Liquidity risk and the usefulness of stress tests

The financial crisis clearly highlighted the area of liquidity risk and added a new dimension to stress-testing known as the ‘advanced approach’, now applied under the new liquidity regulations to which large banking groups are subject. Nicolas Kunghehian, asset and liability management (ALM) specialist at Moody’s Analytics, considers liquidity risk, and the usefulness of stress-testing exercises in this respect, in the context of regulatory constraints and the very real stakes for the world of banking.

When you ask banks about the biggest challenges facing them as the new regulations on liquidity risk come into force, improving stress-testing scenarios is right at the top of the list. They will have to judiciously model risk factors to come up with a range of relevant stress-testing scenarios based on different assumptions, both bank-specific (a rise in non-performing assets, a rating downgrade, excessive concentration of liabilities on a small number of counterparties, etc.) and macroeconomic (a crisis on an international scale, or more localised, etc.) as well as a combination of these and other scenarios relevant to their own institution. For each of these scenarios they then have to draw up funding plans. This is all driving them to significantly upgrade their risk management.

The new liquidity stress-testing requirements are being given a cautious welcome by banks, who see in them both a regulatory burden and an opportunity to improve profitability. The regulations certainly pose a challenge to infrastructure and methodology that is not easy to tackle. Importantly, they concern each bank in its entirety, and thus require the consolidation of data within each group to look at ‘aggregated’ risks, which inevitably requires innovative centralised IT systems capable of working at the cutting edge. Internal control systems (reports on flows into and out of the free liquid asset reserve) will also be essential. Banks can also expect regulatory reports at varying intervals as reporting frequency changes. Clearly, the issue here is not just one of putting adequate stress-testing in place to manage liquidity risk.

Liquidity and liquidity risk

Liquidity is a bank’s ability to raise funds and meet its commitments as and when they fall due “without incurring unacceptable losses.” The second half of this definition is relatively new and comes on top of the internal control regulations. A bank is free to define its own liquidity management framework to ensure it is capable of financing itself with certainty using short-term funding (an analytical horizon which implies a greater frequency of calculation: monthly, weekly or daily) and make a medium-term forecast of its liquidity needs to carry on its activities and pursue its strategy over the coming months.
Based on recent experience, banks feel that the main liquidity management risk factor to be reconsidered is liquidity risk in internal costs. They feel it should be given a similar level of attention to how a bank is financed, its illiquid assets and off-balance sheet activities. Liquidity risk has three aspects: it can be 1) systemic in origin, in a situation where there is a shortage of funds from central banks or the interbank market because of regulatory action or a market shock; 2) specific, where there is reduced access to funding, for instance because of a downgrade or a negative market perception of the bank’s quality; or 3) technical (managed by the ALM section), where it arises from a mismatch in the structure of payments.

Liquidity risk management is therefore vital for banks in the sense that having insufficient or no liquidity can mean missing out on market activities because new business cannot be financed, or even lead to a liquidity crisis if new commitments cannot be put in place. Modelling will be based on regulatory limits, but also on the generally more restrictive internal limits used by banks in the form of internal funding costs and liquidity spreads. Assumptions will need to be made for all these elements when drawing up a budget for the scenarios to come.

Liquidity risk and concerted international regulatory action

Since 2007 something of a race has been under way to regulate liquidity risk, involving the Financial Services Authority (FSA), which has been tightening liquidity requirements, the Committee of European Banking Supervisors (CEBS) and the Basel Committee on Banking Supervision (BCBS). Under Basel II, the latter draws a distinction between two types of liquidity risk: funding liquidity risk; i.e. “the risk that the firm will not be able to meet efficiently both expected and unexpected current and future cash flow and collateral needs without affecting either daily operations or the financial condition of the firm,” and market liquidity risk; i.e., the risk that a bank is unable to easily “offset or eliminate a position at the market price because of inadequate market depth or market disruption.” Regardless of risk type, all agree that regulating liquidity is at least as important as regulating capital adequacy. Regulation must also make it possible to come up with efficient ways to identify and control liquidity risk in all forms in which banks are likely to have to deal with it. Recent publications have also generally called for a major reform of liquidity management.

Apart from “diversifying funding sources,” the CECB recommends putting in place sufficient back-up liquidity, robust stress-testing and regular trials of funding strategies to be used in the event of a liquidity crisis. Amongst other risk types, the FSA lists some highly specific liquidity risks: intra-group liquidity risk, inter-currency liquidity risk and intra-day liquidity risk, to name but a few. It lays down requirements for reporting, which like all rules have to be audited. In addition, software will have to be able to cope with the need to calculate more frequently, and intra-group consolidation implies greater volumes of calculation and reporting. Taken together, this all suggests that data needs to be consolidated, since it will have to be adapted to specific formats.

What about the liquidity reserve? As one of the main regulatory measures, it merits attention. Its size is set based on a bank’s entire portfolio, and reflects eligibility criteria fixed by the supervisor. The idea of eligibility of assets is fairly straightforward: only assets on a restricted list qualify for inclusion in this reserve. These assets must be available; i.e., not allocated to other commitments such as serving as collateral for another bank or being used for a repo transaction. It is also possible to model a reserve available for sale made up of all portfolio holdings such as government securities (no haircut applied, can be sold in a single day); ‘highly rated’ securities (10%, one day); ‘less highly rated’ securities (30%, two days); and illiquid securities (50%, one week). Our clients generally make assumptions about the sale of securities that do not necessarily match the ‘regulatory’ reserve comprising solely government securities, mostly by applying a haircut to the market price of a security.

When considering regulatory reports, after a complex and laborious production phase (ensuring the availability and quality of information from various systems and calculation engines, confirming quality before submitting to the regulator, comparing reports over time
and using scenarios), it is surely essential to justify and audit them. One has to justify the aggregated amounts by showing the individual contribution made by each transaction, analysing the details of how each indicator is calculated and conducting both top-down and bottom-up audits. Finally, one needs to take account of changes in national regulations and recalibrate the calculation methodology where required, while still running the calculation engines and producing reports.

**Constructing scenarios**

Apart from models for presenting reports intended for regulators and bank management, descriptions of contingency plans and liquidity indicators, this work must include four types of stress test scenario: a standard scenario, a systemic crisis scenario, a specific scenario (e.g., the bank is downgraded) and a ‘combined’ scenario (e.g., a bank-specific liquidity crisis accompanied by a general liquidity crunch).

Whether the models are standard or internal, the bank must focus on at least one group of key liquidity indicators, such as the liquidity ‘gap’ and the liquid asset reserve (these two determine the ‘survival period’ of the bank under the scenario chosen), the liquidity ratios and the degree of concentration of funding sources. This enables it to consider its liquidity positions and analyse its exposure to the main liquidity risk factors, such as the resilience of funding in retail and commercial banking activities. Depending on the type of activity, it may be appropriate to consider different hypotheses; the differences between the funding risks of retail banks and commercial banks must be reflected in the modelling (in the example below, two main hypotheses are used). A commercial bank needs to model two elements: what happens to immediately accessible credit lines and what happens to term deposits that have to be rolled over, which are minimal compared to a retail bank. The risk is usually analysed in terms of the type of debt (securitised or not), the type of counterparty, the country and reliability of the counterparty, and the degree of subordination. For a retail bank, modelling has to cover a funding risk linked to behaviour which is both habitual (anticipated repayments, renegotiations) and ‘crisis-driven,’ such as account closures, payment delays and increases in unauthorised overdrafts.

Banks must also achieve sufficient granularity in their data to be able to carry out detailed analyses able to respond to the requirements of both supervisors and internal reporting. They may also use dynamic simulations, which are more frequently ‘medium to long-term’ rather than ‘short-term’ analyses. Such simulations attempt to define a target and analyse the future based on the past: they involve looking at the characteristics of loans that have been issued recently, which are then replicated to set the proportions of new lending.

Greater consideration is now given to the cost of liquidity to be taken into account in internal cost allocation, performance measurement, new product issuance and budgeting, whereas previously the focus was more on interest rates. The idea of liquidity spreads, for example, is now integral. The liquidity spread is calculated using the lattice valuation methodology of Moody’s KMV, based on a string of data relating to the characteristics of the contract and parameters relating to the borrower, the market and the bank.

All these elements show the need for a sophisticated IT system and familiarity with the full extent of group operations beyond the highly detailed information required to build the different types of models. The in-depth cash flow forecasting offered by the Fermat liquidity management solution provides specific indicators and detailed analytical capacity, the flexibility to define liquidity indicators and the ability to produce efficient reporting.
Liquidity Gap

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<th>Assets</th>
<th>Liabilities</th>
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<td>Long term assets</td>
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Assets

Liabilities

The graph illustrates the liquidity gap over different time periods, showing how assets and liabilities change over time.
AUTHOR

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Nicolas worked as ALM and risk manager in two French Banks, Credit Agricole and Caisse Nationale des Caisses d’Epargne for more than six years before joining Fermat, a leading risk management software solution provider in 2005. Since then, Nicolas has been working as an expert in Asset and Liability Management at the Research Department. Fermat was acquired by Moody’s Analytics in late 2008 and is now fully integrated.

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Nicolas holds a mathematics and economics degree from the Ecole Polytechnique and a finance and statistics degree from the Ecole Nationale de la Statistique et de l’Administration Economique, two prestigious French Grandes Ecoles. To contact Nicolas Kunghehian, please call Manuela Gebhard at +44 (0)207-772-1547 or via e-mail at stresstesting@moodys.com.

This article has been written on the basis of a presentation given by the author at Moody’s Analytics Stress Testing Forum held in Paris, France on February 9, 2010. For more information or to attend similar events, please contact us at stresstesting@moodys.com.