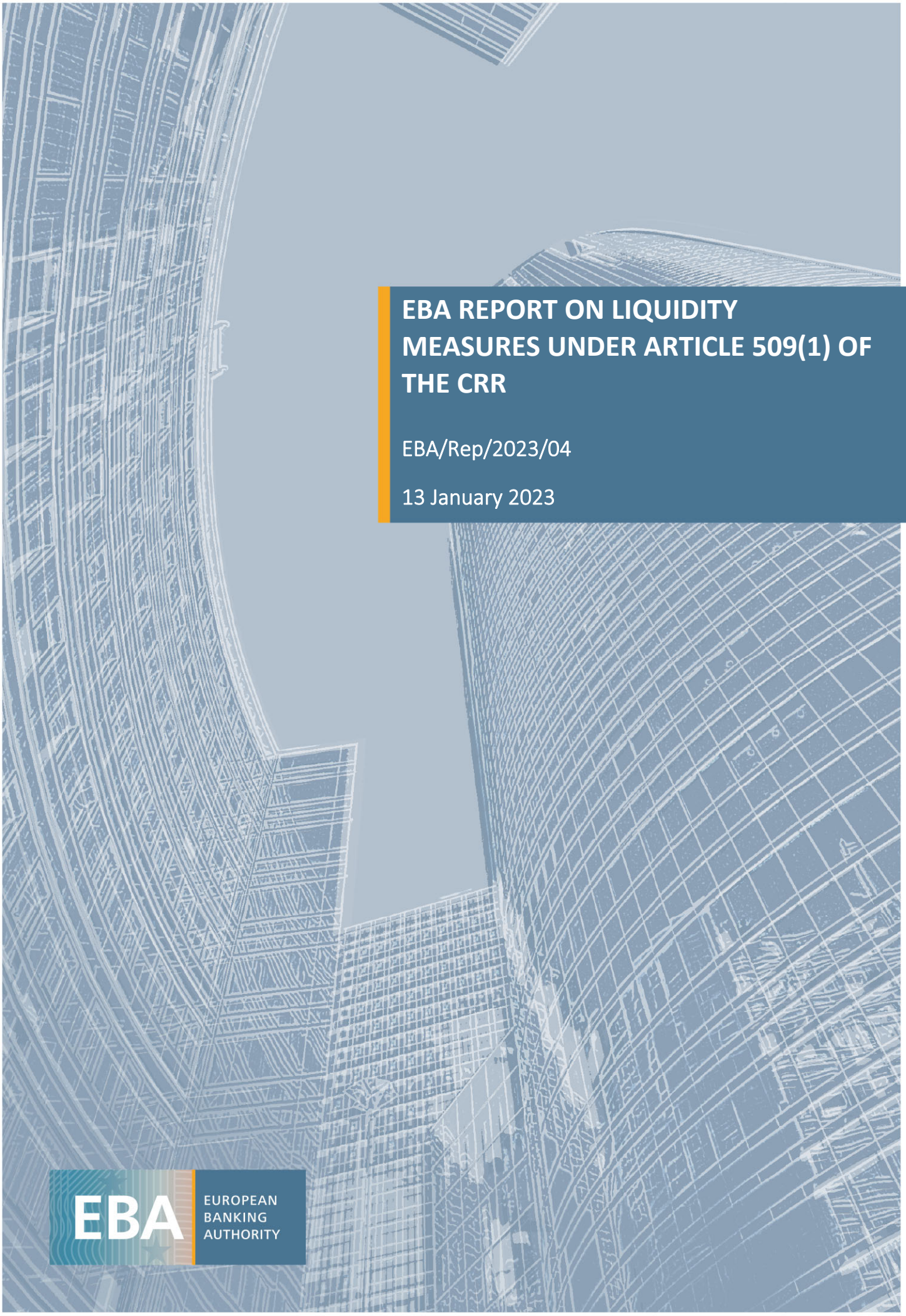

EBA REPORT ON LIQUIDITY MEASURES UNDER ARTICLE 509(1) OF THE CRR

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Contents

List of figures 3
List of tables 6
Abbreviations 7
Executive summary 8
Introduction 11
Analysis of the LCR and its components 12
Analysis of the LCR by business model 29
LCR — analysis of currency mismatch 35
LCR — impact on lending 45
The unwind mechanism of the LCR 52
The relationship between LCR and NSFR 61

List of figures

Figure 1: LCR evolution (weighted average) 12

Figure 2: Weighted average LCR across bank groups (GSIIs, O-SIIs and others)..... 13

Figure 3: Evolution of the numerator and the denominator of the LCR, September 2016 = 100% — balanced sample 13

Figure 4: Evolution of the numerator and denominator of the LCR by bank group, September 2016 = 100% — balanced sample 14

Figure 5: Evolution of the composition of cash outflows (post-weight) relative to total assets — balanced sample 14

Figure 6: Evolution of the composition of cash inflows (post-weight and before cap) relative to total assets — balanced sample..... 15

Figure 7: Evolution of the composition of liquid assets (post-weight and before the cap) relative to total assets — balanced sample..... 15

Figure 8: HQLA and net liquidity outflows (as a share of total assets) by group of banks (as of June 2022) 16

Figure 9: Evolution of the liquidity shortfall (EUR billion) — balanced sample 17

Figure 10: Evolution of the liquidity shortfall by bank group (EUR billion) — balanced sample 17

Figure 11: LCR across countries — balanced sample 18

Figure 12: LCR dispersion across countries — balanced sample 18

Figure 13: Composition of liquid assets (post-weight and before the cap) relative to total assets (as of June 2022)..... 20

Figure 14: Evolution of central bank assets and exposures over time (EUR billion) — balanced sample 21

Figure 15 Composition of cash outflows (post-weight) relative to total assets (as of June 2022) .. 23

Figure 16: Composition of cash outflows (pre-weight) relative to total assets (as of June 2022)... 24

Figure 17: Composition of collateral posted for secured funding transactions with central banks maturing within 30 days — balanced sample 26

Figure 18: Composition of cash inflows (post-weight and before the cap) relative to total assets (as of June 2022)..... 27

Figure 19: Dynamics of the liquidity buffer, outflows and inflows (as a share of total assets) 28

Figure 20: LCR across business models — balanced sample 30

Figure 21: HQLA and net liquidity outflows (as shares of total assets), per business model (as of June 2021) 31

Figure 22: Comparisons of pre- and post-weight cash outflows relative to total assets, per business model 32

Figure 23: Composition of cash outflows (post-weight) relative to total assets by business model — balanced sample 33

Figure 24: Composition of cash inflows (post-weight and before the cap) relative to total assets, per business model — balanced sample 33

Figure 25: Composition of liquid assets (post-weight and before the cap), relative to total assets, per business model — balanced sample 34

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) 37

Figure 27: Evolution of the comparison between the positions in LCR in EUR and LCR in all currencies — balanced sample 37

Figure 28: Evolution of average LCR in EUR vs average LCR in all currencies — balanced sample . 38

Figure 29: Evolution of the distribution of the LCR in EUR vs the distribution of the LCR in all currencies — balanced sample 38

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) 39

Figure 31: Evolution of the comparison between the positions in LCR in USD and LCR in all currencies — balanced sample 39

Figure 32: Evolution of average LCR in USD vs average LCR in all currencies — balanced sample . 40

Figure 33: Evolution of the distribution of the LCR in USD vs the distribution of the LCR in all currencies — balanced sample 41

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) 41

Figure 35: Evolution of the comparison between the positions in LCR in GBP and LCR in all currencies — balanced sample 42

Figure 36: Evolution of average LCR in GBP vs average LCR in all currencies — balanced sample . 42

Figure 37: Evolution of the distribution of the LCR in GBP vs the distribution of the LCR in all currencies — balanced sample 43

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) 43

Figure 39: Scatter plot: Variation in the stock of loans vs LCR 47

Figure 40: Loans yearly variation at bank level vs LCR at the beginning of the year 49

Figure 41: Extent of the unwind mechanism regarding L1 excl EHQCB, June 2022 54

Figure 42: Extent of the unwind mechanism regarding L1 excl EHQCB since 2016 56

Figure 43: average LCR and NSFR 62

Figure 44: distribution of LCR and NSFR ratios 62

Figure 45: Relationship between the NSFR and the LCR..... 63

List of tables

Table 1: Main sources of funding by business model 29

Table 2: Loans yearly variation at bank level vs LCR at the beginning of the year 48

Table 3: Logistic regression Pr(y<5%) vs LCR and control variables 50

Table 4: Control variables vs LCR 51

Table 5: Samples of major and smaller institutions, June 2022 53

Table 6: Impact of the unwind mechanism on the LCR at bank level 57

Table 7: Banks involved in reverse repo operations, effect of the unwind mechanism on the LCR 59

Table 8: detail of the banks involved in reverse repo operations for which the effect of the unwind mechanism is material 59

Table 9: percentile distribution of the LCR and NSFR ratios 63

Table 10: estimate of the model's parameter 64

Table 11: Number of banks included in the June 2021 analysis 67

Table 12: Total asset coverage by country (in percentage) 68

Table 13: Number of banks included in the evolution analysis if the balanced sample criterion applies 69

Table 14: Number of banks included in the analysis by two reference dates if the balanced sample criterion applies 70

Table 15: Number of banks submitting liquidity coverage data (by business model) 71

Table 16: Number of banks included in analysis in section 'LCR — impact on lending' 71

Table 17: Number of banks included in analysis in section 'The unwind mechanism of the LCR' .. 72

Table 18: Definition of business models 73

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
p.p.	percentage points
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]

LCR values decreased in the first half of 2022 but, on average, continues to be well above the minimum requirement. The decrease was driven by an increase in net outflows and a stabilisation of HQLA.

At the end of June 2022, the weighted average LCR across the sample of EU banks stood at 166%, well above the minimum LCR requirement of 100% even if the ratio decreased by 9.5 p.p. during the first half of 2022 driven by an increase in net cash outflows following the outbreak of the war in Ukraine, while HQLA remained stable. The increase in outflows between December 2021 and June 2022 is mainly driven by growing outflows from non-operational deposits, other outflows and from secured lending transactions. Such increase can be linked to the increase in interest rate expectations and general market volatility following the surge in inflation that started during the first half of the year, and that resulted in a significant fall in asset prices. As of June 2022, no bank in the monitoring sample had LCR levels below 100%. The average LCR level of global systemically important institutions (GSIIs) stood at 146% and that of other systemically important institutions (O-SIIs) at 172%. The weighted average LCR of the remaining banks was even higher, at 212%. The decrease in the average LCR during 2022 affects all group of banks and a majority of countries. 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. All in all, despite some reduction in the EU banks' LCR levels, the LCR buffers remain significantly higher than before the outbreak of COVID-19 pandemic. The process of normalisation of the liquidity-enhancing on monetary policy measures started in 2022 and is expected to continue in the coming years with the bulk of TLTRO-3 maturing in 2023. Given banks' current favourable ratios, the TLTRO may not be entirely refinanced in the market but may be repaid by banks by drawing down their central bank reserves,

[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.

thus contributing to a further decline of EU banks' LCR buffers to more normal levels.

Specific funding structures could drive different LCR compositions across business models.

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 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. The ability of banks to swap currencies and to raise funds in the foreign exchange markets may be impaired during times of stress. Indeed, the rising geopolitical tensions in Europe during 2022 and its consequences in the macroeconomic outlook had led to a devaluation of the EUR versus the USD translating into the widening of the USD-EUR cross currency basis swaps and making USD funding more expensive for Euro area banks. Such situation might pose a risk for some banks, in case they need to quickly fill liquidity gaps in USD. Under such scenario, 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.

Substantially in line with the results of the previous year, 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 unwinding of secured transactions in order to calculate the adjusted stock of HQLA used in the LCR calculation, in the observed period and with the available samples of credit

institutions, 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.

Based on current data, the LCR and the NSFR does not appear to be strongly correlated.

The report contributes to the discussion about the interaction between the LCR and the NSFR. The analysis points in the direction that the two liquidity requirements are not redundant in as much it was not possible to identify a strong relationship between them.

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 ninth publication of the EBA report under Article 509(1) and the seventh 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.[2] As in the previous reports, the analysis is based on COREP data. The sample covers 324 banks (368 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.[3]

The report includes a detailed assessment of the LCR key components (HQLA and net liquidity outflows) and analyses the interaction of the LCR with other liquidity metrics such as the NSFR as well as the impact of some implementation features such as the unwinding mechanism. It also provides breakdowns by different business models across the EU. The analysis of currency mismatches investigates whether the banks' liquidity coverage in foreign (and significant) currencies differs from their overall LCR. Additionally, the report analyses what is the impact on lending that could derive from the existence of the LCR regulation.

The bank sample covers both globally active and other significant institutions (GSIIs and O-SIIs), as well as 'other banks'. In terms of total assets, the sample covers approximately EUR 27.4 trillion (EUR 28.2 trillion including subsidiaries) or, on average, 84.7% of the total assets of the EU banking sector.[4] Country data should be interpreted with caution as differences in the representativeness of the sample across countries may affect data comparability.[5] 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,[6] which also include subsidiaries of EU parent institutions.[7] Unless stated otherwise, all average figures are weighted.

[2] See definition of significant and foreign currency in Section "LCR — analysis of currency mismatch" .

[3] 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.

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

[5] See Table 12: Total asset coverage by country (in percentage) for more details regarding the coverage by country.

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

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

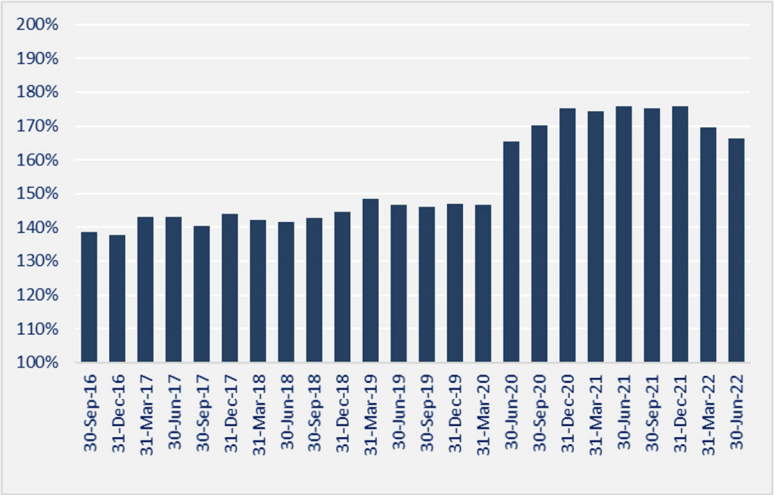
Analysis of the LCR and its components

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%.[8] 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[9] shows that banks experienced a strong increase in the last three quarters of 2020 (from 147% as of March 2020 to 175% as of December 2020) as a result of central banks' extraordinary liquidity-enhancing measures following the COVID-19 crisis. During 2021 the LCR showed some signs of stabilisation, reaching 175.9% in December 2021. During 2022, the LCR decreased to 166.4% in June 2022 following the outbreak of the war in Ukraine. However the LCR levels remain significantly above the pre-COVID levels.

Figure 1: LCR evolution (weighted average)

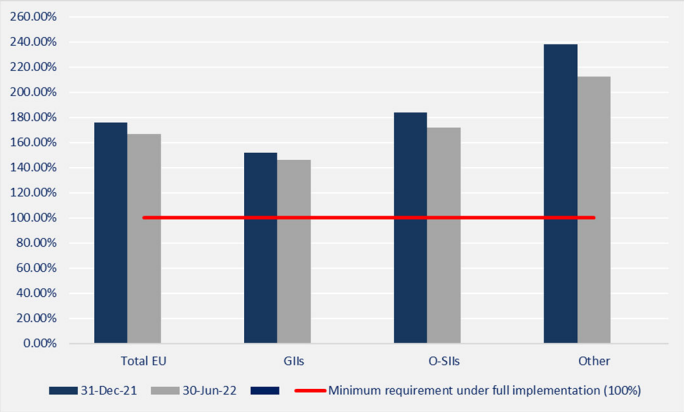


[8] In accordance with Article 412 of the CRR and Article 4(3) of the Commission Delegated Regulation (EU) 2015/61, credit institutions can make use of their liquid assets to cover their net liquidity outflows under stressed circumstances, even if such a use of liquid assets may result in their liquidity 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.

[9] The time series uses a consistent sample of 91 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 297 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 2022, LCR values drop across all groups of banks but more importantly for 'other banks' than for GSIIs and O-SIIs. LCR levels reduced from 238% to 212% for 'other banks'. GSIIs and O-SIIs have decreased their LCRs from 152% to 146% and from 184% to 172%, respectively. Moreover, the LCR dispersion across 'other banks' remained greater than across GSIIs and O-SIIs, reflecting 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 decrease in the LCR ratio between December 2021 and June 2022 can mostly be attributed to a significant increase in net outflows while the liquid assets (HQLA) component remained relatively stable. The same tendency was observed across all groups of banks. (Figure 3 and Figure 4)

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

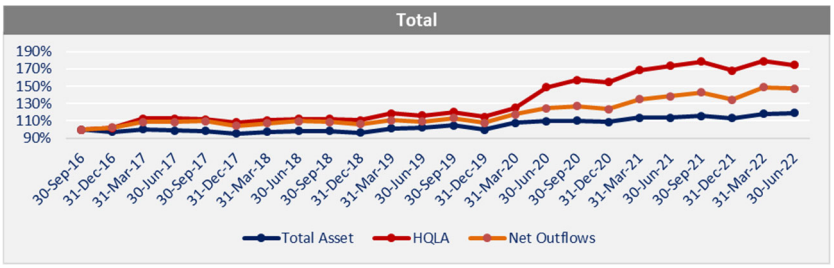
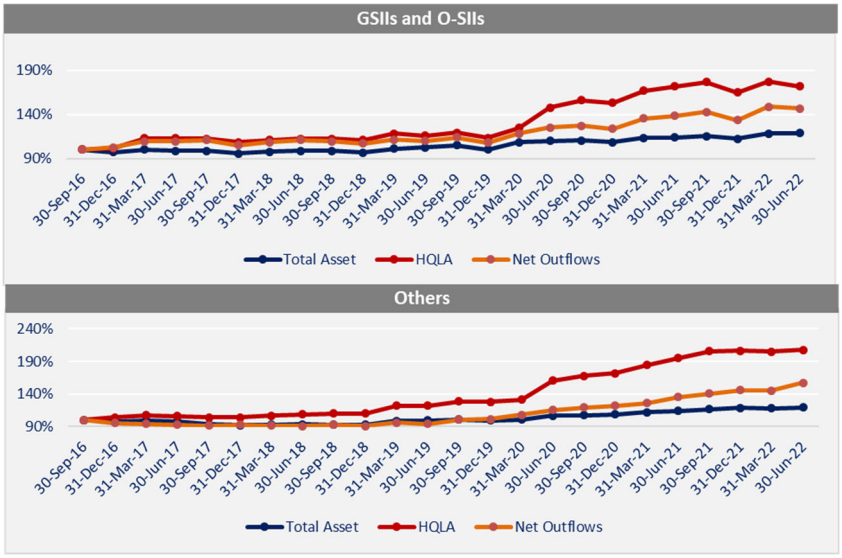


Figure 4: Evolution of the numerator and denominator of the LCR by bank group, September 2016 = 100% — balanced sample



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, Figure 6 and Figure 7 show the evolution of such composition between December 2021 and June 2022.

The rise in net cash outflows was driven by an increase of gross outflows, which was bigger than the increase of inflows. The latter increased slightly from 4.5% to 5.2% of total assets between December 2021 and June 2022 (Figure 6). The increase in gross outflows between December 2021 and June 2022 is mainly driven by growing non-operational deposits, other outflows and from secured lending transactions (Figure 5). Such increase can be linked to the unstable economic outlook during the first half of the year that resulted in a significant fall in asset prices. In such circumstances, outflows from derivatives (included in 'other outflows') are expected to increase to reflect negatives market values due to elevated volatility on financial and other markets. Additionally, outflows from secured funding transactions could increase as counterparties may request additional collateral to cover for falling asset values.

Figure 5: Evolution of the composition of cash outflows (post-weight) relative to total assets — balanced sample

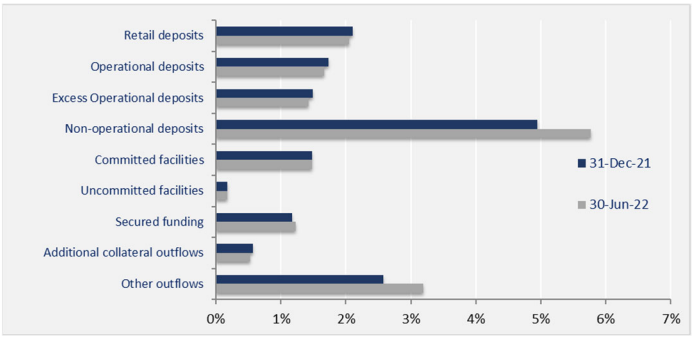


Figure 6: Evolution of the composition of cash inflows (post-weight and before cap) relative to total assets — balanced sample

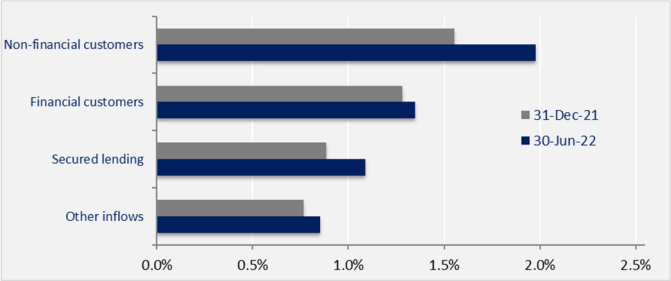
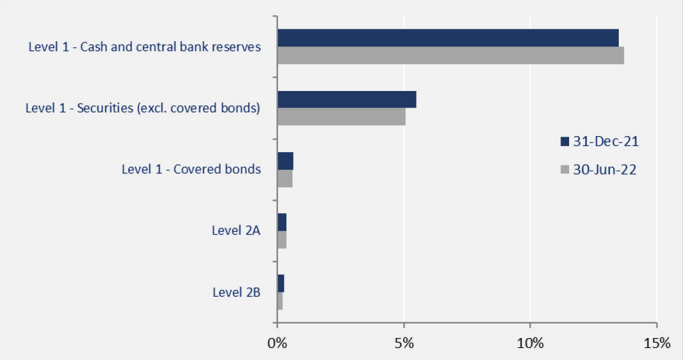


Figure 7: Evolution of the composition of liquid assets (post-weight and before the cap) relative to total assets — balanced sample



Liquid assets remained stable between December 2021 and June 2022 (liquid assets represented 20.2% of total assets as of December 2021 and 20.0% as of December 2020). The slight decrease arises from the Securities component that decreased following the increase in the yield curves that negatively affected the market value of such instruments during 2022. Such decrease was partially offset with an increase in Cash and reserves which remained the main source of HQLA, accounting for 68% of the liquidity buffer. The current size of the cash a reserve component is a consequence of its evolution in the recent years. Cash and reserves increased considerably since the outbreak of the pandemic in March 2020, in particular for Euro area banks. This coincides with the ECB launch of the pandemic asset purchase programme and the application of more generous terms for TLTRO-3. Although the bulk of TLTRO-3 will mature in 2023, banks' funding plans only envisage a partial substitution for market-based and deposit funding[10]. The TLTRO that may not be refinanced in the market, may be repaid by banks by drawing down their central bank reserves, given their current favourable LCR ratios. For that reason, the EBA is currently developing further analysis to understand the potential impact of maturing TLTRO-3 funding with particular interest to LCR levels and potential outliers.

Monitoring the evolution of banks' LCR levels becomes particularly relevant amid the highly uncertain economic outlook including high inflation and rising interest rates (which may affect the market value of liquid instruments), and the expected maturity of central bank instruments. Although, EU/EEA banks continued to show strong LCR levels in the first half of 2022, an extension

[10] See Chapter 3.1 of the EBA Risk Assessment Report published in December 2022.

of the current trend of increasing outflows together with the expected maturity of HQLA would push further down LCR levels.

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%.

Similarly to previous findings[11], as of June 2022, most banks in the sample are located above the line, suggesting that they still have LCR levels that are adequately above the minimum requirement despite the decreasing tendency . 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 2022)

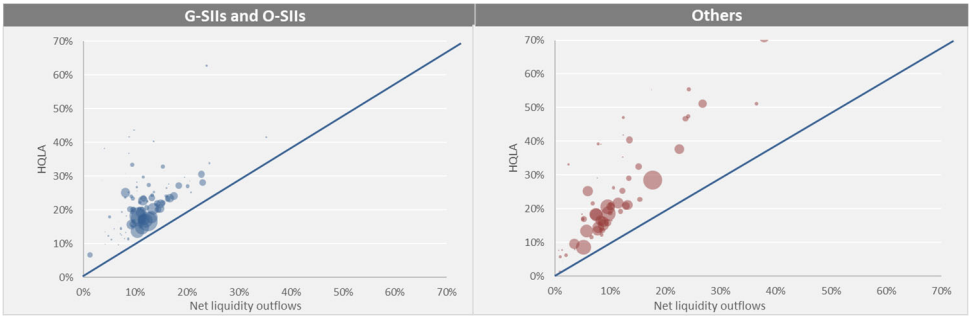


Figure 9 shows the evolution of the liquidity shortfall,[12] which, based on the fully loaded LCR minimum requirement (100%), has decreased from over EUR 27 billion in September 2016 to no shortfall since June 2020, for the balanced sample of banks[13]. Consequently, the number of banks with an LCR below 100% also declined, from eight in September 2016 to no bank with a shortfall since June 2020.

[11] See EBA Report on liquidity measures (4Q2020/2Q2021 Reference date).

[12] 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.

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

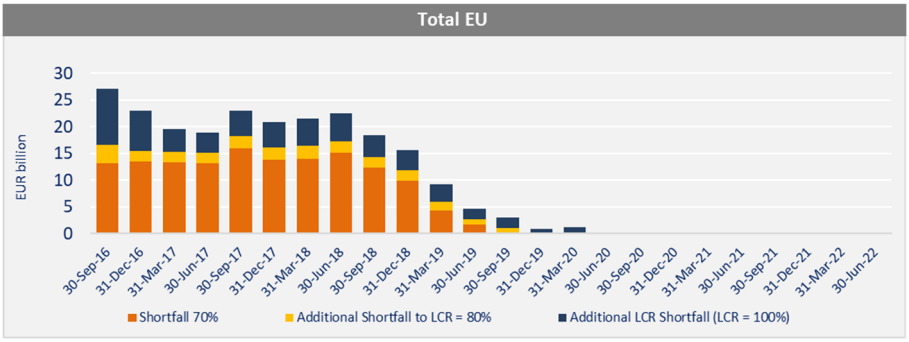
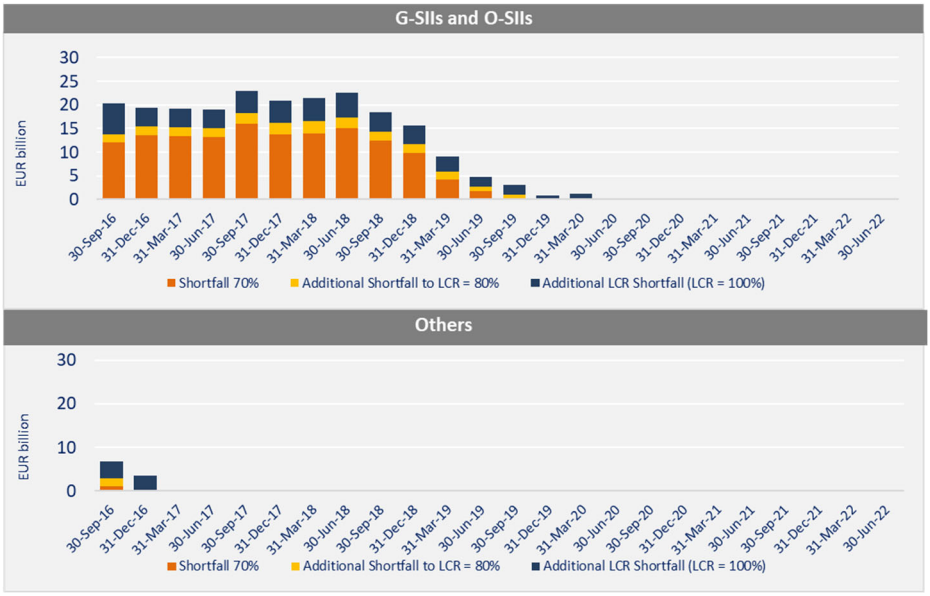
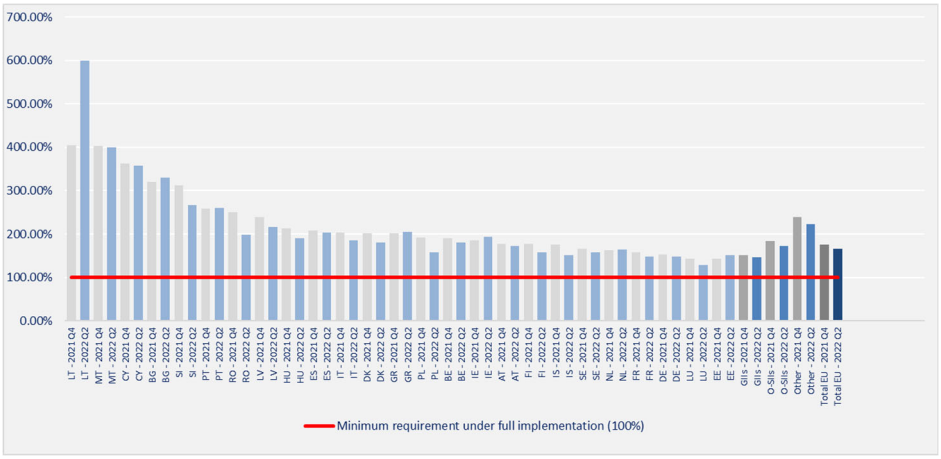


Figure 10: Evolution of the liquidity shortfall by bank group (EUR billion) — balanced sample



The analysis of the weighted average LCR levels across countries highlights some differences across member states. The majority of countries have LCR levels between 100% and 200% as of June 2022. Nevertheless, some countries present very high average LCR levels, such as Lithuania, Malta, Cyprus and Bulgaria, with weighted average ratios above 300%. Slovenia, Portugal, Latvia and Spain have ratios higher than 200% and no country presents average LCR levels lower than 100%.

Figure 11: LCR across countries — balanced sample



Differences can also be found when looking at the LCR evolution between December 2021 and June 2022. Out of 25[14] countries, 18 showed a decrease in their average LCR ratios, following the tendency also seen at aggregate level. However, 7 countries showed an increase in their average ratio. The reason behind such increases corresponds to LCR increases for specific banks in the sample for those countries and answer to different situations and liquidity strategies followed by those individual banks. The significant increase in the average LCR ratio of Lithuania (from 405% to 600%) is driven by one bank that carried out a transitory liquidity operation as of June 2022. The ratio came back to its regular size in July 2022.

Figure 12: LCR dispersion across countries — balanced sample

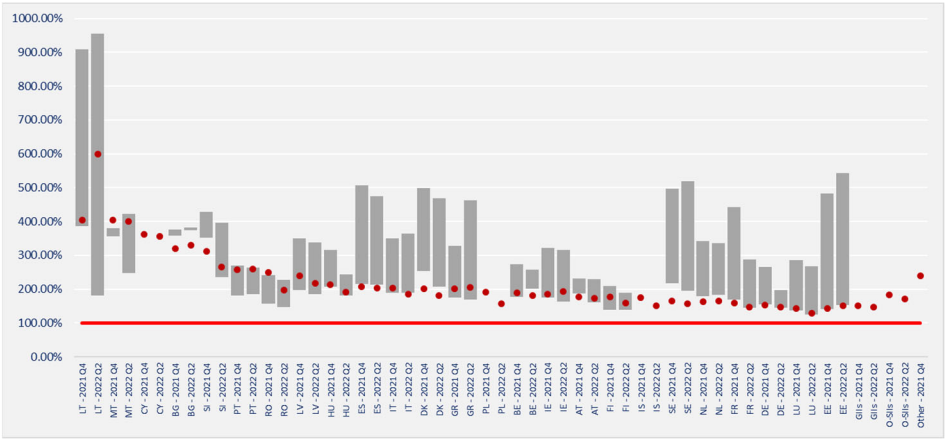


Figure 12 shows the dispersion of the LCR across countries. The top line of the grey box shows the 75th percentile, whereas the bottom line of the grey box shows the 25th percentile.[15] The red

[14] 27 EU Member States and 2 European Economic Area / European Free Trade Association states were included in the analysis but no country results are shown for the Czech Republic, Slovakia, Croatia and Norway as fewer than 3 banks reported data for the two reference dates shown in the analysis.

[15] 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.

points represent the weighted average LCRs.[16] The figure shows that there is dispersion in the banks' LCR levels even within countries. As of June 2022, Lithuania is the country with the highest dispersion driven by one bank that temporarily showed a very high LCR. 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.

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 2022. Results show that the composition did not change significantly since previous reference dates[17]. 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 21.6% of total assets for all banks and for GSIIs and O-SIIs and 19.7% 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 98.9%, or more than 97% when excluding EHQCBs, of the total liquidity buffer).

Within Level 1 assets, the share of securities (26%) is slightly lower than the share of cash and reserves (68%). On average, EHQCBs represent a proportion of around 3.3% for all categories (GSIIs

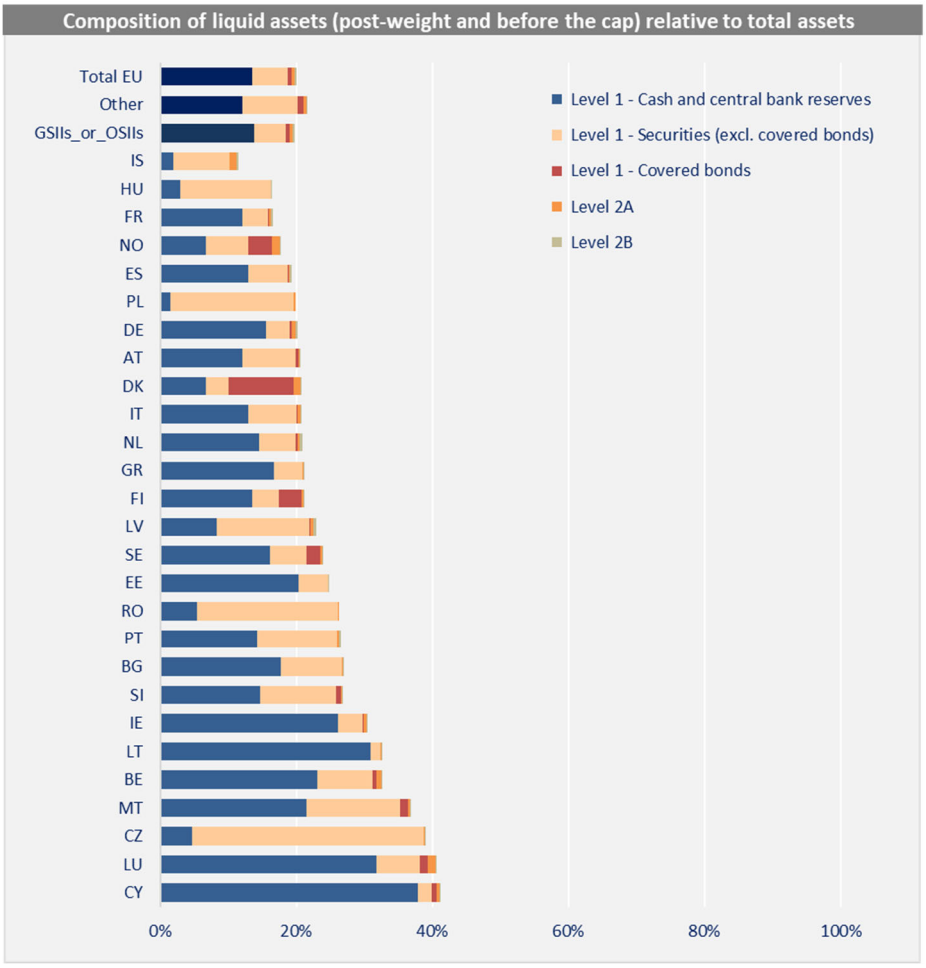
[16] For confidentiality reasons, for countries with between three and four observations, only the weighted average LCR is shown.

[17] See June 2021 results included in the EBA Report on liquidity measures (4Q2020/2Q2021 Reference date).

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 74% of the countries rely largely on cash and central bank reserves; banks in 22% of the countries rely on Level 1 securities (excluding covered bonds). On average, Lithuania and Cyprus are the countries with a larger share of cash and central bank reserves in their total liquidity buffer (95% and 94% of the total liquidity buffer), whereas Poland, Czech Republic 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 (46% of the total liquidity buffer), Norway (20%), Finland (15%) and Sweden (9%).

Figure 13: Composition of liquid assets (post-weight and before the cap) relative to total assets (as of June 2022)

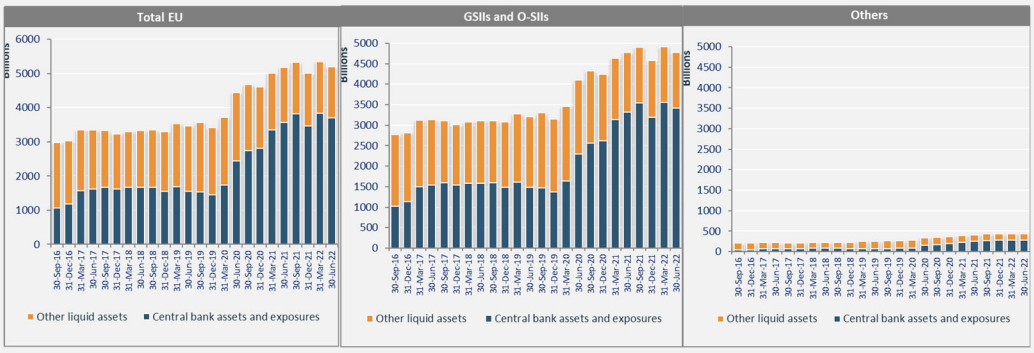


Interactions between non-standard monetary policy measures and the LCR liquidity buffer

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.[18]

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). In the euro area, the ECB improved the conditions of the TLTRO-3 programme and in operations between September 2019 until December 2021, euro area banks took up a total of EUR 2,339 bn of TLTRO-3 funds. 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 December 2021. The relative increase in central bank funding amounts to 133% for GSIIs and O-SIIs and 232% for the rest of the sample. (Figure 14). A portion of the TLTRO-3 operations that took place between September 2019 until December 2021 have already matured, however the biggest share remains outstanding with EUR 101 bn maturing by the end of the year, EUR 1,648 bn maturing in 2023, and EUR 590 bn in 2024.([19])

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. Although the biggest share of TLTRO-3 will mature in 2023, banks' funding plans only envisage a partial substitution for market-based and

[18] 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.

[19] Based on ECB data. ECB data does not reflect early repayments.

deposit funding. In other words, banks may repay TLTRO-3 without fully replacing it by market-based funding, suggesting that banks may draw on their LCR eligible deposits, including deposits at central banks, to repay parts of TLTRO-3 funding, which forecasts declining LCR. Additionally, since November 2022, the ECB changed the conditions for TLTRO-3 funding[20] reducing interest earning opportunities, which might also imply earlier repayments of such instruments and therefore, earlier affecting banks' LCR levels (see chapter 3.1 of the 2022 EBA Risk Assessment report[21]). For that reason, the EBA is currently developing further analysis to understand the potential impact of maturing TLTRO-3 – including potential earlier repayments amid the changed conditions.

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.

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.[22] 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.[23] 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[24] 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%.

[20] From 23 November 2022 the applicable rate to TLTRO-3 operations will be the average applicable key ECB interest rates. See ECB recalibrates targeted lending operations to help restore price stability over the medium term.

[21] See Chapter 3.1 of the 2022 EBA Risk Assessment Report.

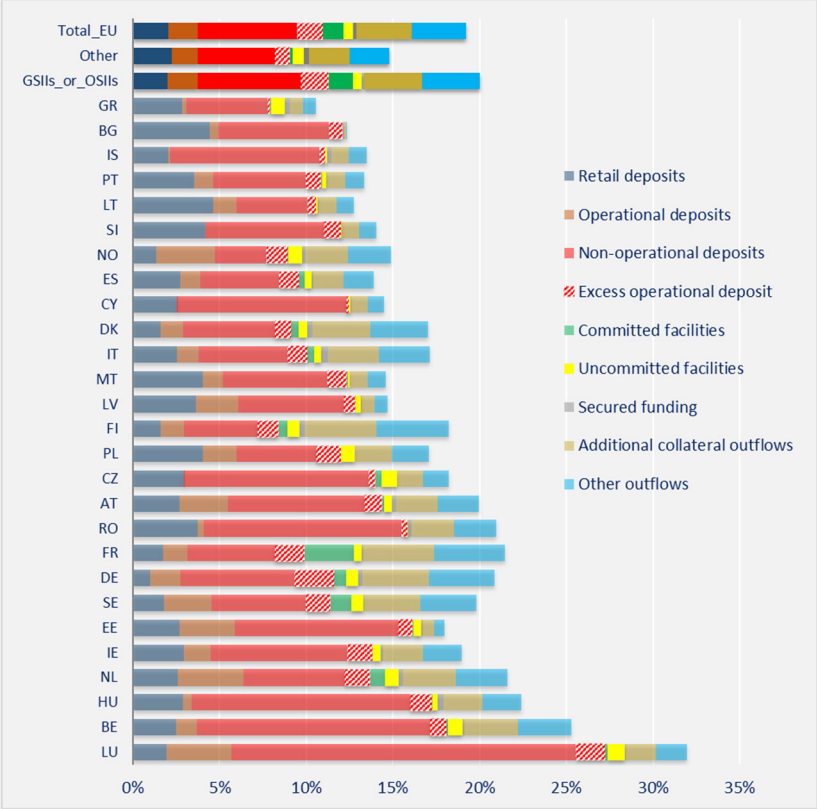
[22] Article 20 of the LCR DR.

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

[24] Article 33 of the LCR DR.

The share of total outflows over total assets has increased since previous reporting dates[25] following the unstable economic outlook during the first half of 2022, as explained in previous sections. As of June 2022, on average, cash outflows (post-weight) represent approximately 17.5% (+1.04 p.p since June 2021) of total assets of the banks in the sample. GSIIs and O-SIIs present a higher share (18.1% as of June 2022, +1.06 p.p since June 2021) than 'other banks' (13.4% as of June 2022, +1.5 p.p since June 2021). The increase in outflows is distributed across almost every category of outflows, being non-operational deposits and other outflows the most affected ones. Therefore, the composition of outflows did not change significantly between since June 2021. The share of outflows from retail deposits of total assets is similar for both groups of banks (around 2% of total assets both reporting dates). However, relative to total cash outflows, 'other banks' present a higher share of retail deposits (16.8% of total cash outflows compared with 11.0% 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 5.9% 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.

Figure 15 Composition of cash outflows (post-weight) relative to total assets (as of June 2022)



[25] See June 2021 results included in the EBA Report on liquidity measures (4Q2020/2Q2021 Reference date).

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.[26] 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.[27] 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.

Figure 16: Composition of cash outflows (pre-weight) relative to total assets (as of June 2022)

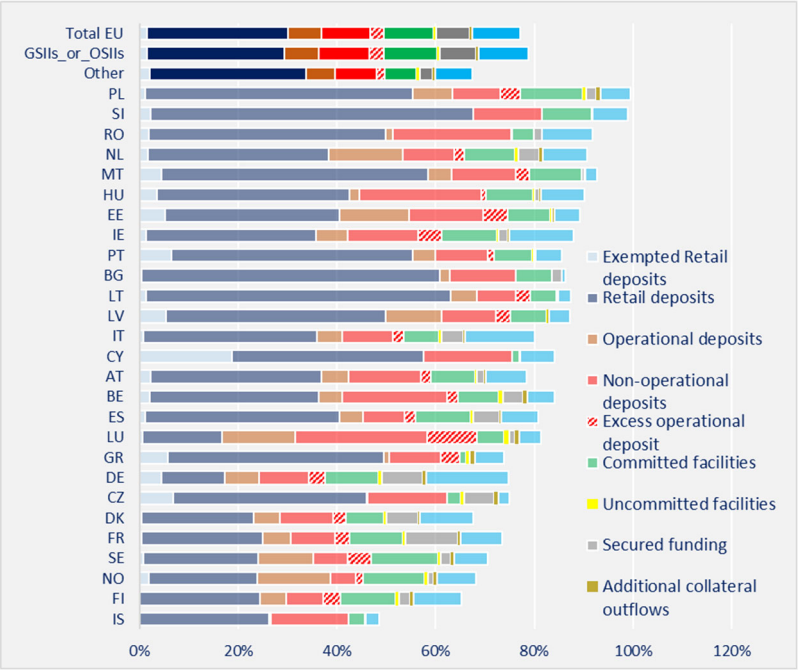


Figure 16 shows the share of cash outflows (pre-weight) over total assets. As expected and due to the high haircuts applicable to this category of outflows, outflows from retail deposits become the category with the highest share over total assets before the application of weights (around 30% of the total assets for all categories of banks). For both groups of banks, around 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 (17% of total assets).

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

[27] 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).

Assessment of secured funding transactions with central banks[28]

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.[29] 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 (non-HQLA): 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 2022, 154 banks reported secured funding transactions with some type of counterparty maturing within 42 days. Of these, 35 reported secured funding transactions with a central bank (23 were either GSIIs or O-SIIs, and 12 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[30] 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 (around 91.2% of the total in December 2021 and 95.6% in June 2022).

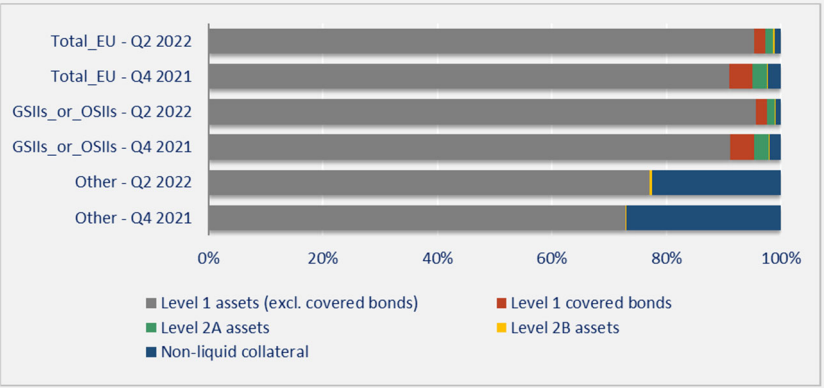
[28] It should be noted that the assessment of SFT with central banks only covers part of the outstanding ECB operations, as the TLTROs are out of scope, and that the collateralisation shown in the chart is not representative of the general collateralisation of the ECB's credit operations.

[29] 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.

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

The Level 1 covered bonds and the non-liquid collateral represent only 4.2%/1.9% and 2.6%/1.6% (December 2021/June 2022) 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 72.8% in December 2021 and 77% in June 2021. Nevertheless, results should be interpreted with caution as only 12 'other banks' reported secured funding transactions with a central bank in June 2022.

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[31] 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.[32] 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 5.5% 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 16 countries showing a higher share of financial customer cash inflows, 2 countries showing a higher share of inflows from non-financial customers, 1 country showing a higher share of inflows from secured lending and 8 countries showing a higher share of other inflows.

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

Figure 18: Composition of cash inflows (post-weight and before the cap) relative to total assets (as of June 2022)

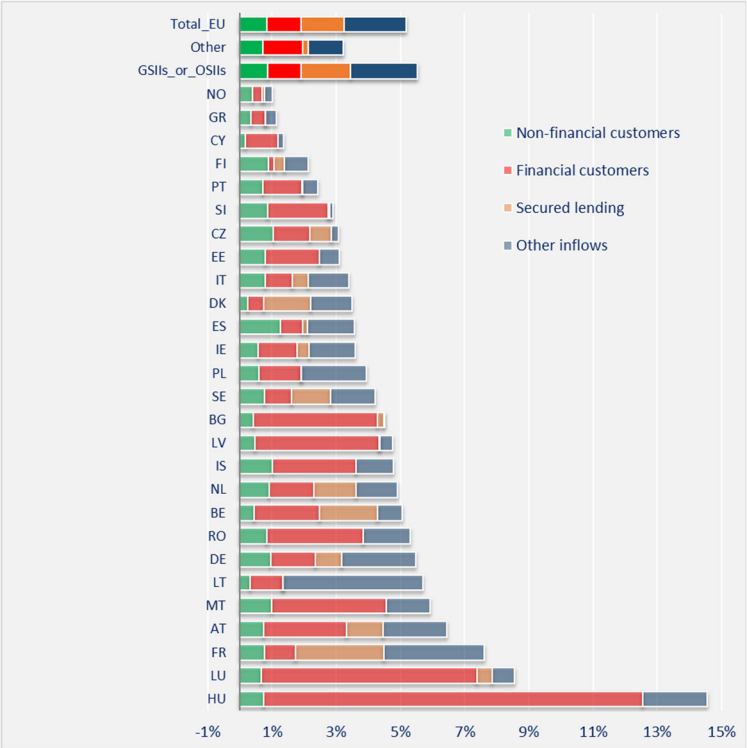


Figure 19 summarises the parameters of the LCR and shows the offsetting effect between outflows (indicated in dark blue) and inflows (indicated in grey) and then illustrates the extent to which the liquidity buffer exceeds the level of net liquidity outflows (portion above the dotted line).

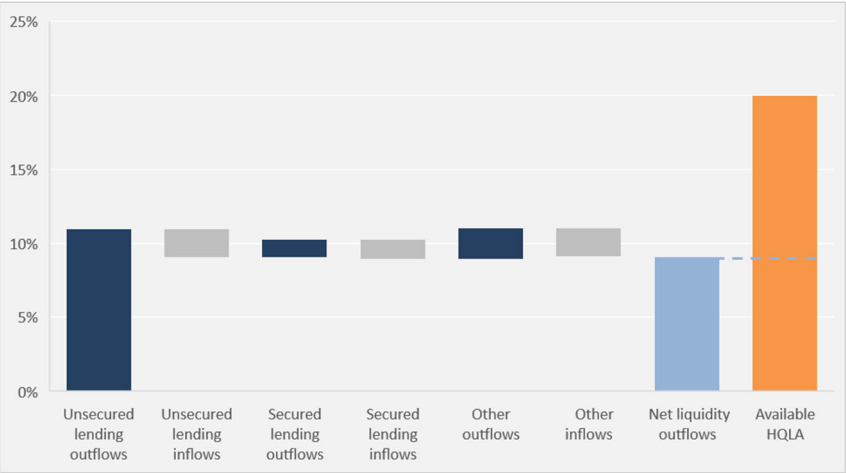
The largest component reducing the LCR is outflows stemming from unsecured lending. This is in line with expectations, for two reasons: First, unsecured funding, especially non-operational deposits, constitutes a large part of banks' outflows; and second, the applicable outflow rates for these financial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

More specifically, outflows stemming from unsecured lending amount to around 11% of total assets. Within this category, non-operational deposits – including excess operational deposits (which have high run-off rates)[33] – are the most important category (7.2% of total assets). Operational and retail deposits (which have lower run-off rates) account for only 3.7% of total assets.

Only about 1.9 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.

[33] 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[34] 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				
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

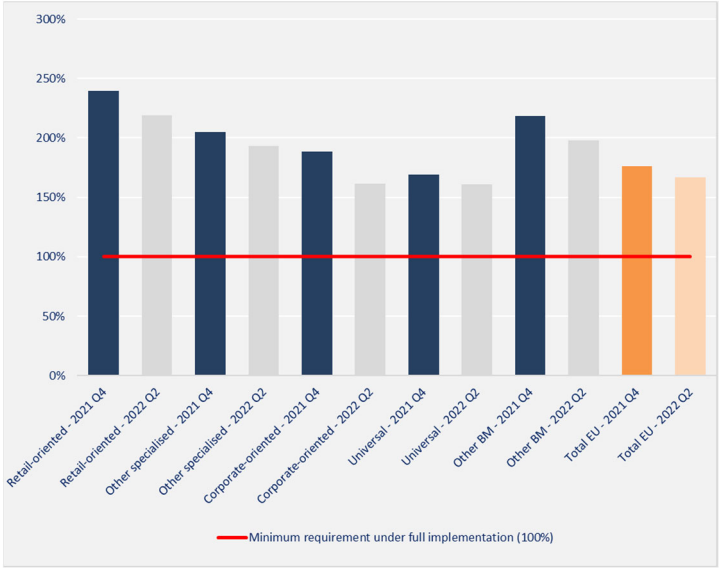
[34] See Table 6 in Annex 1 (business model categorisation).

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 363 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.[35] 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 239% in December 2021 and 219% in June 2022) present the highest LCRs, well above the EU average. Following the aggregate tendency, there was a reduction of LCR levels between December 2021 and June 2022 across business models. Corporate oriented banks experience the biggest LCR reduction (from 188% in December 2021 to 162% in June 2022). After such reduction, Corporate oriented bank, together with Universal banks (composed of large banks), showed one of the lowest LCRs (162% and 161% respectively), below the EU average in June 2022 (LCR of 166%).

Figure 20: LCR across business models — balanced sample

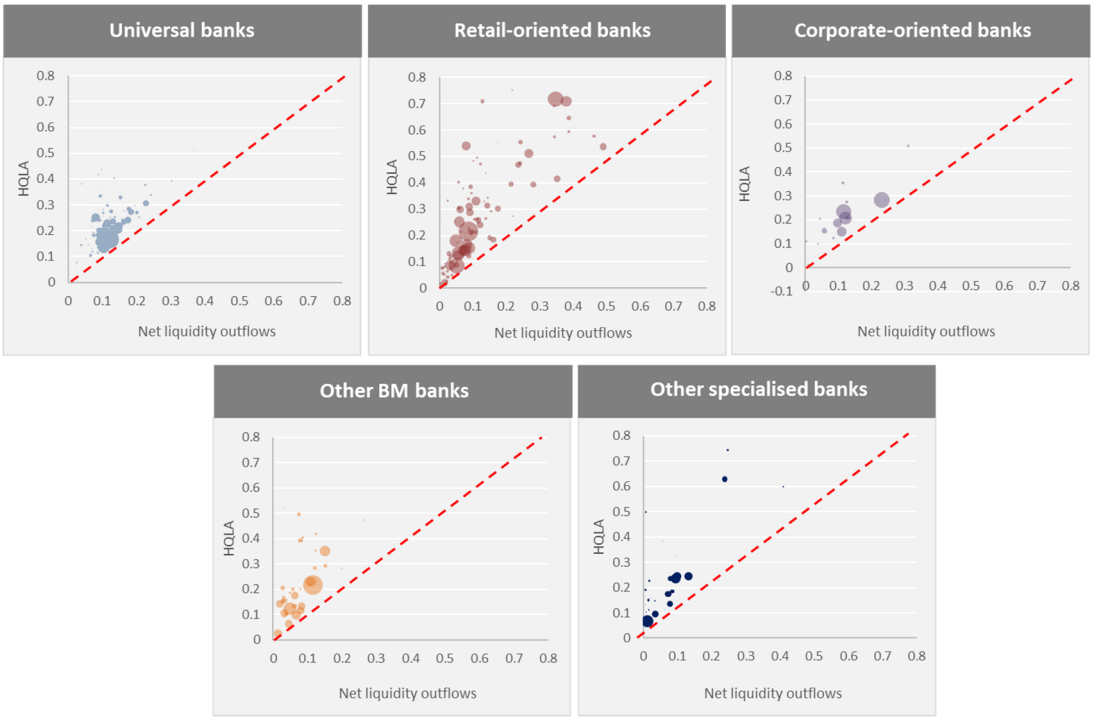


Nevertheless, looking only at LCR levels, it is difficult to understand the implications of the different business models. The ratio of HQLA to net liquidity outflows shows which business models tend to

35 Custodian banks, public 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 14 in the Annex. The definitions of the business models are presented in Table 18 in the annex.

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 40% 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 from 5% to 70% of total assets and ratios of net liquidity outflows to total assets ranging from 5% to 50%).

Figure 21: HQLA and net liquidity outflows (as shares of total assets), per business model[36] (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 (63%, 57% 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 9.6% and 10.1% respectively. As these business models also have an important share of retail deposits (26% and 40% 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

[36] 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.

meaningful proportion of wholesale funding (the share of non-operational deposits in total outflows is 21.1%) and committed facilities (the share over total outflows is 15.2%). 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.

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

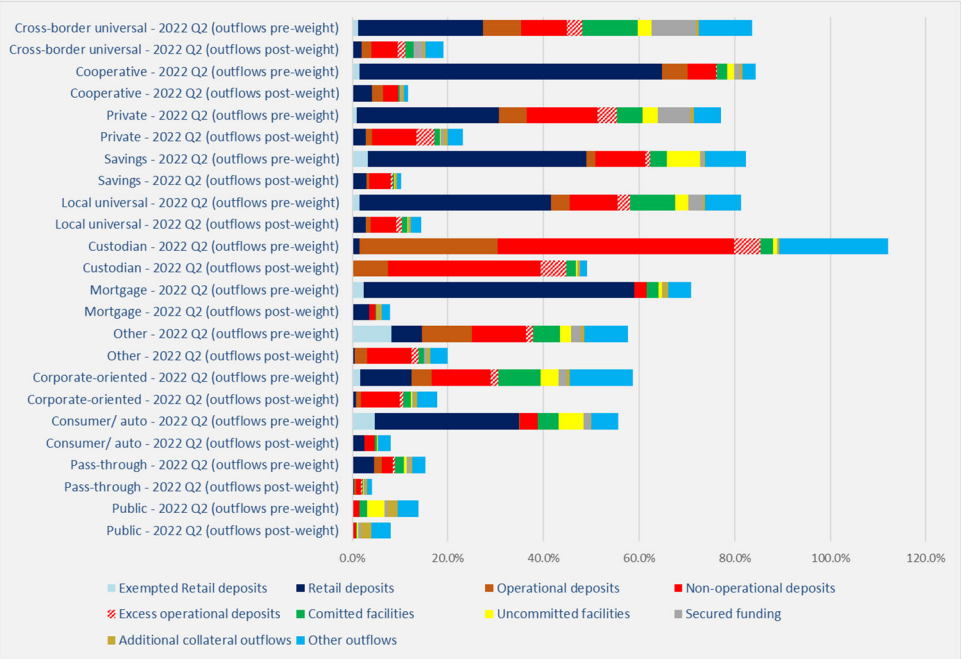
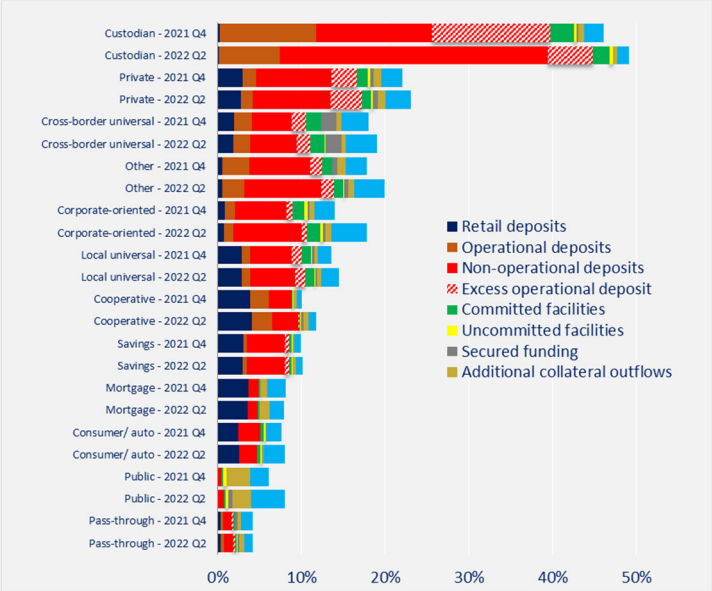


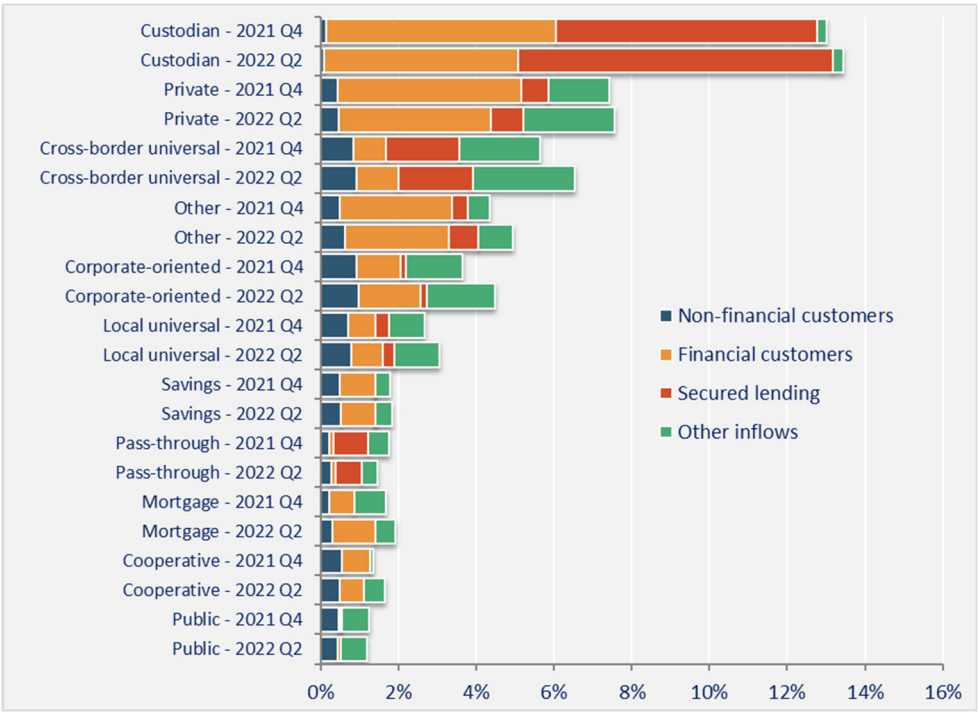
Figure 23 shows the evolution of cash outflows (post-weight) between December 2021 and June 2022. The amount of cash outflows with respect to total assets increased between the two reference dates for all business models except for mortgages. The composition remained stable with the exception of custodian banks for which the amount of non-operational deposits increase significantly between December 2021 and June 2022 while excess operational deposits decreased in the same proportion. This change in composition is likely related to a change in the way custodian banks report operational deposits.

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



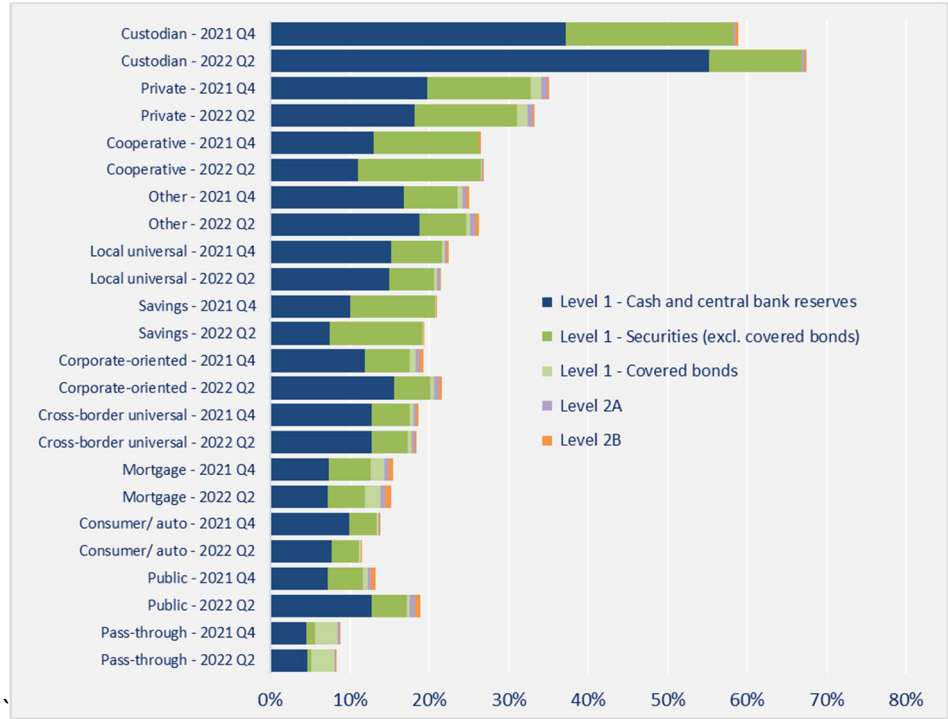
The share of cash inflows (post-weight and before the cap) relative to total assets is, on average, less than 8% across business models, except for custodian banks (around 13% for the two reporting dates).

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 2022, 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. Indeed, This became particularly obvious amid unstable economic outlook during the first half of the year and its particular implications for Europe, which translated in a very significant widening of the USD-EUR cross currency basis swaps end of September 2022.[37] Such widening implies that USD funding has become more expensive for Euro area banks.

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 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[38] (limited to euro, US dollar and pound

[37] See Figure 53 of the 2022 EBA Risk Assessment report.

[38] 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.

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.[39]

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 58 banks (of which 33 are GSIIs/O-SIIs and 25 are 'other banks') reported euro as a significant (foreign) currency. Figure 26 shows a bank by bank comparison between banks' LCR in all currencies and LCR levels in euro as a significant (foreign) currency. The LCR level in all currencies are shown in the y-axis while the x-axis shows the LCR in euro as a significant (foreign) currency. 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.

There is some evidence of a different pattern when euro is the significant currency. 14 banks out of the 33 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%. 9 out of the 25 banks classified as 'other banks' presented an LCR_{EUR} lower than the $LCR_{all\ currencies}$, but no bank presented an LCR_{EUR} below 100%. These banks are located north-west of the diagonal line in Figure 26.

[39] 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)

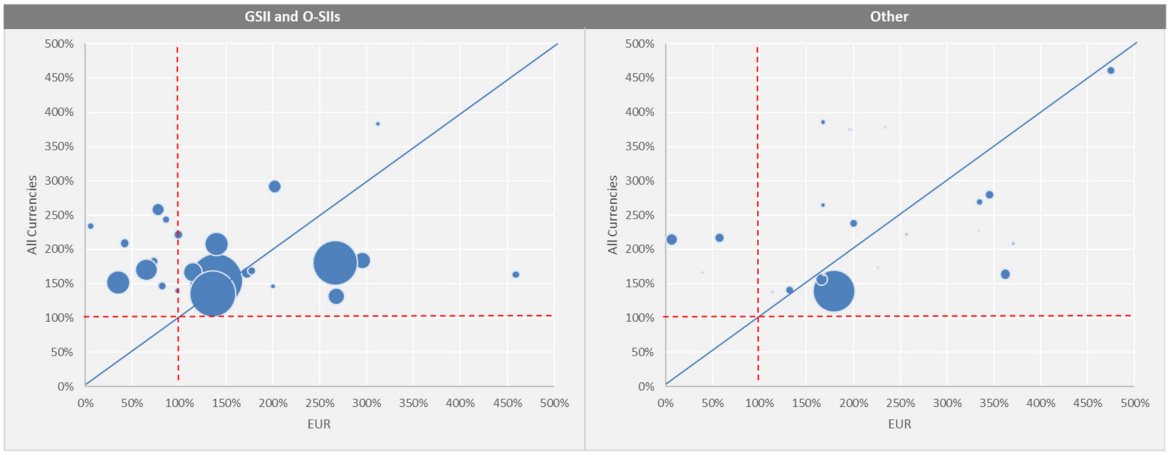


Figure 27 shows the evolution of the proportion of banks in the sample with LCR_{EUR} below $LCR_{all\ currencies}$ (blue line) and the proportion of banks in the sample with LCR_{EUR} below 100% (orange line). The chart shows a significant fluctuation over time in the relationship between LCR_{EUR} and $LCR_{all\ currencies}$. The proportion of banks with LCR_{EUR} below 100% increased since June 2021 to 25% as of June 2022.

Figure 27: Evolution of the comparison between the positions in LCR in EUR and LCR in all currencies — balanced sample [40]

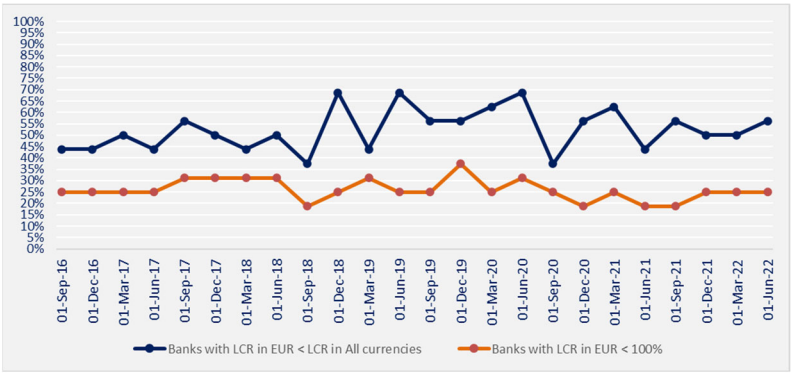


Figure 28 analyses the evolution of the weighted average level of LCR_{EUR} and $LCR_{all\ currencies}$ for a balance sample of banks. Since September 2016, LCR_{EUR} has been on average higher than the average $LCR_{all\ currencies}$. As of June 2022, the average LCR_{EUR} is in line with the $LCR_{all\ currencies}$. Figure 29 shows the evolution of the distribution[41] of LCR_{EUR} and $LCR_{all\ currencies}$ between September 2016 and December 2020/June 2022. It can be observed that LCR_{EUR} values are significantly above 100% with some exceptions. Regarding the evolution, the dispersion in LCR levels has reduced since December 2016 but more significantly for $LCR_{all\ currencies}$ than for LCR_{EUR}.

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

[41] 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

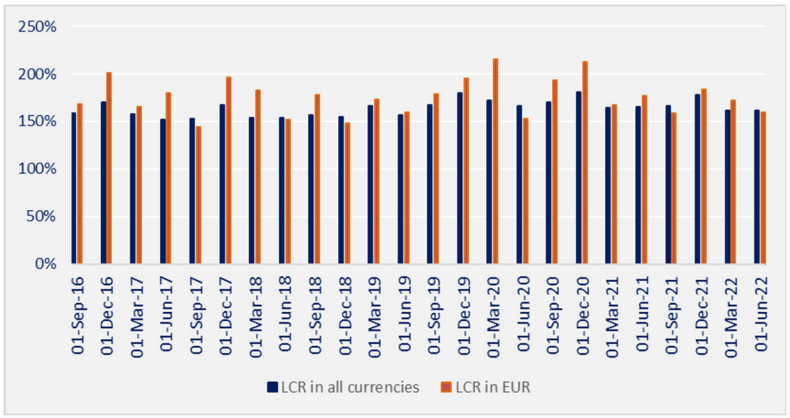
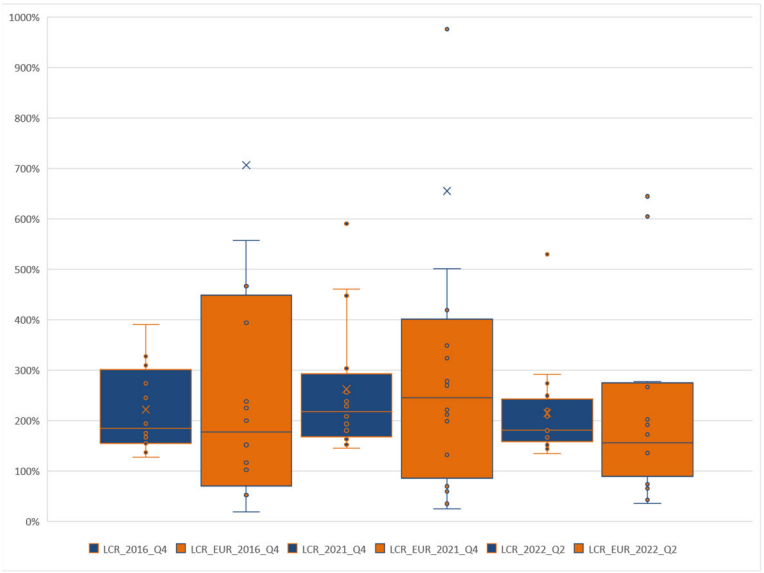


Figure 29: Evolution of the distribution of the LCR in EUR vs the distribution of the LCR in all currencies — balanced sample



Currency mismatches in USD

A total of 109 banks (of which 56 are GSIIs/O-SIIs and 55 are 'other banks') reported US dollar as a significant (foreign) currency. Figure 30 shows a bank by bank comparison between banks' LCR in all currencies and LCR levels in euro as a significant (foreign) currency. The LCR level in all currencies are shown in the y-axis while the x-axis shows the LCR in euro as a significant (foreign) currency. 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.

There is clear evidence of a different pattern when US dollar is the significant currency. 41 banks out of the 56 banks classified as GSIIs and O-SIIs banks presented an LCR_{USD} lower than the $LCR_{all\ currencies}$, and 32 banks presented an LCR_{USD} below 100%; many of them with LCR_{USD} close to 0%. 45 banks out of the 55 banks classified as 'other banks' presented an LCR_{USD} lower than the $LCR_{all\ currencies}$, and 33 banks presented an LCR_{USD} below 100%; many of them also showed LCR levels

close to 0%. In total, 21 banks showed an LCR_{USD} close to zero. These banks are located close to the y axes in Figure 30.

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)

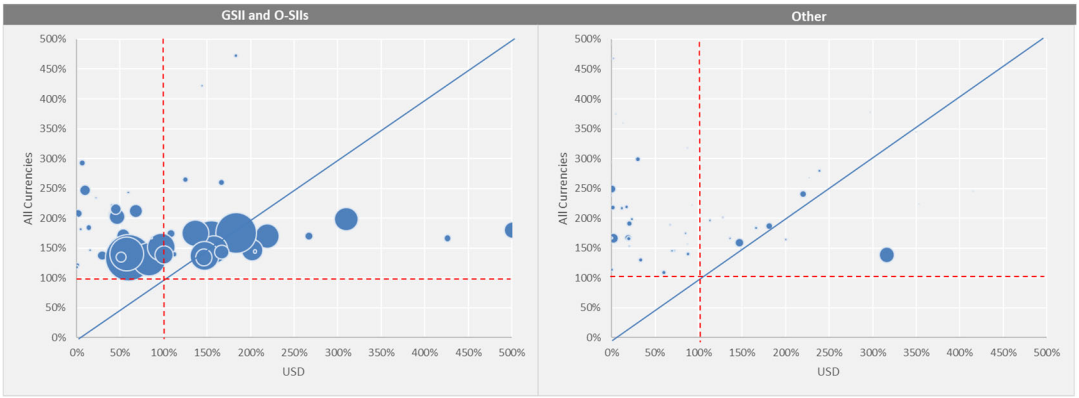


Figure 31 shows the evolution of the proportion of banks in the sample with LCR_{USD} below $LCR_{all\ currencies}$ (blue line) and the proportion of banks in the sample with LCR_{USD} below 100% (orange line). Since September 2016, there is a tendency of a reduction in the number of banks that have LCR_{USD} below $LCR_{all\ currencies}$ although this tendency reverted in the last reporting date. The proportion of banks with an LCR_{USD} below 100% also reduced between September 2016 and December 2021 but showed and increase between December 2021 and June 2022 (from 30% of banks in the sample with LCR_{USD} below 100% as of December 2021 to 43% as of June 2022) .

Figure 31: Evolution of the comparison between the positions in LCR in USD and LCR in all currencies — balanced sample [42]

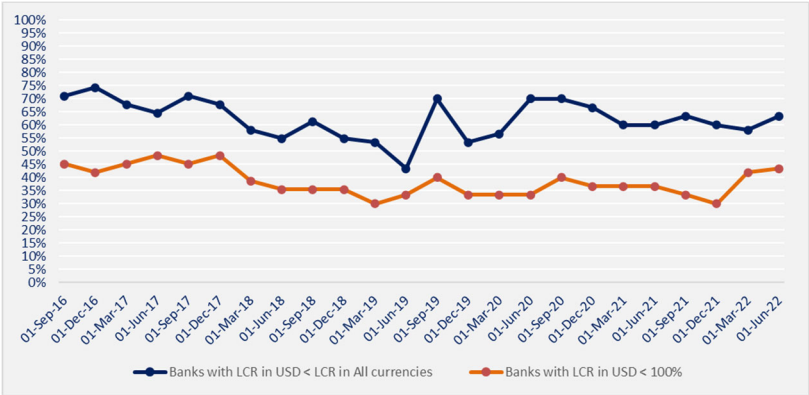


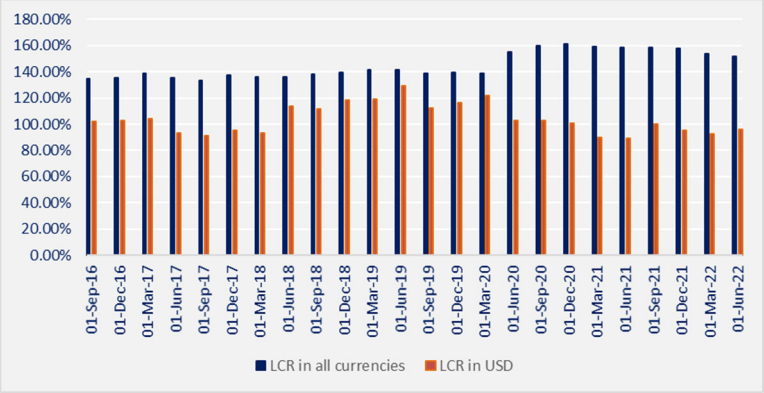
Figure 32 analyses the average level of LCR_{USD} and $LCR_{all\ currencies}$. Since September 2016, the average LCR_{USD} level has been lower than the average $LCR_{all\ currencies}$ level and below to 100% since March 2021. The difference between the two ratios reduced significantly between June 2018 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 $LCR_{all\ currencies}$ until December 2021 driven by the central bank funding operations carried out in 2020 and 2021. On the other hand, LCR_{USD} showed a

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

decreasing tendency since March 2020 until the last reporting date (June 2022). On June 2022 the average LCR_{USD} was 96%, thus below 100% and significantly below the $LCR_{all\ currencies}$ (152%).

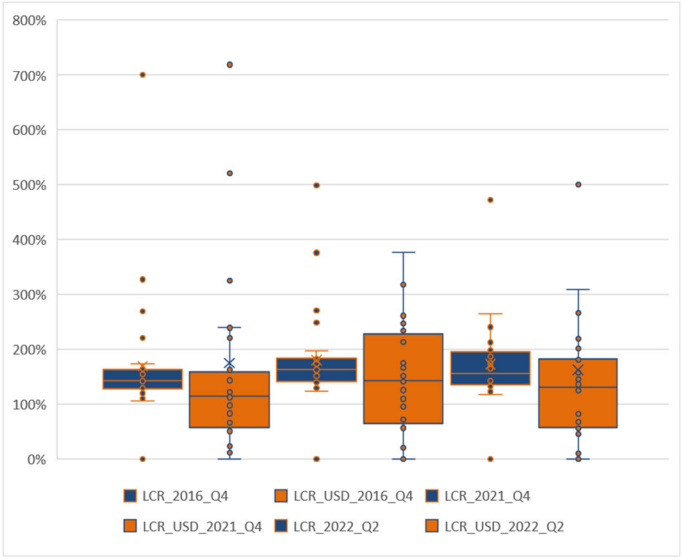
Figure 33 shows the evolution of the distribution[43] of LCR_{USD} and $LCR_{all\ currencies}$ between September 2016 and December 2021/June 2022. A greater dispersion in the LCR_{USD} levels can be observed across different reporting dates. The median and the 25th percentile is always lower for the LCR_{USD} levels while the minimum observation is 0% for all the reporting dates. As of June 2022, even if the average LCR_{USD} is close to 100%, the 25th percentile remains significantly below such threshold (at 58%) and a number of banks showed LCR_{USD} close to 0%. Even if the EU liquidity regulation does not require banks to hold LCR levels in foreign currencies above 100%, low levels of LCR_{USD} may cause problems during volatile markets, as banks' ability to swap currencies and raise funds on USD FX markets at reasonable prices may be questioned. The combination of low levels of LCR_{USD} and the rising costs for USD funding following the widening of the USD-EUR cross currency basis swaps end of September 2022, might pose a risk for some banks, in case they need to quickly fill liquidity gaps in USD.

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



[43] 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.

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

A total of 34 banks (of which 16 are GSIIs/O-SIIs and 18 are 'other banks') reported GBP as a significant (foreign) currency. Figure 34 shows a bank by bank comparison between banks' LCR in all currencies and LCR levels in euro as a significant (foreign) currency. The LCR level in all currencies are shown in the y-axis while the x-axis shows the LCR in euro as a significant (foreign) currency. 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.

12 banks out of the 16 banks classified as GSIIs and O-SIIs banks presented an LCR_{GBP} lower than the $LCR_{all\ currencies}$. 15 banks out of the 18 banks classified as 'other banks' presented an LCR_{GBP} lower than the $LCR_{all\ currencies}$. 12 banks reported LCR_{GBP} close to 0%. 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.

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)

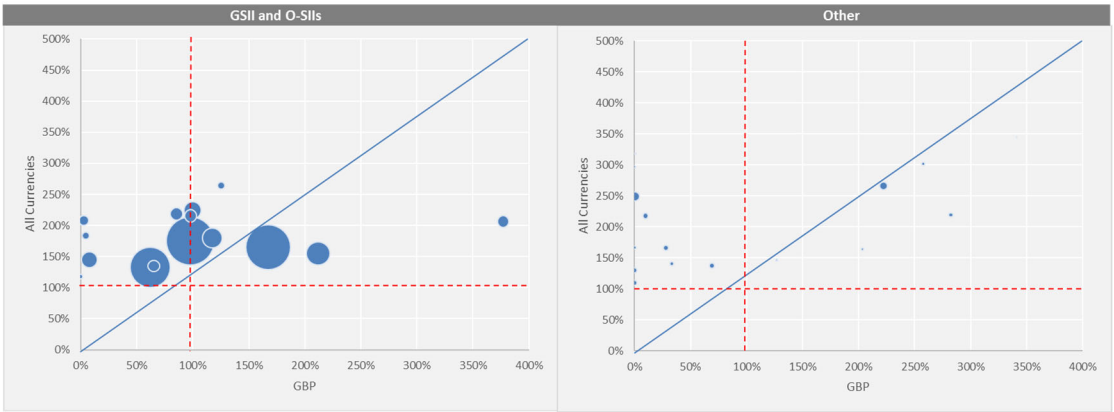


Figure 35 shows the evolution of the proportion of banks in the sample with LCR_{GBP} below $LCR_{all\ currencies}$ (blue line) and the proportion of banks in the sample with LCR_{GBP} below 100% (orange line). The evolution shows that the proportion of banks with LCR_{GBP} below $LCR_{all\ currencies}$ and the proportion of banks below 100% showed a slow but downward tendency between September 2016 and September 2020; this tendency changed in September 2020 when both variables increased. As of June 2020 the proportion of banks in the sample with LCR_{GBP} below $LCR_{all\ currencies}$ was 83% (50% of which showed LCR_{GBP} below to 100%).

Figure 35: Evolution of the comparison between the positions in LCR in GBP and LCR in all currencies — balanced sample [44]

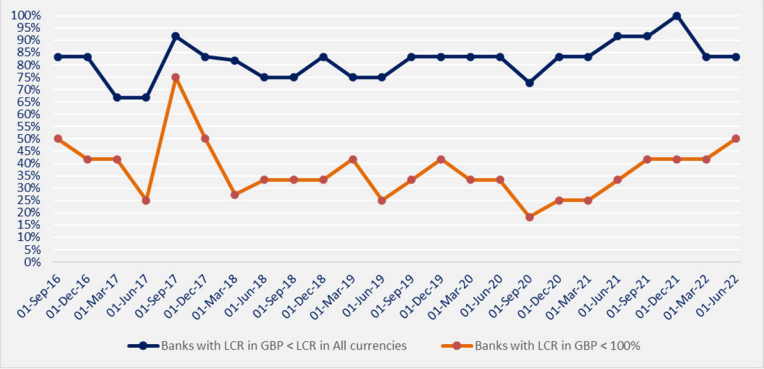


Figure 36: Evolution of average LCR in GBP vs average LCR in all currencies — balanced sample

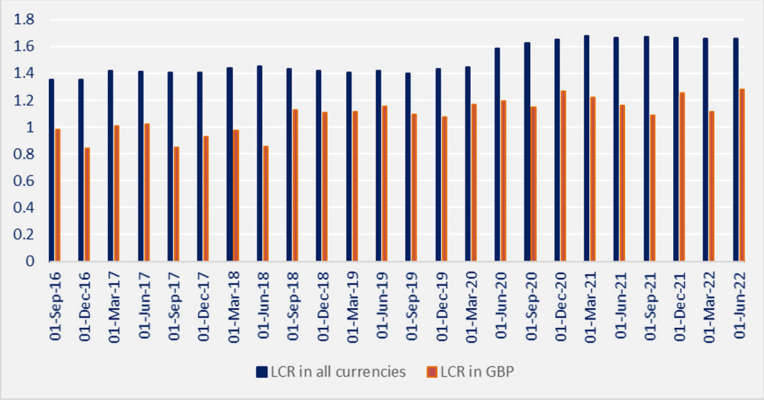


Figure 36 analyses the average level of LCR_{GBP} and $LCR_{all\ currencies}$. Since September 2016, the average LCR_{GBP} level is below the average level of $LCR_{all\ currencies}$. As of June 2022, the average LCR_{GBP} is 86%, significantly below the $LCR_{all\ currencies}$ (184%).

Figure 37 shows the evolution of the distribution of LCR_{GBP} and $LCR_{all\ currencies}$ between September 2016 and December 2021/June 2022. 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 and there are banks with LCR_{GBP} equal to zero for all reporting dates. As of June 2022, the 25th percentile stood at 64% while the median was 98%. Similarly to banks that showed low levels of $LCR_{USD,}$ banks with low LCR_{GBP} may phased problems in times of

[44] Results based on a consistent sample of 13 banks that reported LCR_{GBP} data across reference dates.

stress as banks' ability to swap currencies and raise funds in GBP might be deteriorated. However, these results are based on a sample of 13 banks that reported LCR_{GBP} data across reference dates and should therefore be interpreted with caution.

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

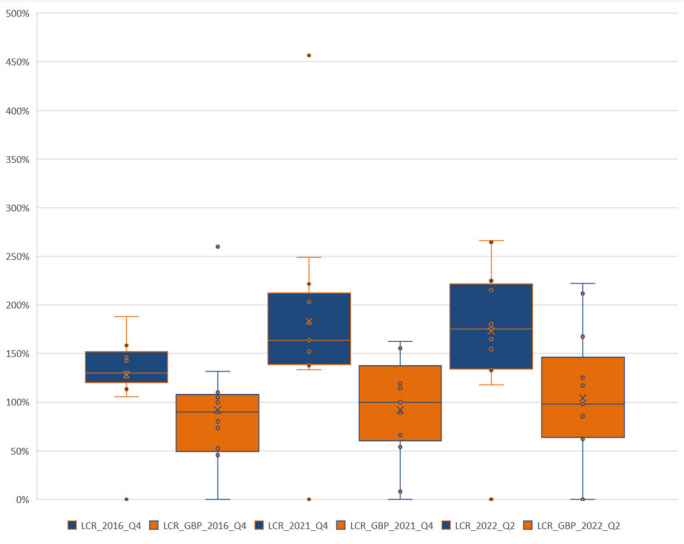
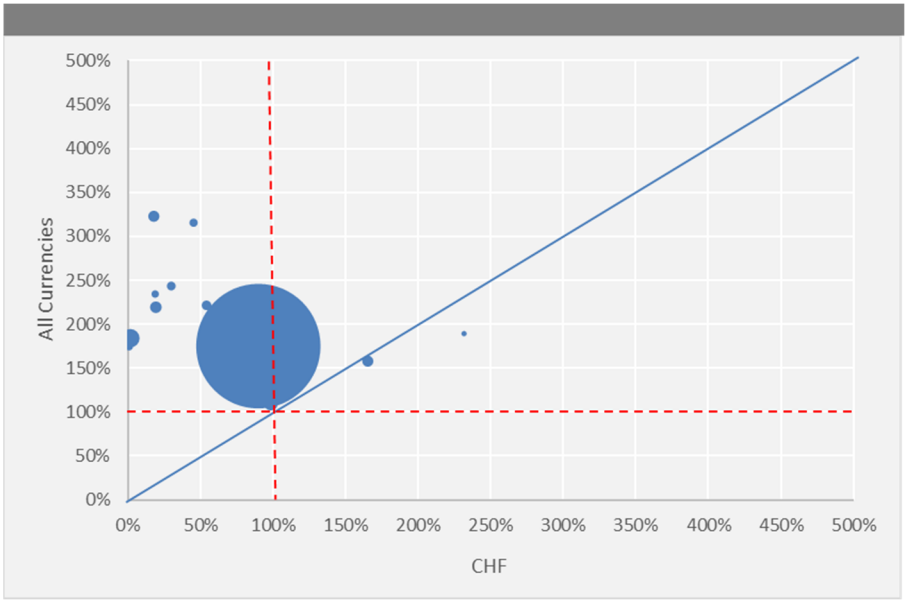


Figure 38: Liquidity buffer over net cash outflows where the significant currency is Swiss franc (x-axis) compared with the same indicator for the reporting currency (all currencies; y-axis)



13 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 2022, 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. Such differences between the liquidity surplus and the net cash outflows in a given currency are particularly relevant for USD and GBP. Indeed, a number of banks showed LCR_{USD} and LCR_{GBP} significantly below the 100% threshold and in some cases close to 0%.

The EU liquidity regulation requires banks to ensure consistency between liquid assets and net liquidity outflows in the LCR that are denominated in the same currency. 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. Indeed, the rising geopolitical tensions in Europe during 2022 and its consequences in the macroeconomic outlook had led to a devaluation of the EUR versus the USD translating into the widening of the USD-EUR cross currency basis swaps and making USD funding more expensive for Euro area banks. Such situation might pose a risk for some banks, in case they need to quickly fill liquidity gaps in USD. Under such scenario, competent authorities may make use of the discretion in Article 8 of the LCR DR which 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 introduced in Basel III. 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.

The analysis takes in 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 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 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 to adopt the DiD for this Report. First, the LCR entered into force in 2015 but banks have 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%. This means that working with Corep data, we could not define the control group because, at the first available reference date, all the banks were subject to the LCR. Moreover, we don't 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[45] 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 on 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[46]. 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[47]. In practice, a standard approach to circumvent the endogeneity and simultaneity problem is to rely on lagged variables[48].

This report showed that the LCR level has continued to increase every year, even after most of the banks' have reached the regulatory minimum. 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.

[45] 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.

[46] 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 a period to another. These are called the informative observations and usually their number is lower compared with the sample size.

[47] This idea has been introduced by Granger in the seventies.

[48] 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 in respect to both e_t and y_t.

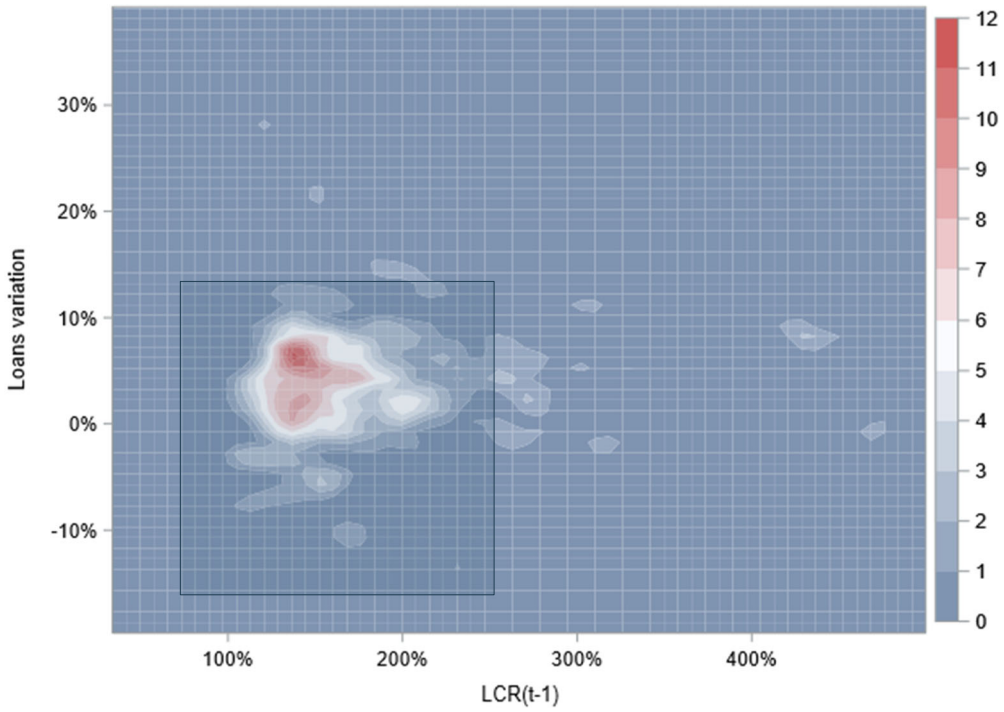
Data

The analysis is based on a sample of 92 banks[49] from 20 countries that reported FINREP and COREP data within the period 2016-2021 excluding subsidiaries. For the purposes of this study, only the end-of-year figures have been considered. The weighted average LCR of the banks included in the sample was steadily higher than 100% and increasing over the observed period.

The aggregate stock of outstanding loans to the real economy (performing loans toward households and NFCs[50]) for the 92 banks was EUR 9,4 trillion at end of 2016. It increased by 25.8% between 2016 and 2021. At bank level, it can be observed a huge variability of the yearly growth rate of the lending level. This is partially explained by merger and acquisition operations but also by the presence in the sample of banks having a limited level of loans toward households and NFCs so that small variations in nominal terms can produce high variations in relative terms.

Both for the LCR and the variation of the loans, it is possible to observe anomalous values, however most of the observations are found in a range for the LCR going from 100% to 250% and for the variation of the loans from -10% to 15% (see the figure below).

Figure 39: Scatter plot: Variation in the stock of loans vs LCR



[49] See detailed sample in **Error! Reference source not found.**.

[50] The data is retrieved from the Finrep template F 18.00.a (Gross carrying amount/Nominal amount)

Bivariate analysis

In our analysis, we reduce the variation of the loans and the level of the LCR to the following two indicator variables. In this way, the effect on the estimates of eventual outliers is reduced without the necessity to eliminate observations from the data set.

$$y_t = \begin{cases} \mathbf{0}\ \boldsymbol{if} & \dfrac{\Delta \boldsymbol{Loans_t}}{\boldsymbol{Loans_{t-1}}} \geq \mathbf{5\%} \\ \mathbf{1}\ \boldsymbol{if} & \dfrac{\Delta \boldsymbol{Loans_t}}{\boldsymbol{Loans_{t-1}}} < \mathbf{5\%} \end{cases} \qquad I_{LCR_{t-1}<130\%} = \begin{cases} \mathbf{0}\ \boldsymbol{if} & \boldsymbol{LCR_{t-1}} \geq \mathbf{130\%} \\ \mathbf{1}\ \boldsymbol{if} & \boldsymbol{LCR_{t-1}} < \mathbf{130\%} \end{cases}$$

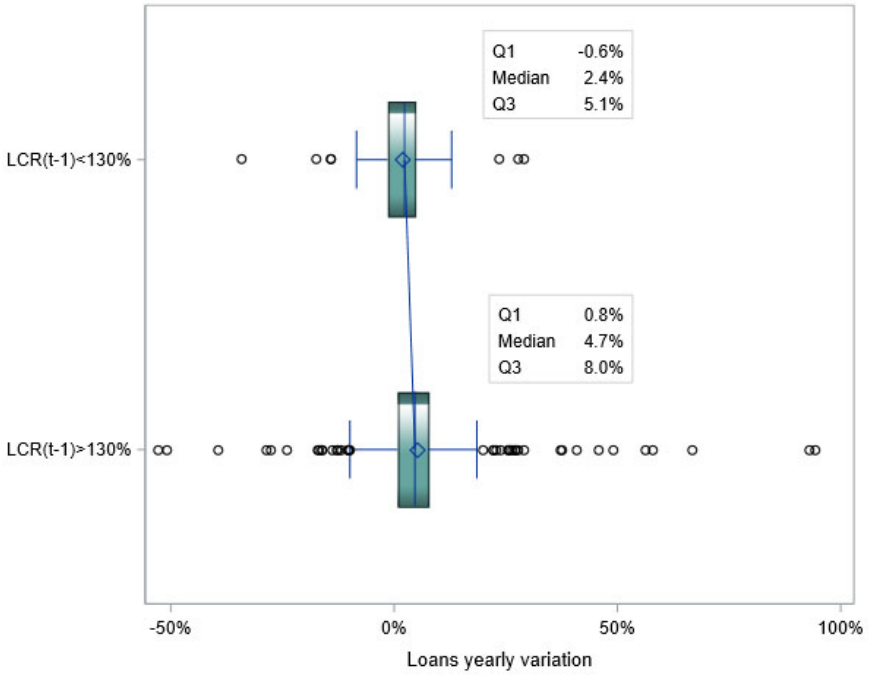
The following two-way table shows the distribution of the 460 observations (92 banks for 5 years) in terms of yearly variation of the Loans (y_t) and the indicator variable $\boldsymbol{I_{LCR_{t-1}<130\%}}$ that is referred to the beginning of the year. The odd of observing low LCR (less than 130%) for a bank that has increased the stock of loans more than 5% is 0.56 (26.1%/47.1%) while for a bank that has increased the stock of loans less than 5% the odd is 1.40 (73.8%/52.9%). The odds ratio is 2.50 (the bounds of a 95% confidence interval are 1.38 and 4.54). These figures suggest the existence of a statistically significant relationship between the two variables.

The Figure 40 provides further evidence of a relationship between the lending activities and the level of the LCR. For banks having LCR lower than 130%, the median of the loans annual growth rate is 2.4% against 4.7% of banks having LCR higher than 130%.

Table 2: Loans yearly variation at bank level vs LCR at the beginning of the year

		$\frac{\Delta Loans_t}{Loans_{t-1}} \geq 5\%$	$\frac{\Delta Loans_t}{Loans_{t-1}} < 5\%$	Total
$LCR_{t-1} \geq 130\%$	Frequency	188	211	399
	Percent	40.9%	45.9%	86.7%
	Row Pct	47.1%	52.9%	100.0%
$LCR_{t-1} < 130\%$	Frequency	16	45	61
	Percent	3.5%	9.8%	13.3%
	Row Pct	26.2%	73.8%	100.0%

Figure 40: Loans yearly variation at bank level vs LCR at the beginning of the year



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 terms, 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.

Table 3 shows the results of a logistic regression where the modelled event is the probability that a bank increases the stock of loans less than 5%. This probability has been conditioned on the level of the LCR at 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. The Additional 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 performing loans toward households and NFCs over performing loans 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.

The parameter associated with the dummy variable LCR(t-1) < 130% is positive and statistically significant (P-value ≈ 0.6%), denoting a higher probability that banks increase their lending activity by less than 5% when the LCR is lower than 130%. The accuracy (AUC) of this model is 65%.

We ran two alternative regressions. We ran a regression using the Chamberlain (1980) estimator that is known to be asymptotically robust against the possible presence of individual (fixed) effects.

The number of informative data points is 339 against 460 available observations. The statically significance of the parameter associated with the dummy variable LCR(t-1) is confirmed (P-value ≈ 0.5%).

We also added the lag of the dependent variable. This entails to reduce the sample by one year. The inclusion of lags of the dependent variable enables to consider possible dynamic adjustment processes typical of many economic phenomena. The associated parameter is positive and highly significant (P-value < 0.01%) indicating for banks experiencing a lower loans growth rate in a given year, it is easier to observe a lower growth rate also in the subsequent year. Along with this model specification, the parameter associated with the dummy variable LCR(t-1) remains positive but its significance decreases (P-value ≈ 2.5%).

Table 3: Logistic regression Pr(y<5%) vs LCR and control variables

	Pooled Panel			Chamberlain			Pooled Panel with Lag dep var		
	Number of Obs 460 AUC 65.4%			Number of Obs 339			Number of Obs 368 AUC 68.4%		
Parameter	Estimate	Standard Error	Pr > ChiSq	Estimate	Standard Error	Pr > ChiSq	Estimate	Standard Error	Pr > ChiSq
Intercept	-2.655	2.302	24.9%				-4.428	2.638	9.3%
Y(t-1)							1.060	0.235	<.0001
$I_{LCR(t-1)<130\%}$	0.948	0.348	0.6%	1.420	0.500	0.5%	1.069	0.475	2.5%
ln_TotAss(t-1)	0.135	0.083	10.4%	3.288	1.444	2.3%	0.153	0.096	10.9%
Δgdp	0.869	3.242	78.9%	5.545	5.426	30.7%	-0.842	3.488	80.9%
ROE(t-1)	-3.810	1.375	0.6%	0.845	2.756	75.9%	-1.399	1.525	35.9%
npl_ratio(t-1)	-1.229	2.008	54.1%	-9.464	4.989	5.8%	0.196	2.612	94.0%
cet1_ratio(t-1)	-1.353	1.115	22.5%	-7.491	4.124	6.9%	-0.517	1.148	65.3%
rwa_density(t-1)	0.464	0.739	53.0%	4.261	3.813	26.4%	0.766	0.866	37.6%
Loans_Deposit_ratio(t-1)	0.004	0.004	27.5%	0.021	0.011	5.6%	0.003	0.004	43.4%
Fee_NOP_ratio(t-1)	-1.391	0.654	3.3%	1.788	2.450	46.6%	-0.609	0.761	42.3%
Loans_ratio(t-1)	0.008	0.005	9.2%	0.009	0.024	72.3%	0.009	0.005	8.6%

To better understand the relationships described in Table 3, 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 Model *Pr*) that a given bank will increase the amount of loans less than 5%. Finally, we would set an arbitrary threshold to 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 4 provides a comparison between the prediction and the realization. The share of banks associated with Model *Pr* (the probability of increasing the loans less than 5%) higher than 50% and which indeed experienced a loan increase lower than 5% is 67.7%, clearly higher than the 41,2% share of banks with Model *Pr* below 50% (see last column of the Table 4). 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 less than 5% is higher when LCR<130% even if we controlled for the Model *Pr*. In detail, banks with Model *Pr* > 50% but LCR>130% have a probability to increase their lending activity by less than 5% equal to 65.8% while for banks with Model *Pr* > 50% but LCR<130% this probability increases to 87.0%. These results suggest that the LCR does contain some additional relevant information to predict the direction of the variation of lending activities.

Table 4: Control variables vs LCR

% of banks increasing the loans less than 5%	LCR(t-1) > 130%	LCR(t-1) < 130%	Unconditioned to LCR
Model Pr > 50%	65.8%	87.0%	67.7%
Model Pr < 50%	39.4%	60.0%	41.2%
Unconditioned to Model Pr	17.1%	78.8%	59.5%

Conclusions

For the period 2016-21, a sample of 92 major EU banks was considered. Even if for most of the banks considered the LCR was above the minimum requirement during the observed period, it was possible to verify that banks with LCR lower than 130% had a higher probability of experiencing a growth rate of the loans lower than 5%. However, once accounted for additional control variables, 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[51] of the LCR

Rationale of the analysis

The unwind mechanism[52] 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 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 actual holdings of HQLA. Instead, the Article 17(2) of Delegated Regulation (EU) 2015/61 as amended by the Delegated Regulation (EU) 2018/1620 (hereinafter the Regulation) requires adjusting the amounts of Level 1, Level 2A and Level 2B assets by unwinding[53] all secured funding, secured lending or collateral swap transactions, that are involving 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 increase the liquidity buffer via short-term secured transactions. For example, without the unwind mechanism and through repo transactions, credit institutions 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.

Although there is general agreement about the purpose of the unwind mechanism — i.e. to hinder credit institutions from 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

[51] 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.

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

[53] 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.

mechanism in the event of reverse repo operations can raise some doubts. Furthermore, the unwind mechanism intervenes in the complex system of cap and floor foreseen in the quantification of the LCR liquidity buffer and its effect is not easily understood.

Data

This Section offers an analysis of the impact of the unwind mechanism for a sample of major European credit institutions (institutions hereinafter). 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 5 years, i.e. from the end of 2016 to Q2 of 2022. The analysis also leverages on the extended number of institutions for which the EBA has started to collect data under the EUCLID project starting from end 2020. Thanks to this, the analysis extends also to less significant and local institutions with a second sample that has been analysed separately.

The empirical analysis is based on common reporting (COREP) data stemming from about 120 major institutions in each year (first sample) and from over 2 thousand of smaller institutions (second sample), representative of the 27 EU Member States and 3 EEA/EFTA states. Unless stated otherwise, all average figures are weighted. The Table below shows the average size of the institutions in the two samples[54]. In the sample of the major institutions the average of the Total Assets is about 230 bln of euro while in the second sample it is less than 3 bln. In both samples the average LCR is well above the regulatory minimum. In the Annex it is provided the detail of the composition of the two samples in terms of countries.

Table 5: Samples of major and smaller institutions, June 2022

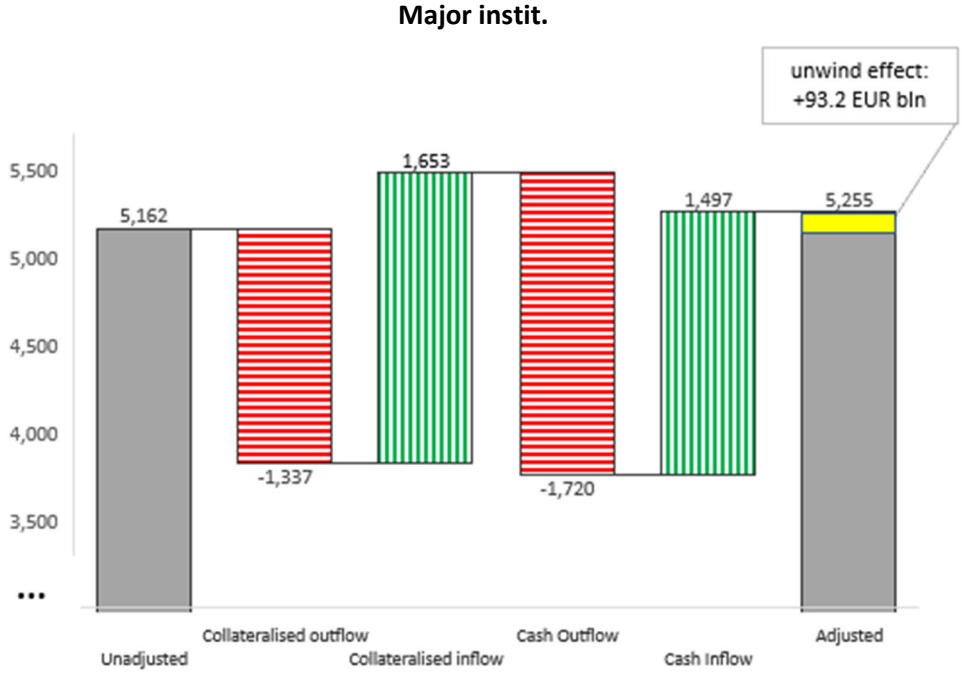
	Smaller Instit.	Major Instit.
Nr of inst.	2,292	121
Assets (bln)	6,246	28,130
Assets avg (bln)	2.7	232.5
LCR avg	185.0%	164.8%
LCR< 100% Nr of inst.	52	0

[54] Since not all institutions 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 it can be expected with this definition the figures are likely to be somehow higher than what could be obtained with the Finrep definition.

Impact of the unwind mechanism on L1 excluding EHQCB

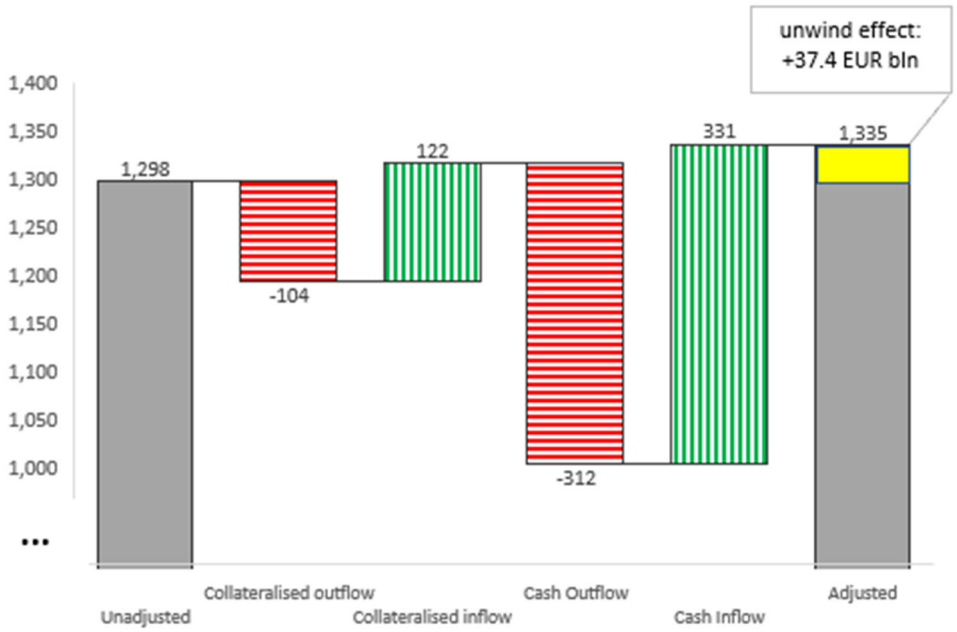
As of the reporting reference date of the end of June 2022, the impact of the unwind mechanism was, at aggregate level, positive for both samples of banks in a sense that the adjusted amount of Level 1 assets excluding EHQCB[55] was higher than the reported amount, with an increment of EUR 93 bln for the first sample and of EUR 37 bln for the second. This result implies that for the institutions in the samples, at aggregate level and in net terms, the amount of reverse repos exceeded the amount of repos. Given that also for the Level 2A and 2B assets the impact of the unwind mechanism was positive, 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.

Figure 41: Extent of the unwind mechanism regarding L1 excl EHQCB, June 2022



[55] Extremely High-Quality Covered Bonds

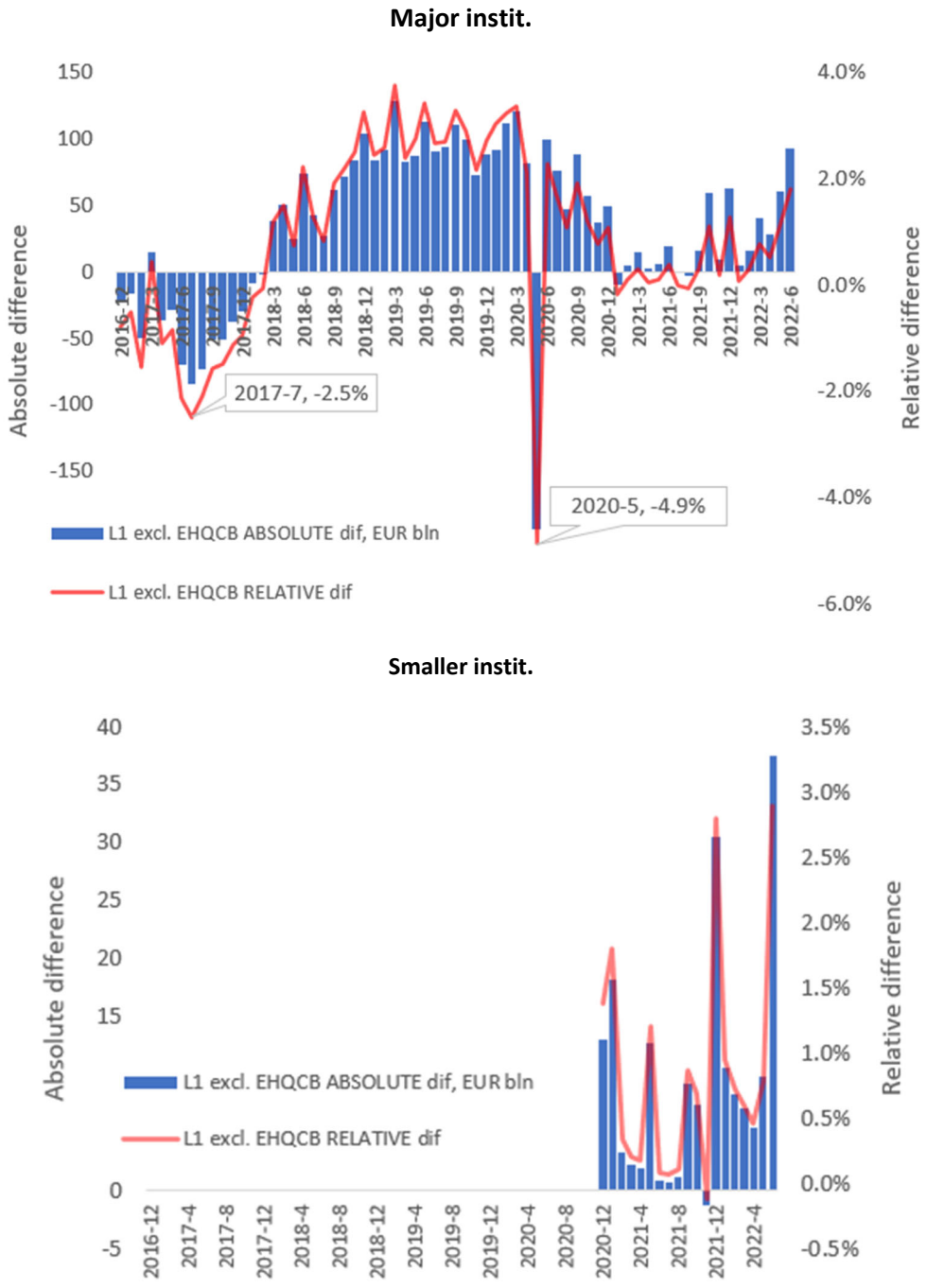
Smaller instit.



For the Major institutions, the same result (i.e. the unwinding of short-term operations produces an increase of the adjusted amount of Level 1 assets excluding EHQCB in respect to the reported amounts) can be observed since Q1 2018 to Q3 2020 (see Figure 42). Before 2018, the unwinding produced a decrease (in 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 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[56] for near 200 bln but in June of the same year the impact turned again to be positive until then end of the year. For most of the 2021 the impact of the unwinding was practically null (less than 1% in relative terms) and it turned to be positive starting from the end of the year. For the sample of Small institutions, the effect of the unwind mechanism produced a limited increase of Level 1 assets excluding EHQCB (in comparison with the reported amount) for most of the observed period.

[56] This variation could be connected with the maturity of a long-term refinancing operation, for example https://www.ecb.europa.eu/mopo/implement/omo/html/20160065.en.html

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



Impact of the adjustment calculation on the LCR

Even if the unwind mechanism has a non-zero effect (the adjusted amount of L1 assets differs from the actual amount), 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 institutions 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 formulae for the determination of the liquidity buffer composition (adjustment calculation) does only induce 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).

The table below shows the impact of the unwind mechanism on the LCR at institution level. In most cases, the LCR is not influenced at all by the unwind mechanism. For example, in May 2020 where the impact of the unwinding on the L1 assets was significant for the sample of Major institution (see Figure 42), the average LCR was 156.22% and this value did not change by excluding the unwinding mechanism. Considering all the reference dates and both samples, a negative impact (a decrease of the LCR) has been observed in a limited number of cases and in most of them the LCR was below or above the regulatory minimum both with and without the application of the unwind mechanism. Only in 5% of the cases the LCR was higher than 100% without the unwind mechanism and lower with the unwind mechanism.

Table 6: Impact of the unwind mechanism on the LCR at bank level

nr of instit	Major insit.			Smaller instit.		
	LCR increases	LCR unchanged	LCR decreases	LCR increases	LCR unchanged	LCR decreases
31/12/2017	1	119	4			
31/12/2018	1	127	2			
31/12/2019	3	124	1			
31/05/2020	.	125	1			
31/12/2020	2	128	.	3	2,389	5
30/06/2021	.	124	1	3	2,321	6
31/12/2021	.	122	.	1	2,251	2
30/06/2022	.	121	.	2	2,289	1

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. However, 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 grating 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. It was possible to find, overall (the entire period with monthly frequency and both samples), just 8 institutions presenting negative value for the amount of Level 1 assets excluding EHQCB after the application of the unwind mechanism and in most of these cases, the LCR was null. Most of these situations were observed before the 2019.

Even if there is no evidence that the absence of the zero 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.

Third, 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. In the following table it is reported the number of banks for which the adjusted L1 assets are higher than the reported L1 assets after the application of the unwinding. It is also reported the variation of the average LCR because of the application of unwind mechanism. As it can be seen, the effect is quite limited. More details are provided in the subsequent table where it is reported the detail of the institutions involved in reverse repo operations for which the impact of the unwind mechanism on the LCR is material. For the sample of Major institutions, it can be noticed that the level of the LCR is well above the minimum both with and without the application of the unwind mechanism. In the sample of small institutions, it is possible to see cases where impact of the unwind mechanism is material, in particular the unwinding shapes a material increment of the LCR, however these cases are negligible in relative terms.

Table 7: Banks involved in reverse repo operations, effect of the unwind mechanism on the LCR

Sample	date	nr of instit.	% of Net Liq Outflow (*)	LCR	effect of the unwinding on the LCR
Major instit.	30/06/2017	48	48.8%	147.8%	0.03%
	31/12/2017	41	49.6%	141.9%	0.17%
	30/06/2018	54	64.8%	140.1%	0.13%
	31/12/2018	53	65.3%	142.2%	0.22%
	30/06/2019	55	58.8%	142.3%	0.10%
	31/12/2019	55	59.9%	145.7%	0.48%
	30/06/2020	59	58.1%	159.3%	0.14%
	31/12/2020	53	54.6%	175.8%	0.12%
	30/06/2021	46	40.9%	181.3%	0.00%
	31/12/2021	42	56.0%	171.3%	0.00%
	30/06/2022	48	59.0%	161.2%	0.00%
Smaller instit.	31/12/2020	99	17.6%	175.8%	0.12%
	30/06/2021	89	27.2%	181.3%	0.00%
	31/12/2021	70	25.5%	171.3%	0.00%
	30/06/2022	84	28.6%	161.2%	0.00%

Table 8: detail of the banks involved in reverse repo operations for which the effect of the unwind mechanism is material

				LCR	
	date	nr of instit.	% of Net Liq Outflow (*)	with the unwind	without the unwind
Major instit.	30/06/2017	1	0.1%	212.0%	191.5%
	31/12/2017	1	0.1%	383.5%	322.8%
	30/06/2018	3	0.7%	226.9%	214.3%
	31/12/2018	1	0.2%	219.0%	140.1%
	30/06/2019	3	1.0%	159.5%	153.1%
	31/12/2019	3	0.6%	190.9%	143.4%
	30/06/2020	1	0.1%	349.7%	282.8%
	31/12/2020	2	0.3%	289.5%	264.4%
Smaller instit.	31/12/2020	1	0.3%	241.4%	67.3%
	30/06/2021	2	0.3%	259.5%	62.1%
	31/12/2021	1	0.2%	280.4%	71.7%
	30/06/2022	2	0.2%	220.0%	94.8%

(*) the percentage is referred to the sample and period

Fourth, 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 which 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[57]. In the situation where only Level 1 excluding

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

EHQCB assets and non-HQLA assets are involved, it should be observed that the adjusted amount of Level 1 excluding EHQCB assets increases in respect to the reported amount but the variations of the adjusted amounts of Level 1 EHQCB, Level 2 A and Level 2 B in respect to the reported amounts is zero. It was possible to detect similar situations in the two samples considered but, in practically all that cases, the LCR was above 100% and the impact of the unwinding on the LCR was negligible.

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[58]. Some theoretical situations where the unwind mechanism could produce unwarranted results have been studied and, in particular, it was shown that their materiality is limited. 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) that 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.

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

The relationship between LCR and NSFR

Introduction

The LCR and NSFR are meant to be complementary measures. The LCR is aimed ensuring institutions to hold high-quality liquid assets to face an acute stress scenario lasting for one month. In contrast, the NSFR takes a more structural and longer-term perspective pushing institutions to fund their activities with more stable sources of funding on an ongoing structural basis. However, the reliance on the liquidity of the assets in addition to their maturity for the assignment of the NSFR factors implies a certain level of coherence between the NSFR and the LCR.

While there is broad agreement on the necessity of complementing short- and long-term horizons for the liquidity standards, there has been recently some discussion on whether both the LCR and the NSFR are needed. In their influential paper, Cecchetti and Kashyap[59] (2016) (CK) suggest that banks meeting the LCR requirement will very likely meet the NSFR requirement as well so that one of the requirements is implicitly defining the other one so only one liquidity requirement would be sufficient. Using a sample of UK banks, they show that the LCR is a tighter constraint, which leads them to conclude that only one of the two requirements is needed.

Behn et al.[60] (2019) empirically test the implications of the CK framework by analysing a sample of 224 EU banks observed over the period 2015-Q4 – 2017-Q4. They find that the two liquidity ratios are positively correlated, but they show wide dispersion suggesting that a strong mechanical interaction between the two measures does not exist. They also observe several banks that meet the LCR (surplus liquid assets > 0) but do not meet the NSFR (surplus stable funding < 0). They further analyse the variations of the two ratios finding that the co-movement between LCR and NSFR is not statistically significant. These results bring the author to conclude that LCR and NSFR are complementary and should not be regarded as shadow measures of each other.

Data

This Section presents an analysis of the interactions between the LCR and NSFR leveraging on reporting data covering the period after the entering into force of the NSFR. The empirical analysis is based on common reporting (COREP) data stemming from major and smaller institutions and spanning the period 2021-Q2 – 2022-Q2 (5 quarters)[61]. Unless stated otherwise, all average figures are weighted. With the aim of reducing the impact of outlier observations of the two ratios, the initial sample was reduced by excluding cases with LCR or NSFR higher than 500% and cases where the Numerator or the Denominator of the two ratios is higher than institutions' total assets. The

[59] Cecchetti, S. and Kashyap, A., "What Binds? Interactions between Bank Capital and Liquidity Regulations" Working Paper, Brandeis International Business School and Chicago Booth School of Business, 2016.

[60] Behn, Markus & Corrias, Renzo & Rola-Janicka, Magdalena, 2019. "On the interaction between different bank liquidity requirements," Macroprudential Bulletin, European Central Bank, vol. 9.

[61] The empirical analysis of Behn et al. spans a period where the NSFR was not binding (it entered into force in June 2021) so that institutions could still have been in the process of adjusting to fulfil this requirement.

sample was further filtered by keeping only the institutions observed along the entire period. The final sample includes about 1,400 institutions representing the 66% of the total assets of the initial sample. The Figure 43 one shows that, in aggregate terms, both the LCR and the NSFR ratios were largely higher than the regulatory minimum. It can be noticed from Figure 44 that the LCR is more dispersed that the NSFR, indeed the coefficient of variation (CV) of the LCR is near two times higher.

Figure 43: average LCR and NSFR

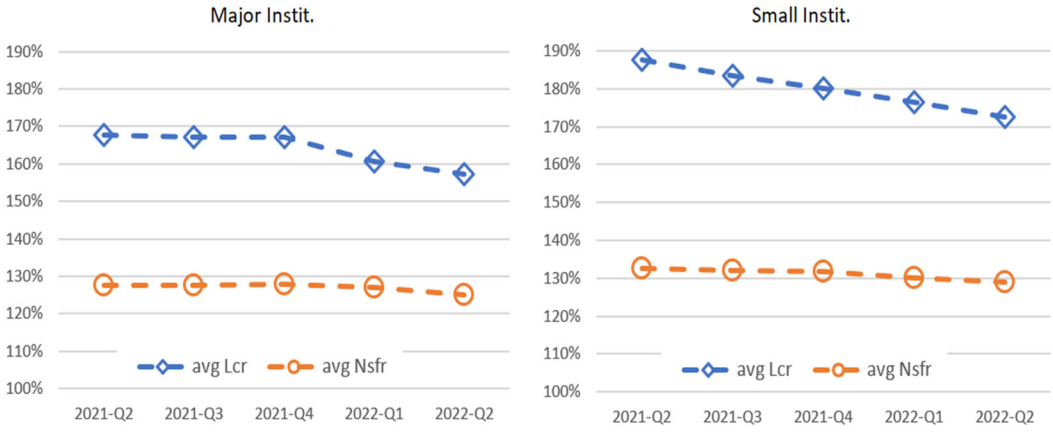
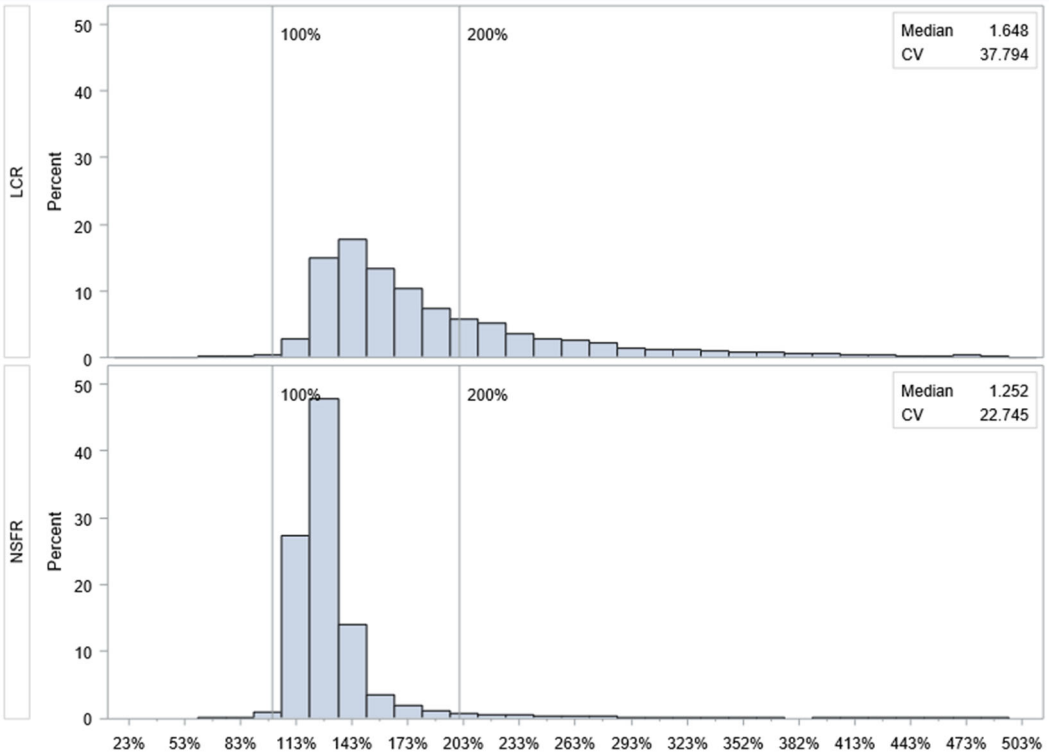


Figure 44: distribution of LCR and NSFR ratios



Cross section analysis

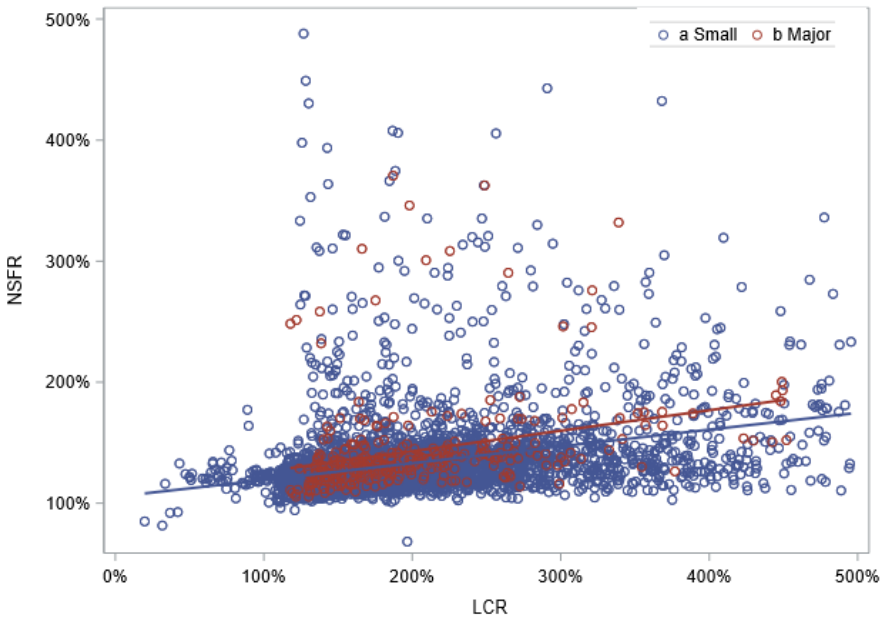
The cross-section correlation between the LCR and the NSFR is about 32% and it is statistically different from zero. The correlation is quite similar for Major and Small institutions[62]. Even if this evidence suggests the existence of a tie between the LCR and NSFR, the relationship does not appear as direct as foreseen by CK. The visual inspection of the Figure 45 confirms this impression. The subsequent table, that is built by dividing the observed LCR and NSFR ratios in percentiles, allows to better appreciate the weakness of the relationship between the two ratios.

Table 9 shows the distribution of the of the NSFR given the level of the LCR. It can be noticed that quite different levels of the NSFR can be observed for each bucket of the LCR. For example, for 24% (19%+4%+1%) of the cases where the LCR is in the first 5-percent of the distribution (i.e. LCR<120%) the NSFR is in the third quartile (NSFR>134%). Also, for 10% (3%+7%) of the cases where the LCR is in the last 5-percent of the distribution (LCR>346%) the NSFR is in the first quartile (NSFR<119%).

Table 9: percentile distribution of the LCR and NSFR ratios

		NSFR					
		<p5	p5-p25	p25-p50	p50-p75	p75-p95	>p95
		<111%	111%-119%	119%-125%	125%-134%	134%-175%	>175%
LCR <p5	<120%	11%	29%	37%	19%	4%	1%
LCR p5-p25	120%-140%	8%	31%	36%	19%	4%	2%
LCR p25-p50	140%-165%	5%	24%	32%	29%	9%	2%
LCR p50-p75	165%-214%	4%	15%	21%	31%	25%	4%
LCR p75-p95	214%-346%	3%	11%	12%	21%	45%	8%
LCR >p95	>346%	3%	7%	6%	20%	35%	29%

Figure 45: Relationship between the NSFR and the LCR



[62] Major institutions are defined as those for which the EBA has data referring to before December 2020. The sample includes 80 Major institutions representing the 85% of the total assets of the sample. Small institutions are those for which the EBA has data as of December 2020. The sample includes 1,389 Small institutions.

Dynamic analysis

As in Behn et al., we analyse the co-movement between the LCR and the NSFR. In detail we study the following model. The model's parameters are estimated exploiting a panel of 4 observations referred to about 1,400 institutions.

$$\frac{NSFR_{i,t} - NSFR_{i,t-1}}{NSFR_{i,t-1}} = b_0 + b_1 \frac{LCR_{i,t} - LCR_{i,t-1}}{LCR_{i,t-1}} + dummies$$

Table 10 presents the estimate of the model's parameters. The negative value of the intercept implies a decreasing trend of the NSFR for the sample of Small institutions (-0.7% per quarter) that is less evident for the sample of Major banks (-0.7% + 0.6% = -0.1% per quarter). The parameter estimated for the dummy variable indicating the cases where the LCR is below the median is negative suggesting that the NSFR trend tends to reduce when the LCR is low. The statistical significance of the parameter associated to the dummy indicating the cases where the NSFR is below the median, suggests that the NSFR trend tends to increase when the NSFR is low. The parameter associated to the variation of the LCR can be interpreted as the elasticity of the NSFR in respect of the LCR and it is statistically significant: a 1% relative variation of the LCR is associated to a 0.04% relative variation of the NSFR and for Major institutions the elasticity is 0.15%. However, the overall explained variance of the model is quite limited: 2%.

Table 10: estimate of the model's parameter

	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	-0.00742	0.00131	-5.65	<.0001
Major	0.00599	0.00377	1.59	0.1127
LCR_{t-1}<Median	-0.00398	0.00184	-2.16	0.0305
$NSFR_{t-1}$<Median	0.01072	0.0018	5.96	<.0001
ΔLCR/LCR	0.03803	0.00667	5.7	<.0001
ΔLCR/LCR * Major	0.11116	0.03226	3.45	0.0006
ΔLCR/LCR * LCR<Median	-0.0007744	0.00841	-0.09	0.9267
ΔLCR/LCR * NSFR<Median	-0.01005	0.00818	-1.23	0.2192

Conclusions

In line with Behn et al. (2019) this Section provides empirical evidence suggesting that a strict relationship between the LCR and the NSFR does not exist and that movements in the LCR do not automatically imply movements in the NSFR. These results implies that the LCR and NSFR should not be regarded as perfect substitutes.

Conclusions

Liquidity coverage requirements are an important aspect of the EU regulatory framework. COREP data shows that banks have significantly increased their LCR ratios since September 2016 and that both the average and the bank-level LCRs are well above the fully phased-in requirement of 100% as of June 2022 even if LCR levels decreased in the first half of 2022. The decrease was driven by an increase in net cash outflows following the significant fall in asset prices amid the outbreak of the war in Ukraine and the unstable economic outlook in Europe. HQLA remained stable and Cash and reserves which remained the main source of HQLA. The current size of the cash a reserve component is a consequence of its evolution in the recent years. In particular for Euro area banks, this coincides with the ECB application of more generous terms for TLTRO-3. However, the bulk of TLTRO-3 will mature in 2023 while banks' funding plans only envisage a partial substitution for market-based and deposit funding, forecasting declining LCRs. Monitoring the evolution of banks' LCR levels becomes particularly relevant amid the highly uncertain economic outlook including high inflation and rising interest rates (which may affect the market value of liquid instruments), and the expected maturity of central bank instruments. Although, EU/EEA banks continued to show strong LCR levels in the first half of 2022, an extension of the current trend of increasing outflows together with the expected maturity of HQLA would push further down LCR levels.

The average levels of LCRs across different business model categories also decreased during the first half of 2022 but remained 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. Indeed, the rising geopolitical tensions in Europe during 2022 and its consequences in the macroeconomic outlook has led to a widening of the USD-EUR cross currency basis swaps making USD funding more expensive for Euro area banks. Such situation might pose a risk for some banks, in case they need to quickly fill liquidity gaps in USD. 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 2016-22, 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.

It was possible to find that the unwind mechanism influences 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) that may cease in the future.

Some studies dealt with the topic of the possible redundancy of the prudential requirements introduced with Basel III. The report contributes to the discussion about the interaction between the LCR and the NSFR. The analysis points in the direction that the two liquidity requirements are not redundant inasmuch it was not possible to identify a strong relationship between them.

Annex 1

Table 11: Number of banks included in the June 2021 analysis[63]

Country	ISO code	All banks	*Of which: subsidiaries*	GSIIs/O-SIIs	*Of which: subsidiaries*
Austria	AT	16	1	3	0
Belgium	BE	12	0	4	0
Bulgaria	BG	6	1	3	0
Cyprus	CY	3	0	1	0
Czech	CZ	3	1	0	0
Germany	DE	25	2	9	1
Denmark	DK	10	0	5	0
Estonia	EE	8	1	1	1
Spain	ES	39	6	4	0
Finland	FI	11	0	3	0
France	FR	25	2	7	0
Greece	GR	8	0	4	0
Croatia	HR	1	0	1	0
Hungary	HU	9	6	7	5
Ireland	IE	7	0	3	0
Iceland	IS	3	0	3	0
Italy	IT	43	2	4	0
Lithuania	LT	7	1	2	1
Luxembourg	LU	15	5	2	0
Latvia	LV	8	1	4	1
Malta	MT	5	0	3	0
Netherlands	NL	20	0	5	0
Norway	NO	22	2	0	0
Poland	PL	4	2	4	2
Portugal	PT	16	3	6	2
Romania	RO	10	6	7	5
Sweden	SE	24	0	3	0
Slovenia	SI	5	0	1	0
Slovakia	SK	1	0	0	0
Total	**EU**	**366**	**42**	**99**	**18**

[63] 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 12: Total asset coverage by country (in percentage)[64]

Country	% coverage
Austria	68%
Belgium	70%
Bulgaria	20%
Cyprus	65%
Czech Republic	14%
Germany	52%
Denmark	86%
Estonia	65%
Spain	94%
Finland	87%
France	99%
Greece	97%
Croatia	7%
Hungary	90%
Ireland	60%
Italy	92%
Lithuania	53%
Luxembourg	15%
Latvia	35%
Malta	62%
Netherlands	91%
Poland	41%
Portugal	92%
Romania	74%
Sweden	72%
Slovenia	72%
Slovakia	1%

[64] 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 12. The coverage has been calculated based on the latest information available in the ECB DW which at the time of drafting this report was referenced to December 2021. For CZ and HR the numerator of the ratio uses data as of June 2022 as no data was available as of December 2021.

Table 13: Number of banks included in the evolution analysis[65] if the balanced sample criterion applies

Country	ISO Code	All banks	GSIIs/O-SIIs
Austria	AT	4	2
Belgium	BE	5	3
Bulgaria	BG	1	1
Cyprus	CY	1	1
Germany	DE	15	8
Denmark	DK	4	4
Estonia	EE	1	0
Spain	ES	10	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	1	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**	**91**	**61**

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

Table 14: Number of banks included in the analysis by two reference dates[66] if the balanced sample criterion applies

Country	ISO code	All banks	*Of which: subsidiaries*	GSIIs/O-SIIs	*Of which: subsidiaries*
Austria	AT	16	1	3	0
Belgium	BE	12	0	4	0
Bulgaria	BG	6	1	3	0
Cyprus	CY	3	0	1	0
Germany	DE	25	2	9	1
Denmark	DK	10	0	5	0
Estonia	EE	8	1	1	1
Spain	ES	38	6	4	0
Finland	FI	11	0	3	0
France	FR	25	2	7	0
Greece	GR	8	0	4	0
Hungary	HU	9	6	7	5
Ireland	IE	7	0	3	0
Iceland	IS	3	0	3	0
Italy	IT	43	2	4	0
Lithuania	LT	6	1	2	1
Luxembourg	LU	15	5	2	0
Latvia	LV	8	1	4	1
Malta	MT	5	0	3	0
Netherlands	NL	20	0	5	0
Poland	PL	4	2	4	2
Portugal	PT	15	3	6	2
Romania	RO	10	6	7	5
Sweden	SE	23	0	3	0
Slovenia	SI	5	0	1	0
Slovakia	SK	1	0	0	0
Total	**EU**	**336**	**39**	**98**	**18**

[66] 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 15: Number of banks submitting liquidity coverage data (by business model)

Business model	All banks	*Of which: subsidiaries*
Consumer/ auto	22	3
Cooperative	12	0
Corporate-oriented	23	0
Cross-border universal	32	3
Custodian	7	1
Local universal	107	17
Mortgage	6	0
N/A	65	6
Other	19	1
Pass-through	3	0
Private	41	8
Public	7	0
Savings	19	1
Total	**361**	**38**

Table 16: Number of banks included in analysis in section 'LCR — impact on lending'

Country	ISO code	Banks
Austria	AT	6
Belgium	BE	5
Bulgaria	BG	1
Cyprus	CY	2
Germany	DE	15
Denmark	DK	4
Estonia	EE	1
Spain	ES	10
Finland	FI	3
France	FR	9
Hungary	HU	1
Ireland	IE	4
Italy	IT	9
Malta	MT	2
Netherlands	NL	5
Poland	PL	1
Portugal	PT	5
Romania	RO	1
Sweden	SE	6
Slovenia	SI	2
Total		**92**

Table 17: Number of banks included in analysis in section 'The unwind mechanism of the LCR'

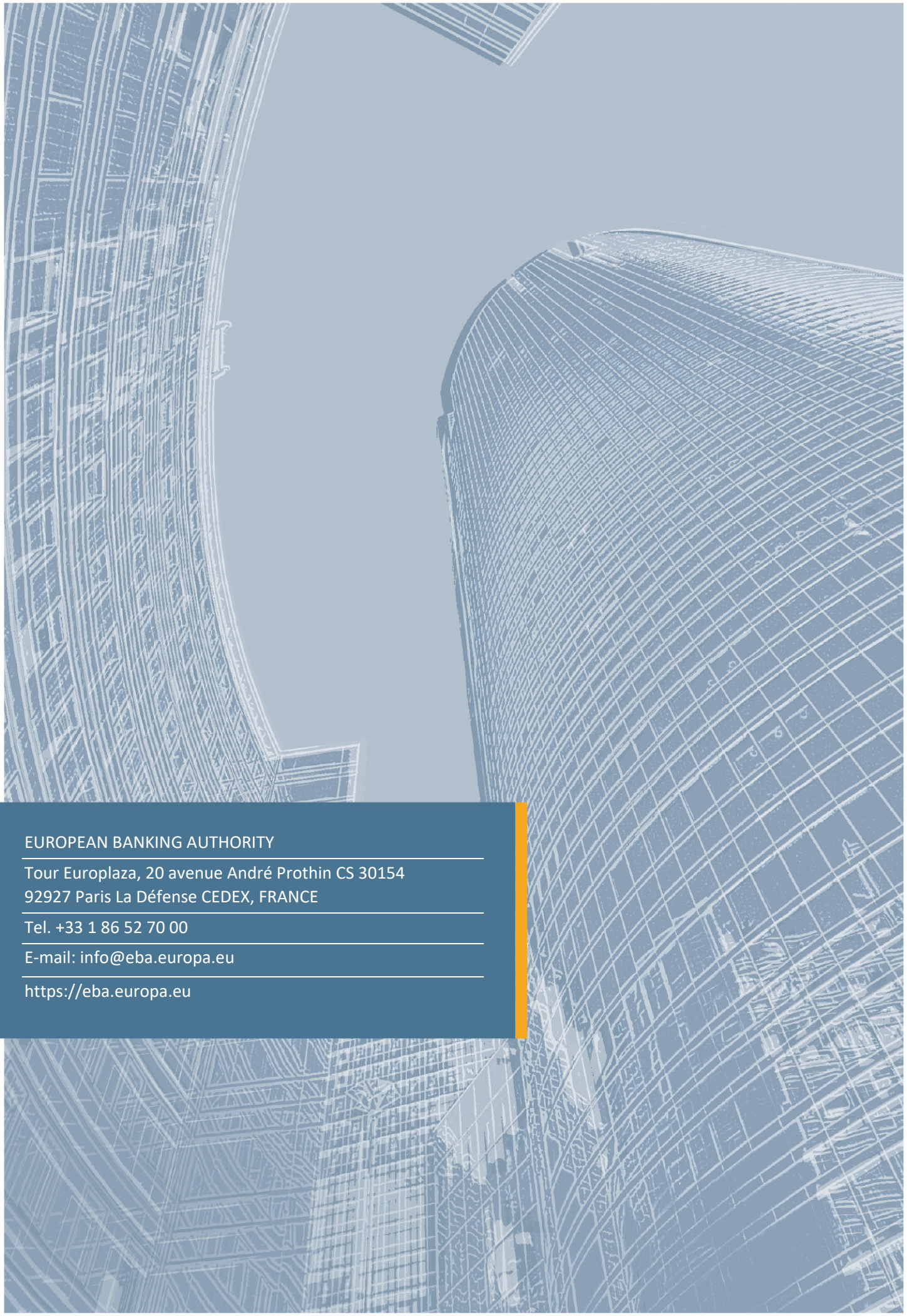
Country	ISO code	Smaller banks	Major banks
Austria	AT	366	6
Belgium	BE	17	5
Bulgaria	BG	11	1
Cyprus	CY	5	3
Czech Republic	CZ	12	.
Germany	DE	1,239	17
Denmark	DK	47	4
Estonia	EE	5	2
Spain	ES	54	10
Finland	FI	7	4
France	FR	76	12
Greece	GR	11	4
Croatia	HR	12	.
Hungary	HU	6	1
Ireland	IE	6	6
Iceland	IS	.	3
Italy	IT	117	11
Liechtenstein	LI	11	.
Lithuania	LT	10	1
Luxembourg	LU	46	3
Latvia	LV	8	1
Malta	MT	15	2
Netherlands	NL	22	6
Norway	NO	46	3
Poland	PL	10	2
Portugal	PT	21	5
Romania	RO	9	1
Sweden	SE	94	6
Slovenia	SI	5	2
Slovakia	SK	4	.
Total		**2,292**	**121**

Table 18: 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
Corporate-oriented banks	Corporate-oriented (including leasing and	Corporate-oriented	Financing domestic and international trade Specialise in products such as letters of credit,	No specification Taking or not taking retail deposits	No specification

	factoring, merchant banks)		bank guarantees and collection and discounting of bills		
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.



EUROPEAN BANKING AUTHORITY

Tour Europlaza, 20 avenue André Prothin CS 30154
92927 Paris La Défense CEDEX, FRANCE

Tel. +33 1 86 52 70 00

E-mail: info@eba.europa.eu

https://eba.europa.eu