Interplay of Basel III Ratios
LCR, NSFR and Leverage Ratio

Introductory Remarks

We present a series of examples that illustrate the interplay between three Basel III ratios – leverage ratio (LR), liquidity cover ratio (LCR) and net stable funding ratios (NSFR). The examples are based on a bank with a stylised balance sheet having a fairly broad funding base, comprising equity, money market deposits, repos, customer deposits and covered bonds.

Although the examples deployed are simple and indicative they show that these ratios cannot be managed independently. When considered together the behaviour of the ratios may result in responses that cannot effectively address the underlying capital or liquidity issue the bank needs to address. Of course, a more complex analysis would need to include other Basel III ratios and/or be based on a more representative bank balance sheet, but we believe this effort is satisfactory in showing how the three new measures interact.

We start with a balance sheet where all three ratios meet the Basel III requirements. This balance is then disturbed when the NSFR is breached, because a source of funding (in the case of these examples, covered bonds) under the ratio has zero value when it falls below 1 year. We then look at a number of possible cures that, in turn, bring one or more of the other ratios in breach. The final cure results in the bank raising more capital in response to a change in its funding profile.

Although the examples are triggered by the cliff effects associated with the NSFR, changes in any of the ratios could trigger a similar chain of events. We note that the cap on LCR inflows is not a restriction in these examples but could add a level of complexity to any further work we undertake in this area, and would further complicate the response to a real-life situation.

Starting Position (Table 1)

The starting case shows an example balance sheet with:

- the LCR described in terms of the eligibility of assets for the liquid asset buffer and inflow/outflow profiles by balance sheet item; and,

- the NSFR described in terms of the Required Source of Funding (‘RSF’) by asset and the Available Source of Funding (‘ASF’) by liability

- the LR reported in terms of equity / total assets subject to a 3% limit and its reciprocal (33 times)

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1 We recognize that the Committee is seeking to i) evaluate the treatment of match funded assets and liabilities; and, ii) provide incentives for term funding within a year (BCBS 188, para 134). Nevertheless, the cliff effects associated with the NSFR remain a concern.
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At this starting point, the bank’s LCR, NSFR and LR are all in line with the Basel III requirements.

**Covered Bond and Mortgage Balances <1yr maturity (Table 2)**

The second table shows the impact of the remaining maturity of the covered bonds falling below 1 year together with their associated encumbered mortgage balances. As the maturity of the covered bonds falls below 1 year, the amount that can be included in the ASF for the calculation of the NSFR falls overnight from 100% to 0%. There is, however, a less than proportionate reduction in the RSF associated with the underlying mortgage loans which reduces from 100% to 65%. This leads to a significant reduction in NSFR from 101% to 73%.

The next three tables (3 to 5) show the impact of possible responses to this fall in the NSFR and the impact on the other two ratios. Table 5 presents the most likely solution but is contingent on curing a breach in the LR. Possible steps to cure the LR are presented in Tables 6 and 7 with Table 7 illustrating the ‘end solution’.

**Deleverage – Scenario 1 A (Table 3)**

Under this scenario the bank responds to the breach in the NSFR through a deleveraging of the balance sheet, involving the sale of corporate credit exposures (which had attracted a RSF of 100%) and non-repo exposures to the financial sector. The corresponding funding is reduced through the repayment of money market deposits and a managing down of retail deposits.

This response does not successfully resolve the breach of the NSFR. Moreover, the improvement in the LCR and LR are gained through increased holdings of short-term assets and a reduction in the balance sheet.

**Movement to more liquid assets – Scenario 1 B (Table 4)**

An alternative response involves maintaining the size of the balance sheet, but changing the mixture of assets. This is done by moving illiquid corporate exposures (that attract a 100% RSF) to cash (0% RSF), government bonds (5% RSF) and short-term financials (0% RSF).

This action significantly alters the bank's liquidity profile. This is reflected in the rapid increase in the LCR and the improvement in the NSFR. The steps taken do not, however, allow the bank to meet its NSFR requirement.

**Issuance of term debt – Scenario 1 C (Table 5)**

In this scenario the bank deals with the shortfall in the NSFR, by issuing unsecured term debt through the capital markets (receives full value of funding under the ratio) and by increasing the deposit base (receives a blended ASF 75%) to match both sides of the balance sheet. The

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2 Another presentation in the package prepared for discussion with the BCBS liquidity working group on 10 May 2011 discusses the cliff-effects for covered bonds in more detail.
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Proceeds from this additional funding are then invested in highly liquid government bonds (5% RSF) and short term placements with financial institutions (0% RSF). Although the NSFR is now met, and the LCR has improved, the additional funding has resulted in a breach in the LR.

Deleveraging short-term business – Scenario 2 A (to cure Scenario 1C) (Table 6)

The next table shows the effect of trying to correct the breach in the bank's LR through deleveraging short term business transactions. This is done, on the liabilities side, through reducing money market and repo funding. The corresponding reductions on the assets side are in holdings of government bonds and reverse repos.

However, in this example it is not possible to shrink the balance sheet sufficiently to allow the restoration of the LR to (or above) its minimum level. In addition, the LCR declines significantly owing to the substantial reduction in short term liquid assets, and is breached.

Issuance of additional equity – Scenario 2 B (alternate cure to Scenario 1C) (Table 7)

The second alternative to cure the breach in the LR is through issuing more equity and investing in short-term assets so that the NSFR is not breached. This results in restoration of all the ratios, but the balance sheet is considerably expanded without any of the extra funding going toward long-term investment.

Conclusion

The interplay between the ratios is complex and the calculations we have presented are necessarily stylised. However much it presents a simplified view, it nevertheless clearly illustrates the complexities of meeting all of the ratios, all of the time, even for a simple balance sheet.

This example does not attempt to assess the interplay between these ratios and the overall regulatory capital requirements. Leaving the full analysis for another day, it nonetheless shows that the ratios, in particular the LR, may become binding in situations that may not have been intended.

In the example, owing to the cliff effects associated with the NSFR, the bank may be forced to raise additional capital as alternative measures are insufficient or unworkable. In addition to the relatively high costs of raising the additional equity capital, the bank has only been able to invest the proceeds in short term assets which are likely to carry lower yields than its core longer term business activities, thereby potentially reducing profitability and retained earnings.

Forcing the bank to divert resources from customer lending will also have a negative impact on economic growth.

A more straightforward and cost-effective way of offsetting the cliff effects associated with a particular liability for liquidity purposes would be to seek additional term funding although, as can be seen from our examples, the interplay of the liquidity ratios and the leverage ratio would not permit this.
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It is also possible to note some of the other potential economic consequences of the interplay between the different ratios. For example, in seeking to meet the NSFR ratio in Scenarios 1A and 1B (Tables 3 and 4), the bank discontinues a large proportion of its core lending business, and under Scenario 1A it seeks to reduce its role in taking customer deposits.

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Illustrative examples based on a simple balance sheet showing the potential interplay of the leverage and liquidity ratios

<table>
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<tr>
<th>Scenario</th>
<th>Description</th>
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| Scenario 3A: To cure NSFR (Table 3) | Deleveraging - Planned strategy to reduce asset exposure or increase liability maturities | - Reduce exposure to funded assets (e.g., covered bonds) with a 65% RWA to reduce the RSF.
- Increase liability maturities by extending deposits or issuing new corporate debt.
- For example, the firm could extend a portion of its deposits (e.g., 1-year term deposits) to 2-years or issue new corporate debt with a 1-year maturity.

**Key Points:**
- The firm aims to reduce its exposure to assets with a 65% RWA to 50%.
- To achieve this, it needs to alleviate the impact of these assets on its NSFR.
- By increasing liability maturities, the firm can reduce the impact of these assets on its NSFR.

**Calculation Notes:**
- The firm needs to ensure that the new funding does not exceed the NSFR threshold.
- The firm should monitor its NSFR on an ongoing basis to ensure compliance.

**Explanations:**
- The NSFR is calculated as the ratio of high-quality liquid assets (HQLAs) to net short-term funding needs.
- HQLAs include cash, term deposits, government bonds, and other liquid assets.
- Net short-term funding needs are calculated as the sum of all short-term liabilities projected to mature within one month.

**Example:**
- If the NSFR falls below the regulatory threshold, the firm may need to increase its liquid assets or reduce its short-term liabilities to comply with the NSFR requirement.

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