



Enhancing Risk Management and Governance in the Region's Banking System to Implement Basel II and to Meet Contemporary Risks and Challenges Arising from the Global Banking System

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## **Managing Liquidity Risks**

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The global sub-prime crisis of 2007-8 has emphasized the importance of liquidity management in banking (and other organizations) and the potentially disastrous risks which exist. The Basel Committee has issued (June 2008) its “Principles for Sound Liquidity Management and Supervision”.<sup>1</sup>

Liquidity management involves financial institutions implementing strategies of “self-insurance” or “purchased insurance” against shortfalls of cash required to meet current and forthcoming obligations in a variety of ways. The optimal mix will reflect the relative costs incurred in using each approach and the risks associated with each.

Determining the scale of potential liquidity needs is an ongoing daily activity with a number of dimensions. These include:

- Ensuring adequate “cash” is available at customer outlets (branches, ATMs) to meet withdrawals;
- Having sufficient settlement account balances to meet overnight settlements;
- Projecting likely net withdrawals/inflows (due to maturing deposits, loan drawdowns, customer transactions etc) on future dates such that actions can be taken to ensure the availability of adequate liquidity as these dates approach. As the time horizon involved gets longer, liquidity management morphs into “funding” and capital management arrangements.

There are a range of techniques available for these purposes, but an important component is that of “stress testing”. One such test which most regulators will require is for financial institutions to demonstrate that they are able to survive a “name crisis” in which their ability to access key sources of funds dries up for a number of days. Table 1 provides information on possible assumptions which might be required in stress testing.

**Table 1: Stress Testing: Possible assumptions**

asset market illiquidity and the erosion in the value of liquid assets
the run-off of retail funding
the (un)availability of secured and unsecured wholesale funding sources
the correlation between funding markets or the effectiveness of diversification across sources of funding
additional margin calls and collateral requirements
funding tenors
contingent claims and more specifically, potential draws on committed lines extended to third parties or the bank's subsidiaries, branches or head office
the liquidity absorbed by off-balance sheet vehicles and activities (including conduit financing)
the availability of contingent lines extended to the bank
liquidity drains associated with complex products/transactions

<sup>1</sup> In February 2008 it published “Liquidity Risk Management and Supervisory Challenges”

the impact of credit rating triggers
FX convertibility and access to foreign exchange markets
the ability to transfer liquidity across entities, sectors and borders taking into account legal, regulatory, operational and time zone restrictions and constraints
the access to central bank facilities
the operational ability of the bank to monetise assets
the bank's remedial actions and the availability of the necessary documentation and operational expertise and experience to execute them, taking into account the potential reputational impact when executing these actions
estimates of future balance sheet growth.
<i>Source: Basel Committee: BCBS144</i>

Potential sources of liquidity include the following:

- Holding “cash” or near-cash assets. This is generally perceived to be expensive – because providers of funds to the institution do not adjust downwards their required rates of return sufficiently to reflect the lower risk associated with higher liquidity. As financial markets have developed, cash holdings have fallen as a form of liquidity management – although there has been clear evidence of a flight to cash (such as Central Bank deposits) during the uncertain times of the sub-prime crisis.
- Holding readily marketable securities (financial assets). The sub-prime crisis has exposed the shortcomings in such a strategy for coping with market wide liquidity crises. It involves taking on market risk (due to volatility in the market prices of those assets), with the risk of having to sell into a depressed market. In a time of crisis, when many organizations are pursuing the same strategy, the cost can be significant – and particularly so if markets freeze up as has happened during the crisis.
- Holding securities which can be pledged as collateral for short term borrowings. The repurchase (repo) market, in which securities are sold and simultaneously repurchased for delivery at a future date, has become an important tool for liquidity management of this sort.
- Having in place lines of credit or other arranged borrowing facilities. The ability to draw on a committed line of credit or overdraft facility from another institution will typically involve incurring some cost for establishment and maintenance of that facility in addition to the cost of borrowing. Another option is to have facilities in place which enable the organization to issue securities (such as commercial paper) into the capital market. In some cases this may also be achieved by having an option attached to existing securities on issue which enables the issuer to extend their maturity.
- Having at-call or short term loans outstanding to other entities which can be called to provide cash when needed. The risk here is that such loans involve counterparty risk – and calling such loans may increase the likelihood of default if there is widespread stress in the financial market. Often, such loans may be

collateralized by marketable securities pledged by the borrower against the loan (such as via a loan made as a reverse repo). This reduces the risk of the borrower defaulting, but leads to potential exposure to market risk if default occurs and the value of the security has declined. Consequently, ensuring that margin requirements are continually met and the value of collateral maintained above the loan value becomes an important operational requirement.

- Having sufficient credit rating and standing with potential counterparties to be able to borrow at short notice in inter-bank markets. This is an important component of daily liquidity management in which banks with projected surpluses and deficits in their desired settlement account balances at the Central Bank trade with each other to correct those imbalances. Table 1 provides more detail on potential sources of “funding liquidity”
- For banks, the ability to access “Lender of Last Resort” loans or use discount window facilities at Central Banks provide further potential, albeit costly, sources of liquidity.

#### **Table 2: Potential sources of funding**

- deposit growth
- the lengthening of maturities of liabilities
- new issues of short- and long-term debt instruments
- intra-group fund transfers, new capital issues, the sale of subsidiaries or lines of business
- asset securitisation
- the sale or repo of unencumbered, highly liquid assets
- drawing-down committed facilities
- borrowing from the central bank’s marginal lending facilities.

*Source: Basel Committee: BCBS144*

Liquidity risks can arise from specific individual products or business lines, meaning that an overall framework is required for total liquidity management. Some of these risks can arise from contingent commitments – which may be contractual or non-contractual (where the reputational costs of not meeting that commitment are sufficiently severe as to make them effectively contractual). Liquidity risks and credit counterparty risks are inherently interrelated, and liquidity risk can easily transform into solvency risk for an institution.

Some questions which financial institutions need to address in examining their liquidity management arrangements include the following:

- How is liquidity risk of new (and existing) products to be measured?
- What liquidity risk costs should be incorporated into the funding costs of products (and how do internal systems achieve this)?
- How are all potential liquidity risks (such as contingent commitments and lines of credit provided) appropriately incorporated into centralized liquidity planning and management?

For Central Banks and Prudential Regulators, questions which warrant attention include:

- What are the appropriate structures for liquidity support facilities which Central Banks provide to individual institutions (lender of last resort, rediscount window etc)?
- How should system liquidity management techniques be designed (such as use of securities lending v repos; allowable collateral etc)?
- Can liquidity creation outside the banking sector and based on activities such as repos and securities loans be adequately controlled by use of traditional central Banking weapons?
- What are some possible early warning signs of institutions facing liquidity problems? Table 3 provides some suggestions.
- What information should regulators expect institutions to publicly disclose about their liquidity management practices? Table 4 provides some suggestions, and the disclosures by Deutsche Bank are also shown..

**Table 3: Early warning indicators**

• rapid asset growth, especially when funded with potentially volatile liabilities
• growing concentrations in assets or liabilities
• increases in currency mismatches
• a decrease of weighted average maturity of liabilities
• repeated incidents of positions approaching or breaching internal or regulatory limits
• negative trends or heightened risk associated with a particular product line, such as rising delinquencies
• significant deterioration in the bank's earnings, asset quality, and overall financial condition
• negative publicity
• a credit rating downgrade
• stock price declines or rising debt costs
• widening debt or credit-default-swap spreads
• rising wholesale or retail funding costs
• counterparties that begin requesting or request additional collateral for credit exposures or that resist entering into new transactions
• correspondent banks that eliminate or decrease their credit lines
• increasing retail deposit outflows
• increasing redemptions of CDs before maturity
• difficulty accessing longer-term funding
• difficulty placing short-term liabilities (eg commercial paper)

*Source: Basel Committee: BCBS144*

**Table 4: Possible Liquidity Risk Management Disclosures**

the aspects of liquidity risk to which the bank is exposed and that it monitors
the diversification of the bank's funding sources
other techniques used to mitigate liquidity risk
the concepts utilised in measuring its liquidity position and liquidity risk, including additional metrics for which the bank is not disclosing data
an explanation of how asset market liquidity risk is reflected in the bank's framework for managing funding liquidity
an explanation of how stress testing is used
a description of the stress testing scenarios modelled
an outline of the bank's contingency funding plans and an indication of how the plan relates to stress testing
the bank's policy on maintaining liquidity reserves
regulatory restrictions on the transfer of liquidity among group entities.
the frequency and type of internal liquidity reporting
<i>Source: Basel Committee: BCBS144</i>

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## Liquidity Management

Liquidity Risk Management safeguards the ability of the bank to meet all payment obligations when they come due. Our liquidity risk management framework has been an important factor in maintaining adequate liquidity and a healthy funding profile during the year 2007.

### Liquidity Risk Management Framework

Treasury is responsible for the management of liquidity risk. Our liquidity risk management framework is designed to identify, measure and manage the liquidity risk position. The underlying policies are reviewed and approved regularly by the Capital and Risk Committee. The policies define the methodology which is applied to the Group.

Our liquidity risk management approach starts at the intraday level (operational liquidity) managing the daily payments queue, forecasting cash flows and factoring in our access to Central Banks. It then covers tactical liquidity risk management dealing with the access to unsecured funding sources and the liquidity characteristics of our asset inventory (asset liquidity). Finally, the strategic perspective comprises the maturity profile of all assets and liabilities (funding matrix) on our balance sheet and our Issuance Strategy.

Our cash-flow based reporting system provides daily liquidity risk information to global and regional management.

Our liquidity position is subject to stress testing and scenario analysis to evaluate the impact of sudden stress events. Our scenarios are based on historic events, case studies of liquidity crises and models using hypothetical events.

### Short-Term Liquidity

Our reporting system tracks cash flows on a daily basis over an 18-month horizon. This system allows management to assess our short-term liquidity position in each location and region and globally on a by-currency, by-product and by-division basis. The system captures all of our cash flows from transactions on our balance sheet, as well as liquidity risks resulting from off-balance sheet transactions. We model products that have no specific contractual maturities using statistical methods to capture the behavior of their cash flows. Liquidity outflow limits (Maximum Cash Outflow Limits), which have been set to limit cumulative global and local cash outflows, are monitored on a daily basis and safeguard our access to liquidity.

### Unsecured Funding

Unsecured funding is a finite resource. Total unsecured funding represents the amount of external liabilities which we take from the market irrespective of instrument, currency or tenor. Unsecured funding is measured on a regional basis by currency and aggregated to a global utilization report. The Capital and Risk Committee sets limits by business division to protect our access to unsecured funding at attractive levels.

### Asset Liquidity

The asset liquidity component tracks the volume and booking location within our consolidated inventory of unencumbered, liquid assets which we can use to raise liquidity via secured funding transactions. Securities inventories include a wide variety of different securities. As a first step, we segregate illiquid and liquid securities in each inventory. Subsequently we assign liquidity values to different classes of liquid securities.

The liquidity of these assets is an important element in protecting us against short-term liquidity squeezes. In addition, we continue to keep a portfolio of highly liquid securities in major currencies around the world to supply collateral for cash needs associated with clearing activities in euro, U.S. dollar and other currencies. Also to support our liquidity profile in case of potential deteriorating market conditions, as seen globally in the second half of 2007, we increased these dedicated portfolios by € 7.8 billion to € 25.4 billion as of December 31, 2007.



#### **Stress Testing and Scenario Analysis**

We employ stress testing and scenario analysis to evaluate the impact of sudden stress events on our liquidity position. The scenarios have been based on historic events, such as the 1987 stock market crash, the 1990 U.S. liquidity crunch, September 2001 terrorist attacks, liquidity crisis case studies and hypothetical events. The scenarios also incorporate challenges presented by the 2007 financial markets crisis: prolonged term money-market freeze, collateral repudiation, non-fungibility of currencies and stranded syndications. The hypothetical events encompass internal shocks, such as operational risk events and 3-notch ratings downgrades, as well as external shocks, such as market risk events, emerging market crises and systemic shocks. Under each of these scenarios we assume that all maturing loans to customers will need to be rolled over and require funding whereas rollover of liabilities will be partially impaired resulting in a funding gap. We then model the steps we would take to counterbalance the resulting net shortfall in funding. Action steps would include selling assets, switching from unsecured to secured funding and adjusting the price we would pay on liabilities (gap closure).

This analysis is fully integrated within the existing liquidity risk management framework. We track contractual cash flows per currency and product over an eight-week horizon (which we consider the most critical time span in a liquidity crisis) and apply the relevant stress case to each product. Asset liquidity complements the analysis.

Our stress testing analysis provides guidance as to our ability to generate sufficient liquidity under critical conditions and is a valuable input when defining our target liquidity risk position. The analysis is performed monthly.



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# Liquidity Management

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## Outline

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- The significance of liquidity management
- Techniques of liquidity management
- Sources of liquidity exposures
- Management structures
- Best practice guidance

## Basel Committee Best Practice

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- Guidance released Sept 2008 (BCBS 144)
- Key areas of enhancement to past guidance
  - the importance of establishing a liquidity risk tolerance;
  - the maintenance of an adequate level of liquidity, including through a cushion of liquid assets;
  - the necessity of allocating liquidity costs, benefits and risks to all significant business activities;
  - the identification and measurement of the full range of liquidity risks, including contingent liquidity risks;
  - the design and use of severe stress test scenarios;
  - the need for a robust and operational contingency funding plan;
  - the management of intraday liquidity risk and collateral; and
  - public disclosure in promoting market discipline.

## Liquidity Management Goals

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- Objective: ensuring ability of bank to meet all payment obligations when they come due
  - Deposit outflows, non-rollover of capital market funding, customer drawdown of facilities, off balance sheet commitments
- Goal of liquidity risk management
  - Identify potential future payment/funding problems
  - Ensure that funds can be obtained to meet those problems

## Liquidity Management Problems

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- What is risk tolerance and costs of emergency actions?
- What future scenario(s) should be assumed?
- How is information about potential future cash flows aggregated and analysed?
- What are suitable indicators of the liquidity position of firms relying primarily on liability management?

## Sources of liquidity exposures

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- On balance sheet
  - Deposit outflows, debt maturities, loan fundings etc
- Off balance sheet
  - Collateralisation
  - Standby/Liquidity support facilities
  - Derivatives
  - Pipeline business
  - Revolving credit facilities
  - Liabilities on bill acceptances

## **Three levels of liquidity management**

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- Operational – management of intra-day and next/near day positions
  - Cash flows, central bank account positions, interbank markets, central bank access
  - Systems for aggregating information
  - Limits on mismatch positions for future days
- Tactical – short term unsecured funding and asset liquidity
- Strategic – funding/capital markets access

## **Tools**

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- Quantitative forecasting
- Limits on certain business activities
- Early warning indicators
- Stress testing
- Contingency funding plans

## **Liquidity disruptions: sub-prime crisis**

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- Closure of ABS commercial paper markets
- Closure of securitization markets
- Delays in loan syndication completions and underwriting exposures
- Interbank market disruptions
- Exposures to off balance sheet SIVs/conduits

## **Fundamental Issues for Regulators**

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- How to identify institutions with possible liquidity problems?
- How to best design liquidity support facilities to individual institutions (lender of last resort, rediscount window etc)?
- How to best design system liquidity management techniques (securities lending, repos, allowable collateral etc)?
- How to control liquidity creation outside the banking sector based on activities such as repos and securities loans?