LIQUIDITY RISK MANAGEMENT

FIS BALANCE SHEET MANAGER

FORMERLY AMBIT FOCUS

Liquidity management and resiliency of the banking sector to liquidity shocks have stayed in the focus of regulatory bodies around the world for almost a decade. Regulatory requirements to liquidity risk management and reporting have thus grown exponentially. As a result, the banking industry now faces a number of major challenges, such as the need for qualitative and quantitative liquidity assessment, data granularity, increased reporting frequency, firm-wide risk governance and controls, stress testing, and contingency planning. In addition, changes in market environment, including growing costs of liquidity, larger funding spreads, and reduced market confidence, remind banks about the importance of staying solvent. As such, a sound liquidity risk management strategy, facilitating optimization of liquid asset buffer holdings and minimization of related costs, becomes an important constituent of business planning and a source of competitive advantage.

The Liquidity Risk module of FIS® Balance Sheet Manager (formerly Ambit Focus), enables banks to benefit from industry best practice, leveraging the state-of-the-art, ready-to-use liquidity management solution to forecast the impact of liquidity risk measures on income and ensure compliance with external and internal requirements.

Our solution helps banks to take a 360° view of liquidity risk:

- Comprehensive analysis of **cash flows** starts from generation of liquidity gaps based on current balance sheet, further complemented by **scenario modeling and stress testing** to estimate the effect of market factor changes and various business strategies on the bank's liquidity position

- Day-to-day reporting of **liquidity ratios,** leveraging a flexible report setup framework to quickly adapt to regulatory changes, is completed by **LCR & NSFR forecasting** capabilities for proactive management of liquidity ratios

- The **liquidity pricing** framework estimates the costs related to liquidity buffer holding. The inbuilt Fund Transfer Price framework supplies proper incentives for business units generating and consuming liquidity

- A clear view on firm-wide liquidity risk is ensured by the **multidimensional reporting** capabilities of the solution, enabling the banks to create a fully customized report set, complying with country-specific requirements and supporting internal decisions

Cash Flows & Stress Testing

Balance Sheet Manager provides all essential elements of best practice, forward-looking liquidity analysis, as recommended by regulators and the industry:

- Cash flow generation of existing business adjusted to market conditions

- Enriching the running-out balance sheet with new business assumptions

- Dynamic stress testing across firm-specific, market-wide, and combined crisis scenarios, as well as any scenarios defined by the institution

- Assessment of the bank's counterbalancing capacity, depending on the nature and severity of the scenario

Figure 1: 360° Liquidity Risk Management with Balance Sheet Manager

Contractual ("Running-Out") and Behavioral Cash Flows

As a starting point, the Balance Sheet Manager - Liquidity Risk Module rolls out contractual cash flows for both principal amounts and coupons of existing transactions and displays them in discrete or cumulative gaps. Flexible report setup enables the user to change the time buckets with a few mouse clicks, as well as to view the cash flows in required breakdown using built-in filters. Further, the report allows to analyze the total cash flow by its constituents, such as principal payment, disbursement, prepayment, fees, coupon, and margins. Likewise, externally generated cash flows can easily be delivered into the application, thus ensuring absolute consistency of data across bank's systems.

Behavioral assumptions can be set for positions without contractual maturity, i.e. on-demand deposits. Cash flows of such positions are modelled via replication keys and other assumptions.

Modeling of customer behavior is reinforced by available prepayment models, which can include dependencies on customer- and deal-specific parameters, as well as macroeconomic factors. In addition, loan disbursement behavior can be flexibly altered through corresponding modeling framework, to reflect the effect of various scenarios on disbursement timing and volumes. Further, the impact of explicit options on the cash flow profile can be taken into account by the system through setting assumptions on exercise of options depending on either their moneyness or on different behavioral assumptions per stress scenario.

Figure 2: Balance Sheet Manager - cashflow

New Business Planning ("Going Concern")

Liquidity risk management guidelines require banks to run **forward-looking projections,** enabling them to identify future funding mismatches and define countermeasures to mitigate potential lack of liquidity. Such an analysis needs to be tailored to match the bank's business strategy, complexity of operations, and risk profile, while also recognizing the risks arising from off-balance sheet commitments.
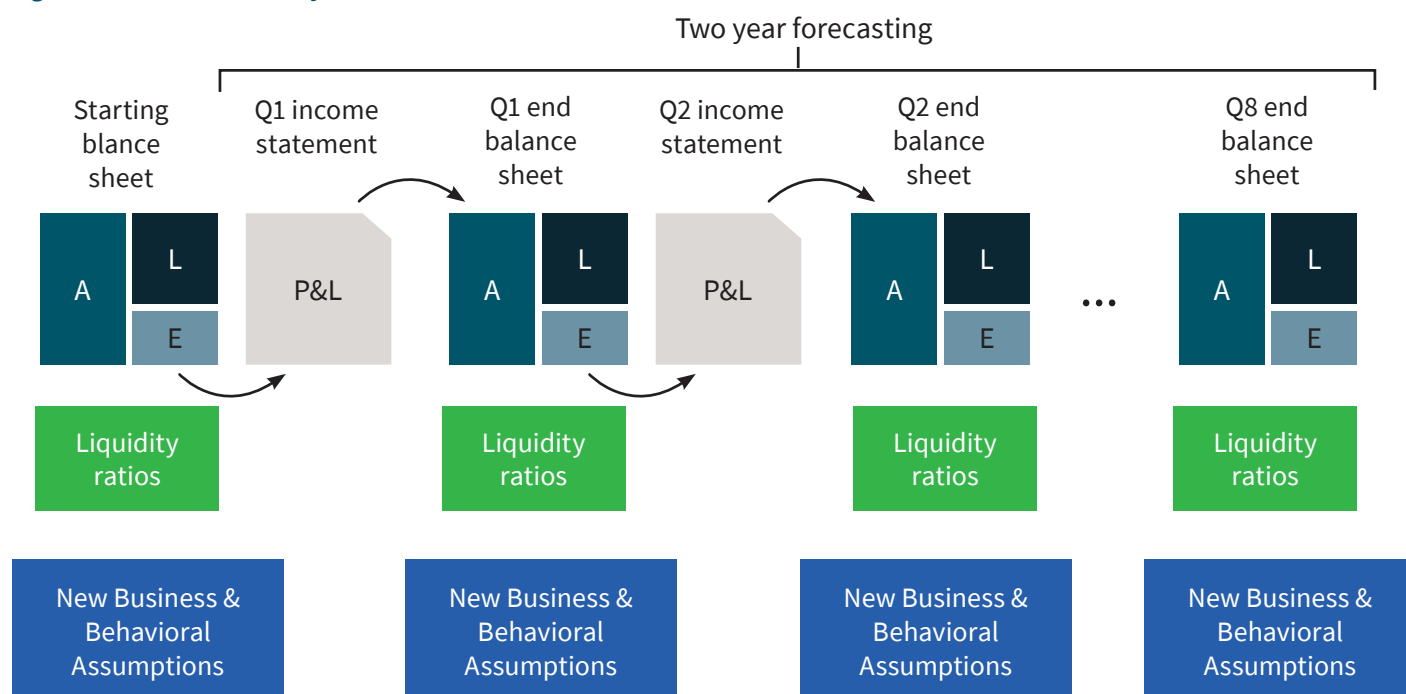
In the Balance Sheet Manager - Liquidity Risk Module, today's balance sheet is projected into the future by making assumptions regarding new business and client behavior. Balance sheet projections typically incorporate a number of assumptions from different departments. For example, the budget scenario and ALM-specific scenarios are complemented by liquidity-focused scenario assumptions. As an outcome, a large set of results is available on projected balance sheets, ranging from liquidity risk management specific metrics like point-in-time cash flow gap profiles, horizon-specific inflow, outflow and market value analysis, and the liquidity ratios (LCR and NSFR) to more interest rate risk management relevant metrics like income analysis, sensitivities, and repricing gaps.

The process of balance sheet projection begins with the definition of granularity at which the balance sheet is being forecasted, which can be easily addressed through Balance Sheet Manager multidimensional framework. For example, current planning process can envisage planning of new business volumes at the level of consolidated balance sheet, product, or entity; a stress test may include modeling of shifts between products under a specific market scenario; or projecting customer behavior in breakdown by counterparty type (retail and wholesale) and other characteristics.
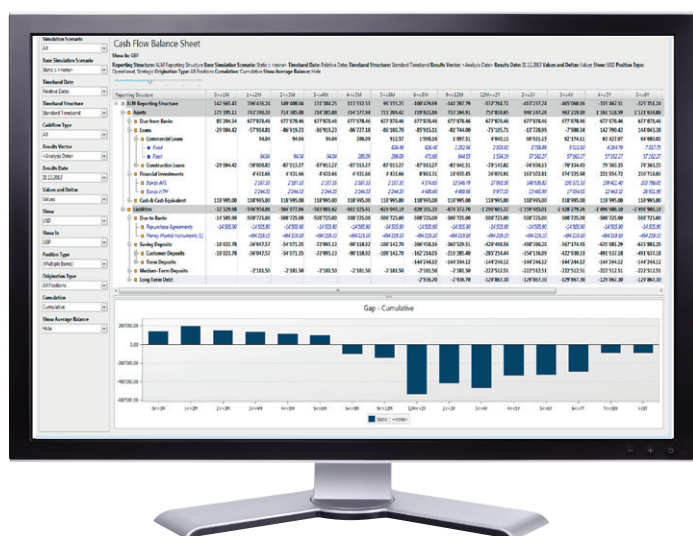
Once the scenario specific balance sheet structure has been defined, different sets of new business assumptions, such as budget or growth scenarios, can be assigned to relevant levels of the planning structure. In order to model further evolution of the balance sheet, business users can define the planned volumes, maturities, and pricing of new business, as well as behavioral assumptions for the existing and new business (replication keys for non-maturing balances, prepayments, option exercise etc.).

Figure 3: Balance Sheet Projections

Two year forecasting

Starting blance sheet — Q1 income statement — Q1 end balance sheet — Q2 income statement — Q2 end balance sheet — Q8 end balance sheet

A | L | E | P&L | A | L | E | P&L | A | L | E | ... | A | L | E

Liquidity ratios

New Business & Behavioral Assumptions

Planning of new business is highly flexible in the system, enabling business users to plan at the high level (e.g. total investments portfolio) or more granular levels (e.g. by product, entity or currency). To enable needed granularity of obtained results and adequate allocation of planned new business volumes into liquidity and earnings projections, the system further can automatically assign qualitative attributes to the planned deals. For example, for LCR simulation the newly planned Investment portfolio volumes would be adequately assigned to the respective HQLA categories, given today's distribution of the ratings, counterparty types, and other qualitative criteria. Alternatively, users can explicitly plan volume changes on selected dimensions, e.g. an increase in commercial mortgages while residential mortgages remain constant.

The balance sheet scenarios are complemented by assumptions on market rates, supporting definition of all kinds of macroeconomic factors, including among other FX rates, credit spreads, and interest rate scenarios (e.g. linear shift, flattening, inversion, etc.) to assess the resulting effect on the market value of liquid assets stock.

The flexible planning structure and scenario setup allows reacting quickly to changing business requirements and ad-hoc management reporting requests. Further, multiple departments and entities can leverage common scenarios to derive results across relevant metrics and breakdowns – for example, analyzing the effect of liquidity-specific scenarios on the income of the bank.

Stressed Cash Flows

In order to be able to assess the resiliency of the balance sheet to liquidity shocks, stress tests are applied on top of the defined "going concern" scenarios. Balance Sheet Manager supports defining multiple stress scenarios with different level of severity (e.g. moderate, severe, extreme) including various types of effects such as contagion, reduced access to selected funding sources, and modeling of different stages of a crisis. For embedded options, option exercise models are available, which enable the bank to assess the impact of changing customer behavior regarding the economic exercise of options under stressed liquidity conditions as well as model the call events on own issues. As such, it is possible to analyze the effect of the option exercise pattern with the most adverse effect on the bank's liquidity.

Contingency Planning

The intuitive scenario simulation framework of Balance Sheet Manager, provides the possibility to include counterbalancing measures in order to compensate for net liquidity outflows under stress, delivering essential inputs for contingency funding plan development.

Among others, the following countermeasures can be embedded into stress scenarios:

- Selling off liquid assets using various strategies (including P&L impacts of haircuts)

- Unsecured borrowing

- Secured borrowing (repos, loans from Central Bank)

- Use of standing facilities available from Central Bank

- Effects of securities lending

- Lending strategies

- Reduced lending pipeline

Based on the above described combination of assumptions, the results computed by the solution can be used in ILAAP process, stress testing, contingency planning, and survival horizon analysis to show how long an institution can survive a specific stress, taking into account existing buffer levels and contingency plans. Consequently, banks can optimize their buffer holdings and manage the related costs.

Figure 4: Liquidity Stress Testing with Balance Sheet Manager

Input:

Stress Scenarios

Market specific factors
- Interest-induced effect on market value of HQLA
- Widening of credit spreads
- FX rates changes

Bank specific factors
- Deposit outflow
- Wholesale funding roll-over
- New issuances
- Outflow from facilities
- Additional collateral posting

Mitigating actions
- Repo / sell off liquidity buffer
- Sell off marketable assets

Output:

LCR, NSFR projection

Counterbalancing capacity

Cash flow projection ⇨ Survival horizon

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LCR & NSFR

Supervisors acknowledge that adequately designed and properly implemented internal stress testing provides important insights into an institution's liquidity risk profile. However, they also need to be provided with a quantitative and comparable set of data. As such, banks are required by national regulatory bodies implementing Basel III to showcase resilience to a standardized stress test (LCR) and a healthy balance sheet structure where long term commitments are funded through long-term, stable liabilities (NSFR).

Supporting state of the art liquidity risk management, Balance Sheet Manager naturally ensures operational efficiencies in traditional work-intensive areas such as regulatory reporting. The solution comes along with fully customizable LCR and NSFR framework in order to account for country-specific regulatory discretion or internal liquidity risk policies in place.

Based on relevant dimensions (such as counterparty, rating, or product type), the system maps specific positions into LCR and NSFR report categories. In effect, the bank only needs to specify the mapping rules (i.e. the criteria along which positions are classified), instead of having to deliver the needed LCR category at the position level. As such, all the business logic behind this classification is situated in the system itself and can be customized by the business users. The user can further define, which results shall be reported for a specific category (outstanding balances, unencumbered part of market value, etc.), as well as weights and run-off factors.

Taking into account the importance of repo and reverse repo transactions in the liquidity management of banks, as well as the need to correctly include these types of transactions into LCR calculation, Balance Sheet Manager fully accounts for the following use cases:

- Impact of repos and reverse repos on calculation of stock of HQLA and Net Cash Outflows

- Unwinding of repos for calculation of respective adjustments

- Rehypothecation – re-usage of collateral received under reverse repo for another repo transaction

Banks can choose the interval at which to calculate the Basel III ratios. Some jurisdictions are already requesting daily LCR reporting capability. Additionally, many jurisdictions reserve the right to increase the frequency of ratio reporting (see Exhibit below). Thus, banks need to have processes in place that allow for time- and effort-efficient ratio reporting. With the fully automated LCR & NSFR computation in Balance Sheet Manager, banks can freely define and easily adapt the reporting frequency.

LCR REPORTING FREQUENCY

"The LCR should be reported to supervisors at least monthly, with the operational capacity to increase the frequency to weekly or even daily in stressed situations at the discretion of the supervisor."

Source: BCBS 238: Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools, January 2013
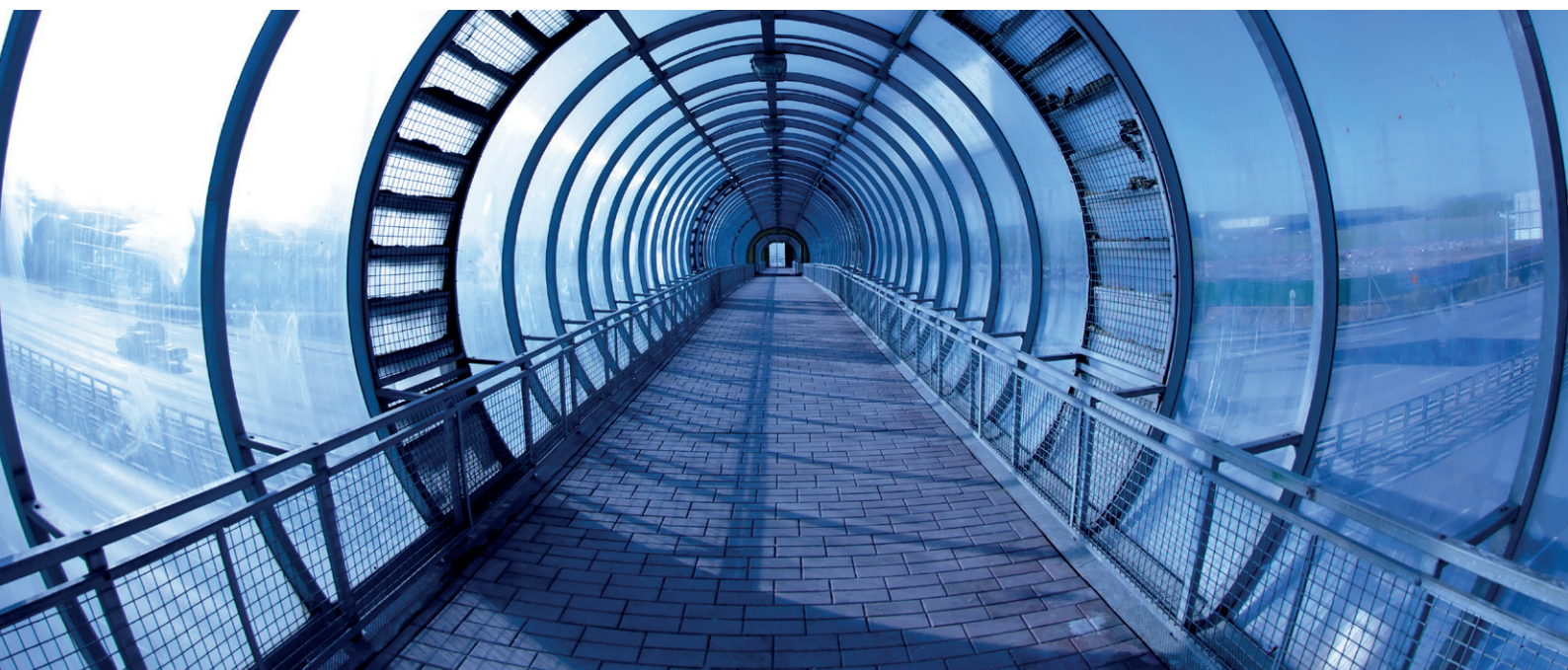
LCR & NSFR Forecast

LCR and NSFR ratios have to be fulfilled at reporting dates, with calculations based upon ratio dynamics along the previous dates (see Exhibit below). Given that even trivial events such as the maturity of a bond issue can have a massive impact on the LCR, potential swings in LCR need to be foreseen in order to be properly managed.

On the other side, holding excess liquidity is costly. Banks thus need to steer the regulatory ratios that will be reported in the future constantly and in a prospective manner. Thus, in addition to supporting day-to-day liquidity ratio reporting, Balance Sheet Manager also enables banks to flexibly project the ratios into the future, leveraging the scenario engine described above. Additionally, ad-hoc simulations allow identifying the impact of large transactions on the fly, thus supporting efficient business decisions.

Forecasting of LCR and NSFR empowers banks to

- Identify potential for liquidity buffer reduction

- Reduce probability of unforeseen ratio swings and regulatory breaches

- Analyze LCR drivers for indirect liquidity costs

Figure 5: Liquidity Coverage Ratio Forecast Under Different Simulation Scenarios
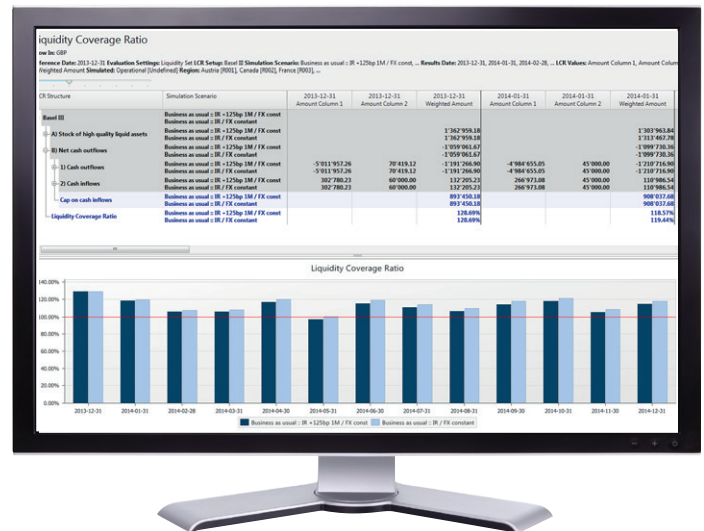
LCR DISCLOSURE REQUIREMENTS

"The disclosure of quantitative information about the LCR... must be presented as simple averages of daily observations over the previous quarter."

Source: BCBS 272: Liquidity coverage ratio disclosure standards, January 2014; rev. March 2014

Liquidity Transfer Pricing

A liquidity transfer pricing (LTP) framework ensures that incentives are set correctly and that liquidity is treated as a scarce resource throughout the bank. The consumption of liquidity is charged internally, while units gathering funding are credited for the provision of liquidity. LTP is embedded within the funds transfer pricing (FTP) framework of Balance Sheet Manager. Similarly to traditional interest rate FTP, within liquidity transfer pricing a dedicated unit such as the treasury takes over liquidity risk and thus acts as an intermediary between liquidity consuming and liquidity generating profit centers, "selling" and "buying" liquidity at internal transfer price to reflect the demand and supply for it.

The LTP can be split into two components:

- Direct costs / term liquidity premium: cost incurred by the bank for obtaining liquidity (spread paid by a bank to compensate its creditors for its own institution-specific credit risk). It is credited or debited to the profit center within the bank, which consumes or provides liquidity, respectively.

- Indirect costs / contingent liquidity premium: opportunity cost of holding a liquid asset buffer to protect against liquidity stress and contingent outflows. Business that is classified as high risk, either due to internal limits or regulatory requirements, is requiring a higher liquidity buffer which needs to be priced and incentivized accordingly.

Balance Sheet Manager allows banks to include both direct and indirect costs within the LTP. The direct costs correspond to the (real or hypothetical) spread paid by the bank to compensate its creditors for liquidity and bank-specific credit risk. The allocation to the front businesses is done based on the maturity of the positions. For indirect costs, the liquidity opportunity costs need to be identified and allocated to the front businesses. The driver for aforementioned attribution is dependent on a bank's business model and can stem, for example, from the LCR or from internal liquidity guidelines, rules, and metrics.

Figure 6: Direct and Indirect Costs of Liquidity
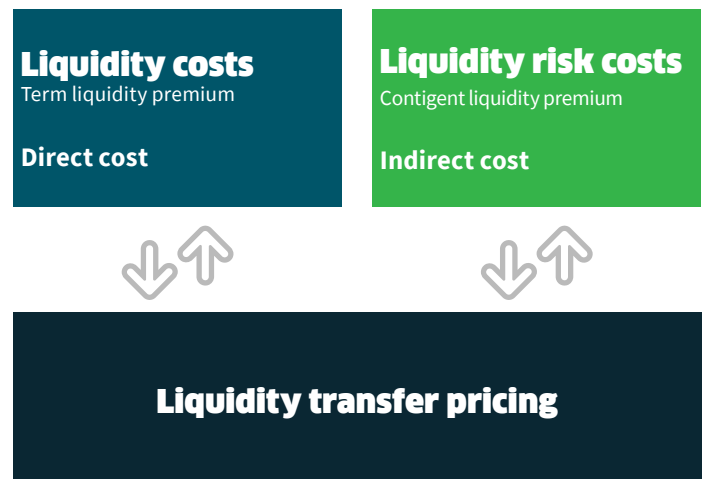
REGULATORS AND LTP

The German regulator (BaFin) states:
"All institutions need to have an appropriate LTP in place. Small institutions need to consider direct costs. Large institutions with complex business models have to consider direct as well as indirect costs."

Source: BTR 3.1.5 and 6, Rundschreiben 09/2017 (BA), 27.10.2017

Liquidity Risk Reporting

Balance Sheet Manager exclusively provides a customizable report suite for comprehensive assessment of a bank´s liquidity situation. Examples of bank-specific reports facilitated by the solution include the following:

- **Survival horizon analysis,** providing a management summary of multiple stress scenarios with different severity levels and showing how long an institution can survive under a specific stress

- Detailed assessment of the banks **counterbalancing capacity** under various scenarios

- Analysis of **funding diversification** across currencies and other dimensions, facilitating compliance with EBA requirements on liquidity monitoring metrics

- **Key risk indicators,** enabling a thorough assessment of the market and bank specific conditions that can act as early warning triggers for contingency plans

- **LCR and NSFR projection** under different balance sheet scenarios

- **Liquidity cost analysis,** including direct and indirect costs calculated with regards to internal stress scenario or derived from projected LCR

Leveraging the multidimensional reporting technology, various results can be compared over time, thus facilitating trend analysis. This allows an institution to recognize a deterioration in its key risk indicators in due time and to take appropriate action. Further, the ability to publish reports on Web or a mobile portal allows for swift distribution of results to all participants of decision-making process.

Thus, Balance Sheet Manager enables banks to incorporate liquidity risk management into a holistic balance sheet management framework, helping to comply with evolving regulatory requirements, as well as ensuring comprehensive analytic support for informed risk and finance decision making.

EBA – ADDITIONAL LIQUIDITY MONITORING METRICS

The EBA is proposing the following metrics to obtain a comprehensive view of an institution's liquidity risk profile:

- maturity ladder

- concentration of funding by counterparty and product type

- concentration of counterbalancing capacity by issuer/ counterparty

- prices for various lengths of funding

- rollover of funding.

Source: EBA FINAL draft implementing technical standards on additional liquidity monitoring metrics under Article 415(3)(b) of Regulation (EU) No 575/2013, 18.12.2013

Figure 7: Examples of Multidimensional Reports

Why choose Balance Sheet Manager?

Our solution provides the following benefits:

- Full integration of balance sheet management, empowering risk measurement across different departments

- Best of breed balance sheet management solution, enabling banks to take risk management beyond compliance and focus on performance

- Modular platform, allowing combinations of out of the box functionalities for:

  – ALM
  – Stochastic ALM
  – Liquidity Risk
  – Market Risk
  – Hedge Accounting
  – IFRS 9 Impairment and Credit Adjusted ALM
  – Funds Transfer Pricing

- Intuitive and user-friendly interface

- Multi-dimensional planning and reporting

About FIS

FIS is a leading provider of technology solutions for merchants, banks and capital markets firms globally. Our employees are dedicated to advancing the way the world pays, banks and invests by applying our scale, deep expertise and data-driven insights. We help our clients use technology in innovative ways to solve business-critical challenges and deliver superior experiences for their customers. Headquartered in Jacksonville, Florida, FIS is a Fortune 500® company and is a member of Standard & Poor's 500® Index.

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