Economic Commentary

An adjusted liquidity coverage ratio that takes greater account of maturity matching

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Table of contents

Summary

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One of the most common metrics used by banks around the world to measure their liquidity risk is the Liquidity Coverage Ratio (LCR). The metric shows the net outflows of money a bank is generally expected to have under stressed conditions over the next 30 days. These outflows are to be covered by a liquidity buffer of highly liquid assets. The metric serves as a good way to measure liquidity risks and has contributed to the fact that banks have a greater resilience to financial turmoil. One problem with the metric is however that it does not take into account the time at which cash inflows and outflows occur over the next 30 days, but only measures aggregate flows after 30 days. This could mean that a bank, which is able to cover its net outflows with its liquidity reserve after 30 days, is unable to do so on individual days before day 30 because it has had a larger net outflow on one or more of the previous days. In this Economic Commentary, we describe how a supplementary LCR metric can be calculated to take into account the additional liquidity need required to ensure that banks are able to cope throughout the entire stressed 30-day period covered by the LCR. Near-term liquidity risks are particularly serious because there is little time for action. An increased focus on these risks is one way to prevent liquidity crises.

1 Good with a supplementary LCR metric

If a bank is exposed to stress, it can quickly encounter problems. In such a situation, it is important that the bank can stand on its own feet until it finds new funding or is able to call on the authorities for help. The Basel Committee has therefore developed a liquidity metric, LCR, to create the right conditions for a bank to be able to cope with the initial phase of stress.[2]

In brief, the LCR liquidity metric requires banks to hold sufficient liquid assets to cover a potential net cash outflow that may occur during the first 30 days of stressed conditions. Banks under stress should basically be able to fend for themselves for 30 days, giving them time to put in place measures to ensure their long-term survival.

The Basel Committee on Banking Supervision (2008) lists a number of principles for sound liquidity management in banks, the first of which states that the liquidity reserves are to cover any maturity risks in their funding. The LCR was developed in part

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[2] The LCR was developed in Basel Committee on Banking Supervision (2010) and adopted in Basel Committee on Banking Supervision (2013). The metric was implemented in EU (2013) with a requirement of at least 100 per cent from 2018.

to satisfy this first principle. However, the metric only takes into account cumulative cash flows at day 30, and thus not the maturity risks that arise during those 30 days. If large cash outflows occur at the beginning of the 30-day period and cash inflows at the end of the period, this means that the LCR underestimates the liquidity risk and the metric may therefore need to be supplemented.

The LCR metric cannot therefore fully ensure compliance with the first principle of the Basel Committee from 2008: that the banks' liquidity reserves shall cover any maturity risks in funding. Hansson and Lindqvist (2022) have also shown that banks optimise their LCR by, on average, presenting their best liquidity position at day 30, which means that they take greater liquidity risks both before and after this day.[3]

In order for liquidity reserves to also cover the maturity risks occurring before day 30 and thus further secure short-term solvency, it may be justified to study banks' cash flows a little closer and examine how the LCR could be supplemented with an adjusted metric to show the maturity risks over the whole period. We have chosen to develop an adjusted LCR metric that considers cash flows day by day over these 30 days. The adjusted metric could be used to evaluate if banks hold sufficient liquid assets to last until day 30.

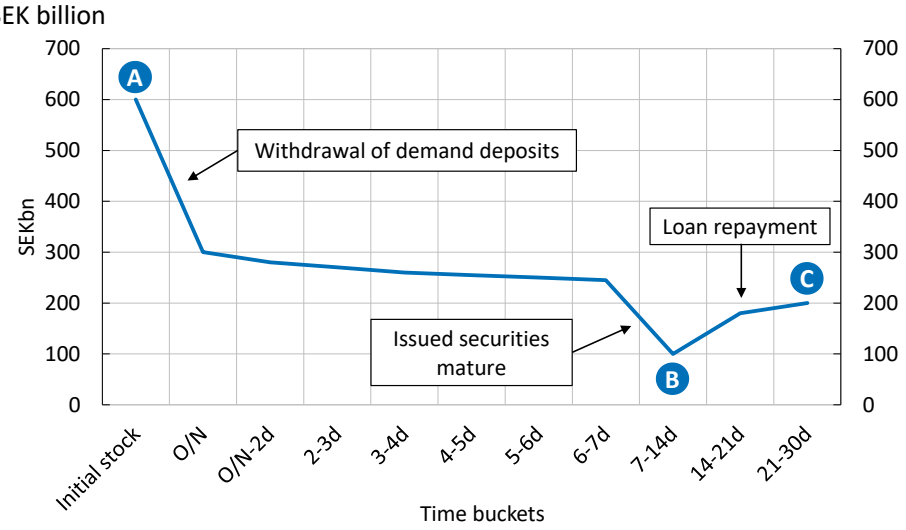
In Section 2 we discuss how the additional liquidity need is calculated, section 3 describes the consequences of such a need for the major banks in Sweden (Danske Bank, Handelsbanken, Nordea, SEB and Swedbank) in aggregate and section 4 provides a concluding comment.

2 Additional liquidity need may arise

In order to calculate an additional liquidity need for a bank, we have to look at their cumulative cash flows in the first 30 days. Chart 1 shows a fictitious example of what the cumulative net cash flow might look like for a major bank using the LCR metric. The bank starts with liquidity reserves of SEK 600bn, which then shrink due to the loss of a certain amount of demand deposits, i.e. deposits without any term period, in this case SEK 300bn. These lost deposits are not based on an actual contracted maturity but consists of standardized rates from a predefined bank run that can occur under stressed conditions as defined by the LCR. This has to be covered by the liquidity reserves, thus reducing the cumulative net position to SEK 300bn. It is also common for the net position to decrease when issued securities mature. The bank then needs to repay this funding to investors. But money also comes into the bank, for example when outstanding loans fall due, and then the cumulative net position increases.

[3] See also the Basel Committee on Banking Supervision (2022).

Chart 1. Fictitious example of a major bank's cumulative net cash flows according to the LCR



Note. The graph is based on fictitious data. A = liquidity reserves, B = lowest cumulative net cash flow position day 1–30, C = cumulative net cash flow position day 30.

The LCR in Chart 1 has liquidity reserves of SEK 600bn (point A). The graph ends at SEK 200bn (point C) and thus the cumulative net cash outflow is SEK 400bn (SEK 600bn - SEK 200bn). The LCR is then, simplified, SEK 600bn/400bn = 150 per cent, which is above the 100-percent requirement specified by the Basel Committee, see Formula 1.

Formula 1 LCR without adjustment for additional liquidity need:

$$\frac{\text{Liquidity reserves (A)}}{\text{Net outflows (A} - \text{C)}} = \frac{\text{SEK 600bn}}{\text{SEK 400bn}} = 150\%$$

To take into account liquidity risks that may arise within the next 30 days, we need to adjust for any maturity risk that arises within this timeframe, and which the LCR does not consider. We do this by comparing the lowest cumulative net cash flow position within 30 days with the same position at day 30. If the latter is larger than the former, an additional liquidity need arises.[4] In the example in Chart 1, the lowest position is SEK 100bn (point B) and at day 30 the position is SEK 200bn (point C). This corresponds to an additional liquidity need of SEK 100bn (SEK 200bn - SEK 100bn). This is added as an additional cash outflow in the calculation of the LCR according to Formula *2*:

Formula 2 LCR with adjustment for additional liquidity need:

$$\frac{\text{Liquidity reserves (A)}}{\text{Net outflows (A} - \text{C)} + \text{need (C} - \text{B)}} = \frac{\text{SEK 600bn}}{\text{SEK (400} + \text{100) bn}} = 120\%$$

[4] If the minimum cumulative net cash flow is at least equal to the same on day 30, there is no additional liquidity need.

The Basel Committee on Banking Supervision (2013) requires banks to report all balance sheet items according to contractual maturity. In the EU, the maturity ladder report is used for this purpose, see EU (2017). Since March 2018, all banks in the EU have to report this data on a monthly basis[5], which now makes it possible to easily study banks' cash flows like the graph in Chart 1.[6]

In Figure 1 in the appendix, we present the weights used to calculate cash flows according to the LCR, see EU (2015).[7] The maturity ladder report is not as granularly split into different balance sheet items as the LCR and therefore not all items can receive the exact weight given by the LCR. However, the maturity ladder report should serve as a very good estimate in the vast majority of cases.[8]

Deposits from the public that can be withdrawn at any time are reported in the first time bucket in the maturity ladder. However, these deposits do not have a maturity date. Instead, the LCR metric is based on a pre-specified bank run where a certain proportion of deposits disappears within 30 days. However, the metric does not indicate when these deposits disappear, within the 30 days included in the LCR. However, it is important that the bank is able to withstand the stress that the LCR assumes, regardless of when the bank run occurs. Therefore, in our supplementary liquidity metric, we have assumed that the entire bank run from deposits specified by the LCR disappears immediately.[9]

3 Consequences for the major banks in Sweden

To get an idea of the overall impact of an additional liquidity need on the major banks in Sweden, we use the LCR calculated as a surplus in SEK billion. This is defined as liquid assets (numerator of the metric) plus inflows (denominator) minus outflows (denominator). In Chart 2 this is illustrated by the blue line while the red bars show the additional liquidity need.[10] The blue line thus shows in SEK how much the banks in total are above the 100-percent requirement. The red bars show how much of this surplus is lost when additional liquidity is needed.

[5] Some smaller banks only need to report quarterly.

[6] Unfortunately, daily cash flows for all 30 days are not available in this report. This means that the available data may underestimate the need in this respect, as more time buckets can never result in less liquidity need. If banks reported more time bucket, a better liquidity risk metric could be obtained.

[7] Cash flows are obtained in the report by summing rows 720 and 1080, after applying the weights.

[8] The LCR also includes several items that do not have typical maturity dates, such as issued credit facilities. These items could be included as an outflow in the first time bucket of this analysis, but would then not affect the calculation of an additional liquidity need. As all these items with no maturity date are not included in the maturity ladder, we have excluded them from the analysis for simplicity.

[9] Lost deposits typically make up the largest share of total outflows in the LCR for the banks we have studied. This implies that there would usually be a lower additional liquidity need if the lost deposits were spread over all 30 days.

[10] At the individual level, banks had no additional liquidity need in most months. This is because their cumulative net cash flows for all time buckets over 30 days exceed the corresponding amount at day 30. However, this is not always visible in the chart as the bars sum up all banks.

For those months where there is a red bar, i.e. an additional liquidity need, the adjusted LCR metric will be lower than the unadjusted metric. The red bars, in relation to the blue line, thus show how much of the major banks' margins disappear in an adjusted LCR metric. On average, the LCR surplus has been SEK 1,290bn and the additional liquidity need has been SEK 80bn for the period studied. The LCR surplus has remained at a higher level since the outbreak of the pandemic.

Chart 2. LCR surplus and additional liquidity need per month for the five major banks in Sweden aggregated

SEK billion

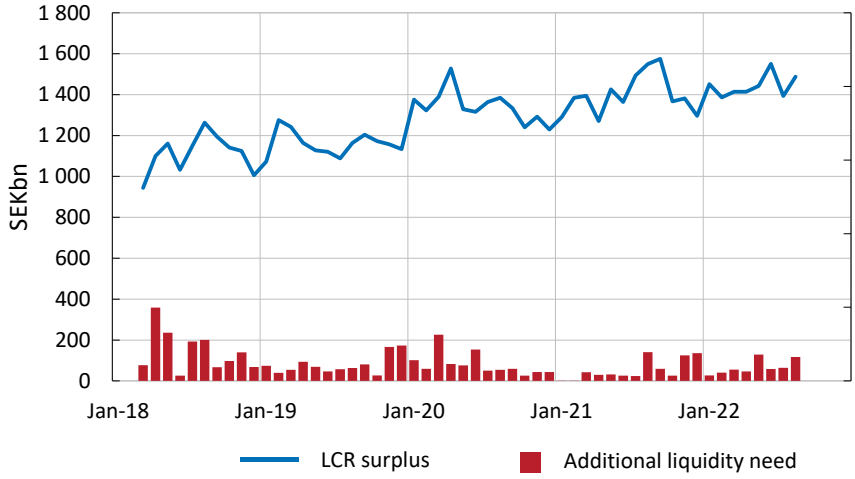
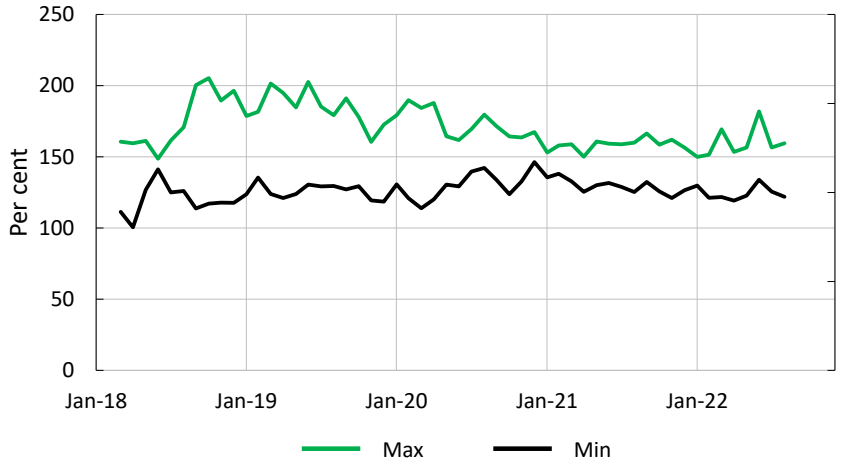


Chart 3 shows the largest and the smallest adjusted LCR for any of the major banks in Sweden after the additional liquidity need has been included according to Formula 2. The green line thus shows the largest adjusted LCR that any of the major banks in Sweden had for each month. Similarly, the black line shows the minimum adjusted LCR. Thus, for a given month, it is not the same bank that has the largest and the smallest adjusted LCR. All banks had an adjusted LCR above 100 per cent throughout the period studied since the black line is always above 100 per cent even if one bank was very close to 100 per cent at the beginning of the period.[11]

[11] Note that inflows may only be calculated up to 75 per cent of outflows in the LCR. If a bank's inflows are capped by this, an additional mark-up on outflows will mean that more inflows can be included, thereby mitigating (or completely removing) the negative impact on the LCR that arises when liquidity need increases. However, no major bank in Sweden has been capped on inflows during the period.

Chart 3. Adjusted LCR per month, max and min for the major banks in Sweden, after taking into account additional liquidity need
SEK billion



4 A way of preventing liquidity crises

Near-term liquidity risks are particularly serious because there is little time for action. Even if the authorities or the bank itself have time to resolve the liquidity problems, albeit with a few hours' delay, the damage may already be done as confidence may have been eroded. This can spread to the whole market and have serious negative consequences for society. It is therefore particularly important to monitor near-term liquidity risks.

There are several ways to capture these risks, for example through different types of stress tests. Authorities and banks usually conduct their own stress tests for their individual purposes. Thus, through their supervision, authorities can capture the most significant liquidity risks. However, the LCR is the only liquidity stress test defined by the Basel Committee with a specific requirement and it is therefore important to clarify which material liquidity risks the metric cannot capture, for example through the supplementary metric proposed here.

The supplementary liquidity metric described in this Commentary is still a ratio, which makes it easy to communicate both internally and externally. Even if the banks already today study cash flows in the near-term in various ways, the calculation of the metric would require banks to tighten their monitoring of these cash flows. This would create greater awareness of the liquidity risks to which the bank exposes itself in the short term. This is a good basis for preventing liquidity crises.

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APPENDIX

Figure 1. Weights per row in maturity ladder reporting

Code	ID	Item	
010-380	1	**OUTFLOWS**	**Weights**
10	**1.1**	**Liabilities resulting from securities issued (if not treated as retail deposits)**	**100%**
60	**1.2**	**Liabilities resulting from secured lending and capital market driven transactions collateralised by:**	**100%**
260	**1.3**	**Liabilities not reported in 1.2, resulting from deposits received (excluding deposits received as collateral)**	
270	1.3.1	stable retail deposits	**5%**
280	1.3.2	other retail deposits	**15%**
290	1.3.3	operational deposits	**25%**
300	1.3.4	non-operational deposits from credit institutions	**100%**
310	1.3.5	non-operational deposits from other financial customers	**100%**
320	1.3.6	non-operational deposits from central banks	**40%**
330	1.3.7	non-operational deposits from non-financial corporates	**40%**
340	1.3.8	non-operational deposits from other counterparties	**40%**
350	**1.4**	**FX-swaps maturing**	**100%**
360	**1.5**	**Derivatives amount payables other than those reported in 1.4**	**100%**
370	**1.6**	**Other outflows**	**100%**
380	**1.7**	**Total outflows**	
390-720	2	**INFLOWS**	
390	**2.1**	**Monies due from secured lending and capital market driven transactions collateralised by:**	**100%**
590	**2.2**	**Monies due not reported in 2.1 resulting from loans and advances granted to:**	
600	2.2.1	retail customers	**50%**
610	2.2.2	non-financial corporates	**50%**
620	2.2.3	credit institutions	**100%**
630	2.2.4	other financial customers	**100%**
640	2.2.5	central banks	**100%**
650	2.2.6	other counterparties	**50%**
660	**2.3**	**FX-swaps maturing**	**100%**
670	**2.4**	**Derivatives amount receivables other than those reported in 2.3**	**100%**
680	**2.5**	**Paper in own portfolio maturing**	**100%**
690	**2.6**	**Other inflows**	**100%**
700	**2.7**	**Total inflows**	
710	**2.8**	**Net funding gap**	
720	**2.9**	**Cumulated net funding gap**	
730-1080	3	**COUNTERBALANCING CAPACITY**	
730	**3.1**	**coins and bank notes**	**100%**
740	**3.2**	**Withdrawable central bank reserves**	**100%**
750	**3.3**	**Level 1 tradable assets**	
760	3.3.1	Level 1 excluding covered bonds	**100%**
810	3.3.2	Level 1 covered bonds (CQS1)	**93%**
820	**3.4**	**Level 2A tradable assets**	**85%**
860	**3.5**	**Level 2B tradable assets**	
870	3.5.1	Level 2B ABS (CQS1)	**75%**
880	3.5.2	Level 2B covered bonds (CQS1-6)	**70%**
890	3.5.3	Level 2B corporate bonds (CQ1-3)	**50%**
900	3.5.4	Level 2B shares	**50%**
910	3.5.5	Level 2B public sector (CQS 3-5)	**50%**
920	**3.6**	**other tradable assets**	**0%**
990	**3.7**	**non tradable assets eligible for central banks**	**0%**
1000	**3.8**	**undrawn committed facilities received**	**0%**
1070	**3.9**	**Net change of Counterbalancing Capacity**	
1080	**3.10**	**Cumulated Counterbalancing Capacity**	

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