution of the LCR in all currencies — balanced sample



Currency mismatches in GBP

[46] See press release announcing the extension of temporary US dollar liquidity swap lines through March 2021 and also through December 2021.

[47] Some considerations need to be taken into account when interpreting distribution graphs in this sector: The blue bars represent the $LCR_{all\ currencies}$ while the orange bars represent $LCR_{EUR.}$ The top line of the blue/orange box shows the 75th percentile, whereas the bottom line of the blue/orange box shows the 25th percentile. The top line outside the box represents the maximum observation while the bottom line outside the box represents the minimum observation.

A total of 26 banks (of which 15 are GSIIs/O-SIIs and 16 are 'other banks') reported GBP as a significant (foreign) currency. 14 banks out of the 15 banks classified as GSIIs and O-SIIs banks presented an LCR_{GBP} lower than the $LCR_{all\ currencies}$. 13 banks out of the 16 banks classified as 'other banks' presented an LCR_{GBP} lower than the $LCR_{all\ currencies}$. In total, 16 banks reported LCR_{GBP} lower than the $LCR_{all\ currencies}$. There is some evidence of a different pattern when pound sterling is the significant currency, but this evidence is based on a reduced sample of banks that reported pound sterling as a significant (foreign) currency. The size of the bubble in this figure indicates the banks' weights in terms of total assets. The bigger the bubble, the larger the bank.

Figure 34: Liquidity buffer over net cash outflows where the significant currency is pound sterling (*x*-axis) compared with the same indicator for the reporting currency (all currencies; *y*-axis)

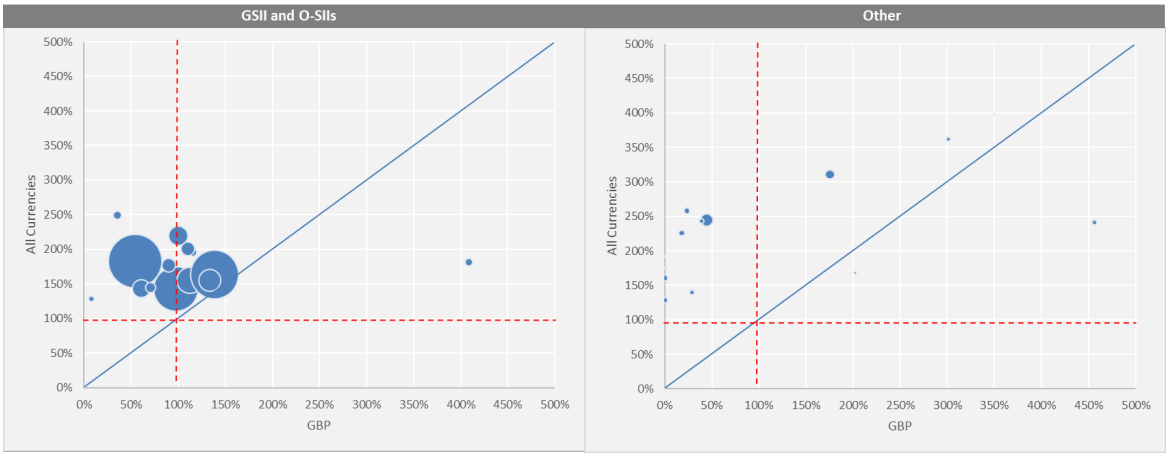


Figure 35 shows the evolution of the proportion of banks in the sample with LCR_{GBP} below $LCR_{all\ currencies}$ (blue line) and the proportion of banks in the sample with LCR_{GBP} below 100% (orange line). The evolution shows that the proportion of banks with LCR_{GBP} below $LCR_{all\ currencies}$ and the proportion of banks below 100% showed a slow but downward tendency between September 2016 and June 2019; this tendency changed in September 2019 when both variables increased and went down again in September 2020. Between September 2020 and June 2021 the proportion of banks reporting LCR_{GBP} below $LCR_{all\ currencies}$ increased significantly to 92%.

Figure 35: Evolution of the comparison between the positions in LCR in GBP and LCR in all currencies — balanced sample [48]

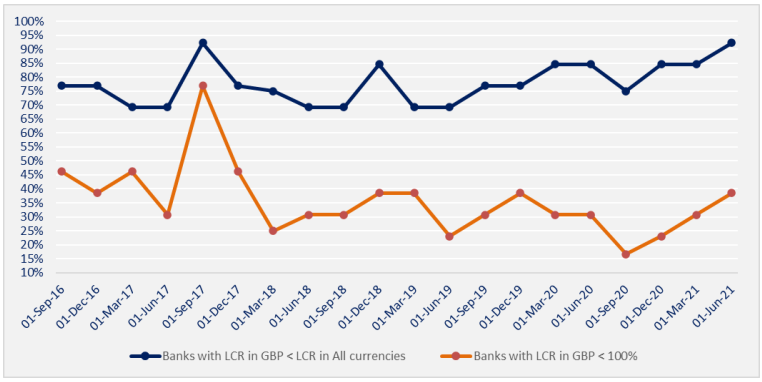


Figure 36: Evolution of average LCR in GBP vs average LCR in all currencies — balanced sample

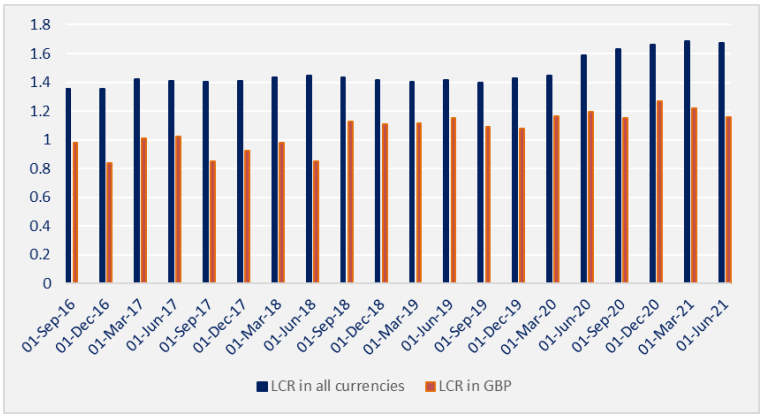


Figure 36 analyses the average level of LCR_{GBP} and $LCR_{all\ currencies}$. Since September 2016, the average LCR_{GBP} level is below the average level of $LCR_{all\ currencies}$. As of June 2021, the average LCR_{GBP} is 116%, significantly below the $LCR_{all\ currencies}$ (167%).

Figure 37 shows the evolution of the distribution of LCR_{GBP} and $LCR_{all\ currencies}$ between September 2016 and December 2020/June 2021. A slightly greater dispersion in the LCR_{GBP} levels can be observed but differences are not significant. The median and the 25th, 75th percentile are lower for the LCR_{GBP} for all the reporting dates.

[48] Results based on a consistent sample of 14 banks that reported LCR_{GBP} data across reference dates.

Figure 37: Evolution of the distribution of the LCR in GBP vs the distribution of the LCR in all currencies — balanced sample

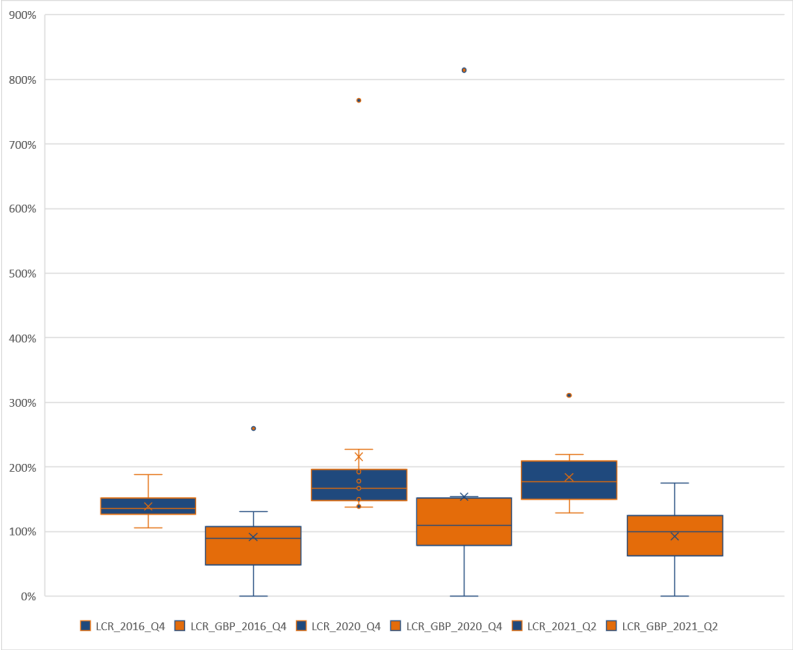
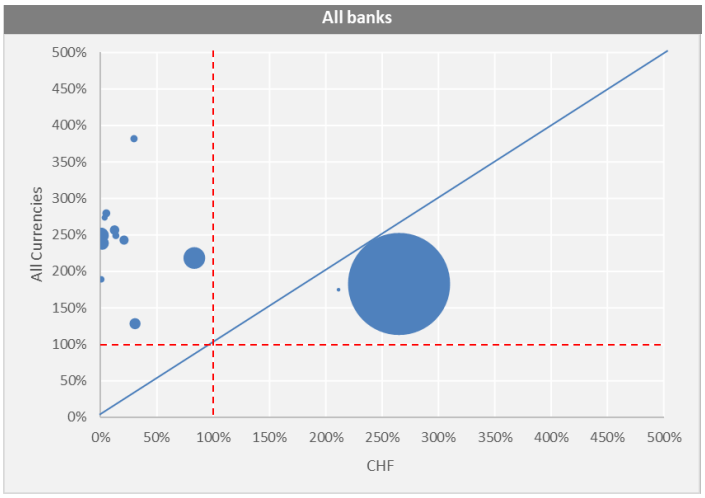


Figure 38: Liquidity buffer over net cash outflows where the significant currency is Swiss franc (x-axis) compared with the same indicator for the reporting currency (all currencies; y-axis)



16 banks reported Swiss franc as a significant (foreign) currency. Due to the small sample, all banks are shown together without distinguishing between bank categories. A majority of banks reported an LCR_{CHF} lower than the $LCR_{all\ currencies}$ and even below 100%. There is some evidence of a different pattern when Swiss franc is the significant currency, but this evidence is based on a reduced sample of banks that reported Swiss franc as a significant (foreign) currency. The size of the bubble in this figure indicates the banks' weights in terms of total assets. The bigger the bubble, the larger the bank.

Between September 2016 and June 2021, only 3 banks reported Swiss franc as a significant (foreign) currency consistently. Due to the small balanced sample for Swiss franc, evolution graphs are not shown for this currency.

For the majority of the banks, the ratio for the total figures (reporting currency, i.e. across all currencies) is higher than the same ratio when considering only each individual significant currency (euro, US dollar, pound sterling and Swiss franc). This implies that banks are likely to hold a higher liquidity buffer in relation to their net cash outflows in the national currency than in significant (foreign) currencies. Thus, at aggregate level, the surplus in liquidity coverage in all currencies offsets (or dominates) the liquidity shortfall in other significant currencies.

Low levels of LCR in one significant currency may create problems during stress periods when liquidity sources may be constrained and the FX swaps markets may become difficult to access. Amid the COVID-19 crisis, central banks have established or reactivated FX swap lines to ensure that they can meet increased demand for funding in foreign currencies. These measures have partially alleviated stress in the FX funding market even though average LCR levels in foreign currencies show some signs of deterioration. As the duration and extension of these currency swap lines is unknown, banks need to ensure consistency between liquidity buffers and net outflows by currency.

Therefore, Article 8 of the LCR DR states that competent authorities may limit significant excesses of net outflows denominated in a significant or reporting currency (Article 8(6) of the LCR DR). Possible specific limits or quantitative restrictions may be implemented to correct mismatches in material cases.

LCR — impact on lending

Rationale of the analysis

In its 2012 position paper, the EBA Stakeholder Group raised the concern that banks could be forced to channel a meaningful part of their funding towards LCR eligible assets (for example, through acquisition of government securities or holdings of additional deposits with the central bank) rather than to lending to the non-financial sectors. Indeed, banks have two ways of improving their LCR: either by increasing the amount of HQLA by acquiring additional eligible liquid instruments, or by replacing non-LCR eligible assets, such as loans, with HQLAs.

This section analyses the relationship between the banks' lending behaviour and the minimum LCR requirements as defined in European legislation. In particular, the focus is on lending to households (mortgage loans and consumer loans) and to non-financial companies (NFCs hereafter). As in the other sections in this Report, the analysis is based on COREP/FINREP data. It is worth mentioning that this is bank-specific analysis, and substitution/compensation effects at the system level are not considered. Indeed, the impact of lower loan growth of some banks could be compensated by other banks.

The analysis takes into consideration that banks' lending activity can be influenced by several additional factors such as regulatory requirements on the capital side, banks' financial health and the general macroeconomic conditions. Moreover, the ongoing expansionary monetary policy measures introduced by several central banks within the EU reduce the constraints from the liquidity side.

A standard empirical approach for the evaluation of the impact of the introduction of a new regulation is the Difference in Difference method (DiD). This approach requires data about a treatment group (banks subject to the new regulation) and a control group (banks not subject to the new regulation) observed before and after the entering into force of the new rules. For example, in the BIS working paper 473/2014, the authors exploit data regarding UK banks. They take advantage of the fact that already in 2010 the UK Financial Services Authority introduced a regulation requiring banks to hold a sufficient stock of high-quality liquid assets (HQLA) but not all banks were made subject to this liquidity regulation.

Two practical problems prevented the adoption of the DiD for this Report. First, the LCR entered into force in 2015 but banks started to report the LCR figure in COREP only in 2016. Albeit in 2015 the minimum LCR was set to 60% (increased up to 100% in 2018) we know that already in September 2016 (the first reference date available in COREP) most of the banks were already compliant with the 100% (the weighted average LCR in September 2016 was 136%). This means that, working with COREP data, we could not define the control group either because at the first available reference date all the banks were subject to the LCR and we do not have information

regarding the period prior to the introduction of the LCR. Second, the DiD approach is known for having high 'internal validity' but lower 'external validity', that is, while this approach provides a robust estimation of the effect at the moment of the shock, it is not so easy to extend the results far from that moment. While it is certainly interesting to know if the LCR had an effect on lending at the moment of its introduction, it would not be possible to infer from there that the LCR still has an effect nowadays. In other words, the DiD does not fit the needs for a monitoring exercise.
We analyse the relationship between the variations of the stock of bank lending[49] at a given point in time with the level of the LCR that was observed at the beginning of the period. The underlying economic intuition is that banks need some time to react to eventual liquidity problems so that the possible impact on the lending side can be observed only after a while. Non-performing exposures have been excluded from the analysis so that changes in the loan aggregates can be more easily considered as proxies of the banks' lending policy. The purpose of this bivariate analysis is to investigate whether the variation in the banks' lending is statistically independent from the level of the LCR. We present different versions of the same model by introducing in the underlying data some filters to control for outliers or other phenomena. This approach permits us on the one hand to observe the results obtained on the original data set and on the other to do some sensitivity analysis. We also used the Chamberlain (1980) estimator to account for potential fixed effects[50]. In a second step, a multivariate analysis was performed to verify whether the relationship potentially identified in the first step is robust.

The main risk in regression analysis is that the identified empirical relationship only establishes a correlation, failing to identify a causality relationship. However, it is possible to rely on a definition of causality based on the general principle that the cause precedes the effect[51]. In practice, a standard approach to circumvent the endogeneity and simultaneity problem is to rely on lagged variables[52].

This report showed that the LCR level has continued to increase every year, even after most of the banks have reached the regulatory minimum (Figure 39). This suggests that the banking industry could be pursuing a target level for LCR higher than the regulatory minimum. This could be due to several reasons. If the banks indeed choose to target an LCR higher than the regulatory minimum, it is still possible that liquidity constraints have an impact on the banks' lending decisions even if the minimum LCR is seemingly met.

[49] The lending to real economy, or the stock of lending activities, has been defined as the amount of outstanding performing loans to households and NFCs. The amounts have been obtained from FINREP as the sum of both components.

[50] While in the context of linear models with panel data, it is possible to resort to the within or the first difference transformation to account for fixed effects, for non-linear models this is no longer the case. For the specific case of logistic models, Chamberlain (1980) derived an estimator that is asymptotically unbiased also in the presence of fixed effects. The main drawback of the Chamberlain estimator is that it exploits only the observations for which the target variable has changed from one period to another. These are called the informative observations and their number is usually lower compared with the sample size.

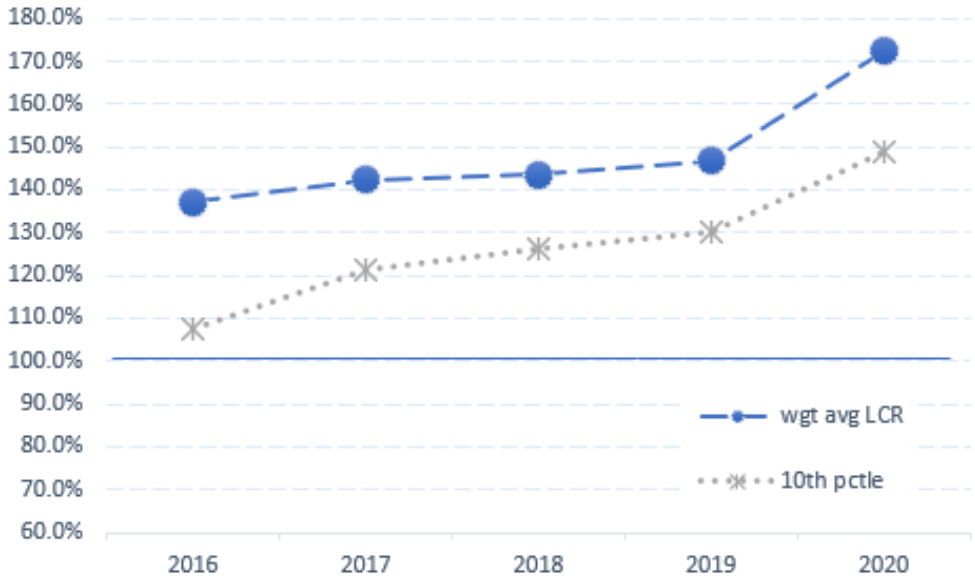
[51] This idea was introduced by Granger in the seventies.

[52] While in a model like $y_t = \beta x_t + e_t$ there exists the possibility that x_t and e_t are not independent or that the causal relationship between y_t and x_t could go in the opposite direction (i.e. it is x_t that causes y_t), in a model like $y_t = \beta x_{t-1} + e_t$ the problem is less material because in this case the explanatory variable x_t is preconditioned with respect to both e_t and y_t.

Data

The analysis is based on 103 banks[53] from 23 countries that reported FINREP and COREP data within the period 2016-2020 excluding subsidiaries. In COREP, the LCR is reported on a monthly basis, however for the purposes of this study only the December figures have been considered. UK banks are excluded from the sample. Against the minimum LCR requirement of 100%, the weighted average LCR for this sample of banks was 137.2% at the end of the 2016 and 172.4% in 2020. It is important to notice that already starting from the end of 2016, 90% of the banks reported an LCR above 105% and at the end of 2020 the same percentile was 150%. For each of the years there is a huge variation in the individual bank-level LCRs (ranging from 0% to over 700%).

Figure 39: Average weighted LCR and 10th percentile



The aggregate stock of outstanding loans to the real economy (performing loans towards households and NFCs) for the 116 banks was EUR 10.0 trillion at the end of 2016. It increased by 13.8% between 2016 and 2020. At bank level, huge variability in the growth rate of the lending level can be observed. This fact is partially explained by merger and acquisition operations but also by the presence in the sample of banks that have a limited level of loans towards households and NFCs so that small variations in nominal terms can produce high variations in relative terms.

Table 2: Distribution of the 1-year and 2-year variation of the stock of loans to households and NFCs at bank level

[53] See detailed sample in Table 9

	p1	p5	p10	p25	p50	p75	p90	p95	p99
1-year variation	-50.9%	-10.4%	-4.7%	0.0%	**4.0%**	7.7%	14.4%	26.1%	181.9%
2-years variation	-81.0%	-13.7%	-7.8%	1.3%	**9.1%**	16.2%	32.1%	59.3%	544.8%

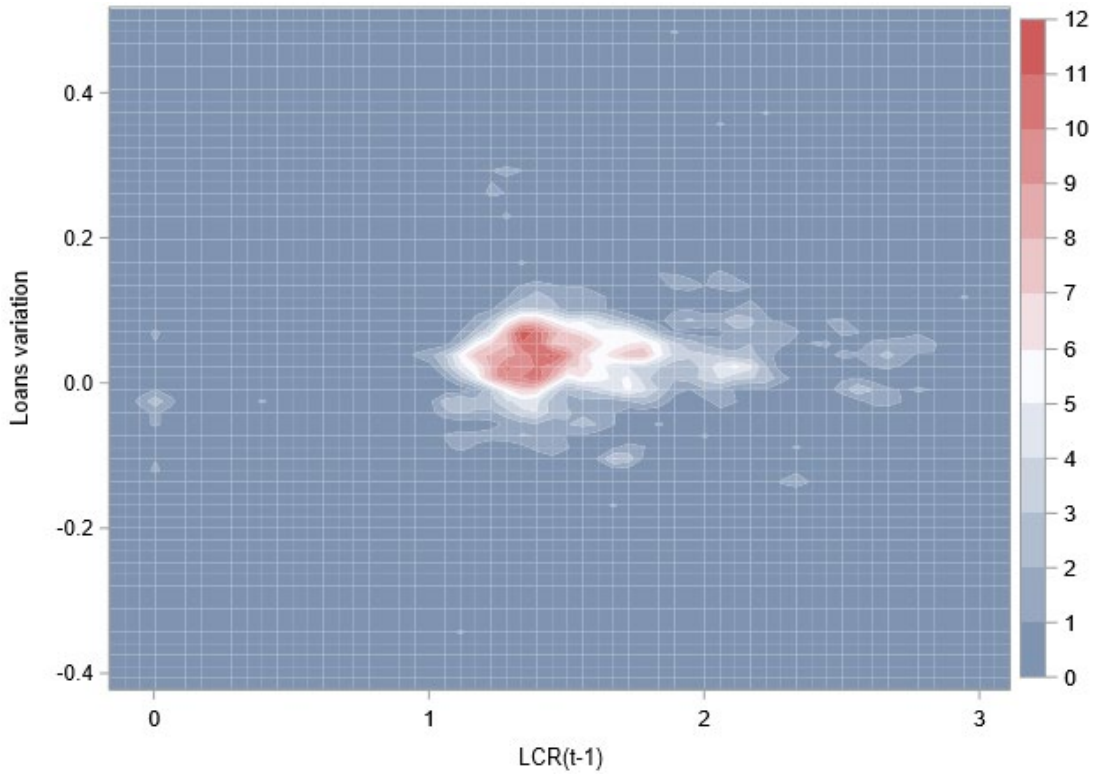
Bivariate analysis

Although for both the LCR and the variation of the loans it is possible to observe anomalous values, most of the observations are found (see the chart below) in a range for the LCR going from 100% to 200% and for the variation of the loans from -10% to 40%. In our analysis, we reduce the variation of the loans and the LCR to the following indicator variables. In this way, the effect on the estimates of the eventual outliers is reduced without the need to eliminate observations from the data set.

$$y_t = \begin{cases} \mathbf{1}\ if & \dfrac{Loans_t - Loans_{t-1}}{Loans_{t-1}} < 4\% \\ \mathbf{0}\ if & \dfrac{Loans_t - Loans_{t-1}}{Loans_{t-1}} \geq 4\% \end{cases}$$

$$LCR_t < 130\% = \begin{cases} \mathbf{1}\ if & LCR_t < 130\% \\ \mathbf{0}\ if & LCR_t \geq 130\% \end{cases}$$

Figure 40: Scatter plot: Variation in the stock of loans vs LCR



The following table shows the result of a logistic regression where the modelled event is the probability that a bank increases the stock of loans towards households and NFCs by less than 4%. This probability has been conditioned on the level of the LCR at the beginning of each period. Since the sample is constituted by banks not homogenous in terms of size, the logarithm of the total assets has been included.

Table 3 shows the results of the logistic regression. The estimated parameter associated with the dummy variable built from the LCR is positive and statistically significant (P-value ≈ 1.6%). The accuracy (AUC) of this simple model is 60%. In particular, from the odds-ratio analysis it can be seen that banks with an LCR lower than 130% showed a probability of increasing their stock of loans by less than 4% that was nearly 2 times higher than the banks which had an LCR higher than 130%. The model also includes a size variable, namely the natural log of the bank's total assets at the beginning of the period. The positive coefficient associated with this variable suggests that larger banks have a higher probability of increasing their lending activities less than the median growth rate.

Table 3: Logistic regression Pr(y<4%) vs lagged LCR and size

Variable	Parameter estimate	Standard error	Wald chi-square	P-value
Intercept	-4.7885	1.8653	6.5902	0.0103
Lcr(t-1) < 130%	0.6388	0.2659	5.7734	0.0163
Ln TotAss (t-1)	0.1873	0.0743	6.355	0.0117

Odds ratio estimates

Effect	Point estimate	95% Wald confidence limits	
Lcr(t-1) < 130%	1.894	1.125	3.19
Ln TotAss (t-1)	1.206	1.043	1.395

We ran two alternative regressions by filtering the data. In the first case, we excluded banks that have a structurally low (<1%) share of loans towards households and NFCs compared with the total assets and banks that showed an anomalous variation of the stock of total assets[54]. We also ran a

[54] Anomalous variation of the total assets could be due to merger and acquisition operations (M&A). In these cases, the annual variation of the stock of loans could be not representative of the banks' behaviour. In the observed period, about 99% of the banks' annual variation of the total assets were included in the range +/- 40%. We defined as outliers those variations exceeding this range.

regression using the Chamberlain (1980) estimator, which is known to be asymptotically robust against the possible presence of individual (fixed) effects.

Table 4 shows that the parameter associated with the dummy variable built from the LCR is always significant. For the Chamberlain estimator, the number of informative data points is 264 against 412 available observations (103 banks observed for four years).

Table 4: Logistic regression Pr(y<4%) vs lagged LCR and size, different sample and estimator

Variable	Model	Parameter estimate	Standard error	Wald chi-square	P-value
Lcr(t-1) < 130%	Base	0.6388	0.2659	5.7734	0.0163
	Excluding outliers	0.6371	0.2766	5.3034	0.0213
	Chamberlain estimator	0.9576	0.4149	5.3278	0.0210

Multivariate analysis

The relationship identified between the lending activity and the LCR could be spurious in the sense that the LCR could be correlated with other explanatory variables. In other words, in the bivariate analysis above, the LCR could arise as a significant explanatory variable simply because it may capture the characteristics of some omitted relevant variables. To control for this, we also carried out a multivariate analysis to verify the robustness of the relationship.

The control variables added to the logistic regression are related to the banks' capital position (CeT1 ratio); profitability (ROE); riskiness of the assets (RWA density and NPL ratio); business model (Total Loans over Deposits and Fee over Net Operative Profits). We also included a variable defined at the country level that measures the annual variation of the GDP level.

Table 5 shows the results of the logistic regression. The parameter associated with the dummy variable LCR<130% is still positive, denoting an increasing probability that the bank increases its lending activity by less than 4% if the LCR is lower than 130%. However, its impact is now less statistically significant. The accuracy (AUC) of this model is 65%.

Table 5: Logistic regression Pr(y<4%) vs LCR and control variables

Variable	Parameter estimate	Standard error	Wald chi-square	P-value
Intercept	-2.8153	2.4801	1.2886	0.2563
Lcr(t-1) < 130%	**0.5641**	**0.2962**	**3.6266**	**0.0569**
Ln TotAss (t-1)	0.1572	0.089	3.123	0.0772

ROE(t-1)	-4.3736	1.4829	8.6989	0.0032
CeT1 ratio (t-1)	-0.739	1.3525	0.2986	0.5848
RWA density (t-1)	-1.3851	0.812	2.9096	0.0881
NPL ratio (t-1)	-0.0945	1.3889	0.0046	0.9457
Loan/Deposit (t-1)	-0.0851	0.0628	1.8344	0.1756
Fee over Nop (t-1)	-0.9927	0.6656	2.2244	0.1358
Δ GDP (t-1)	6.5367	6.5101	1.0082	0.3153

To better understand the relationships described in Table 5, imagine that we first run a logistic regression that uses only the control variables. We then use the results of this model to compute the predicted probability (call it *Pr*) that a given bank will increase the amount of loans by less than 4%. Finally, we would set an arbitrary threshold for this probability, for example 50%, and use it to classify the banks. In practice, by following this strategy we are using the control variables to set up a prediction model.

Table 6 provides a comparison between the prediction and the realisation. The share of banks associated with *Pr* (the probability of increasing the loans by less than 4%) higher than 50% and which indeed experienced a loan increase lower than 4% is 58.6%, clearly higher than the 41.1% share of banks with *Pr* below 50% (see last column of the table). Furthermore, by classifying the banks on the grounds of the LCR level (and setting the threshold at 130%), it is possible to see that the observed frequency of banks increasing their lending by less than 4% is higher when LCR<130% even if we controlled for *Pr*. In detail, banks with *Pr* > 50% but LCR>130% have a probability of increasing their lending activity by less than 4% equal to 54.5%, while for banks with *Pr* > 50% but LCR<130%, this probability increases to 69.8%. These results suggest that the LCR does contain some additional relevant information to predict the direction of the variation of lending activities.

Table 6: Control variables vs LCR

% of banks increasing the loans less than 4%	LCR>130%	LCR<130%	Unconditioned to LCR
Pr > 50%	54.4%	69.8%	58.6%
Pr < 50%	40.6%	46.7%	41.1%
Unconditioned to Pr	47.6%	65.4%	51.0%

It is possible that by introducing further variables, the explanatory power of the LCR decreases. However, as we are working with a relatively small sample, increasing the number of parameters that must be estimated can reduce the reliability of the estimates. For this reason, we followed a different approach. Compared with the previous models, we included 9 additional variables (all lagged by one year): cost to income, net interest income, relative share of residential mortgages, relative share of derivatives, share of encumbered assets, the coverage ratio of non-performing loans, the staff expenses, the ratio between total loans and total assets, and we added back the

logarithm of the total assets. Then we employed a factor analysis to reduce these 15 variables to a lower number of indicators.

The analysis showed that the first 9 factors can explain about 90% of the total variance of the 15 variables but only factors 2, 8 and 9 were statistically significant in explaining the probability that the annual increase of the loans towards households and NFCs is lower than 4%. The following table shows the results of the logistic regression where these 3 factors are included together with the LCR and macroeconomic variable. The parameter associated is still positive and statistically significant.

Table 7: Logistic regression Pr(y<4%) vs LCR and factors extracted from 15 control variables

Variable	Parameter estimate	Standard error	Wald chi-square	Pr > |t|
Intercept	-0.1822	0.1863	0.9565	0.3281
Lcr(t-1) < 130%	**0.5291**	**0.2722**	**3.7797**	**0.0519**
Factor 2	-0.4595	0.2485	3.4181	0.0645
Factor 8	0.2194	0.1099	3.9833	0.046
Factor 9	-0.4239	0.1354	9.8072	0.0017
D GDP (t-1)	4.6154	6.3342	0.5309	0.4662

Conclusions

For the period 2016-20, a sample of major EU banks showed LCR ratios well above the 100% minimum requirement. This notwithstanding, it was possible to identify a relationship between the probability of increasing the lending activities by less than 4% (where 4% is the median annual growth rate of the lending – see Table 2) and the level of the LCR. Out of the total of 412 observations available (banks per years), 210 banks registered an annual growth rate of the loans to households and non-financial companies lower than 4%. Even if for most of the banks considered the LCR was above the minimum requirement throughout the observed period, it was possible to verify that banks with an LCR lower than 130% had a higher probability of experiencing a growth rate of the loans lower than 4% (see last row of Table 6). However, once additional control variables are accounted for, the relationship appears less statistically significant. This analysis suggests the possibility that banks are fronting a target for the LCR that is higher than the regulatory minimum and that, in some circumstances, this can represent a driver of their lending policies.

The unwind mechanism[55] of the LCR

Rationale of the analysis

The unwind mechanism is embedded in the calculation of the excess liquid asset amount (ELAA), which is the amount of liquid assets that is held in excess of the limits provided in the LCR Regulation and that is therefore to be deducted from the current holdings of high-quality liquid assets (HQLA) when calculating the LCR liquidity buffer. These caps are intended to reduce the reliance on less-liquid assets as part of the LCR liquidity buffer.

Therefore, the ELAA is not calculated based on the current holdings of HQLA. Instead, Article 17(2) of Delegated Regulation (EU) 2015/61 as amended by the Delegated Regulation (EU) 2018/1620 (hereinafter the Regulation) requires the amounts of Level 1, Level 2A and Level 2B assets to be adjusted by unwinding[56] all secured funding, secured lending or collateral swap transactions that involve HQLA on at least one leg of the transaction and that are maturing within 30 calendar days. In doing so, the resulting 'adjusted' amounts reflect the stock of Level 1, Level 2A and Level 2B assets that an institution would hold if it had not entered these short-term secured transactions.

In that sense, the unwind mechanism aims to avoid an unsustainable inflation of the liquidity buffer by preventing credit institutions from using short-term secured funding transactions (including repos and collateral swaps) to circumvent the caps on the Level 1 covered bonds, Level 2A and Level 2B assets and to unsustainably inflate the liquidity buffer via short-term secured transactions. For example, without the unwind mechanism and through repo transactions, banks could swap Level 2 assets (to which limits apply within the LCR framework) with Level 1 assets (which is allowed in unlimited amounts among the HQLA).

Credit institutions are not asked to actually resolve these short-term contracts but only to simulate the economic impact of the resolution of these contracts. In other terms, in the context of the calculation of the ELAA, credit institutions are asked to evaluate the composition of their holdings of HQLA under the hypothesis that all the short-term contracts involving HQLA are not rolled over. If a bank has no non-Level 1 assets (reported or adjusted), the unwind mechanism is irrelevant.

Although there is general agreement about the purpose of the unwind mechanism – i.e. to hinder credit institutions from circumventing the caps on HQLA other than Level 1 excluding EHQCB and

[55] In this section, the term 'unwind mechanism' is generally used to indicate the 'unwinding' of secured transactions in order to calculate the adjusted stock of Level 1, Level 2A and Level 2B that serves as the basis for applying the caps.

[56] In finance, the term 'to unwind' is used to refer to the process of closing out a trading position; the term tends to be used when the trade is complex. The term 'unwinding' is more likely to be used when the buying or selling occurs over multiple transactions. For the purpose of this note, 'unwinding' means assuming that all short-term secured transactions (< 30 calendar days) are maturing, i.e., assuming no roll-over at all.

improving the LCR by borrowing liquid assets against less-liquid assets through short-term transactions – concerns have been raised about the possibility that the unwind mechanism may have some unintended consequences. For example, the effect of the unwind mechanism in the event of reverse repo operations can raise some doubts. This is also because the unwind mechanism intervenes in the complex system of cap and floor foreseen in the quantification of the LCR liquidity buffer, and this means that its effect is not easily understood.

This section offers an analysis of the impact of the unwind mechanism for a sample of major European banks. The impact is evaluated in terms of both the quantification of the Level 1 component of HQLA (the numerator of the LCR) and the quantification of the LCR itself. The analysis is extended for a period of over 4 years, i.e. from the end of 2016 to Q1 of 2021. The analysis also leverages the extended number of banks that have started to report to the EBA under the EUCLID project starting from the end of 2020. It is thanks to this enlargement of the range of banks that report to the EBA that the analysis extends also to less significant and local banks with a second sample that has been analysed separately.

The empirical analysis is based on Common Reporting (COREP) data stemming from about 120 major credit institutions in each year (first sample) and from over 2 thousand smaller banks (second sample), representative of the 27 EU Member States and 3 EEA/EFTA states, which report COREP data to the EBA on a regular basis. Unless stated otherwise, all average figures are weighted.

Data

This section relies on micro-data from European credit institutions. The main database is the EBA supervisory data, which contain quarterly or monthly financial data for a sample of large credit institutions in the EU and, since December 2020, also for an enlarged number of smaller and local banks.

Uniform reporting requirements were set by the EBA with the Commission Implementing Regulation on supervisory reporting (EU) No 680/2014 (COREP). Data is collected at the highest level of consolidation for banking groups and at individual bank level. Before being released to users, the data goes through an intensive data quality process in which all stakeholders (credit institutions, supervisory authorities and the EBA) are involved. The mandatory quality checks (i.e. validation rules) are part of the framework and are in place to monitor the consistency and plausibility of the data submitted first to the authorities and thereafter to the EBA.

The analysis is done on two samples of banks: A first sample (‘major banks’ hereinafter) includes about 120 credit institutions in each year, representative of 27 EU Member States and 3 EEA/EFTA states, which report COREP data to the EBA on a regular basis. The sample covers both globally active and other significant institutions (GSIIs and O-SIIs), as well as other credit institutions, and the observation period encompasses over 4 years. The second sample (‘smaller banks’) includes non-significant and local banks that have started to report COREP data to the EBA since December 2020. Subsidiaries have been excluded from both samples. The table below shows the average size

of the banks in the two samples[57]. In the sample of the major banks, the average of the total assets is about EUR 210 bln, while in the second sample it is less than EUR 3 bln. In both samples, the average LCR is well above the regulatory minimum. Detailed information on the composition of the two samples in terms of countries is provided in the Annex.

Table 8: Samples of major and smaller banks, March 2021

	Smaller banks	Major banks
Nr of Banks	2,425	125
Assets (bln)	5,980	26,277
Assets avg (bln)	2.6	210.2
LCR avg	206.0%	172.3%
LCR< 100% Nr of Banks	51	0

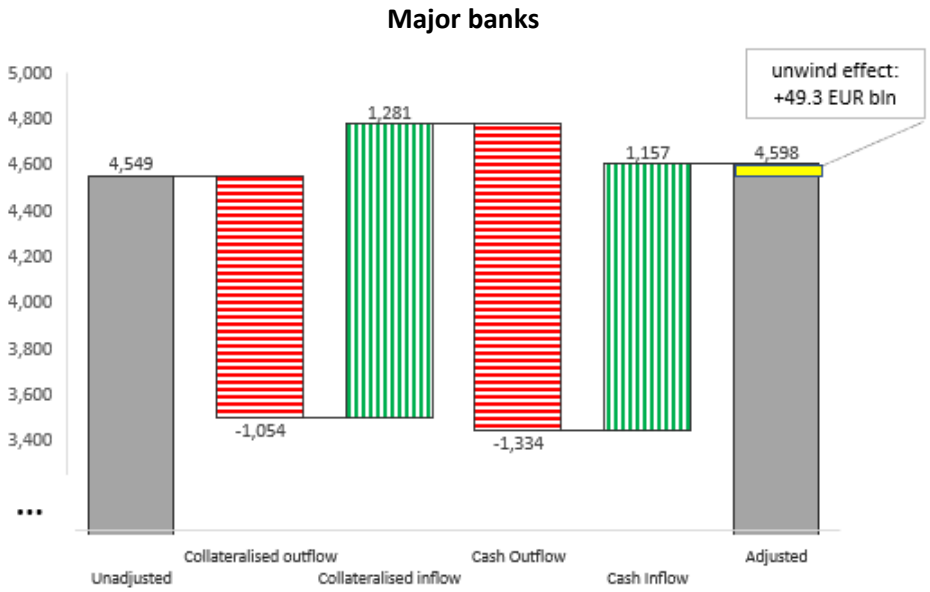
Impact of the unwind mechanism on the L1 components of the HQLA

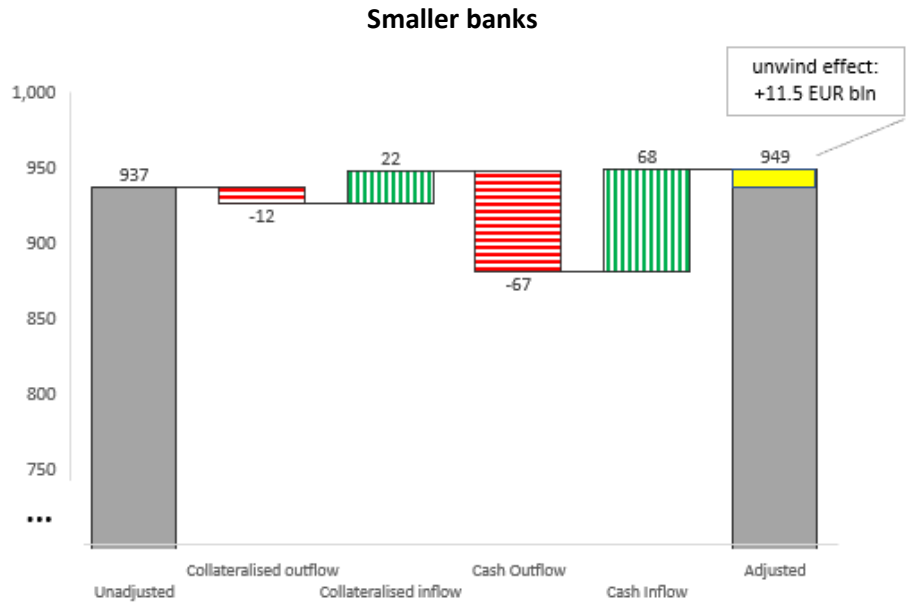
As of the reporting reference date of the end of March 2021, the impact of the unwind mechanism was, at aggregate level, positive for both samples of banks in the sense that the adjusted amount of Level 1 assets excluding EHQCB[58] was higher than the reported amount, with an increment of EUR 49 bln for the first sample and of EUR 11 bln for the second. This result implies that for the credit institutions in the samples, at aggregate level and in net terms, the amount of reverse repos exceeded the amount of repos. Given that the impact of the unwind mechanism was also positive for the Level 2A and 2B assets, it can be argued that the major credit institutions were providing Level 1 assets against less-liquid assets. For the sample of smaller banks, the impact of the unwinding on the Level 2A and 2B banks was negative but practically null. Figure 41 depicts the effect of the unwind mechanism on the amount of Level 1 assets excluding EHQCB.

[57] Since not all banks report FINREP information to the EBA, the total assets (Template F.01 row 380) has been proxied with the total exposures amount used for the computation of the leverage ratio (Template C.47 row 290). This definition is broader than the total assets because it also encompasses the off-balance-sheet exposures transformed into credit equivalent through the application of credit conversion factors. This implies that, with this definition, it can be expected that the figures are likely to be somehow higher than what could be obtained with the FINREP definition. The total amount of such definition over the entire sample was about 32.2 trillion in March 2021 (5.9 trillion stemming from smaller banks and 26.3 trillion from major banks – see Table 8). This number can be compared with the total assets of EU-headquartered credit institutions published by the ECB, which was 30.4 trillion at the same reference date. This comparison demonstrates that the samples considered for this report cover practically all the EU banking system.

[58] Extremely High-Quality Covered Bonds

Figure 41: Extent of the unwind mechanism regarding L1 excl. EHQCB, March 2021

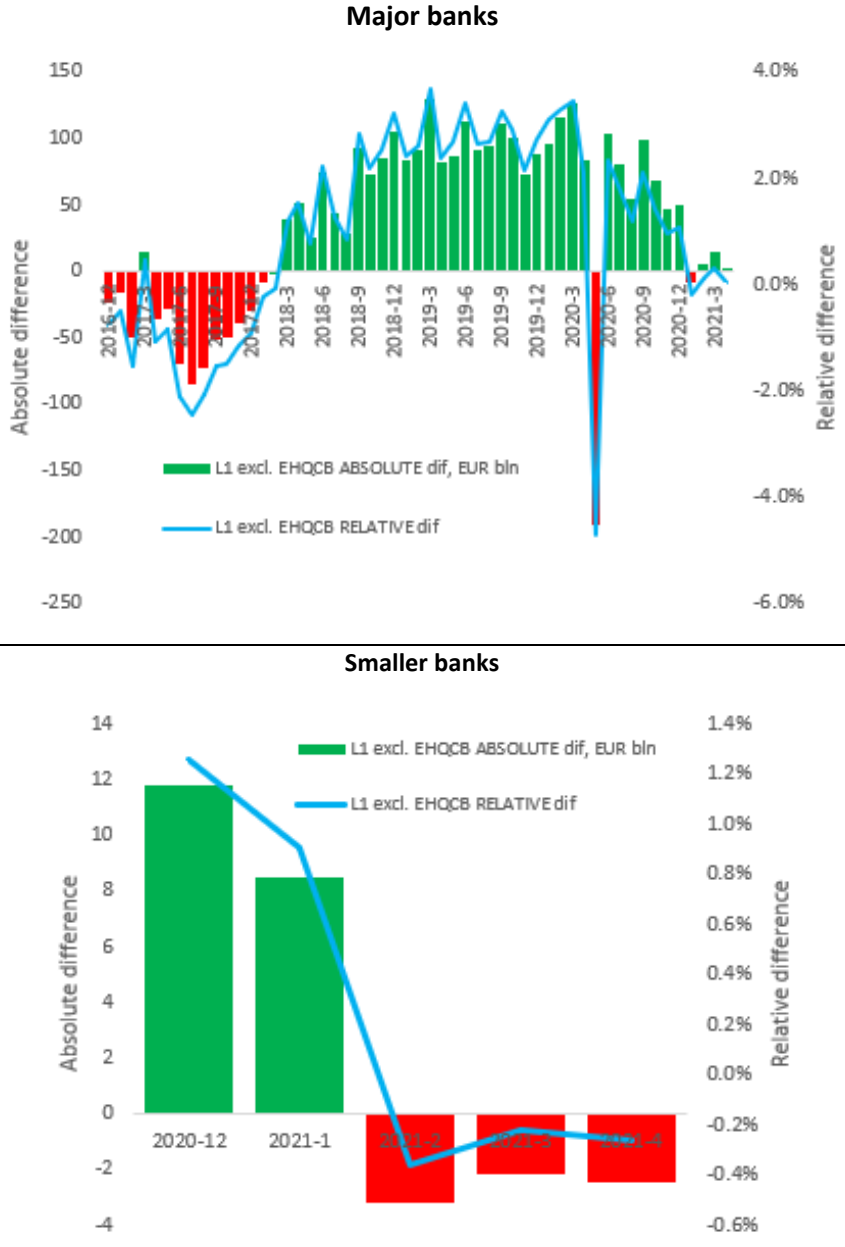




For the major banks, the same result (i.e. the unwinding of short-term operations produces an increase in the adjusted amount of Level 1 assets excluding EHQCB with respect to the reported amounts) can be observed between Q1 2018 and Q3 2020 (see Figure 42). Before that period, the unwinding produced a decrease (with respect to the reported amounts) in the amount of adjusted Level 1 assets excluding EHQCB. It is worth remembering that, in Q3 2017, the ECB conducted a longer-term refinancing operation to provide additional, longer-term refinancing to the financial sector maturing in March 2021. In May 2020, the impact of the unwind mechanism became

negative for nearly 200 bln, but in June of the same year the impact turned again to be positive. In the first quarter of 2021, the impact of the unwinding was practically null (less than 1% in relative terms). For the sample of smaller banks, the effect of the unwind mechanism produced an increase in Level 1 assets excluding EHQCB (in comparison with the reported amount) until the first month of 2021, then the impact became negative.

Figure 42: Extent of the unwind mechanism regarding L1 excl. EHQCB since 2016



The following tables provide the detail of the extent of the unwind mechanism regarding the L1 excluding EHQCB at country level. As regards the sample of major banks and in May 2020, it can be seen that the low level of adjusted L1 excl. EHQCB at aggregate level came mostly from 4

countries. With regard to the sample of the smaller banks, the extent of the unwind mechanism stemmed mainly from one country.

Table 9: Extent of the unwind mechanism regarding L1 excl. EHQCB by country for the sample of major banks. Countries with less than 3 banks represented have been aggregated

	31/12/2017	31/12/2018	31/12/2019	31/05/2020	31/12/2020	31/03/2021
All	-30.0	104.5	88.5	-190.9	49.3	14.8
AT	3.0	3.1	7.7	2.5	6.3	6.8
BE	-16.0	1.5	2.2	-0.9	0.2	-1.4
CY	-0.1	0.0	0.0	0.0	0.0	0.0
DE	5.7	16.6	13.2	-40.5	-2.3	-2.2
DK	-8.4	-1.5	13.7	5.1	7.7	5.8
ES	-29.6	-9.5	-17.6	-48.8	-6.9	-5.1
FI	15.4	18.9	20.7	4.4	2.6	-2.4
FR	-12.5	34.8	-1.8	-103.0	-13.3	-39.5
GR	-27.5	-7.2	1.5	-3.8	0.1	0.1
IE	-0.1	1.8	1.7	4.6	1.4	1.0
IS	.	0.0	0.0	0.0	0.0	0.0
IT	4.8	8.2	1.4	-54.5	1.6	0.1
LU	1.4	0.9	2.0	1.2	0.9	0.4
MT	-0.1	0.0	0.0	0.0	0.0	0.0
NL	25.1	22.2	28.1	22.2	32.0	37.4
NO	5.7	2.9	0.9	13.6	10.4	7.5
PT	0.0	0.3	0.3	-8.3	-0.1	-0.4
SE	3.0	11.5	15.0	15.7	8.1	6.7
XX	0.2	0.0	-0.4	-0.3	0.5	-0.2

XX: includes BG, EE, HU, LT, LV, RO, PL, SI

Table 10: Extent of the unwind mechanism regarding L1 excl. EHQCB by country for the sample of smaller banks

	31/12/2020	31/03/2021		31/12/2020	31/03/2021
All	11.8	-2.2	IT	0.4	-0.8
AT	0.1	-0.2	LI	0.9	-0.3
BE	6.8	7.3	LT	0.0	0.0
BG	0.0	-0.1	LU	1.9	1.8
CZ	0.1	1.3	LV	0.0	0.0
DE	-5.4	-18.3	MT	0.0	0.0
EE	0.0	0.0	NL	4.5	7.9
ES	1.7	-1.6	NO	0.1	0.1
FI	0.0	0.0	PL	0.1	0.0
FR	0.0	0.2	PT	0.0	0.0
GR	0.0	0.0	RO	0.0	0.0
HR	0.0	0.0	SE	-0.2	0.0
HU	0.6	0.0	SI	0.0	0.0
IE	0.2	0.4	SK	0.0	0.0

Impact of the adjustment calculation on the LCR

Even if the unwind mechanism has a non-zero effect, i.e. if adjusted amounts of HQLA are different to reported amounts of HQLA, it does not necessarily have an impact on the overall level of the liquidity buffer or the LCR. This would only be the case where – based on the adjusted amounts of liquid assets – the banks were constrained by the caps envisaged in the Regulation, thus requiring a deduction (the ELAA) from the current – unadjusted – holdings of liquid assets (where the caps are not binding, the ELAA would be zero). The formula for the determination of the liquidity buffer composition (adjustment calculation) only induces a change to the liquidity buffer when at least one of the caps on non-Level 1 assets, applied to the adjusted amounts after the unwind, are breached. For instance, if the effect of the unwind mechanism is 'positive' for all categories of HQLA, the effects on individual HQLA categories can neutralise each other. Also, if a bank has no non-Level 1 assets (reported or adjusted), the unwind mechanism is irrelevant for the overall liquidity buffer (as there is nothing that can be capped). With this in mind, the effect of the adjustment calculation on the LCR is insignificant at aggregate level throughout the entire period considered. For example, in May 2020, where the impact of the unwinding on the L1 assets was significant for the sample of major banks, the average LCR was 156.22% and this value did not change by excluding the unwinding mechanism.

The table below shows the impact of the unwind mechanism on the LCR at bank level. In the vast majority of cases, the LCR is not influenced at all by the unwind mechanism. Considering all the reference dates and both samples, a negative impact (a decrease of the LCR) has been observed 251 times: In 47% of these cases, the LCR was below the regulatory minimum both with and without the application of the unwind mechanism and in 48% of the cases the LCR was above 100% both with and without the application of the unwinding. Only in 5% of the cases was the LCR higher than 100% without the unwind mechanism and lower with the unwind mechanism.

Table 11: Impact of the unwind mechanism on the LCR at bank level

Major banks

nr bank / Date	Unwind effect		
	LCR increases	LCR constant	LCR decreases
31/12/2017	2	120	4
31/12/2018	1	130	2
31/12/2019	3	126	1
31/05/2020	.	129	1
31/12/2020	2	125	.
28/02/2021	1	124	.
31/03/2021	1	124	.

Smaller banks

nr bank / Date	Unwind effect		
	LCR increases	LCR constant	LCR decreases
31/12/2017			
31/12/2018			
31/12/2019			
31/05/2020			
31/12/2020	7	2,409	5
28/02/2021	8	2,327	59
31/03/2021	11	2,383	9

The functioning of the adjustment calculation in specific situations

In this sub-section, some practical and theoretical situations where the unwind mechanism may produce unwarranted results are analysed.

First, consider a credit institution that has no HQLA at all. At the reporting date, the credit institution may make an overnight collateral swap, borrowing Level 2B assets against non-HQLA. In this case, the adjusted value of any HQLA category would be zero, i.e. no excess amounts would be calculated. Hence, the credit institution would report a positive liquidity buffer amounting to the liquidity value of the borrowed Level 2B assets, although it has no Level 1 assets and the Level 2B assets have to be returned within the LCR horizon. In practice, this arbitrage would be possible only if such a transaction was made with the domestic central bank. Otherwise, the credit institution would need to report a liquidity outflow. It was not possible to find similar situations in the two samples observed. This implies that, at least for the period and for the institutions used for this report, this situation is not relevant and only theoretical.

Second, consider a credit institution that conducts a secured funding operation with the domestic central bank using non-HQLA collateral. If the maturity of this operation falls within the LCR horizon, the operation will need to be included in the unwind. Where the funds initially received through the secured funding operation have been reused and invested in assets other than Level 1 EHQCB (for example for granting loans) and provided the credit institution does not report any other current holdings of Level 1 assets excl. EHQCB, the adjusted amount of Level 1 assets excl. EHQCB may become negative. This is because, unlike in the Basel standards, the EU LCR regulation does not provide for a floor (of zero) for the individual categories of adjusted amounts of liquid assets.

Third, any empirical analysis on the extent of the adjustment to the stock of HQLA and the impacts of the unwind mechanism is currently biased by the high share of long-term refinancing operations with the central bank (TLTROs, PELTROs) in institutions' secured funding transactions. Short-term funding transactions with the central bank secured by level 1 assets have no net impact on the unwind mechanism, while short-term transactions with non-level 1 assets would have. Therefore, it can be assumed that institutions, when reporting their LCR, take advantage of this by assigning their lower-quality collateral to these long-term operations with the central bank, whose maturities are beyond the 30-day horizon, in order to avoid any impact on the unwind mechanism. This explains that the easing of the collateral requirements, which includes an expansion of the list of collateral eligible as collateral for central bank operations, is not reflected in a corresponding increase of lower-quality collateral used in short-term secured funding transactions that are subject to the unwind mechanism. However, as soon as central banks cut back long-term refinancing operations or the list of eligible collateral, the relevance of short-term funding operations secured with non-level 1 assets that are subject to the unwind will become more prevalent.

We further study the case where the application of the unwind mechanism results in negative figures for the adjusted amount of Level 1 assets excl. EHQCB. It was possible to find, overall (the entire period with monthly frequency and all the credit institutions), 111 cases presenting a negative value for the amount of Level 1 assets excluding EHQCB after the application of the unwind mechanism. The number of cases observed in each month decreased over the period. In most of these cases, the LCR was null. In only 7 out of 111 cases was the LCR higher than '0', and in all of them the unwind mechanism produced a reduction in the LCR. Computing the ELAA with a zero floor on the adjusted values would have changed the LCR value in 4 cases.

Even if there is no evidence that the absence of this floor has a detrimental impact, it could be argued that it is unjustified that the adjusted amount can become negative. Indeed, the motivation of the unwind mechanism is to avoid circumventing the caps referred to in the LCR regulation, but, if the assets received have been reused for non-HQLA purposes (such as granting loans), then the transaction has not been used to circumvent the limits and so there is no reason to penalise the institution. However, a negative adjusted amount provides some valuable information. It indeed reveals that part of the assets received though a short-term transaction is not available, because it is committed to a, possibly, long-term transaction (see Table 12).

Table 12: Detail of the cases where the unwind mechanism produces negative L1 values and the LCR is not null

Sample	date	LCR		
		unwind	no unwind	unwind and 0 floor
major banks	31/10/2018	5.9%	34.1%	34.1%
	30/11/2018	13.4%	33.4%	33.4%
	31/10/2017	8.2%	12.6%	12.6%
	31/01/2019	3.4%	24.1%	14.9%
	31/12/2016	107.7%	129.1%	127.3%
smaller banks	28/02/2021	97.2%	319.0%	100.9%
	28/02/2021	59.0%	189.6%	60.5%

Fourth, in the event of a reverse repo, a credit institution with excess liquidity uses part of its HQLA to obtain assets providing higher returns but with lower liquidity levels. The following table shows the number of banks for which the adjusted L1 assets are higher than the reported L1 assets after the application of the unwind mechanism. The variation of the average LCR because of the application of the unwind mechanism is also reported. As can be seen, the effect is quite limited. More details are provided in the subsequent table, which shows the detail of the banks involved in reverse repo operations where the impact of the unwind mechanism on the LCR is material. It is worth noticing that the level of the LCR for these banks is well above the minimum both with and without the application of the unwind mechanism.

Table 13: Banks involved in reverse repo operations, effect of the unwind mechanism on the LCR

Sample	date	nr of banks	% of Net Liq Outflow	effect of the unwind on the LCR
Major banks	31/12/2017	41	49.6%	0.17%
	31/12/2018	53	65.0%	0.22%
	31/12/2019	55	59.6%	0.48%
	31/05/2020	42	30.1%	0.00%
	31/12/2020	52	54.3%	0.12%
	31/03/2021	55	52.2%	0.00%
Smaller banks	31/12/2020	97	16.9%	-1.14%
	31/03/2021	82	15.9%	-1.11%

Table 14: Detail of the banks involved in reverse repo operations for which the effect of the unwind mechanism is material

Sample	date	nr of banks	% of Net Liq Outflow	Lcr	
				with the unwind	without the unwind
Major banks	31/12/2017	1	0.3%	383.49%	322.79%
	31/12/2018	1	0.3%	218.97%	140.07%
	31/12/2019	3	1.0%	190.93%	143.37%
	31/05/2020	.	.	.	.
	31/12/2020	2	0.5%	289.45%	264.40%
	31/03/2021	1	0.2%	210.60%	209.02%
Smaller banks	31/12/2020	.	.	.	.
	31/03/2021	3	0.3%	225.71%	214.23%

Fifth, a sale-and-lease-back structure is an operation in which the institution sells non-HQLA assets and uses the cash received in a reverse repo. It is essentially an operation that changes the formal ownership but not the liquidity risk profile. What may happen in this case is that the amount of liquid assets is unchanged in comparison with the initial situation, however, due to the unwinding, the cash amount is considered as if it were at hand[59]. In the situation where only Level 1 excluding EHQCB assets and non-HQLA assets are involved, it should be observed that the adjusted amount of Level 1 excluding EHQCB assets increases with respect to the reported amount but the variations of the adjusted amounts of Level 1 EHQCB, Level 2A and Level 2B with respect to the reported amounts are zero. It was possible to detect similar situations in the two samples considered but, in practically all those cases, the LCR was above 100% and the impact of the unwinding on the LCR was negligible

[59] In other words, it is possible that a credit institution uses short-term reverse repo to optimise the LCR. In this case, the amount of level 1 assets excluding EHQCB will increase after the unwind.

Conclusions

In the observed period and with the available samples of credit institutions, it was not possible to detect material impacts on the level of the LCR of the institutions. In aggregate terms, it was possible to find that the unwind mechanism has an effect on the determination of the adjusted amount of Level 1 assets, and this effect can be positive or negative, whereas the effect on the LCR is mostly null (i.e. the ELAA was zero). A few cases were detected in which the unwind mechanism caused a reduction in the LCR, but the effect was not economically meaningful in most of them[60]. Some theoretical situations where the unwind mechanism could produce unwarranted results have been studied and, in particular, it was shown that their materiality currently is limited as it can be assumed that institutions assign predominantly Level 1 HQLA to the maturing transactions. When, due to a reversal of the current liquidity supply by the central bank, maturing transactions need to be more secured by non-Level 1 assets the materiality might change. The case of reverse repo operations has been studied because in this case the unwind mechanism may produce an increase in the amount of HQLA. However, it has been empirically shown that the materiality of these situations is currently limited.

These findings appear to be due to the predominant use of Level 1 EHQCB, far above the regulatory minimum of 30% of the overall liquidity buffer, by banks, which makes an excess of other HQLA categories over the respective caps relatively unlikely. However, this situation may be the result of certain special conditions on funding markets (e.g. the liquidity provision by central banks) which may cease in the future. Under the current conditions, empirical analysis of the impacts of the unwind mechanism is biased by the high share of long-term refinancing operations with the central bank (TLTROs, PELTROs) in institutions' secured funding transactions. However, as soon as central banks cut back long-term refinancing operations, the relevance of short-term funding operations secured with non-level 1 assets that are subject to the unwind will become more prevalent. Thus, it has to be observed whether the practical relevance of unwarranted effects of the unwind mechanism may increase when the current funding conditions change.

[60] It must be mentioned that the possibility of waiving the unwind mechanism introduced in Delegated Regulation (EU) 2015/61 should provide sufficient flexibility to deal with such idiosyncratic situations.

Conclusions

Liquidity coverage requirements are an important aspect of the EU regulatory framework. COREP data shows that banks have significantly increased their HQLA holdings since September 2016 and that this is the main driver behind the upward trend in the average LCR levels. Results show that, in general, both the average and the bank-level LCRs are well above the fully phased-in requirement of 100% (which has been in place since 1 January 2018) under full implementation. This tendency continued at the end of December 2020 even though the COVID-19 crises exerted severe stress on the banks' liquidity positions. Data shows that the main reason behind the increases in LCR levels in June 2021 is the access to additional liquidity via central bank funding from the ECB and other EU central banks. During the first half of 2021, the LCR levels showed some signs of stabilisation even if additional central bank liquidity was provided during this year due to an increase in banks' net outflows.

The average levels of LCRs across different business model categories are also above the minimum requirements. As could be expected, there are significant differences across business models in the composition of LCRs and LCR parameters. The different funding strategies applied by banks following different business models could have an impact on their LCR structures. Business models that rely relatively more on wholesale funding sources show higher levels of net liquidity outflows and HQLAs. Nevertheless, results by business models should be interpreted with caution since the sample has a relatively high concentration of banks in two business models.

Additionally, the analysis shows that banks are likely to hold a higher liquidity buffer, in relation to their net cash outflows, in their domestic currency than in other significant (foreign) currencies. At the aggregate level, the surplus in liquidity coverage in all currencies offsets the liquidity shortfall in other significant currencies. However, low levels of LCR in one significant currency may generate problems during stress periods when liquidity may be constrained and the FX swaps markets may become difficult to access. Banks need to ensure consistency between liquidity buffers and net outflows for each currency in which they operate. Against this background, competent authorities should consider making greater use of their discretion to restrict currency mismatches. This can be done e.g. by setting limits on the size of the net liquidity outflow in a foreign currency that can be met by holding liquid assets not denominated in that currency.

For the period 2016-20, a consistent sample of major EU banks showed LCR ratios well above the 100% minimum requirement. This notwithstanding, it was possible to identify a relationship between the lending activities and the level of the LCR. In detail, it was possible to verify that banks with an LCR lower than 130% had a higher probability of experiencing a growth rate of the loans lower than the other banks. This suggests that the banks may be pursuing targets for the LCR that are higher than the regulatory minimum. However, once additional control variables are accounted for, the relationship appears less statistically significant.

In the observed period and with the available samples of credit institutions, it was not possible to detect material impacts on the level of the LCR of the institutions. In aggregate terms, it was possible to find that the unwind mechanism has an effect on the determination of the adjusted amount of Level 1 assets, and this effect can be positive or negative, whereas the effect on the LCR is mostly null. These findings appear to be due to the predominant use of Level 1 EHQCB, far above the regulatory minimum of 30% of the overall liquidity buffer, by banks, which makes an excess of other HQLA categories over the respective caps relatively unlikely. However, this situation may be the result of certain special conditions on funding markets (e.g. the liquidity provision by central banks through TLTROs) which may cease in the future.

Annex 1

Table 15: Number of banks included in the June 2021 analysis[61]

Country	ISO code	All banks	*Of which: subsidiaries*	GSIIs/O-SIIs	*Of which: subsidiaries*
Austria	AT	20	3	4	1
Belgium	BE	13	0	5	0
Bulgaria	BG	5	0	3	0
Cyprus	CY	4	1	2	1
Czech	CZ				
Germany	DE	23	2	9	1
Denmark	DK	4	0	4	0
Estonia	EE	8	1	1	1
Spain	ES	40	6	4	0
Finland	FI	11	0	3	0
France	FR	26	3	7	0
Greece	GR	8	0	4	0
Croatia	HR				
Hungary	HU	10	7	6	5
Ireland	IE	8	0	3	0
Iceland	IS	3	0	3	0
Italy	IT	47	1	4	0
Lithuania	LT	6	2	3	2
Luxembourg	LU	14	5	2	0
Latvia	LV	9	2	4	2
Malta	MT	7	2	3	0
Netherlands	NL	21	0	5	0
Norway	NO				
Poland	PL	4	2	4	2
Portugal	PT	16	4	6	2
Romania	RO	10	6	6	5
Sweden	SE	23	0	3	0
Slovenia	SI	5	1	1	0
Slovakia	SK	1	0	0	0
Total	EU	346	48	99	22

[61] Results that are shown by total/group of banks (total EU/GSIIs, O-SIIs and others) do not include subsidiaries. However, results by country do include subsidiaries.

Table 16: Total asset coverage by country (in percentage)[62]

Country	% coverage
Austria	66%
Belgium	68%
Bulgaria	20%
Cyprus	98%
Czech Republic	0%
Germany	53%
Denmark	83%
Estonia	50%
Spain	95%
Finland	87%
France	99%
Greece	97%
Croatia	0%
Hungary	89%
Ireland	54%
Italy	95%
Lithuania	75%
Luxembourg	14%
Latvia	80%
Malta	62%
Netherlands	90%
Poland	26%
Portugal	90%
Romania	73%
Sweden	71%
Slovenia	67%
Slovakia	1%

[62] The information on total assets by country has been obtained from the Statistical Data Warehouse of the European Central Bank (ECB). The information provided in this table should be interpreted with caution as data on total assets by country includes local banking groups, local standalone banks, EU and non-EU subsidiaries and EU and non-EU branches. This may lead to an underestimation of the % coverage for some countries with a significant presence of branches and non-EU subsidiaries as they are outside the scope of this report. No data was available for non-EU countries; these have been excluded from Table 16.

Table 17: Number of banks included in the evolution analysis[63] if the balanced sample criterion applies

Country	ISO code	All banks	GSIIs/O-SIIs
Austria	AT	5	2
Belgium	BE	6	4
Bulgaria	BG	1	1
Cyprus	CY	1	1
Germany	DE	14	8
Denmark	DK	4	4
Estonia	EE	1	0
Spain	ES	11	4
Finland	FI	3	3
France	FR	9	6
Greece	GR	4	4
Hungary	HU	1	1
Ireland	IE	3	3
Italy	IT	9	4
Luxembourg	LU	2	1
Malta	MT	2	2
Netherlands	NL	4	4
Poland	PL	1	1
Portugal	PT	5	4
Romania	RO	1	1
Sweden	SE	5	3
Slovenia	SI	2	1
Total	**EU**	**94**	**62**

[63] All evolution analyses are shown by group of banks (total EU/GSIIs, O-SIIs and others) and, therefore, they exclude subsidiaries.

Table 18: Number of banks included in the analysis by two reference dates[64] if the balanced sample criterion applies

Country	ISO code	All banks	*Of which: subsidiaries*	GSIIs/O-SIIs	*Of which: subsidiaries*
Austria	AT	19	*2*	3	*0*
Belgium	BE	13	*0*	5	*0*
Bulgaria	BG	5	*0*	3	*0*
Cyprus	CY	4	*1*	2	*1*
Germany	DE	21	*2*	9	*1*
Denmark	DK	4	*0*	4	*0*
Estonia	EE	7	*0*	0	*0*
Spain	ES	40	*6*	4	*0*
Finland	FI	11	*0*	3	*0*
France	FR	26	*3*	7	*0*
Greece	GR	8	*0*	4	*0*
Hungary	HU	10	*7*	6	*5*
Ireland	IE	8	*0*	3	*0*
Iceland	IS	3	*0*	3	*0*
Italy	IT	46	*1*	4	*0*
Lithuania	LT	6	*2*	3	*2*
Luxembourg	LU	13	*5*	2	*0*
Latvia	LV	8	*2*	3	*2*
Malta	MT	7	*2*	3	*0*
Netherlands	NL	19	*0*	5	*0*
Poland	PL	2	*0*	2	*0*
Portugal	PT	15	*4*	6	*2*
Romania	RO	10	*6*	6	*5*
Sweden	SE	23	*0*	3	*0*
Slovenia	SI	5	*1*	1	*0*
Slovakia	SK	1	*0*	0	*0*
Total	**EU**	**334**	***44***	**94**	***18***

[64] Results that are shown by total/group of banks (total EU/GSIIs, O-SIIs and others) do not include subsidiaries. However, results by country do include subsidiaries.

Table 19: Number of banks submitting liquidity coverage data (by business model)

Business model	All banks	*Of which: subsidiaries*
Consumer/auto	21	8
Cooperative	22	*2*
Corporate-oriented	18	*2*
Cross-border universal	34	*6*
Custodian	4	*2*
Local universal	89	*20*
Mortgage	4	*0*
N/A	51	*18*
Other	16	*4*
Pass-through	3	*0*
Private	44	*18*
Public	7	*0*
Savings	16	*0*
Total	**329**	***80***

Table 20: Number of banks included in analysis in section 'LCR — impact on lending'

Country	ISO code	Banks
Austria	AT	6
Belgium	BE	6
Bulgaria	BG	1
Cyprus	CY	2
Germany	DE	14
Denmark	DK	4
Estonia	EE	1
Spain	ES	12
Finland	FI	3
France	FR	9
Greece	GR	4
Hungary	HU	1
Ireland	IE	4
Italy	IT	9
Luxembourg	LU	2
Malta	MT	2
Netherlands	NL	5
Norway	NO	3
Poland	PL	1
Portugal	PT	5
Romania	RO	1

Sweden	SE	6
Slovenia	SI	2
Total		**103**

Table 21: Number of banks included in analysis in section 'The unwind mechanism of the LCR'

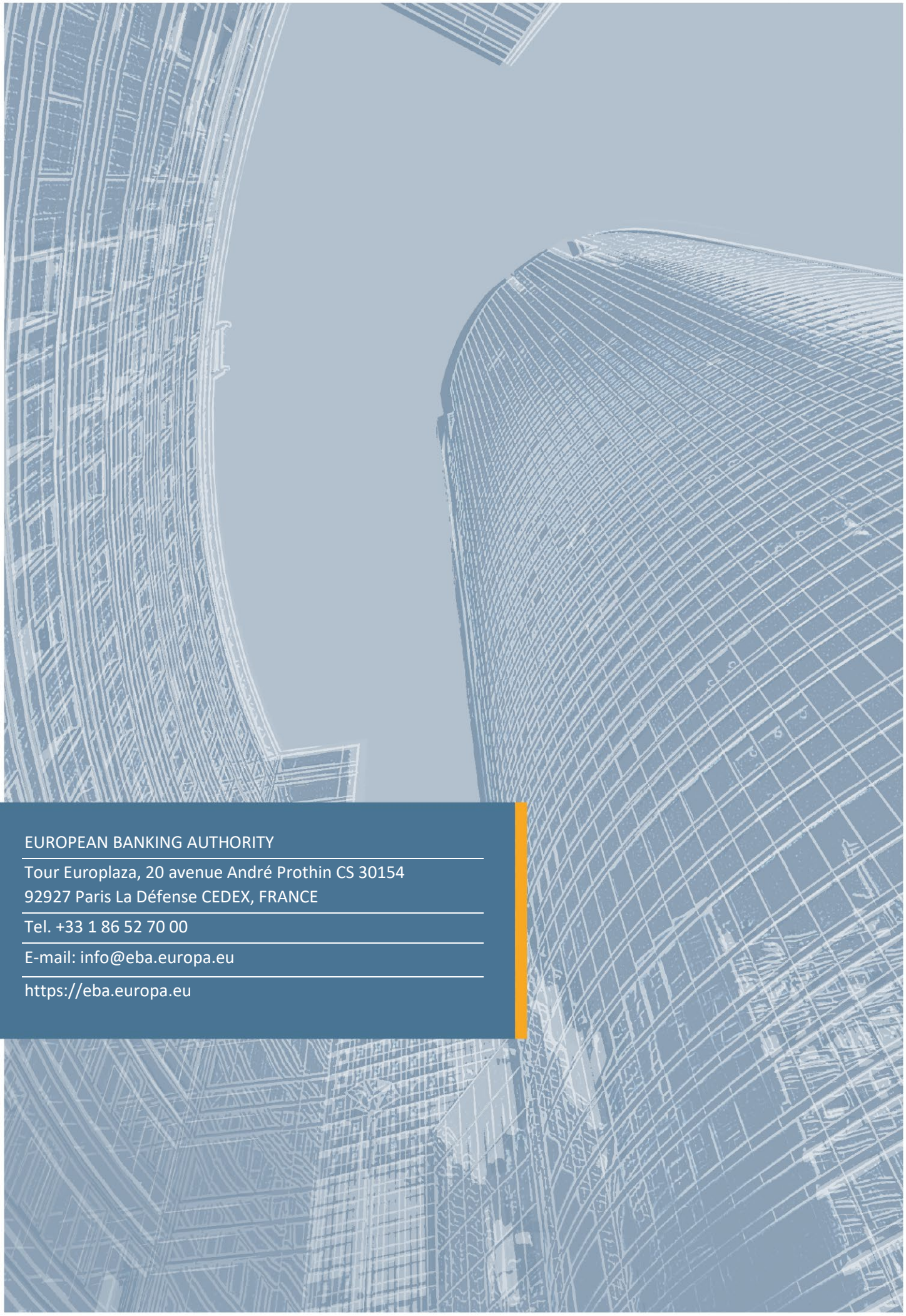
Country	ISO code	Smaller banks	Major banks
Austria	**AT**	385	6
Belgium	**BE**	16	6
Bulgaria	**BG**	11	1
Cyprus	**CY**	5	3
Czech Rep	**CZ**	12	.
Germany	**DE**	1,306	17
Denmark	**DK**	.	4
Estonia	**EE**	5	2
Spain	**ES**	56	11
Finland	**FI**	7	4
France	**FR**	79	10
Greece	**GR**	11	4
Croatia	**HR**	12	.
Hungary	**HU**	6	1
Ireland	**IE**	8	7
Iceland	**IS**	.	3
Italy	**IT**	131	10
Liechtenst	**LI**	11	.
Lithuania	**LT**	8	1
Luxembou	**LU**	45	5
Latvia	**LV**	10	1
Malta	**MT**	16	3
Netherlan	**NL**	22	6
Norway	**NO**	121	3
Poland	**PL**	10	2
Portugal	**PT**	22	5
Romania	**RO**	10	1
Sweden	**SE**	91	7
Slovenia	**SI**	5	2
Slovakia	**SK**	4	.
Total		**2,425**	**125**

Table 22: Definition of business models

Type of business model	Business model	Label	Qualitative description of the business model		
			Main activities	Main funding	Ownership/legal structure
Universal banks	Cross-border universal bank	Cross-border universal	Engaged in several banking activities including retail, corporate and capital market operations Major cross-border operations	Diversified source of funding including deposits from clients, wholesale funding and derivatives liabilities Significant part of funding can come from foreign investors Taking or not taking retail deposits	Major cross-border cooperative banks: owned by depositors All others: no specification
	Local universal bank	Local universal	Engaged in several banking activities including retail, corporate and capital market operations Operating predominantly in their domestic market	Diversified source of funding including deposits from clients, wholesale funding and derivatives liabilities Predominantly funded in their domestic market Taking or not taking retail deposits	Major cross-border cooperative banks: owned by depositors All others: no specification
Retail banks	Consumer credit banks (including automotive banks)	Consumer/auto	Originating and servicing consumer loans to retail clients	No specification	No specification
	Co-operative banks/savings and loan associations	Cooperative	Originating and servicing loans to local community individuals and businesses	Retail deposits	Owned by depositors
	Savings banks	Savings	Retail banking (payments, savings products, credits and insurances for individuals and small and medium-sized enterprises)	Retail deposits	No specification
	Mortgage banks taking retail deposits (including building and loan associations from Germany – *Bausparkasse*)	Mortgage	Originating and servicing mortgage loans to retail clients	Retail deposits	No specification Building societies: subject to specific statutory requirements with respect to activities and purpose
	Private banks	Private	Wealth management services to high net worth individuals and families	No specification	No specification

	Custodian institutions (including CSDs, which are subject to CSDR)	Custodian	Custodian services (holding securities in electronic or physical form on behalf of corporate and individual investors for safekeeping) Other services such as account administration, transaction settlements, collection of dividends and interest payments, tax support and foreign exchange	No specification	No specification
Corporate-oriented banks	Corporate-oriented (including leasing and factoring, merchant banks)	Corporate-oriented	Financing domestic and international trade Specialise in products such as letters of credit, bank guarantees and collection and discounting of bills	No specification Taking or not taking retail deposits	No specification
Other specialised banks	Custodian institutions (including CSDs, which are subject to CSDR)	Custodian	Custodian services (holding securities in electronic or physical form on behalf of corporate and individual investors for safekeeping) Other services such as account administration, transaction settlements, collection of dividends and interest payments, tax support and foreign exchange	No specification	No specification
	Institutions not taking retail deposits (including pass-through financing)	Pass-through	Originating and servicing loans (including mortgage loans) Includes pass-through financing	No retail deposits Issuance of covered bonds or other types of securities liabilities	No specification
	Public development banks	Public	Financing public sector projects or the provision of promotional credit or municipal loans	No specification	Majority owned by the state or public sector. Subject to specific statutory requirements with respect to the purpose and/or activity
	Other specialised banks	Other	Banks not included in the above categories (residual category) This category should include among other business models: * Islamic finance * cooperative central banks * CCPs	No specification	No specification

Source of detailed business model categories: Cernov and Urbano (2018), "Identification of EU bank business models: A novel approach to classifying banks in the EU regulatory framework", EBA Staff Paper N 2 - June 2018.
Grouping by 'Type of business model' based on EBA criteria.



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