Bank Asset–Liability Management and Liquidity Risk Management

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This Chapter Covers

Bank risk management is encompassed by the discipline of asset–liability management (ALM) and liquidity risk management;
The principal tenet of ALM philosophy is the centralization of risk management, including interest-rate risk and liquidity risk, within a central ALM function;
The Basel III banking regulations seek to enshrine good ALM and liquidity practice through implementation of the liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) metrics;
Liquidity risk principles necessary to ensure adherence to the requirements of Basel III regulatory rules include the need for stable long-term funding, diverse funding sources, and an adequate reserve of genuine liquid assets;
To ensure long-term through-the-cycle viability it is necessary to enshrine a fit-for-purpose risk culture within the firm, captured by an effective ALM committee framework.

Introduction

Risk management in banking is summarized in essence by asset–liability management (ALM). This reflects the nature of the products that banks offer to their customers, and the risk exposures that these products generate. In banks the three main strands of risk exposure are credit risk, interest rate (and foreign exchange) risk, and liquidity risk. ALM practice is concerned with managing these risks. Interest rate risk exists in two strands. The first strand is the more obvious one, the risk of changes in asset–liability value due to changes in interest rates. The second strand is that associated with optionality, which arises with products such as early-redeemable loans. The other main type of risk within the bailiwick of ALM is liquidity risk, which refers both to the liquidity of funding markets and to the ease with which assets can be translated into cash.

ALM is conducted primarily at an overview, balance-sheet level. The risk that is managed is an aggregate, group-level risk. This makes sense because one could not efficiently manage a viable banking business by leaving interest rate and liquidity risk management at individual operating levels. We illustrate this in Figure 1, which highlights the cornerstones of ALM. Essentially, the risk exposure is managed at the group or entity level by the treasury desk.

![Figure 1. Cornerstones of ALM philosophy](image)

We speak of risk exposure as being for the group as a whole. This exposure must therefore aggregate the net risk of all the bank’s operating businesses. Even for the simplest banking operation, we can see that
this will produce a net mismatch between assets and liabilities, because different business lines will have differing objectives for their individual books. This mismatch will manifest itself in two ways:

- the mismatch between the different terms of assets and liabilities across the term structure;
- the mismatch between the different interest rates at which each asset or liability contract has been executed.

This mismatch is known as the ALM gap. The first type is referred to as the liquidity gap, while the second is known as the interest rate gap. We value assets and liabilities at their net present value (NPV); hence, we can measure the overall sensitivity of the balance sheet NPV to changes in interest rates. As such, ALM is an art that encompasses aggregate balance sheet risk management at the group level.

**Liquidity Risk Management**

The art of banking is essentially the art of liquidity management. What exactly do we mean by this? According to Wikipedia: “In banking, liquidity is the ability to meet obligations when they become due.” The important part is to understand exactly what is meant by “when they become due.” Essentially, it means in perpetuity, or at least as long as we wish the bank to remain a going concern. In other words, maintenance of liquidity at all times is the paramount order of banking.

This is also the paradox of banking. Banking creates maturity mismatches between assets and liabilities, because assets are invariably long-dated and liabilities are short-dated, and this creates liquidity risk. In fact, to undertake banking is to assume a continuous ability to roll over funding, otherwise banks would never originate long-dated illiquid assets such as residential mortgages or project finance loans. As it is not safe to assume anything in finance, prudent liquidity risk management in banks dictates that all leveraged financial institutions need to set in place an infrastructure and governance ability to ensure that liquidity is always available, to cover for times when market conditions deteriorate.

**The Scope of Liquidity Risk**

The crash of 2007–2008 was as much a crisis of liquidity as it was of capital. Many banks ran a funding regime that was heavily overweight in short-term liabilities and volatile liabilities, such as wholesale funds (see the case study). That this is accepted as a prime causal factor of the crash is apparent from the way banks are adjusting to the new requirements of Basel III. Basel I and Basel II did not address liquidity, only capital. The new regime, which will be fully implemented by 2019, makes material demands on banks with respect to the way they manage liquidity.

However, liquidity risk management is not simply a matter of liquidity metrics and ratios. There are important governance and policy issues that also need to be built into the infrastructure and workings of a bank’s treasury and risk departments. Liquidity risk management needs to be addressed at the highest level of a bank’s management, the board of directors. The board will delegate this responsibility to a management operating committee such as an ALM committee (ALCO), but it is the board that owns liquidity policy. If it does not own it, then it is not following business best practice. Given this, it is important that the board understands every aspect of liquidity risk management.

Business best practice dictates that liquidity risk management encompass the following specific areas:

- a formal statement by the board on liquidity risk appetite and tolerance;
- liquidity strategy, policy, and processes;
- regulatory requirements and reporting obligations;
- bank funding strategy and policies;
- institution-specific and market-wide stress scenarios, and stress-testing;
- the liquid asset buffer;
- a liquidity contingency funding plan.

In other words, liquidity management is devised at and dictated from the highest level, and it influences every aspect of the bank’s business strategy and operating model.
Case Study: Northern Rock

The UK bank Northern Rock was originally a mutual savings-and-loan organization, with no shareholders, that had operated for over a century when it turned itself into a bank in 1997. Alongside the change in type of legal entity came a change in business philosophy, one that emphasized aggressive asset growth. Its main product was residential mortgages, which it marketed nationwide. However, its retail deposit base was still confined to its original home area in the northeast of England, so the new loans were funded by recourse to the wholesale market. Figure 2 shows the growth in wholesale and capital market funding as a share of its total balance-sheet liabilities during the 10 years from its transformation to its ultimate demise and government bailout.

Figure 2. Types of funding used by Northern Rock 1998–2007

In summary, the case of Northern Rock highlights the pitfalls of a business model based on:

- rapid asset growth in pursuit of market share (residential real estate), with an asset pool that far outstrips the retail deposit base;
- use of securitization to support asset growth, rather than as a funding diversification tool;
- increasing reliance on an unsustainable funding source.

Following the US subprime crash in July 2007, the quality of Northern Rock’s asset pool became the subject of rumors circulating in the interbank market, and banks began to reduce the term and size of their interbank lines. One day in September 2007 the bank was not able to roll its overnight funding and turned to the Bank of England, the lender of last resort. The Bank of England was obliged to report the borrowing. This news led to media headlines the next day, such that there was a run on high-street banks—the first in the United Kingdom for more than 100 years. The government could not countenance a default and therefore nationalized Northern Rock.

The lessons of Northern Rock for all banks are that they should:

- term out funding;
- monitor liquidity ratios and the customer funding base;
- arrange diversified funding, and also have alternative sources of funds available;
- grow more slowly during a bull market, and set aside reserve liquidity for a rainy day.

Meeting the Requirement of Basel III Liquidity Structural Metrics

Basel III enshrines the new risk approach in formal regulatory law with two new structural risk metrics, one for short-term and one for long-term funding. On the face of it, these represent a step change in liquidity...
management culture, but that is only because principles accepted as commonplace in the 1860s or 1960s had been discarded by 2008. Nevertheless, for many banks they will prove a challenge to work toward.

The critical short-term metric is the liquidity coverage ratio (LCR). The metric is defined as:

Stock of high-quality liquid assets

\[
\text{30-day stressed net cash outflows} \times 100\% > 100\%
\]

The Basel committee prescribes outflow assumptions for the different types of liabilities on a bank’s balance sheet, and these form the basis of the “outflows” denominator. Stable retail customer deposits such as current account balances have the lowest outflow assumptions, while short-dated wholesale market funds have the highest outflow assumptions. Customer deposits benefit from being assigned “behavioral” tenor characteristics that reflect the reality that such funds are actually longer in tenor than their contractual maturity. A bank that is rich in such deposits can generate a smaller funding “gap,” at lower cost, than a bank trying to meet LCR requirements via long-term wholesale liabilities. Figure 4 shows the difference in gap profiles at a UK commercial bank when the contractual gap profile is compared with the behavioral gap profile for customer loans and deposits. The difference is marked.

![Figure 4 (a). Customer asset–liability gap profiles at a UK commercial bank: contractual](image)

![Figure 4 (b). Customer asset–liability gap profiles at a UK commercial bank: behavioral](image)

The LCR demands that a bank holds a stock of “liquid” assets to cover for any expected outflow of liabilities during stressed market conditions. What constitutes “liquid” is debatable, with certain equities, corporate bonds, and even residential mortgage-backed securities being eligible to form part of the liquidity buffer. However, more prudent banks will restrict their liquid asset buffer (LAB) to cash at the central bank and AAA-rated Treasury bills and sovereign bonds.

The objective of this metric is to promote short-term resilience to liquidity shocks. Setting a limit for it, and requiring banks to hold a stock of sufficient high-quality, genuinely liquid assets results in a more stable funding regime that will be less susceptible to a freeze in interbank markets of the kind observed in October 2008.

In other words, the LCR requirement results in banks having to maintain a liquidity buffer that matches expected cash outflows in a stressed environment. The amount of funds that might be observed in a market stress situation is given by the stress tests that banks run every month, under specified assumptions. The time period covered in the stress test is 30 days. This implies that a stressed environment would last for only a month, which is unrealistically short. For this reason some regulators, including the United Kingdom’s Prudential Regulation Authority (PRA), impose a 90-day time period over which the stress would be assumed to take place.

Are the stress tests themselves reliable? Any analysis undertaken under assumed conditions is always at risk of inaccuracy, which is why continuous review and back-testing are also part of a bank’s risk
management regime. However, for this reason we recommend that the size of the liquidity buffer should be a function of other metrics, including the following:

at least 2.5 times the size of the aggregate of a bank’s liabilities that are of less than one-year maturity;
at least 110% of the stressed outflow number.

For commercial bankers, the impact of the LCR requirement is to incentivize a lower reliance on wholesale funding and a greater share of stable customer deposits as a percentage of total balance-sheet funding. All else being equal, this drives a smaller LAB size requirement, which assists the profit and loss statement given that the LAB is usually a loss-making portfolio (a bank’s funding costs are invariably higher than the return on LAB assets).

Individual national jurisdictions have their own requirements which are in line with Basel III or may be more onerous. For example, the UK’s Prudential Regulatory Authority applies a 90-day survival horizon when applying its liquidity requirements to UK banks.

The critical long-term metric is the net stable funding ratio (NSFR). This is given by:

\[
\frac{\text{Available stable funding}}{\text{Required stable funding}} \geq \approx 100\%
\]

The metric measures the amount of stable funding as a proportion of the total requirement for such stable funding. Definitions on what constitutes “stable” are given by the Basel Committee. The NSFR is typically used to monitor and control the level of dependency on volatile, short-term wholesale markets as a key structural balance-sheet ratio. A low ratio indicates a concentration of funding in shorter maturities (less than one-year tenor) that can give rise to funding rollover and mismatch risks.

The NSFR promotes resilience over the longer term, and setting a limit for it ensures that sufficient long-term funding is in place to support a bank’s balance sheet. In other words, maintaining an adequate NSFR should help considerably in ensuring a stable funding structure because more of a bank’s liabilities will consist of longer-dated funding. (In Treasury terms, we might define “long-dated” as being more than 12 or 24 months in tenor).

Setting a minimum level for term funding would reduce dependence on short-term funding while increasing the cost of business as more liabilities are moved into longer-term funding. Again, the issue for banks is one of cost, and the impact on profits. Longer-dated liabilities cost more than short-dated liabilities, and in a stressed environment these are difficult to raise. The challenge for risk managers and regulators is to ensure that the spirit of NSFR—which has not yet been enshrined in formal legislation—is maintained throughout the business cycle.

Ten Principles of Liquidity Risk

Business best practice dictates that, assuming they wish to stay in business over the long term, banks must adhere to certain liquidity principles. That is the only way to ensure through-the-cycle survival when one is dealing with mitigating the negative impact of a risk exposure that cannot, in effect, be hedged.

The base-case principles include the following.

1. Fund illiquid assets with core customer deposits.
2. Where core customer deposits are not available, use long-term wholesale funding sources.
3. No overreliance on wholesale funding. Run a sensible term structure wherever wholesale funding is used: more of it should be in long-term tenors (>1 year) than in short-term.
4. Maintain liquidity buffers of instantly liquid assets to cater for both firm-specific and market-wide stresses.
5. Establish a liquidity funding contingency plan.
6. Know what central bank facilities the bank can access, and test such access.
7. Be aware of all the bank’s exposures (here we are referring to the liability side, not the credit side). For example, sponsoring a commercial paper conduit creates a reputational, rather than contractual, obligation to provide funding. Therefore be aware of reputational obligations, especially if they mean that the bank has to lend its name to another entity.
8. Liquidity risk is not a single metric. It is an array of metrics, and a bank must calculate them all in order to obtain the most accurate picture of liquidity. This is especially true for multinational banks and/or banks with multiple business lines.

9. The internal funding pricing (transfer pricing) framework must be set correctly and adequately.

10. All legal entities and geographies are required to be stand-alone with regard to liquidity and funding.

Establishing a Genuine Risk Governance Culture

What the current debate in banks needs to focus on is the need for a genuine, firm-wide approach to balance-sheet risk management. To effect this, it becomes necessary to establish the ALM committee or ALCO as the premier risk management forum in the bank, with board-delegated authority.

As we all recognize, culture is set from the top down. To remove its dependence on individuals, banks need to consider their operating model and risk infrastructure, and how exactly capital, balance sheet, and liquidity are to be managed. The issues are:

- the operating model and internal organization;
- the risk governance infrastructure, and the risk management “triumvirate” of the chief risk officer (CRO), chief financial officer (CFO), and treasury. This must be organized so that the three constituents of the triumvirate are able to work together effectively.

The challenge is for banks to establish a cultural mindset and operating framework that embed balance-sheet risk management in everyone’s thinking. In other words, something beyond the regulatory requirements set out under Basel III.

Figure 5 appears to state the obvious, but in fact makes a much more subtle, and potentially controversial, point. The three departments are peers, so the reporting line could not logically subordinate one to the other. Crucially, ALCO would have the oversight for all balance-sheet risk, including credit risk policy at the high level. Any credit risk committee or CRO forum would be subordinated to ALCO. This is the real meaning behind Figure 1.

The logic for this is irresistible. As the membership of ALCO covers both front-office business line heads with profit and loss (P&L) responsibilities as well as risk management persons, it has the overarching balance-sheet view that an enterprise risk management (ERM) forum perhaps may not. Therefore it makes sense to make ALCO the premier risk management body.

Figure 5. The risk management triumvirate for the bank balance sheet

For treasury, the reporting line is a key influencer of the extent of the risk culture. From its position in the triumvirate, treasury will need to report to the same level as the CFO and CRO. This would logically be the CEO, and such an arrangement is common.

Ensuring Effective Teamwork

Changes in culture and operating method are perhaps the hardest to make in any firm, including a bank. The larger the bank, the more bureaucratic the process of risk management is. In large firms there is a danger that risk management becomes more of a forms-based, box-ticking process than a genuine exercise in managing risk exposure. However, effective teamwork is essential if the triumvirate is to work together efficiently.

One way to try to address the issues raised by a growing bureaucracy and process is to drive a culture of genuine teamwork. In a treasury team, this would be what one might term “total treasury.” This is modeled
loosely on the teambuilding concept first espoused by Rinus Michels, the coach of the Holland team during the 1974 football World Cup.

Figure 6 shows that the treasury function is a multidisciplinary one, with a diverse set of objectives and deliverables. These are better served if members of the team are able to support each other. In the Dutch national side, “total football” referred to the concept whereby each outfield player was able to play in any position, and so could cover for any other team member. This concept is replicated in “total treasury.”

This is not something that can be implemented overnight. It requires experience, and learned judgement, together with a genuinely open and transparent culture, to work properly. It also demands that there be no cliques, no “inner circles” and no “favorites” amongst senior management. This inspires loyalty and dedication. But if it can be operated successfully, it makes balance-sheet risk management much easier to implement firm-wide because the triumvirate of CRO, CFO, and treasurer, along with their teams, will be able to work together much more effectively.

Figure 6. Diversity of treasury deliverables

Conclusions

ALM and liquidity management constitute a discipline that is as old as banking itself, but one lesson we must learn is that its principles need to be refreshed and maintained throughout the business cycle. Under the new regime that is being implemented under Basel III, the need to adhere to old-fashioned beliefs about sound liquidity practice is something that will be enshrined in law. However, its two new funding metrics reflect banking logic, and one almost feels that the principles behind them should be followed regardless, simply because bank management should be aware of their importance anyway.

Six years after the first signs of the crash, the discipline of risk management—the need to have a rigorous risk framework in place at all banks with respect to capital, liquidity, and funding—is universally accepted. There is no disagreement with what Basel III, and national regulators, wish to implement with respect to levels of capital and liquidity. The real challenge comes with the need to embed a genuine risk management culture in the bank. If this is successful, it will ensure that principles of balance-sheet risk are adhered to throughout the cycle, particularly when bull market conditions return. A change in operating model style and firm culture to one of genuine openness and understanding will help to ensure that this becomes the case.

More info

Books


Websites

• Bank for International Settlements, Principles for Sound Liquidity Risk Management: www.bis.org/publ/bcbs138.htm
• European Banking Authority: www.eba.europa.eu/regulation-and-policy/liquidity-risk
See Also

Best Practice

- ALM in Financial Intermediation: The Derivatives Business
- Formulating a Contingency Funding Plan to Manage Liquidity Risks
- Factoring Problem Loan Assumptions into Asset–Liability Management (ALM) Modeling

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