Basel III Liquidity Risk

Perspectives on the implementation challenges facing banks

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Contents

About the Author

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New Liquidity Risk Management Regime

Basel III liquidity risk guidelines are uncharted territory for most middle-tier and large banks. The complexity of their operations in multiple currencies and legal entities spread across various geographical locations pose a significant implementation challenge. The new paradigm for liquidity covers both long-term, structural funding and immediate or short-term liquidity. The new regulatory guidelines reflect the lessons learned from the 2008-2009 financial crisis and are driving banks to plan and manage liquidity based on very stringent quantitative and qualitative standards.

The guidelines concerning medium- to long-term funding require banks to calculate a net stable funding ratio (NSFR) – i.e., the available amount of stable funding relative to the amount of required stable funding over a one-year horizon – and ensure that it is greater than 100 percent on an ongoing basis. Banks must also fund long-term assets with reliable sources of funds that have an effective (residual) maturity greater than one year. To comply with this regulation, banks need to classify their equity, liabilities and assets with an effective maturity of greater than one year, at an individual account or position level into either available stable funding or required stable funding based on their liquidity attributes and stability under stressed conditions.

The guidelines for short-term liquidity require banks to demonstrate that they can meet all the payment obligations that may arise during a period of continued stress lasting for 30 days or longer. To fulfill this regulation, banks must calculate a liquidity coverage ratio (LCR). Accordingly, banks must always maintain a buffer in the form of highly liquid assets sufficient to withstand the cash outflow during this period. This arrangement is basically to make sure that a bank gets a sufficient window of time – i.e., 30 days – to address the causal factors to create lasting normalcy as an alternative to being forced into bankruptcy. The LCR must be greater than 100 percent and must be measured and reported to the regulators as the simple average of daily observations over the previous quarter.

Other equally important aspects of the Basel III regulation aimed at creating a sound liquidity management infrastructure require banks to:

- Manage liquidity of significant currencies. This involves monitoring the LCR ratio in each significant currency, which requires the calculation of foreign currency LCR ratios. It also involves examining a bank's ability to transfer a liquidity surplus in one currency to mitigate a liquidity deficit in another currency during a stress period.

- Transfer pricing involving liquidity credits and charges to provide an incentive or disincentive for business units based on the liquidity impact of each new transaction.

- Monitor the diversification of the funding base or, in other words, examine funding concentrations. This requires banks to monitor proportions of liabilities in each significant currency, product type and counterparties relative to the total liabilities on the balance sheet.

- Put in place an appropriate liquidity limits management system to monitor and control liquidity risk, as well as have an action plan for resolving limit breaches.

- Create a formal contingency funding plan that should lay out orderly liquidation of securities and funding activities that will be carried out in the event of a liquidity stress.

Implementation Challenges of Basel III Liquidity Risk Ratios

The existing liquidity management systems in most banks primarily comprise:

- Cash management units responsible for tactical liquidity, such as for intra-day or overnight funding and manages daily payment and settlement in a variety of accounts that a bank has with other banks, clearing corporations or the central bank (for example, real-time gross settlement).

- Asset and liability management unit in the treasury department performing cash forecasts arrived at from all future contractual and behavioral cash inflows and outflows, and summing up the observations in a liquidity mismatch report.

This framework for tuning cash inflows and outflows has worked so far to manage end-of-day cash balances in various nostro accounts and to manage liquidity in an orderly market. However, this approach has an operational focus and, as a result, management of liquidity risk is ignored. Prior to Basel III liquidity risk norms, most banks were required to submit simple monthly or biweekly liquidity mismatch reports to the regulators. The liquidity risk analysis was typically done at a fairly high level (or a pool level), and it used to involve simple assumptions regarding the behavior of assets and liabilities. There was limited assessment of the impact of contingent or off-balance-sheet positions, such as derivatives and guarantees on a bank's liquidity. It is already known that liquidity risk was a major problem for banks that relied excessively on wholesale unsecured funding and had large derivative operations. The new Basel III regime for liquidity risk has increased the scope of liquidity management by asking banks to identify potential liquidity impacts from all the contingent sources.

Another change implied in the Basel III regime is for banks to do a detailed liquidity profiling of assets and liabilities, which requires delving into an individual position or account's attributes. The rules ask for a priori classification of each account into a predefined liquidity class that will be assigned a specific liquidity treatment downstream. This classification process is rules-driven and takes into account the fundamental characteristics, such as low credit and market risk, and market characteristics, such as bid-ask spread, active and sizable market and so on. Basel III has – for the first time – therefore addressed liquidity risk as a consequential risk resulting from problems with poor credit quality and market volatility.

The integration of liquidity risk with credit risk and market risk poses implementation challenges, especially for middle-tier and large banks where risk systems are not as well integrated with each other. For example, assessing the impact of derivative collateral on liquidity requires the middle office (which is in charge of market risk) to provide this assessment to the liquidity risk team so that it can be factored into the LCR computations. In addition to calculating the net payable or receivable on derivatives, the middle office also needs to run a more comprehensive assessment that takes into account the following scenarios that will lead to increased liquidity requirements:

• Activation of downgrade triggers (1-notch to 3-notch) embedded in securities financial transactions and derivatives.

• Potential valuation changes in posted collateral.

• Market valuation changes on derivatives.

Most banks lack integration of market risk and liquidity risk systems, so the current infrastructure leads to errors stemming from manual work. In addition, working with high-level assumptions can often be inaccurate.

Basel III liquidity risk compliance will produce big benefits for banks in the form of better management of collateral portfolios and integration of stress testing derivatives portfolio activity with liquidity management processes. However, given the inadequacy of the liquidity management infrastructure and its connections with other risk applications, the implementation definitely poses a huge systems challenge for banks. For example, at any given point in time, a treasurer should be able to obtain a consolidated collateral report across different products, currencies, businesses and regional hubs. Such information, if available promptly, has a lot of value for liquidity management since it can ease the pressure on money market teams to raise costly short terms from market.

Traditional liquidity systems have not needed to assess liquidity characteristics of the hold-to-maturity portfolio. Until the financial crisis, it was believed possible to use most of such securities in a repo transaction and roll over the contract to create permanent funding. During the crisis, however, it was proved by flight-to-quality that nothing other than sovereign bonds serve as good collateral for repos. This has raised the bar for securities that can be used in a repo transaction. It is practically impossible now to repo assets with high market volatility or less credit quality without steep haircuts. Market behavior during the crisis made it clear that only extremely liquid assets are good for generating cash during an acute liquidity crisis; therefore, the Basel III regulations require banks to create a liquidity buffer comprising extremely high liquid assets, classified based on a number of properties – e.g., issuer type, credit risk weight, under independent control of liquidity management function, etc.

Banks now must assess each and every security individually in this classification process. Therefore, it is not surprising that a supervisory guidance paper published by BCBS in January 2014 suggests methods such as liquidity scoring by using a number of key metrics and devising a liquidity threshold for assigning a security to the liquidity buffer.

The LCR norms tend to calibrate the liquidity buffer for a 30-day stress period. At the same time, banks are also advised to do a more conservative internal assessment, thereby testing to what extent a buffer may be needed for a stress duration longer than 30 days. Some banks also have demanded liquidity monitoring for a shorter period, anywhere from one to 29 days.

Indeed, liquidity measurement systems need to be flexible and should be able to adapt to any buffer calibration window or multiple windows. This is not a trivial task – it requires a complete reassessment that takes into account collateral flows and maturing transactions that happen in a broader or narrower time window.

The main challenge is that some of the liquidity risk applications that middle-tier and large banks support continue to work as black boxes that do not allow possibilities for user-defined configurations and custom risk analysis.

There are a host of other challenges that are more technical and system-oriented. The span of operations of middle-tier and large banks invariably involves multiple currencies and entities. Such banks are required to do consolidated reporting in their base or jurisdictional currency for their home regulator and in local reporting for each legal entity to the respective host regulator as well. The LCR norms for the classification of

securities into liquidity buffer, application of haircuts and reporting rules, though broadly guided by BCBS, are jurisdiction-specific. Therefore, banks have to deploy liquidity systems to cover legal entities in various jurisdictions. They need the flexibility to not only adapt to the local jurisdiction rules, but also enable a consolidated view of liquidity that combines the liquidity risk of all entities across currencies, monitors risks and reports this consolidated liquidity situation.

Above all, transparency in different liquidity calculations (e.g., calculation of unencumbrance accounting for collateralization, marking-to-market, contractual cash flow computation, haircut assignments, aggregation of data and mapping results to the right place in the reporting template) and the flexibility to configure different stress scenarios and re-run liquidity calculations to assess the impact are critical aspects of a good liquidity risk solution. Provided a liquidity risk solution addresses these aspects, liquidity analysts can easily use it to perform their everyday activities.

Another important requirement of a good system is the ability to trace results back to the portfolio data and clearly bring out any information on the model used in the computations. This is called data lineage, and it allows risk analysts to work back from output to the source system data, as well as trace each aggregation to the drill-down to a view comprising individual exposures. The entire data processing flow – from portfolio data and liquidity classifications up to the liquidity ratio calculation – should be open to allow for regulatory and internal risk auditing of the calculations. With most traditional systems, this can be quite a challenge for IT departments and business users alike. That's because most of the existing applications work like reporting solutions that provide a regulatory template or just a view of the results. However, such applications take away a lot of important possibilities that could help an analyst diagnose and repair a liquidity problem.

In the next section of this paper, we will provide some insights on the liquidity risk management framework offered as part of SAS® Asset and Liability Management for addressing the business and technical challenges we have discussed.

SAS® Liquidity Risk Management Framework

The liquidity risk management framework provides an end-to-end analytical and technical infrastructure that addresses the needs of modern-day liquidity risk management. Together with other applications – e.g., SAS Credit Risk for Banking and SAS Market Risk for Banking – the liquidity risk framework also

provides an integrated risk management platform for banks that want consistent enterprisewide implementation of different risks on a same platform.

The liquidity risk infrastructure includes a risk data warehouse, a liquidity-specific data mart, analytical computations for Basel III ratios, and liquidity risk integrated with a dedicated reporting warehouse. The architecture supports multi-entity implementation for a global bank, including support for different analysis configurations and jurisdiction-specific business rules. The span of LCR computations is intended to break up a complex process into individual data processing steps and enable analysts to get maximum insights from the output of each step.

The following sections will describe the data process flow as well as the functional and technical capabilities for accommodating the LCR process.

Liquidity Data Enrichment

Various provisions of Basel III liquidity LCR and NSFR norms are prebuilt into the liquidity data enrichment process that checks every individual asset and liability position and its liquidity attributes to determine its appropriate liquidity class. There are more than 60 different liquidity classifications built into a standard process, which can also be customized to include a greater number of classifications as needed based on a bank's portfolio. The system also has the flexibility to bypass this classification step if a bank chooses to provide liquidity classification as an input feed.

The enrichment process includes classification logic based on Basel III. There are rules for various types of assets, liabilities, derivatives and off-balance-sheet exposures, including margining and collateralization. For example, analysts can perform appropriate checks to see if positions in a particular security can be included in the liquidity buffer over the next 30 days; if so, whether it should belong to Level 1, Level 2A or Level 2B Basel III classification; and to what extent, based on the unencumbered holdings. This multitier logic is fairly data-intensive and is arrived at by simultaneously looking into the pledged holdings across all the trading counterparties, the right to re-hypothecate a security, the nature of the security, including its issuer type, date of maturity, etc. Another example is where deposit accounts need to be examined for classification as stable or less stable based on the presence of a deposit insurance, and also examining other operational characteristics, such as the account type, deposit withdrawal option with the depositor and the denomination currency.

Liquidity Portfolio Manager

The liquidity data enrichment step is followed by creating an LCR group structure that basically groups or segments processed data into LCR specific sub-portfolios and maps them in an LCR tree structure as provided in Basel III. In other words, it is the pooling of financial accounts and instruments belonging to the same liquidity class into one sub-portfolio so that it meets with consistent regulatory treatment.

The process enables a liquidity analyst to view the enriched liquidity portfolio right in the application interface to check the classification accuracy and then create liquidity sub-portfolios. For example, a liquidity analyst may want to group positions classified as "Stable Deposits" from any region ABC together in a sub-portfolio for analysis compared with "Stable Deposits" from region XYZ, because they may have different behavioral characteristics. Even though they may have the same liquidity classification, the bank may want to assign different run-off treatments based on what may be specific to the individual regions. Likewise, analysts can quickly and interactively create as many sub-portfolios and save them in the system for subsequent analysis.

Figure 1 shows a liquidity risk interface where an analyst has created the relevant sub-portfolios for analysis. Figure 2 shows that the analyst has opened a high-quality liquid asset (HQLA) portfolio to view a list of high-quality bonds with filters corresponding to its classification applied. This portfolio can be quickly exported to Microsoft Excel for further analysis, saved and shared with the rest of the team members. The system also allows an analyst to import a portfolio from Excel and use it directly in any analysis. This option is for banks that want a quick data load and analyze option.

Figure 1: Portfolio manager.
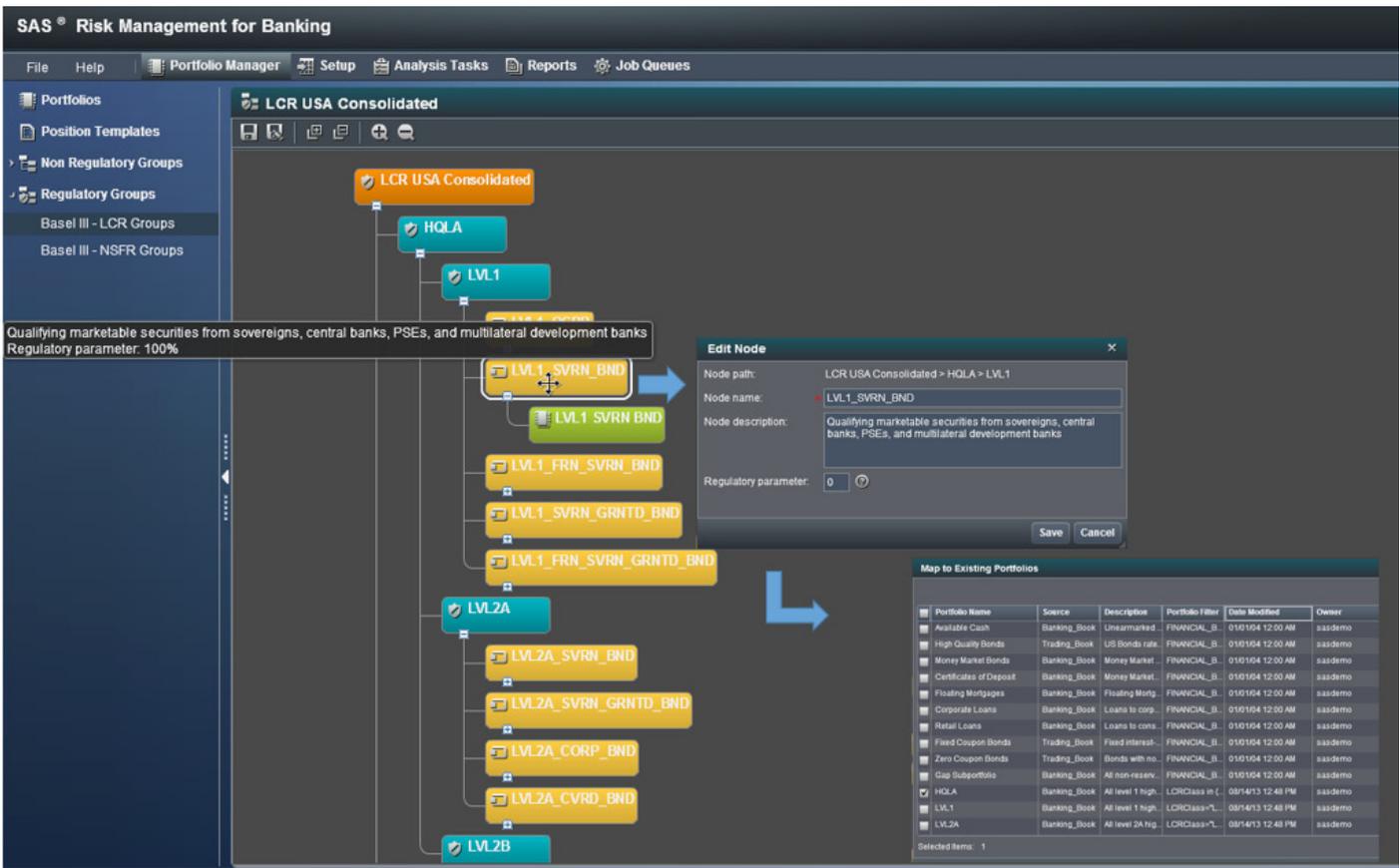

Figure 2: Portfolio view.

Figure 3: Basel III LCR group structure and node properties (LCR factor assignment).

Designing Basel III Based LCR

The liquidity application provides a value-added workflow for creating a Basel III LCR and NSFR grouping structure, as shown in Figure 3. The liquidity group structure enables the creation of nodes that are based on Basel III definitions, such as HQLA, Level 1 assets, Level 2A assets and Level 2B assets, etc., for further analysis. The unique aspect of the liquidity group structure is that it offers flexibility in defining different categories, assigning an LCR factor to that category based on Basel III or a bank's internal requirement, and then mapping sub-portfolios to the category. The LCR factor applied to a node in the group is applied to all the portfolios that are mapped with this node. Through this feature, liquidity analysts can create one or more LCR and NSFR grouping schemes applicable to one or more entities.

More than one group can be opened via the interface for editing and comparison with each other. This enables an analyst at global headquarters to oversee the LCR configurations for a host country right beside the consolidated LCR, as shown in Figure 4.
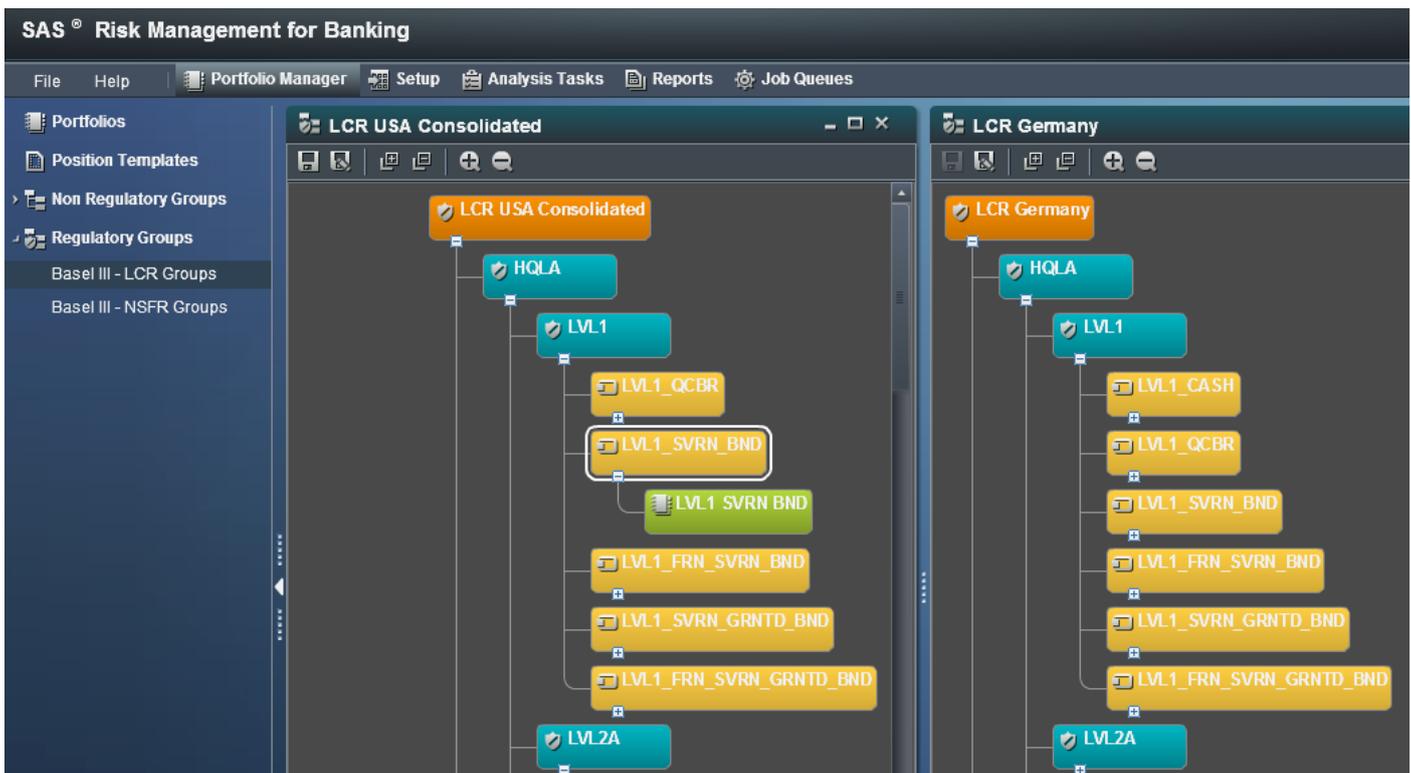
Figure 4: Creating and comparing two LCR groups.

Creating and Running LCR Analysis

With traditional liquidity risk solutions, an analyst sometimes cannot even create and run LCR analysis with custom specifications, which leads to some dependence on the IT department. Figure 5 shows how this problem can be solved by empowering an analyst to quickly create and run LCR analysis after completing all the workflow steps.

A liquidity analyst can view the LCR USA Consolidated portfolio group and Basel III LCR (0-30 Day) time grid inputs. All the objects that are selected with an analysis task can be created and modified, depending on the need of the analysis.

For example, the LCR measurement time horizon can be made more conservative to 0-45 Days, and the LCR group can be changed from LCR USA Consolidated (the consolidated entity) to LCR Germany (the host country). As you can see, implementation of the SAS liquidity risk solution is flexible and gives the liquidity manager a lot of control over creating, running and re-running an analysis under the same or different stress scenarios.

Once the analysis is triggered and successfully completed, users have an option to verify the results data sets, as shown in Figure 6. The mark-to-market value and the haircut applied can be viewed at different levels at which data is post-processed. An example of this is each node of the HQLA comprising break-up between Level 1, Level 2A and Level 2B, and then within Level 1, for example, central bank reserves, securities issued by sovereigns, etc. The LCR calculation comprising the numerator (HQLA) and the denominator (total net cash outflow) is also shown in the results.

Once the results are verified, the analyst can generate specific Basel III LCR templates (based on BCBS 2013 QIS – monitoring standards) and obtain a full Excel-based report that can be analyzed and submitted to the regulator. An analyst may also choose to generate the LCR Excel template for any of the past dates. In this case, the system will fetch the data from the reporting warehouse called a SAS Risk Reporting Repository and produce the desired historical reports.

Figure 5: Creating and running an LCR analysis.

Figure 5: Creating and running an LCR analysis.

Conclusion

The new liquidity risk regulations pose tremendous implementation challenges for banks. Owing to the increasingly complex nature of the regulation, banks need more flexible and comprehensive systems to help them comply with the regulation and, at the same time, help improve the risk management processes. The SAS liquidity risk management framework enables banks to establish the right infrastructure using prebuilt advanced analytics and reporting capabilities for Basel III liquidity risk LCR and NSFR norms and beyond. This, in turn, enables treasurers to get complete control over their bank's liquidity situation.

About SAS® Asset and Liability Management

SAS Asset and Liability Management enables banks to manage interest rate risk, liquidity risk and funds transfer pricing from a single platform. The solution comes with out-of-the-box reporting templates for liquidity risk and interest rate risk, as well as analytical capabilities that support fixed-income analytics suited for a range of risk management activities.

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