



CENTRAL BANK OF BAHRAIN

*Proposed Consultation paper on Liquidity
Risk Management for Conventional Banks*

1st July 2009
(Deadline for comments: 30th July 2009)

Proposed Consultation paper on Liquidity Risk Management for Conventional Banks

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Executive Summary of the proposed consultation on Liquidity Risk Management for Conventional banks

1. Introduction:

This Consultation Paper sets out CBB’s proposals and views on the future of liquidity regulation within the Kingdom of Bahrain. Ensuring that banks deliver high standards of liquidity risk management is of paramount importance, not only to minimize the possibility of bank failures but also to help the CBB achieve its broad statutory objectives of market confidence and financial stability. The proposals incorporate recently agreed standards for liquidity set by the Basel Committee (Principles for Sound Liquidity Risk and Management – September 2008). They also take on board what has been learnt from the difficulties faced by financial institutions over the last year, as well as from the CBB’s supervisory counterparts in other jurisdictions. Most issues are addressed in greater detail throughout the proposed consultation paper; however, this paper outlines them upfront to set the scene. The consultation paper attempts to be sensitive to all different components in banks’ businesses that contribute significantly to liquidity risk. Many institutions will need to significantly reshape their business models over the next few years to accommodate the new standards.

2. Scope of the Proposed Consultation Paper:

- The paper sets out CBB's proposed supervisory approach to liquidity risk, including the principles and factors to be considered for evaluating the adequacy and effectiveness of a bank's liquidity risk management;
- It highlights the proposed prudential requirements in relation to liquidity risk and the manner in which CBB intends to monitor compliance with these requirements; and
- It provides guidance to banks on the key elements of a sound liquidity risk management process.

3. Prudential liquidity ratio requirements (Chapter 3):

The CBB proposes to implement a new quantitative regime for banks to anchor the stability of their liquidity positions. The proposed consultation paper states the need for banks to exceed the minimum prudential liquidity ratio requirements of 25%. Other proposed statutory liquidity ratio requirements include mismatch ratio and loans to liabilities ratio.

4. Role of Board of Directors/ Senior Management and ALCO (Chapter 4):

A bank's board of directors should review and approve the structure, strategy, policies and practices related to the management of liquidity (including contingency planning) at least annually, and also should ensure that senior management manages and monitors liquidity risk effectively. Senior management should continuously review information on the bank's liquidity developments and report to the board of directors on an annual basis. An example of a liquidity management structure is provided, using an Asset and Liabilities Committee (ALCO). For ALCO to function effectively, it should comprise personnel from senior management, treasury function, risk management and other business areas that could affect liquidity risk. Diagram 1 classifies the roles and responsibilities of liquidity management.

5. Liquidity management strategy, policies and procedures (Section 4.3):

Every bank will be required to formulate a statement of its liquidity management policies that will be reviewed and discussed by the CBB with the objective of agreeing minimum liquidity standards for them. The policy statement must be properly documented, reviewed annually and approved by the Board of Directors to ensure that it remains valid under changing circumstances. While specific details of the policy statement will differ; it must at least cover the liquidity management strategy, responsibilities, systems and contingency planning.

6. Cash flow management and reporting (Chapter 5):

Banks are required to develop an effective Liquidity Risk Management Framework. A primary objective of the Liquidity Risk Management Framework should be to ensure with a high degree of confidence that the bank is in a position to both address its daily liquidity obligations and withstand a period of liquidity stress affecting both secured and unsecured funding, the source of which could be institution-specific crisis or general market crisis. A bank should be able to measure and forecast its expected cash flows for assets, liabilities and off-balance sheet commitments over a variety of time horizons, under normal conditions and a range of stress scenarios, including scenarios of severe stress.

7. Asset and liability management (Chapter 6):

To ensure that there are no undue risk of banks not being able to meet their liabilities as they fall due, banks are required to maintain an appropriate mix of high quality liquid assets. Chapter 6 further discusses liquid assets, including the type and quality of assets to be held for liquidity purposes and the level of such holdings. The amount and composition of such assets should be determined by individual banks with reference to the nature of their business and liquidity risk profile. Concentration limits should also be established where appropriate to avoid excessive exposure to market and other risks within the assets portfolios in respect of asset type, counterparty, geographic location and economic sector.

8. Contingency Plan (Chapter 7):

Finally, this chapter outlines an overall requirement for banks to have in place a formal contingency plan that clearly sets out the strategies for addressing liquidity shortfalls in emergency situations. The results of stress tests should also play a key role in shaping the bank's contingency planning and in determining the strategy and tactics to deal with events of liquidity stress. As a result, stress testing and contingency planning are closely intertwined. In addition, this chapter elaborates on the importance of public disclosure. A bank should publicly disclose information on a regular basis that enables market participants to make an informed judgment about the soundness of its liquidity risk management framework and liquidity position.

9. Appendices:

At the end of the proposed consultation paper, 4 appendices are provided to further explain and supplement chapters including correlation of liquidity risk with other risks, examples of scenario analysis, behavioral assumptions for cash-flow management and examples of liquidity ratios and limits.

- **Detailed proposed consultation on Liquidity Risk Management for Conventional banks**

1. Introduction

1.1 Background

1.1.1 Liquidity risk as defined by the Basel Committee is “the ability of a bank to fund increases in assets and meet obligations as they come due without incurring unacceptable losses”. In September 2008, the Basel Committee released a comprehensive and updated paper on liquidity. This Consultation Paper draws on certain requirements in the Basel Paper and in Basel Core Principle 14 to outline proposals for a new set of prudential standards in liquidity for banks licensed by the CBB to follow. These standards include the need for banks to observe:

- adequate liquidity to meet obligations as they will or may fall due; and
- any supervisory liquidity ratios required by Rulebook provisions (the Rulebook).

1.1.2 Failure of a bank to meet the CBB liquidity ratios or adhere to the principles and standards set by the CBB may call into question whether the bank continues to satisfy its authorization criteria. Section 2 of this Paper indicates the supervisory approach that CBB proposes to adopt in respect of these cases, including the actions that may be taken.

1.2 Scope

1.2.1 This paper:

- sets out CBB’s proposed supervisory approach to liquidity risk, including the principles and factors to be considered for evaluating the adequacy and effectiveness of a bank’s liquidity risk management;
- highlights the proposed prudential requirements (i.e. quantitative limits) in relation to liquidity risk and the manner in which CBB intends to monitor compliance with these requirements; and
- provides guidance to banks on the key elements of a sound liquidity risk management process.

1.2.2 In developing this paper, CBB has had regard to the following:

- the Basel Committee paper entitled “Principles for Sound Liquidity Risk Management and Supervision” (2008);
- Principle 14 of the “Core Principles for Effective Banking Supervision” covering banks’ risk management processes for controlling other material risks (including liquidity risk) (the relevant information is contained in the Basel Committee paper on “Core Principles Methodology” (2006); and
- the liquidity risk management practices currently adopted by some international banks.

1.3 Implementation

1.3.1 CBB recognises that some banks may need time to develop / enhance their internal systems necessary to comply with the proposed requirements of this Paper. However, banks are expected to accord priority to liquidity and be ready to submit the monthly report on liquidity position and quarterly return on liquidity stress-testing within **one year** of the issue date of this paper. The CBB will monitor the progress of the banks in enhancing their systems and procedures to meet the remaining requirements (e.g. the cash-flow and scenario analyses, etc.) within a reasonable timeframe.

2. Supervisory approach to liquidity risk

2.1 Objectives and principles

2.1.1 Every bank is required to maintain adequate liquidity (including the compliance with prudential liquidity requirements).

2.1.2 A key objective of the CBB in respect of liquidity risk is to ensure that banks can satisfy the above requirement on a continuing basis. This relates, in particular, to a bank's ability to:

- meet its obligations as and when they fall due; and
- maintain a sufficient stock of high quality liquid assets to cater for a funding crisis.

2.1.3 In supervising liquidity risk, the CBB proposes to adopt a system-based approach that focuses on the processes and controls established by banks. Prudent management of liquidity, through the institution of proper strategies, systems and controls, is the primary responsibility of the senior management of banks under authority and limits approved by the Board. Management is expected to put in place adequate risk management systems to identify, measure, monitor and control liquidity risk. The sophistication of these systems should reflect the nature, size and complexity of a bank's activities.

2.1.4 Central to effective liquidity risk management is a bank's ability to maintain adequate liquidity in the event of a funding crisis. The CBB will assess this ability in respect of:

- the amount of **high quality liquid assets** that the bank can readily dispose of or pledge for funding;
- the results of **stress tests** carried out by the bank on its cash-flow and liquidity positions under different scenarios. CBB may, where appropriate, conduct across-the-board stress tests to evaluate individual banks' ability to weather a liquidity crisis; and
- the stability of the bank's funding sources and its contingency measures for dealing with crisis situations.

These issues are further discussed in sections 3 and 5 to 7.

2.1.5 Every bank is required to document in a policy statement its policies and strategies for managing liquidity risk, including how it identifies, measures, monitors and controls that risk. This policy statement should be prepared in sufficient detail, and cover various factors described in subsection 2.3. It must be approved by the Board of Directors and agreed with CBB. See subsection 4.3 below for more guidance.

2.1.6 In assessing the overall adequacy of liquidity of Bahrain branches of foreign banks or Bahrain-based subsidiaries of banks incorporated **outside Bahrain**, CBB will take account of the global liquidity risk management policies of the head office or parent bank and the extent to which liquidity is supervised by the home authority.

2.2 Supervisory process

2.2.1 CBB proposes to adopt a risk-based supervisory approach that includes continuous supervision of banks' liquidity risk through a combination of risk-focused on-site examinations, off-site reviews and prudential meetings. The objectives are to obtain sufficient and timely information for evaluation of banks' liquidity risk profile and to assess the adequacy and effectiveness of their liquidity risk management process.

2.2.2 CBB will review banks' liquidity management policy statements to assess the adequacy of their risk management strategies and policies. It will also conduct off-site analysis to monitor the level and trends of banks' liquidity positions through their regular submission of the following statistical returns and management information:

- the monthly "Return on Liquidity Position –("Liquidity Return") – to monitor banks' compliance with the prudential requirements on the minimum liquidity ratio and analyse other information on liquefiable assets and funding sources (see paragraphs 3.4.1 and 3.4.2 below for more details);
- the quarterly "Return on Selected Data for Liquidity Stress-testing" ("Liquidity Stress-testing Return") (only applicable to locally incorporated banks) – to enable CBB to conduct across-the-board stress tests on individual banks' liquidity risk (see para. 5.5.6 below for more details); and
- the cash-flow and scenario analyses conducted by banks (based on their internal management reports submitted on a quarterly basis) – to analyse banks' ability to maintain adequate liquidity under normal and stressed conditions (see section 5 and Annex B below for more guidance).

2.2.3 Where necessary, the CBB may request individual banks to provide additional information on their liquidity positions. For example, banks with significant foreign exchange business will be required to submit separate **scenario analyses** on their foreign currency positions.

2.2.4 The CBB currently monitors the liquidity risk profile of banks during off-site reviews and evaluates the effectiveness of their liquidity risk management systems during on-site examinations. These current procedures will be enhanced. If a bank demonstrates one or more of the following weaknesses, this may call into question whether the bank continues to satisfy the minimum authorization criterion for adequate liquidity:

- failure to meet the **prudential minimum liquidity ratios** or honour obligations as they fall due;
- insufficient liquidity to meet crisis or emergency situations;
- evidence of imprudent management of liquidity (such as serious or persistent breaches of the bank's own liquidity policies, excessively large mismatches, difficulty in obtaining external funding and undue reliance on high cost funds); and
- other significant deficiencies in the internal systems and controls for identifying and measuring liquidity risk (e.g. material reporting errors and omissions).

2.2.5 CBB will normally enter into discussions with the bank concerned and seek prompt remedial action. If such remedial action is not possible, it may be necessary to consider whether CBB's powers to restrict the activities of the bank or revoke the bank's license should be exercised. In determining whether such a step should be taken, CBB would have primary regard to the need to maintain the stability of the banking system.

2.2.6 Depending on the circumstances of each case, CBB may also consider taking other supervisory measures. For example, CBB may set a **minimum liquidity ratio in excess of 25%** (see Section 3.1 for more details) for the bank concerned if there is doubt about its liquidity profile. It may also require the bank to reposition its asset portfolios to reduce liquidity risk.

2.3 Factors to be considered

2.3.1 In assessing a bank's liquidity risk profile and the adequacy of its liquidity risk management process, CBB will have particular regard to the following factors:

- the level and trend of the bank's prudential liquidity ratios as well as the quality and composition of its liquid assets to withstand a liquidity crisis (see section 3 and subsection 6.1 below for more guidance);
- the adequacy of the bank's **liquidity risk management framework**, including the level of oversight exercised by the Board and senior management and the propriety of its liquidity management policies and reporting systems (see section 4 below for more guidance);
- staff knowledge and expertise in identifying and managing sources of liquidity risk;
- the ability of the bank to measure, monitor and control cash-flow positions under both normal and stress scenarios and for the management of liquidity in foreign currencies in which it has significant positions (see section 5 below for more guidance);

- the funding capacity of the bank in both normal and crisis situations, including its ability to borrow in the interbank and wholesale markets, the diversification and volatility of its deposit base and the availability and reliability of standby facilities and intra-group funding (see subsections 6.2 to 6.5 below for more guidance);
- the adequacy and effectiveness of the bank's internal risk tolerance limits and ratios for managing liquidity (see subsection 6.6 below for more guidance); and
- the adequacy of the bank's **contingency planning** for a liquidity crisis, including such aspects as warning signs of an approaching crisis, emergency funding sources and the actions that would be taken to pre-empt it (see section 7 below for more guidance).

2.3.2 In considering whether a bank has appropriate systems for managing liquidity risk, the CBB will also take into account the nature and complexity of its business and, in addition, its compliance with the standards and sound practices set out elsewhere in the Rulebook.

3. Prudential liquidity ratio requirements

3.1 Minimum liquidity ratio

3.1.1 This subsection summarises key provisions in relation to the liquidity ratio of banks.

3.1.2 Banks will be required to maintain, a liquidity ratio of not less than 25% in each calendar month.

3.1.3 The liquidity ratio of a bank licensee, whether incorporated in or outside Bahrain, will apply only to its principal place of business in Bahrain and local branches (i.e. excluding any subsidiary or overseas branch of the bank).

3.1.4 The CBB may, by notice in writing, require the liquidity ratio of a locally incorporated bank to be calculated:

- on a consolidated basis instead of an unconsolidated basis; or
- on both a consolidated and an unconsolidated basis.

3.1.5 If the liquidity ratio is to be calculated on a consolidated basis, the CBB may require that the ratio be applied only in respect of certain subsidiaries or overseas branches as specified.

3.1.6 The following are some examples of the situations when the CBB may require consolidation of the liquidity positions of selected deposit-taking subsidiaries or overseas branches of a bank:

- when, in the case of a locally incorporated parent bank, there are material back-to-back transactions (see also subsection 3.3 below) between the parent bank and its authorized subsidiary;
- when the Bahrain operation of the bank concerned deploys a significant part of its surplus liquidity through some subsidiaries or overseas branches; and
- when a significant amount of offshore deposits is booked with some subsidiaries or overseas branches.

3.1.7 Banks will be required to notify CBB of any non-compliance with the liquidity ratio and provide CBB with such particulars of the non-compliance that may be required.

3.1.8 CBB will enter into discussions with the bank concerned to determine what remedial action is required to be taken. After holding such discussions, CBB may issue a notice in writing to the bank specifying the remedial action that it should take.

3.1.9 Any director, chief executive or manager of a bank that fails to notify CBB of the contravention or to take the remedial action specified by CBB will be subject to the enforcement provisions of Module EN of the CBB Rulebook.

3.1.10 CBB is empowered to vary the minimum liquidity ratios applicable to any individual bank. This power may be exercised to increase the minimum liquidity ratio of a bank if there is doubt about the adequacy of the bank's liquidity, having regard to the factors set out in subsection 2.3 above and the bank's financial position.

3.1.11 If CBB varies the minimum liquidity ratios of any bank, it will provide the bank with the relevant particulars of such variation.

3.2 Computation of liquidity ratios

3.2.1 For completion of the Monthly "Return on Liquidity Position", instructions will be provided which will set out the rules and requirements for banks to compute the liquidity ratios as well as the definitions of liquefiable assets and qualifying liabilities.

3.2.2. The stock liquidity ratio for a given calendar month should be calculated as the ratio of the sum of a bank's liquefiable assets, net of deductions required by CBB, to the sum of its qualifying liabilities for each working day of that month, expressed as a percentage. However, CBB may permit a bank to calculate its stock liquidity ratio by reference to such days during the month as the CBB may specify in a notice.

3.2.3 Liquefiable assets, comprise the following categories:

- currency notes and coins;
- gold;
- the excess of one month interbank assets over one month interbank liabilities (i.e. if interbank placements of one month maturity or less are \$ 170m and one month or less liabilities to banks are \$ 120m, the excess would be \$ 50m);

- marketable debt securities or prescribed instruments (exchange traded and listed);
- eligible loan repayments³

3.2.4 Certain items of liquefiable assets mentioned above will each be assigned a liquidity conversion factor (“LCF”) to reflect differences in terms of credit risk, market risk and convertibility into cash. The weighted amount of each liquefiable asset, calculated by multiplying the principal amount of the asset by the relevant LCF, will be used for the purposes of calculating the total amount of liquefiable assets to be included in the liquidity ratio.

3.2.5 Each **liquefiable asset** must also meet the following requirements:

- it must not be overdue;
- it must be free from encumbrances;
- it must be freely remittable and payable to the bank concerned; and
- it must be denominated in Bahraini Dinars or in a currency freely convertible into Bahraini Dinars.

3.2.6 Unless otherwise agreed by CBB, any debt security or prescribed instrument with a residual maturity of within one month issued by a bank, with a LCF of 100%, should be deducted from its liquefiable assets. CBB may also exclude from the liquefiable assets of a bank any transaction that is, in his opinion, not capable of producing genuine liquidity.

3.2.7 The total amount of **qualifying liabilities** is the sum of:

- the excess of one month interbank liabilities over one month interbank assets (i.e. if interbank liabilities of one month maturity or less are \$ 250m and one month or less interbank assets are \$ 210m, the excess would be \$40m);
- the total of its other one-month liabilities.

¹ The term “one-month liability”, in relation to any bank or relevant bank, means:

- (i) any liability, other than a contingent liability, the effect of which will or could be to reduce within one month the liquefiable assets of that bank or relevant bank; and
- (ii) any contingent liability that in CBB’s opinion may result in a reduction within one month of the liquefiable assets of that bank.

² A relevant bank includes: (i) any bank (other than one whose authorization is suspended); (ii) any bank incorporated outside Bahrain which is not a bank (except one which, in the opinion of CBB, is not adequately supervised or whose authorization is suspended); and (iii) the Exchange Fund established by the Exchange Fund Ordinance.

³ These are payments/ instalments falling due within one calendar month which are not currently in default and the bank has no reason to expect default on the next payment/ instalment.

3.2.8 Irrevocable commitments to provide funds within one month should be included in the reporting of other one month liabilities. These include:

- facilities with a known date of drawdown within one month; and
- facilities without known date of drawdown but the drawdown carries a notice period of within one month (including where the drawdown is on demand i.e. requiring no notice period) except where conditions attached to the drawdown cannot in practice be met within one month. These conditions may include the execution of security documentation and the completion of a certain phase of a project etc.

3.2.9 The following are **excluded** from the reporting of **qualifying liabilities**:

- potential commitments relating to overdraft and credit card facilities, which may be cancelled at any time and
- contingent liabilities arising from trade-related contingencies and financial derivatives contracts i.e. interest rate, foreign exchange, equity, precious metal and commodity contracts.

3.2.10 A deposit which has been pledged with a bank for securing a loan granted to a non-bank customer should also be excluded from the calculation of qualifying liabilities to the extent of the outstanding balance of the loan.

3.3 Intragroup back-to-back transactions

3.3.1 The CCB is concerned that banks which are part of a financial conglomerate may become over-reliant on intragroup financing or may provide such financing to group members whilst depending on the wholesale market or short term facilities to cover such positions. Intragroup back-to-back transactions for the purpose of this paper refer to interoffice or intragroup transactions which typically involve two legs, one borrowing long (with maturity of more than one month) and the other lending short (with maturity of one month or less). Both legs are for the same or similar amount and at the same or similar rate of interest and are, in most cases, rolled forward continuously.

3.3.2 CBB may approve the local branch or authorized subsidiary of some international banks to include claims under intragroup back-to-back transactions as liquefiable assets in the computation of the liquidity ratio mainly on the basis of the following conditions:

- the foreign bank is an international bank whose liquidity is managed, and supervised, on an integrated global basis;
- the transactions are carried out with the head office or parent bank (transactions with sister branches or fellow subsidiaries outside Bahrain are not allowed);
- there is no doubt about the liquidity of the head office or parent bank. The CBB will need some form of LOC from parent, and this LOC will need to be confirmed with the concerned supervisor;
- the head office or parent bank has confirmed, in terms acceptable to CBB, that the effect of the transactions is to provide genuine liquidity to the branch or subsidiary concerned even in the event of funding difficulties affecting the bank or banking group as a whole; and

- in the case of transactions or intra-group transactions of material size⁵, the home supervisor has confirmed to CBB that it is aware of the transactions and their purpose and has no objection to them.

3.3.3 In each approved case, a limit has been agreed with the bank concerned to control the extent to which intragroup back-to-back claims can be recognised as liquefiable assets.

3.3.4 As intragroup back-to-back transactions may not involve the actual movement of funds and rely to a great extent on the liquidity support of the head office or parent bank, CBB may grant such approvals only in a limited number of cases. In view of the increasing focus on a cash-flow management approach to liquidity risk, however, it is considered that the use of such transactions for liquidity purposes should be minimised.

3.3.5 CBB's general policy is therefore not to allow banks to use intragroup back-to-back transactions for the purpose of calculating the stock liquidity ratio.

3.3.6 CBB will from time to time review the use of intragroup back-to-back transactions by these banks and their compliance with the conditions for approval, and consider whether the limits approved for such transactions are still appropriate or necessary.

3.4 Monitoring of stock liquidity ratio

3.4.1 CBB will make use of the Liquidity Return and various ratios (e.g. target stock liquidity ratio and lowest daily stock liquidity ratio) to facilitate its review of the level and trends of banks' liquidity ratios and ensure their compliance with prudential requirements.

3.4.2 Banks will be required to submit the Liquidity Return on a monthly basis. The return collects information on the following:

- month-end stock liquidity ratio;
- month-end cumulative mismatch ratios for the relevant periods;
- month-end Loans to Deposits ratio;
- month end Stable Funds to Deposits ratio;
- composition of liquefiable assets and qualifying liabilities;
- average stock liquidity ratio and lowest stock liquidity ratio during the month; and
- other supplementary information on –
 - interoffice or intra-group (back-to-back) transactions;
 - deposits from connected customers;
 - irrevocable standby facilities and large customer deposits and bank borrowings; and
 - foreign currency assets and liabilities maturing within three months.

⁵ As a general rule, back-to-back transactions will be regarded as material if the liquidity ratio of the bank would drop below 30% after excluding such transactions from the calculation of the ratio.

3.4.3 Banks will be required to set a target stock liquidity ratio at a level above the prudential minimum so as to provide a warning signal to the management. This ratio will be particularly useful for banks that engage in retail business as they are more vulnerable to depositor withdrawals in a liquidity crisis and those banks which normally maintain a stock liquidity ratio relatively close to the prudential minimum. The actual positions of the stock liquidity ratio should be compared with the target and any breaches and the follow-up actions taken by the management to restore the stock liquidity ratio should be properly documented. CBB will request banks to give an explanation if their stock liquidity ratio consistently falls below the target ratio.

3.4.4 While the minimum and target stock liquidity ratios refer to the average positions within a calendar month, banks must aim to maintain adequate liquidity on a daily basis and avoid significant differences between the daily and average ratios during the month.

3.4.5 For the purpose of monitoring their daily stock liquidity ratio, banks will be required to report in the Liquidity Return the lowest daily stock liquidity ratio in each calendar month. Banks which have been approved to calculate the monthly stock liquidity ratio on the basis of specified days during a month should report the lowest daily ratio recorded on any of the specified days or the last calendar day during each month. CBB will hold discussions with banks with lowest daily stock liquidity ratios that are significantly or consistently below 25% to ascertain whether they are adopting prudent liquidity policies on a day-to-day basis.

3.5 The maturity mismatch approach

3.5.1 The mismatch approach measures a bank's liquidity by assessing the mismatch between its cash inflows (assets) and cash outflows (liabilities) within different time bands on a maturity ladder.

a) The extent of the difference between the receipts from cash inflows (assets) and cash outflows (liabilities) is termed a mismatch. A positive mismatch exists where the (expected) inflow of cash from assets exceeds the (expected) outflow of funds to repay / cover liabilities. A negative mismatch exists where the (expected) inflow of cash from assets is less than the (expected) outflow of funds to repay / cover liabilities. Mismatches are measured in cash amounts.

b) In the maturity ladder, inflows (assets) and outflows (liabilities) are slotted into time bands (for example, sight, sight to 8 days, and sight to one month). Maturity is determined on a worst-case view, i.e. inflows (assets) are put in at their latest maturity and outflows (liabilities) at their earliest maturity. This approach is adopted to assess a bank's liquidity when its funding sources are unwilling to lend and its depositors withdraw their money.

c) The information provided in the maturity ladder is assessed in the cumulative time bands, mentioned above, of sight - 8 days, sight - 1 month, sight - 3 months,

etc. Items such as liquefiable assets may be inserted into certain time bands (subject to haircuts or adjustments) to reflect their ability to provide cash if sold or repoed. Behavioural adjustments may also be permitted for certain “stable” funds or for undrawn credit facilities. The precise mechanisms for calculating the mismatch ratios for different periods are located in section H of the PIR form.

3.5.2 A net mismatch figure is obtained by subtracting outflows (liabilities) from inflows (assets) in each time band. Mismatches are then measured on a net cumulative basis.

3.5.3 A mismatch ratio is then calculated by expressing the cash mismatch amount (positive/ negative) as a percentage of deposit liabilities.

3.5.4 The proposed regulatory Mismatch ratio includes two ratios: Net maturity mismatch position per band/ total deposits; and negative cumulative maturity mismatch position/ total deposits.

3.5.5 These ratios will be assessed for base currency and other currencies for individual maturity bands and on a cumulative basis.

3.5.6 All banks will be required to ensure that their cumulative negative mismatch ratios (as a percentage of total deposits) do not exceed 10% for the one week band and 15% for the one month band.

3.5.7 Wholesale banks will additionally be required to ensure that their cumulative negative mismatch ratios (as a percentage of total deposits) do not exceed 20% for the three months band and 25% for the 6 months band.

3.5.8 Banks which fail to meet the ratios mentioned above (3.5.6 and 3.5.7), will be required to report the position in a liquidity report to be submitted on a weekly basis. Banks will be questioned and investigated where such breaches of the ratios occur more than once within a given month.

3.5.9 Banks may apply to the CBB for approval to make behavioural adjustments to their deposits with original maturities of 3 months or less. Such applications must be based on at least two years of supporting data, and supported by a report from their external auditors verifying the supporting data used to justify the behavioural adjustments proposed.

3.6 Net Loans to total deposits ratio

3.6.1 The net loans to total deposits ratio measures the extent to which deposits have been used to fund the loans. A high ratio indicates an over-lent position, while a low ratio indicates an under-lent position.

3.6.2 Banks will not be allowed to exceed a net loans to total deposits ratio of 75%. A higher ratio may indicate a potential liquidity problem in case a large amount of

deposits are unexpectedly withdrawn, or a default occurs in one or more large credit exposures leading to a loss of significant cash inflow.

3.6.3 A high ratio normally indicates a less liquid, risk oriented bank. A higher ratio may be allowed in case of branches of foreign banks in Bahrain, provided that the CBB is satisfied, through a home supervisor confirmation, that the parent bank has a satisfactory and robust liquidity risk management system that takes into account the liquidity profile of the branch.

3.7 Net stable funds ratio

3.7.1 The net loans to net stable funds ratio is identical to the net loans to total deposits ratio above, but uses “stable funds” as a denominator instead.

3.7.2 Stable Funds include:

1. Non-bank deposits (based on historical trends as determined by the bank);
2. Certificates of deposits issued;
3. equity less investment in unconsolidated subsidiaries and associated companies;
4. debt securities in issue;
5. term borrowing maturing in more than 2 years.

Less:

Fixed assets and properties acquired as a result of debt settlement.

3.7.3 Banks will not be allowed to exceed a net loans to net stable funds ratio of 90%.

4. Liquidity management framework

4.1 Board and senior management oversight

4.1.1 Effective liquidity risk management requires an informed Board, capable management and appropriate staffing.

The Board of Directors is, in particular, responsible for:

- approving a bank’s liquidity risk strategy and other significant policies related to liquidity risk management (including contingency planning on an annual basis);
- ensuring that an appropriate liquidity risk management structure, which identifies the lines of authority and responsibilities for different levels of management, is established and is reviewed by the Board on at least an annual basis;
- maintaining continued awareness of a bank’s performance and overall liquidity risk profile through quarterly monitoring; and
- ensuring that liquidity risk is adequately managed and controlled by senior management within the established risk management framework through annual review.

4.1.2 Senior management is responsible for overseeing the day-to-day and long-term management of liquidity risk in line with the objectives and risk tolerance levels set by the Board of Directors. This involves the development, implementation and maintenance of:

- appropriate policies procedures and internal limits that translate the Board's approved objectives and risk tolerances into operating standards;
- management information and other systems that adequately identify, measure, monitor and control liquidity risk in respect of the above limits; and
- effective internal controls over the liquidity risk management process.

4.1.3 It is also important for senior management to have a thorough understanding of the nature and level of liquidity risk assumed by a bank and the means to manage that risk.

4.1.4 Given that maintenance of adequate liquidity is crucial for the ongoing viability of a bank, senior management must promptly communicate any material changes in the bank's current or prospective liquidity position to the Board of Directors for advice and consideration.

4.2 Liquidity management structure

4.2.1 Banks must have in place a liquidity management structure that can execute effectively their liquidity management strategy, policies and procedures.

4.2.2 The Board usually delegates the responsibility for managing the overall liquidity of a bank to a senior management committee in the form of an Asset and Liability Committee ("ALCO"). For ALCO to function effectively, it should comprise personnel from senior management, treasury function (responsible for day-to-day liquidity management), risk management (responsible for day-to-day risk management e.g. credit/market risk), internal audit (responsible for independent checking) and other business areas that could affect liquidity risk.

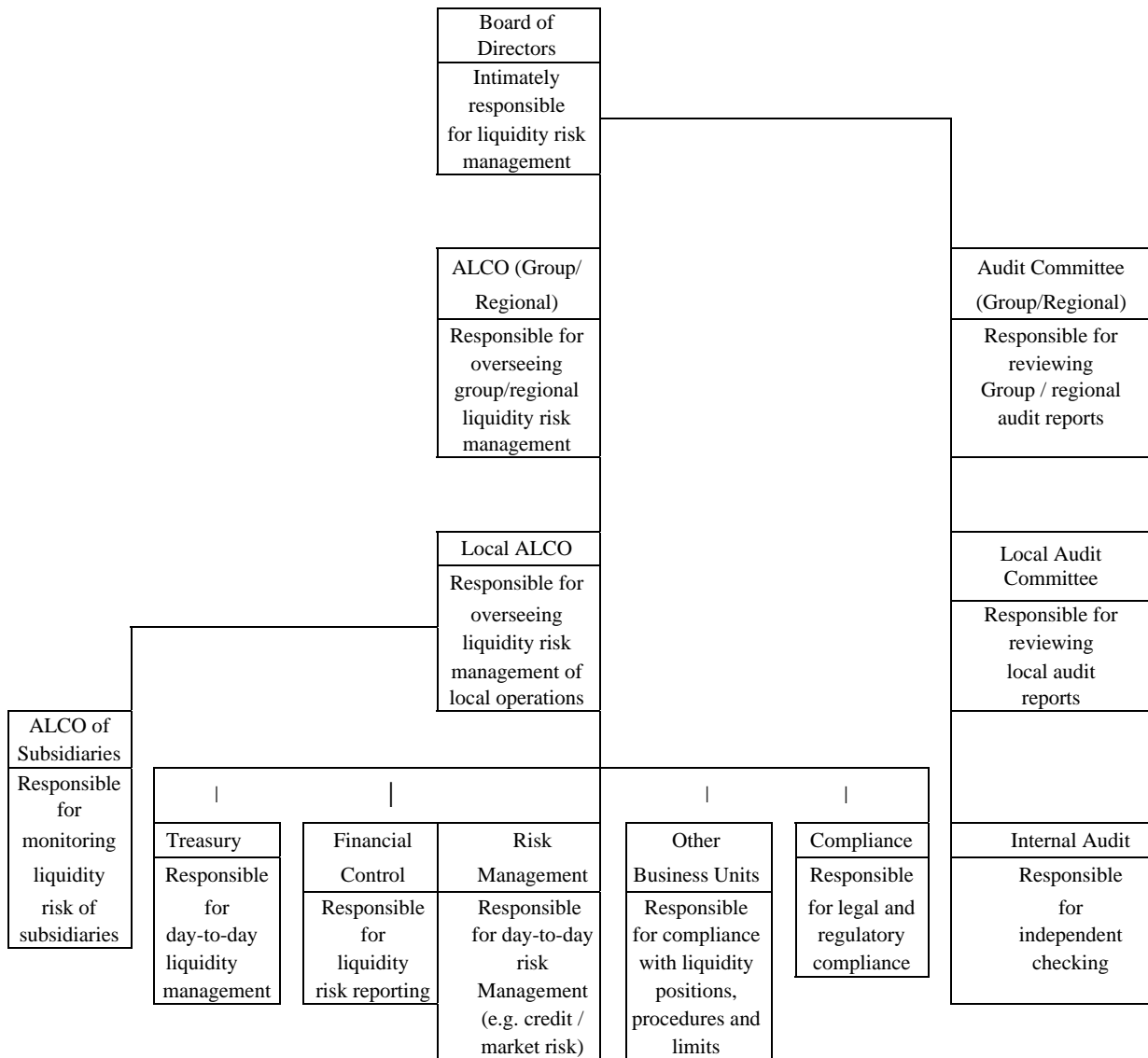
4.2.3 Liquidity management may either be centralised or decentralised, or a combination of the two may be adopted. The structure to be chosen depends on a bank's size and complexity of operations. Large banks or banking groups may tend to have a more centralised structure in which liquidity for individual business units, including branches and subsidiaries, is managed on a consolidated basis. In a decentralised structure, business units within a bank or banking group would be responsible for their own liquidity subject to limits imposed by senior management.

4.2.4 **Diagram 1** provides an example of the liquidity management structure of an international banking group. This example is not intended to be prescriptive, but provides an illustration of the composition of an ALCO and how liquidity management responsibilities can be coordinated at the group / regional, local and subsidiary level.

4.2.5 Where a bank is part of a banking group, its liquidity risk may be managed on a group or sub-group basis. However, the bank remains responsible for ensuring

compliance at the bank level with the liquidity standards and requirements of this **module**. There should be arrangements in place such that any liquidity issues specific to the bank are identified and addressed by the bank itself or by those delegated with the responsibility for managing the bank's liquidity risk.

Diagram 1: Illustration of the liquidity management structure of an international banking group.



4.2.6 Boards must regularly review the appropriateness of their liquidity management structure (at least on an annual basis) in the light of business developments and changes.

4.3 Liquidity management strategy, policies and procedures

4.3.1 **Every bank is required to formulate a statement of its liquidity management policies.** CBB will review and discuss the policy statement with individual banks with the objective of agreeing minimum liquidity standards for them. The policy statement must be properly documented and approved by the Board of Directors, and be subject to regular review (at least annually) by the Board or ALCO to ensure that it remains valid under changing circumstances. CBB must be notified of any material changes to the policy statement.

4.3.2 While specific details of the policy statement will differ across banks according to the nature of their business activities, it must cover, at a minimum, the following key elements:

- Liquidity management strategy – which should set out the general approach to liquidity (including goals and objectives) and specific policies on particular aspects of liquidity risk management, such as -
 - approved composition of assets and liabilities;
 - approach to managing liquidity in different currencies;
 - managing access to interbank and other wholesale markets;
 - diversification and stability of liabilities; and
 - management of intra-group liquidity;
- Liquidity management responsibilities – with clearly defined lines of authority, responsibilities and reporting structure for liquidity risk management;
- Liquidity management systems – use of systems and tools for measuring, monitoring, controlling and reporting liquidity, including –
 - the setting of various risk tolerance limits and ratios (e.g. target liquidity ratio, maturity mismatch limits, loan to deposit ratio etc.);
 - the framework for conducting cash-flow analysis under normal and stress scenarios, including the techniques and behavioural assumptions used; and
 - the management reporting system for liquidity risk; and
- Contingency plan – which should describe the approach and strategies for dealing with various types of liquidity crisis.

4.3.3 The policy statement of a locally incorporated bank must cover both its local and overseas operations as well as all related entities that may have a significant impact on its liquidity. If the bank manages liquidity on a group basis, the policy statement should address issues relevant to the bank and the group as a whole.

4.3.4 Regardless of whether liquidity management is centralised at the head office, Bahraini branches of banks incorporated outside Bahrain must still formulate a policy statement for their Bahrain operations. It should, in particular, include the line of responsibility for monitoring the liquidity in Bahrain and the reporting arrangements to head office. CBB will also take into account the global liquidity management policies of

the head office, especially for the monitoring of branches, and the home authority's supervisory approach to liquidity (including whether it monitors the liquidity of the overseas branches and subsidiaries and is aware of their liquidity policies).

4.3.5 To facilitate the effective implementation of liquidity management policies, banks must establish appropriate procedures which detail the operational steps and processes for the execution of various risk controls. The procedures must also be reviewed at least annually and updated to take into account new business activities and changes in risk management processes.

4.3.6 Managing liquidity is not purely the responsibility of the treasury or risk management function. Banks should communicate the liquidity management policies and procedures to all relevant personnel throughout the organisation, including all business units that conduct activities with an impact on liquidity. They should be fully aware of the liquidity management strategy and their role and responsibilities in relation to approved policies, procedures and limits.

4.4 Management information systems

4.4.1 Banks must have adequate management information systems ("MIS") for measuring, monitoring, controlling and reporting liquidity risk under normal and stressed situations.

4.4.2 The MIS should encompass all significant causes of liquidity risk, including those associated with new products and business initiatives, and be capable of evaluating the effect of such causes on a bank's cash flows and liquidity ratios. In particular, the MIS should be capable of:

- calculating cash flows and maturity mismatch positions arising from the full range of a bank's assets, liabilities and off-balance sheet positions on a daily basis over a series of specified time periods;
- analysing cash flows and maturity mismatch positions in all currencies in which a bank operates, both individually and on an aggregate basis on a daily basis;
- calculating and projecting various limits and ratios in relation to liquidity for both prudential and internal risk management purposes on a daily basis;
- checking compliance with established liquidity policies and limits, and generating exception reports on a daily basis;
- reporting risk measures and liquidity trends to management on a daily basis; and
- setting out clearly the behavioural assumptions and limitations underlying the cash-flow management reports and stress-testing analyses (see section 5 below for more details).

4.4.3 The MIS should also be capable of providing on a daily basis accurate and relevant liquidity reports to senior management / ALCO and other responsible personnel for evaluation of the level of liquidity risk under different operating circumstances.

4.4.4 The appropriate content and format of MIS reports would depend on a bank's liquidity management practices and the nature and complexity of its business. Such reports should enable senior management / ALCO to review and monitor the following aspects of liquidity on a daily basis:

- the maturity profiles of a bank's cash flows under normal and stress scenarios;
- the stock of liquid assets available and their market values;
- the concentration in sources and application of funds;
- the compliance with liquidity management strategies and risk tolerance levels set by the Board of Directors;
- the ability to borrow or undertake asset sales in various markets;
- potential sources of volatility in assets and liabilities (and claims and obligations arising from off-balance sheet activities);
- the analysis of intra-group cash flows and accessibility to such funding;
- the capacity of providers of standby facilities to meet their obligations; and
- the impact of adverse trends (e.g. decline in asset quality, market or operational disruptions etc.) on future cash flows and market confidence.

4.5 Independent reviews and audits

4.5.1 **Banks must conduct periodic (but at least annual) reviews of their liquidity risk management process to ensure its integrity, accuracy and reasonableness.** The reviews must be conducted by independent parties, e.g. internal or external auditors.

4.5.2 Such reviews must, among other things, cover the following areas:

- the adequacy of internal systems and procedures for identifying, measuring and monitoring liquidity risk;
- the appropriateness of various risk limits for controlling liquidity risk;
- the suitability of the underlying assumptions for conducting cash-flow scenario analyses;
- the integrity and usefulness of MIS reports on liquidity risk; and
- the adherence to established liquidity policies procedures and limits.

4.5.3 Banks with complex liquidity risk profile and measurement systems must have their internal models or calculations validated by an independent internal or external reviewer.

4.5.4 Any weaknesses or problems identified in the review process must be addressed by senior management in a timely and effective manner.

5. Cash-flow management and reporting

5.1 Overview

5.1.1 Banks are required to adopt a cash-flow approach to managing their liquidity risk. This approach **complements the prudential framework** on minimum liquidity ratio by

requiring banks to measure, monitor and control their cash-flow and maturity mismatch positions under different operating conditions.

5.1.2 Under the cash-flow approach, banks should have in place appropriate systems and procedures for:

- monitoring on a daily basis net funding requirements under normal business conditions;
- conducting regular cash-flow analyses based on stress scenarios; and
- developing reasonable assumptions for making the above cash-flow projections.

5.1.3 Banks are expected to take a conservative approach in assessing future cash flows, as the underlying assumptions may involve considerable judgement and discretion and could vary considerably depending on their business profile. They should be in a position to provide analysis and evidence to justify the assumptions.

5.1.4 Banks must be able to generate cash-flow positions by individual currencies and in aggregate. For those banks that have significant business in currencies other than their base currency, there should be separate analysis of cash-flow positions for individual foreign currencies in which they are active.

5.1.5 Key elements of the cash-flow management framework are set out in the subsections that follow. Subsections 5.2 and 5.3 provide guidance on the systems and controls expected of banks in respect of cash-flow management under normal and stressed conditions, including the stress-testing procedures that should be undertaken. Subsection 5.4 further describes the approach for managing foreign currency liquidity risk. Subsection 5.5 summarises CBB's supervisory monitoring and reporting requirements, while some hypothetical examples are set out in Annex B to illustrate how cashflow analyses may be conducted.

5.1.6 The cash-flow analyses provided in **Annex B** cover the following scenarios:

- normal business conditions;
- an institution-specific crisis; and
- a general market crisis.

5.1.7 In applying the requirements of this section, CBB will adopt a more flexible approach towards banks that maintain small and simple operations or whose liquidity risk management is managed, and supervised, on an integrated global basis (see also paragraph 5.3.18, 5.3.19 and 5.4.8 below).

5.2 Net funding requirements

Scope of cash-flow projection

5.2.1 In order to stay in business, banks need to ensure that either a positive cash-flow position is maintained in the periods up to one month from the current business day or

otherwise sufficient cash can be generated to satisfy their funding requirements on a daily basis.

5.2.2 Banks must measure and monitor their net funding requirements going forward by constructing a maturity profile that projects future cash flows arising from assets, liabilities and off-balance sheet transactions. All cash flows must be allocated into a series of time bands according to their expected maturity dates, and a net mismatch figure obtained by subtracting outflows from inflows in each time band. A cumulative net mismatch figure must be derived by accumulating the net mismatch figures in each successive time band. This profile enables banks to estimate the prospective net funding requirement in each time band.

5.2.3 The maturity profile should, in principle, cover all cash flows (including off-balance sheet items and non-banking items such as salaries, dividends, and general business expenses). Senior management / ALCO may however approve the exclusion from the profile of certain cash flows that are considered to be immaterial. The rationale and materiality thresholds for such exclusions should be properly documented in the liquidity management policies. Banks should review periodically whether such exclusions remain appropriate.

5.2.4 The maturity profile must encompass adequate time bands so that banks can monitor their short-term as well as medium- to longer-term liquidity needs. The relevant time frame for active liquidity management is generally quite short. It is common best practice for banks to have daily time bands in the very short term (say for a period of five to seven days), followed by wider and less granular time bands for other periods. The time frame could also vary depending on a bank's business.

5.2.5 While the primary focus of the maturity profile is on short-term cash flows, banks should also review the mismatch positions for the medium- to longer-term time bands to identify any early sign of potential liquidity problems.

5.2.6 Banks are generally expected to perform cash-flow analysis for all currencies in aggregate as well as those denominated in Bahraini Dinars. If a bank has significant business denominated in foreign currencies, separate analysis of the maturity mismatch positions of individual foreign currencies in which it is active should also be performed.

Maturity mismatch limits

5.2.7 Banks must set internal limits to control the size of their cumulative net mismatch positions (i.e. where cumulative cash inflows are exceeded by cumulative cash outflows) for the short-term time bands up to one month (i.e. "next day", "7 days" and "1 month"). Such limits should be conservative, realistic and commensurate with their normal capacity to fund in the interbank market. Maturity mismatch limits should also be imposed for individual foreign currencies in which they have significant business.

5.2.8 The maturity mismatch limits must be properly documented in the liquidity management policy statement. Banks must keep their negative cumulative net mismatches within the established limits, and if any exceptions take place, these must be approved by senior management / ALCO and fully justified. The bank's compliance with such limits should also be regularly reviewed by an independent unit from the concerned business areas.

Assumptions and techniques

5.2.9 In order to provide prudent projections of expected cash flows, banks should, as far as possible, incorporate in the maturity profile realistic assumptions underlying the behaviour of their assets, liabilities and off-balance sheet activities rather than relying simply on contractual maturities. These assumptions may include:

- the proportion of maturing assets and liabilities that banks expect to roll over or renew;
- the proportion of marketable securities which are planned for sale before maturity;
- the behaviour of assets and liabilities with no clearly specified maturity dates, such as repayment of overdrafts and retail call/current accounts;
- potential cash flows arising from off-balance sheet activities, e.g. drawdown under loan commitments and contingent liabilities⁶;
- convertibility of foreign currencies; and
- access to wholesale markets, standby facilities and intra-group funding.

5.2.10 In making cash-flow assumptions and projections, banks may use a number of techniques ranging from historical experience and static simulations based on current holdings to sophisticated modelling (for more complex banks). The techniques employed by banks should be commensurate with the nature and complexity of their business activities.

5.2.11 One way of projecting cash flows is to analyse historical observations to determine cash-flow patterns and derive behavioural assumptions applicable to the cash flows. There is no standard methodology for making the assumptions. What is important is the use of consistent and reasonable assumptions that are supported by sufficient historical evidence. The minimum criteria that Banks are required to meet if they intend to use behavioural assumptions for the cash-flow analyses are set out in Annex C.

5.2.12 As an illustration, in projecting the cash flows of retail deposits, a bank may track the minimum outstanding balance of such deposits in the past 12 months and regard this as a "core deposit" balance to be slotted into the "over 1 year" time band of the maturity profile. Any remaining balance may then be evenly distributed over different time bands within one year.

⁶ All potential drawdown from legally binding and non-binding commitments should be included.

5.2.13 Under a “business as usual” situation, marketable debt securities, in particular those that are held by banks for long term investment⁷, should normally be allocated to the time bands according to their remaining contractual maturity. Debt securities that are held for trading purposes or available for sale⁸ may be allocated to the short-term time bands if they represent surplus liquidity that can be turned into cash quickly to meet funding needs if required (i.e. cash can be received on a same day or spot basis). Any cash inflows arising from their expected liquidation should however incorporate the lead time required before the cash can be made available, taking into account the settlement time and the impact of time differences if the clearing or custodian agents are located outside Bahrain.

5.2.14 Banks may, as a general rule, treat normal intra-group transactions (i.e. intra-group placements and borrowings transacted at arm’s length) in the same way as other third party transactions for the purpose of incorporating the relevant cash flows in the maturity profile, provided that there is no doubt about the financial position of the banking group as a whole. However, banks are not expected to include claims on their head office / parent bank under **back-to-back** transactions as cash inflows because such claims would normally be rolled forward continuously.

5.2.15 In projecting the cash flows, banks should also consider general economic and market trends as well as other relevant information that could affect their ability to access funds readily and at reasonable terms (e.g. a credit rating downgrade).

5.2.16 Banks should document in their liquidity management policy statement the underlying assumptions used for estimating the cash-flow projections in the maturity profile and the rationale behind them. The assumptions and their justifications should be approved by senior management / ALCO and subject to regular review to take account of available statistical evidence and changing business environment.

5.3 Stress-testing and scenario analysis

5.3.1 CBB considers that whether a bank can be regarded as having sufficient liquidity depends to a great extent on its ability to meet obligations under a funding crisis. Therefore, in addition to monitoring net funding requirements under normal business conditions, banks should conduct regular stress tests by applying various “what if” scenarios on their liquidity positions for all currencies in aggregate to ensure that they have adequate liquidity to withstand stressed conditions. These stress tests should also be separately conducted for positions in Bahraini Dinars and individual foreign currencies in which they have significant positions.

⁷ These refer to securities classified as “held-to-maturity debt securities” under IAS 39.

⁸ These descriptions “held for trading” and “available for sale” are defined in IAS 39

5.3.2 It is important for banks to construct plausible adverse scenarios and examine the resultant cash-flow needs. While banks are encouraged to cover stress events of different types and levels of adversity, they must, at a minimum, include the following scenarios in their stress-testing exercise:

- an institution-specific crisis scenario; and
- a general market crisis scenario (based on assumptions **prescribed by CBB** from time to time).

Institution-specific crisis scenario

5.3.3 An institution-specific crisis scenario should cover situations that could arise from the bank experiencing both real or perceived problems (e.g. asset quality problems, solvency concerns, rumours on a bank's credibility or management fraud, etc.). It should represent the bank's extreme view of the behaviour of its cash flows in a crisis (i.e. a "worst case" scenario for the bank). A key assumption is that many of the bank's liabilities cannot be rolled over or replaced, resulting in the need to secure emergency liquidity.

5.3.4 This "worst case" scenario should include a deposit run for retail banks. Such a scenario would typically include the following characteristics:

- significant daily run-off rates for deposits, with increasing requests from customers to redeem their time deposits before maturity;
- interbank deposits repaid at maturity;
- no new unsecured funding obtainable from the market; and
- forced sale of marketable securities at discounted prices.

5.3.5 Foreign banks (i.e. branches and subsidiaries of foreign banking groups) should consider two types of institution-specific crisis scenario, namely a crisis that is restricted to their Bahrain operations and a crisis that affects the global operations of the banking group (e.g. with problems originating from the head office or parent bank). In the latter case, no intra-group or head office funding support should be assumed to be available. This is because such support, which would be of particular value in a crisis affecting the Bahrain operations only, could prove to be ineffective if the crisis impinged on the group as a whole.

5.3.6 There are other institution-specific scenarios that are less severe in the short term but may subject a bank to longer term liquidity pressures. These scenarios may be triggered by possible changes in the market and public perceptions of a bank (e.g. as a result of a credit rating downgrade) that affect its access to funds or cause a gradual drain on its liquidity. As mentioned earlier, banks are encouraged to take account of different scenarios applicable to their own circumstances as part of the ongoing liquidity risk management process.

General market crisis scenario

5.3.7 A general market crisis scenario is one where liquidity at a large number of financial institutions in one or more markets is affected. Characteristics of this scenario may include a general liquidity squeeze, counterparty defaults, substantial discounts needed to sell assets and wide differences in funding access among banks due to the occurrence of a severe tiering of their perceived credit quality (i.e. flight to quality).

5.3.8 Banks should be aware that the cash-flow patterns of certain assets and liabilities may behave quite differently in the case of a general market crisis scenario. For example, compared with the institution-specific crisis scenario, a bank may have less control over the level and timing of future cash flows from the sale of marketable debt securities. This could be due to the fact that only very few market participants are willing or have sufficient liquidity to purchase securities. Hence, banks should assign appropriate discount factors to such assets to reflect the price risk associated with different stress scenarios. Moreover, the impact of a general market crisis on individual banks may differ. For example, a bank with a strong market reputation may benefit from a flight to quality as depositors seek a safe haven for their funds.

5.3.9 The inclusion of a general market crisis scenario in banks' liquidity stress-testing is to facilitate CBB's assessment of the vulnerabilities and soundness of the Bahrain banking sector in response to events causing general market disruptions. Where appropriate, CBB will make use of the data and results generated from banks' scenario analysis in its own stress-testing exercise.

Requirements

5.3.10 **Banks must perform stress-testing and scenario analysis on a quarterly basis.** Senior management / ALCO must examine the stress-testing results and formulate appropriate strategies to address the cash-flow needs reflected from the scenario analysis. For example, there may be a need to reduce liquidity risk by obtaining more long-term funding or restructuring the composition of assets.

5.3.11 While a severe liquidity crisis at an individual bank may stem from other problems not related to its liquidity, the bank's ability to honour its immediate commitments under such conditions could provide vital time for it to arrange funding support from other sources⁹ and take actions to address the underlying problems. This will increase its chance of surviving the crisis.

⁹ Such support may include capital injection from major shareholders, intra-group or head office support if the group is not the source of crisis, and support from relevant central banks or monetary authorities.

5.3.12 As such, CBB would normally expect a bank to have sufficient funds to continue in business, at least under the institution-specific crisis scenario, for a minimum number of days necessary for it to arrange emergency funding support. As the nature and size of business may differ widely among banks, CBB does not intend to prescribe a standard minimum number of days for all. Banks must determine this target having regard to their specific circumstances, and be prepared to justify it when necessary. Banks must also establish plans to achieve this target if they do not already do so, as reflected from the stress-testing results.

5.3.13 In conducting the scenario analysis, banks may factor in the possibility of intra-group or head office support for a crisis scenario affecting the Bahrain operations only (i.e. not applicable to one that affects the group as a whole). However, projected cash inflows from intra-group funding lines may only be included if the arrangement is fully committed and irrevocable or where an acceptable level of certainty can be demonstrated (e.g. the entity providing the support must regard such support as a deduction from its own stress liquidity calculations). Any assumption that intra-group deposits will not be withdrawn at maturity should also be supported by **formal arrangements with the placing entity**. See also subsection 6.4 below.

5.3.14 In a crisis scenario, banks may generally project cash inflows from liquidating (or pledging for funding) their holdings in **marketable** debt securities regardless of whether they are held for trading or long-term investment. However, banks should take account of the **expected level of discount in prices** and the time needed to settle the transactions.

5.3.15 Locally incorporated banks must, as part of their contingency planning for a liquidity crisis, consider the extent to which their assets are eligible to secure funding under CBB's lender of last resort ("LOLR") framework. However, they should not assume that such support is automatically available to them during a crisis. Banks' eligibility under this framework is subject to their meeting the prescribed criteria set out in CBB's policy statement. They should also recognise that such support can only be sought in exceptional circumstances and as a last resort.

5.3.16 When banks open any new interbank relationships, particularly in new jurisdictions, they must perform full and comprehensive due diligence to ensure that they understand their priority and legal rights for different types of exposures in the event of possible default by the concerned counterparty bank. Banks should take appropriate measures to protect their rights (e.g. through the taking of collateral) to minimise the extent of loss and damage to cash flow in the event of default.

5.3.17 The above measures should be approved by senior management / ALCO and be subject to regular review in the light of changes in banks' operations and market environment.

Exemptions

5.3.18 In respect of banks that are part of an international banking group, their liquidity risk may be managed on an integrated global basis, with stress tests being conducted at a regional or group level. CBB may regard this arrangement as acceptable for the purposes of complying with the stress-testing requirements, provided that the stress scenarios can adequately reflect the specific risk characteristics of banks concerned. Banks having such an arrangement should discuss this with CBB.

5.3.19 CBB may exempt certain banks from complying with the requirements of this subsection if the nature and scale of their operations do not warrant the use of such risk management techniques. Banks that might be exempted include, for example, those that maintain a simple and small operation with positive funding positions (based on cash flows which are mostly contractual and predictable).

5.4 Foreign currency liquidity management

5.4.1 In addition to managing liquidity risk in Bahrain Dinars and all currencies in aggregate, banks should have adequate systems in place for measuring, monitoring and controlling the cash-flow and mismatch positions **in each major foreign currency** in which they are active.

5.4.2 Banks are required to formulate liquidity strategies and policies for individual currencies which represent a material portion of their funding base **10** or are not currencies that are freely convertible into Bahrain Dinars. The effectiveness of such strategies and policies must be reviewed on at least an annual basis.

5.4.3 In managing individual currency funding needs, banks should address issues that relate to their nature of business and funding strategies. For example, some banks may rely on foreign currency liabilities to fund a portion of their Bahrain Dinar assets while others may fund their foreign currency assets with Bahrain Dinar funding via the foreign exchange or currency swap markets. In these cases, banks will need to assess and monitor the risk of adverse exchange rate movements that could widen existing liquidity mismatches **11** as well as the likely convertibility of foreign currencies and access to foreign exchange markets for switching funding from one currency to another.

¹⁰ CBB will normally regard a currency position as material if the amount of a bank's on-balance sheet assets or liabilities, whichever is the larger, in that currency together with the sum of its expected cash inflows and outflows from off-balance sheet and contingent activities in the same currency is more than **10%** of its total customer deposits in all currencies.

¹¹ If a bank runs a negative maturity mismatch in a foreign currency (i.e. with liabilities exceeding assets in that currency for a particular time period), the mismatch position in Bahrain Dinar terms will worsen should the foreign currency appreciate significantly against the Bahrain Dinar.

5.4.4 As a general principle, banks should manage and control their funding needs to avoid over-reliance on foreign exchange or currency swap markets, as there is a risk that access to these markets may cease to be available. In this regard, banks must consider setting internal limits to control the amount of foreign currency liabilities that can be swapped through the foreign exchange market to fund local currency assets, or vice versa.

5.4.5 Apart from assessing the aggregate foreign currency liquidity needs and the acceptable mismatch in combination with Bahrain Dinar commitments, banks must separately analyse the maturity mismatch positions of foreign currencies in which they have significant positions under both normal and stressed conditions.

5.4.6 Banks must set and regularly review internal limits to control the size of cumulative net mismatches over particular time bands (e.g. “next day”, “7 days” and “1 month”) for foreign currencies in aggregate and for each significant foreign currency with material balances in which they operate. Such limits are generally expected to be lower than those for Bahrain Dinars.

5.4.7 In developing liquidity management strategies for individual foreign currencies and determining the size of maturity mismatches in those currencies, banks (particularly those with active involvement in multiple currencies) should take into account, inter alia, the following factors:

- the convertibility of individual foreign currencies, the volatility of relevant exchange rates as well as the timing of access to funds in those currencies;
- conditions of foreign exchange markets, including the depth and liquidity of the markets and the relative and absolute levels of interest rates;
- Banks’ ability to have access to interbank money markets for foreign currency funding as well as other foreign exchange and currency swap markets;
- the impact of potential disruptions to foreign currency markets and exchange risks (i.e. without presuming that surplus liquidity in one currency can always be used to meet the shortfall in another currency);
- the “stickiness” of deposits in foreign currencies under stressed conditions;
- the availability of foreign currency backup facilities to cater for circumstances in which normal access to funding in individual currencies is disrupted;
- differences in the behaviour of foreign currency depositors/lenders vis-à-vis those of local customers and counterparties; and
- the ability of borrowers to repay their foreign currency liabilities under stressed conditions (e.g. interest rate hikes and fluctuation in exchange rates).

5.4.8 CBB may allow banks with international operations that can demonstrate proficiency in foreign exchange risk management and full convertibility among the individual foreign currencies they operate in to maintain aggregate foreign currency mismatch limits only.

5.5 Supervisory and reporting arrangements

5.5.1 As part of its review of banks' liquidity management policy statement, CBB will consider the suitability and reasonableness of the following limits and assumptions set by banks, having regard to the nature and complexity of their operations:

- maturity mismatch limits and behavioural assumptions adopted for constructing the maturity profile under normal business conditions;
- the cash-flow assumptions for conducting stress-testing under the institution-specific and general market crisis scenarios. CBB will provide input on the scope of the general market crisis scenario; and
- the minimum number of days of positive liquidity targeted by individual banks under the institution-specific crisis scenario.

The above must also cover positions in individual currencies in which a bank has material business.

5.5.2 CBB may review the techniques used by individual banks to estimate future cash flows, and request them to provide historical/statistical evidence or other justification to support the size of their internal mismatch limits and cash-flow assumptions. CBB must be notified of any subsequent changes in these limits and assumptions.

5.5.3 Banks are required to submit to CBB each quarter (or more frequently if necessary) internal liquidity management reports. These reports should cover the following:

- the cash-flow analysis under normal business conditions;
- the stressed liquidity reports for both the institution-specific crisis scenario and general market crisis scenario; and
- the cash-flow analysis and stressed liquidity reports for individual currencies in which a bank has significant positions.

5.5.4 CBB will make use of the above information to monitor the liquidity risk of individual banks, including:

- the net funding requirements of a bank as reported in the maturity mismatch analysis with reference to its internal limits and behavioural assumptions;
- the reported stress-testing results to assess a bank's ability to withstand crisis situations and to identify any notable changes in its liquidity risk profile. Where necessary, CBB will discuss with the bank's management about its strategies to address the results generated; and
- the trend of a bank's mismatch positions in individual foreign currencies against its internal limits. CBB will also seek to understand the underlying liquidity strategies for such currencies.

5.5.5 CBB will identify whether there are any "outlier" banks in terms of the proportion of local currency assets being funded by foreign currency liabilities (or vice versa). This is to ensure that there is no over-reliance on foreign currency funding or on swap markets.

5.5.6 As part of its internal stress-testing exercise, CBB will conduct liquidity-related stress tests to assess the ability of individual banks to cope with a funding crisis. In this connection, CBB will collect relevant information from locally incorporated banks under the quarterly Liquidity Stress-testing Return. The Return requires reporting banks to provide information on selected asset and liability items, including a breakdown of the composition of customer deposits, debt securities held and residential mortgage loans. CBB may request other banks to submit this Return on an ad hoc or need basis.

5.5.7 CBB will review the effectiveness of banks' cash-flow management frameworks during on-site examinations.

6. Asset and liability management

6.1 Liquid asset holdings

6.1.1 Banks must maintain an appropriate mix of high quality liquid assets¹² as a source of liquidity reserve for meeting emergency funding needs. The amount and composition of such assets should be determined by individual banks with reference to the nature of their business and liquidity risk profile.¹³

6.1.2 Liquid assets are usually defined as assets that can be quickly and easily converted into cash in the market at a reasonable cost. In this respect, due consideration should be made of the time-to-cash period (the time to necessary to convert assets into cash).

6.1.3 In order to analyse the liquidity of an asset, institutions and supervisory authorities need to differentiate between normal and stressed times, taking into account the role of central banks' refinancing policies, particularly in times of stress.

6.1.4 Banks must set out their strategy for holding liquid assets, including the types and quality of assets to be held for liquidity purposes and the level of such holdings. Concentration limits should also be established where appropriate to avoid excessive exposure to market and other risks within the asset portfolios in respect of asset type, counterparty, geographic location and economic sector.

¹²Generally, liquid assets include cash, bank placements under one month maturity and debt securities listed or traded on major exchanges, financial instruments issued or guaranteed by governments and banks and other paper with credit ratings of at least single-A or equivalent.

¹³A bank's liquid asset holdings should also be sufficient to meet the prudential requirements under the applicable minimum liquidity ratios.

6.1.3 Marketable debt securities are commonly held by banks as a form of liquid assets. While they represent a readily available source of liquidity in the case of need, the value of such securities is often influenced by market and interest rate risks. There may thus be questions as to whether the securities could be liquidated within a short period of time and at a reasonable price if general market conditions are unfavourable. In determining the types and amount of marketable debt securities to be held as liquid assets, it is important that banks have particular regard to the following aspects:

- the depth and liquidity of the market; i.e. how fast an asset could be sold and how much it could realise;
- the percentage of an issue held by a bank;
- the credit rating of securities held;
- the currency of denomination of securities held;
- the expected maturity date, taking into account the possibility of early redemption or disposal; and

the probability of using the securities as collateral for borrowing funds either in the open market or from CBB or other central bank / monetary authority.

6.1.4 Banks should seek to maintain a well-balanced portfolio of **high quality** liquid debt securities with limits by type, tenor and currency, and monitor the proportion of such securities within the balance sheet to avoid undue reliance on such assets.

6.1.5 **CBB Treasury Bills and Sukuks** are particularly useful to banks in liquidity risk management. In the event of a funding crisis, they can be sold or pledged almost immediately. Banks are therefore recommended to hold an appropriate amount of **CBB Treasury Bills and Sukuks** for liquidity purposes.

6.1.6 Banks are also expected to maintain a proportion of their liquid assets in Bahrain as it is generally easier and quicker to sell or pledge assets that are physically located in Bahrain in crisis situations. In particular, banks with significant retail business need to have sufficient funds in the event of a deposit run to purchase quickly bank notes from note issuing banks to meet the immediate demand from depositors.

6.1.7 For the purpose of managing intraday liquidity (see also subsection 6.5 below), banks participating directly in clearing and settlement systems should hold within their stock of high quality liquid assets an appropriate amount of securities that are eligible for intraday repurchase transactions with CBB. In determining the size of such holdings, banks should take into account the volume and volatility of transactions that they may be required to process.

6.2 Diversification and stability of liabilities

6.2.1 Banks must seek to maintain diversified and stable funding sources by determining the appropriate mix of liabilities and building strong and lasting relationships with key fund providers.

6.2.2 Banks should avoid any potential concentration in their funding sources ¹⁴. Concentration limits must be established, together with systems for monitoring compliance with these limits, so that any undue reliance on a single counterparty (or group of related counterparties), product or market may be prevented.

6.2.3 What would constitute a funding concentration cannot be expressed in definite sizes or amounts, as this depends on the nature and complexity of a bank's business activities. Banks should take into account the following aspects in assessing the degree of liability concentration:

- the maturity profile and credit-sensitivity of the liabilities;
- the mix of secured and unsecured funding;
- the extent of reliance on –
 - a single liability provider or a related group of liability providers;
 - particular instruments or products (e.g. interbank borrowing, retail versus wholesale deposits, and repurchase agreements and swaps); and
 - intra-group funding (see also subsection 6.4 below); and
- geographic location, industry or economic sector of liability providers.

6.2.4 Banks must undertake appropriate analysis of the characteristics of their liabilities and the potential impact these may have on their liquidity position. For example, banks should be aware that, in times of market turbulence, a proportion of their credit-sensitive liabilities (such as wholesale funding or large corporate deposits) may be withdrawn, particularly if the funding is unsecured. Secured funding may also be affected, with counterparties seeking better quality collateral or larger haircuts on collateral.

6.2.5 Banks must identify which funding sources are likely to stay with them under most circumstances, which are likely to run-off gradually if problems arise and which to run-off immediately at the first sign of problems. The objective is to identify and build up an appropriate level of “core” funding and to minimise reliance on liabilities that are volatile. In particular, banks with a large deposit base should have a system to carry out statistical and behavioural analysis to detect any signs that the average life of retail deposits is shortening or that the deposit base is becoming more volatile. Banks must also be cautious about attracting deposits mainly by way of offering above market rates of interest or promotional gift items. Such deposits will tend to be highly volatile. Do the facts back this statement up?

¹⁴ A funding concentration exists when a single decision or factor has the potential of causing a significant or sudden withdrawal of funds.

6.2.6 It is important for banks to assess their exposure to large fund providers (or depositors) on an ongoing basis. At a minimum, banks should review regularly reports on large fund providers (at a minimum, the largest ten) which consolidate all funding that a bank obtains from each provider or related group of providers. The historical performance of these fund providers, e.g. in terms of the maximum, minimum and average balances over the previous 12 months, should also be monitored. Trigger ratios must be established to identify any funding concentration for management review. In the case of a retail bank, a funding concentration may exist if a material amount of its total deposit base is from the top ten depositors or a single depositor (or group of related depositors). Banks should consider whether action needs to be taken to address the issue (e.g. diversify the deposit base).

6.2.7 Banks should aim to foster relationships with depositors and other liability holders (e.g. trading counterparties, correspondent banks and corporate customers) through such means as quality of service and, in case of large depositors, personal contact. The frequency of contact and the frequency of use of a funding source are two possible indicators of the strength of a funding relationship.

6.2.8 While connected deposits are, generally speaking, a more stable funding source than deposits from unconnected parties, CBB would wish banks to broaden, as far as possible, their deposit base rather than relying too heavily on connected deposits.

6.3 Access to interbank and other wholesale markets

6.3.1 The ability to obtain funds in the interbank market is an important source of liquidity for banks. Banks must be in a position to estimate their “normal” borrowing capacity based on past experience and aim to limit their wholesale funding needs for both local and foreign currencies on, say, a daily and weekly basis to an amount which is comfortably within that capacity. It may also be sensible to test their name in the market on a regular basis even if there is no immediate need for funds.

6.3.2 Banks’ capacity to borrow from the interbank market depends on a number of factors, including the size and turnover of the local market, their share of that market as well as the credit limits imposed by counterparties. Given these factors, it may not be feasible for a bank to be absolutely certain about its borrowing capacity in the interbank market. Therefore, in setting internal targets for interbank borrowing, banks should ensure that such targets have actually been attained and exceeded on a reasonable number of occasions. This will help give some assurance that the targets could be achieved without causing any adverse market reaction.

6.3.3 Banks should also recognise that their ability to obtain interbank borrowing may be radically reduced in crisis conditions. To address this risk, banks should build up and monitor their relationships with their main providers of funds. They may try to arrange standby credit lines with other banks or counterparties. However, banks should recognise that their right to draw on these facilities may be denied in a crisis – the fund providers may simply not honour their contractual obligations by refusing to advance any funds to

the banks. There might also be calls for early repayment of drawings under these facilities triggered by defaults or breaches of material adverse change clauses. Banks should therefore avoid any excessive reliance on standby facilities. Where a bank's standby facilities constitute a major source of liquidity in an emergency situation, CBB will seek to be satisfied as to the certainty of these arrangements.

6.3.4 Developing the ability to sell assets (e.g. through inclusion of sale clauses in loan documentation or use of securitisation structures) or exploring arrangements under which a bank can borrow against its assets (e.g. through repurchase agreements) may provide additional liquidity support under adverse circumstances. Prearrangements to generate funding from less liquid assets when required could also be an important element of managing liquidity risk.

6.3.5 Asset securitisation may also provide a means of improving the liquidity of the balance sheet. In generating liquidity through asset securitisation, however, banks should be aware that peculiarities related to certain asset securitisation transactions, such as early amortisation¹⁵, and excessive reliance on a single funding vehicle may increase liquidity risk. They should also be aware that their ability to securitise assets may diminish in stressed market conditions. In addition, the time taken to organize a securitisation transaction may imply that it cannot be relied upon to provide liquidity at short notice.

6.4 Intra-group liquidity

6.4.1 Intra-group fund transfers could affect a bank's liquidity in various ways. For example, a bank may be required to extend support to group companies experiencing liquidity problems, while funding provided by other related entities to the bank may be withdrawn in an emergency.

6.4.2 Banks should therefore have adequate policies and systems to manage their intra-group liquidity arrangements. In particular, banks should specify in their liquidity management strategy the treatment of intra-group liquidity and assumptions on intra-group dependencies.

They should also be able to monitor and analyse how the funding positions of other group companies might affect their own liquidity, and to address any regulatory or legal impediments to accessing liquidity on a group basis.

6.4.3 Where banks provide significant funding or liquidity support to other group or related entities (e.g. in the form of explicit guarantees or funding lines to be drawn at times of need), they should ensure that such support is appropriately accounted for in the measurement of their own liquidity positions.

¹⁵ Early amortisation provisions allow investors to be paid out prior to the original stated maturity of the securities issued once the provisions are triggered.

6.4.4 A locally incorporated bank that decentralises or partially delegates liquidity management among operating units in or outside Bahrain should clearly document its policies and limits established for those units as well as any internal liquidity support arrangements provided to the units. The policies should also address how liquidity of the units is monitored and controlled by head office management in Bahrain.

6.4.5 A local branch or authorized subsidiary of a foreign bank should generally be able to rely on the support of its head office or parent bank in a crisis affecting only the Bahrain operations. Such support could however be called into question if the crisis affected the bank or group as a whole.

6.4.6 Back-to-back transactions between the Bahrain operation and the head office / parent bank of foreign banks should generally be excluded from their cash-flow and liquidity projections. However, those transactions that were previously approved by CBB may continue to be included in the calculation of the liquidity ratio provided that the conditions set out in para. 3.3.2 above are met on an ongoing basis.

6.4.7 CBB will monitor the level and trend of intra-group transactions reported by banks in the monthly Liquidity Return. It may consider restricting intra-group transactions by setting limits to “ring-fence” the Bahrain operation of a banking group if the financial or liquidity position of the rest of the group is in doubt.

6.4.8 In the case where a locally incorporated bank deploys a significant proportion of its liquidity through a deposit-taking subsidiary or an overseas branch, CBB may require the bank to observe the prudential liquidity ratio and its internal maturity mismatch limits on a consolidated basis by including the position of the subsidiary or branch in the calculation.

6.5 Intraday liquidity

6.5.1 Structural and operational changes in payment systems have increased the importance of managing intraday liquidity. Banks that participate directly in clearing and settlement systems must take appropriate steps to ensure that they have sufficient collateral to cover cash positions and systems capable of monitoring intraday liquidity positions and cash needs.

6.5.2 Banks should also be aware that in stressed conditions they are likely to require more intraday liquidity than in normal market conditions for a variety of reasons, including payments due to banks being delayed and wholesale depositors withdrawing from the market. Banks should take account of this in their stress-testing and scenario analysis.

6.5.3 Banks that provide clearing services to correspondent banks should be able to measure the value of payments traffic and have systems to keep track of the balances in memo accounts. They should also be able to estimate the likely cash flows arising from future payments traffic.

6.6 Liquidity ratios and limits

6.6.1 Banks must establish liquidity ratios and limits to control the nature and level of liquidity risk that they are willing to assume. In setting these ratios and limits, consideration must be given to a bank's business strategies and activities, its past performance, the level of its earnings and capital available to absorb potential losses, as well as its tolerance for risk. The ratios and limits must be properly documented in the liquidity management policy statement and subject to at least annual review. They should be revised when conditions or risk tolerances of a bank change.

6.6.2 Set out below are some typical examples of ratios and limits used by banks for liquidity risk management:

- target liquidity ratio (see subsection 3.4 above for more details);
- maturity mismatch limits for local and major foreign currencies (see subsections 5.2 and 5.4 above for more details);
- concentration limits in respect of the mix of assets and liabilities (see subsections 6.1 and 6.2 above for more details); and
- Net loans to total deposits ratio or other ratios appropriate to a bank's business activities (see sub section 3.6 and Annex D for more details).

6.6.3 Senior management / ALCO should ensure compliance with the established ratios and limits. The responsibility for monitoring such ratios and limits should be assigned to a function independent of the funding areas. There should also be a defined procedure for reporting exceptions or breaches to senior management / ALCO, which can be early indicators of excess risk or inadequate liquidity risk management.

6.6.4 Liquidity ratios and limits should always be used in conjunction with more qualitative information such as an bank's funding capacity (e.g. in terms of a reduction in credit lines or increasing requests for early withdrawals of deposits) to reveal material liquidity trends.

6.6.5 CBB will review the liquidity ratios and limits set by a bank having regard to its liquidity risk profile and the actual ratios/positions run by it in relation to those of its peers and other indicators of the bank's liquidity.

7. Contingency plan

7.1 Overview

7.1.1 Every bank must formulate a formal contingency plan that sets out a strategy for dealing with a liquidity crisis and the procedures for making up cash-flow deficits in emergency situations. It is also important that banks identify and understand the types of events that may trigger the contingency plan. Mechanisms should be in place to facilitate monitoring of these trigger events.

7.1.2 As part of the contingency plan, banks must outline how they handle press and broadcasting media when market sensitive information about them is disseminated.

7.1.3 The contingency plan must be updated and reviewed regularly (at least annually) by senior management / ALCO to ensure that it remains robust over time. In addition, banks are required to conduct rehearsals of the contingency plan from time to time to better prepare themselves for unfavourable situations.

7.2 Early warning indicators

7.2.1 To assess whether a potential liquidity problem may be developing, banks must identify various internal and market indicators, including:

Internal indicators

- deteriorating asset quality;
- excessive concentrations on certain assets and funding sources;
- decline in earnings and interest margins;
- increase in overall funding costs;
- rapid asset growth being funded by volatile wholesale liabilities; and
- worsening cash-flow positions as evidenced by widening negative maturity mismatches, especially in the short-term time bands.

Market indicators

- credit rating downgrades;
- persistent drop in the bank's stock price;
- widened spread on the bank's senior and subordinated debt;
- reduction in available credit lines from correspondent banks;
- counterparties unwilling to extend unsecured or longer dated transactions to the bank; and
- increasing trend of deposit withdrawals.

7.2.2 Banks must have a system for identifying and tracking such indicators to spot potential problems at an early stage.

7.3 Strategy and procedures

7.3.1 A contingency plan for dealing with liquidity problems or crisis situations must cover at least the following components:

- Managerial coordination – reporting procedures must be in place to ensure that all necessary information is available for senior management / ALCO to make quick decisions. A clear division of responsibility must be set out so that all personnel understand their roles in a crisis situation. This should include designated

- personnel who would be responsible for identifying crises and crisis management as well as those for promptly notifying CBB of the problems;
- Early warning signals – banks must specify the warning signals to be used for identifying an approaching crisis and the mechanisms to facilitate constant monitoring and reporting of these signals;
 - Backup liquidity – procedures must be set out for making up cash-flow shortfalls in crisis situations. They must clearly spell out all key sources of funds (including unused credit facilities), their expected reliability and under what conditions these funds should be used. Banks must not excessively rely on backup lines and need to understand the various conditions, such as notice periods, that could affect their ability to access quickly such lines. An assessment of the cost of alternative funding strategies and the impact on capital should also be included;
 - Change in asset and liability behaviours – banks may find that interbank placements are no longer being repaid due to standstill agreements or to administration or liquidation of counterparties where, for example, retail liabilities may be being repaid by counterparties, but interbank placements are not. Banks should therefore outline the courses of action for altering asset and liability behaviours to deal with crisis situations. For example, to cater for the increased deposit run-off during a crisis, more aggressive sale of marketable assets or plans to raise deposits would be necessary. The likely impact of particular courses of action on market perception should also be assessed;
 - Customer relationships – procedures must be provided for determining the priority of customer relationships during a crisis, e.g. the order in which credit lines would be withdrawn from specific customers. In deciding which assets are to be disposed of, banks would typically select those which are least detrimental to business relationships and public perception about their financial soundness. Banks should also maintain strong ongoing links with trading counterparties and liability holders in order to be better positioned to secure sources of funds under crisis situations; and
 - Plans for dealing with staff and the public including customers, key market participants and the media (see also subsection 7.4 below).

7.3.2 For retail banks in Bahrain, procedures for obtaining and distributing bank notes are a vital part of contingency planning. Banks with distant branches must have a plan to ensure the delivery of bank notes to these branches within a short period of time in the case of emergency.

7.3.3 For local branches and subsidiaries of foreign banks, the contingency plan should also deal with how the management of liquidity of the Bahrain operations is integrated into their global liquidity management. In particular, it should describe the extent to which the liquidity of the Bahrain operation is supported by liquid assets held elsewhere and the degree of commitment of the head office to provide liquidity support in the event of a crisis.

7.4 Media relationship and public disclosure

7.4.1 Good public relations management can help a bank counter rumours that can result in a significant run-off by retail depositors and institutional investors. For example, if material adverse information about a bank is made public, it should be prepared to announce corrective actions immediately. This will help reduce the uncertainties of market participants and demonstrate that the highest levels of management are attentive to the problems that exist.

7.4.2 Public disclosure is also an important element of liquidity management. Banks must provide adequate information on an ongoing basis to the public and, in particular, to major creditors and counterparties so that it is easier for them to manage market perceptions during crisis situations.

Annex A : Correlation of liquidity risk with other risks

A1. Any bank that takes on more credit risk may be increasing its liquidity risk. A significant rise in the level of a bank's non-performing loans and bad debt charges, in particular, will be perceived by rating agencies and fund providers as signs of deterioration in its asset quality and potential liquidity problems. This may lead to credit rating downgrades and the demand for a risk premium from fund providers, thereby affecting the bank's fund-raising capability. If the situation has cast doubt on the bank's financial viability, it may be denied any funding at all. Many past bank failures have been the combined result of severe credit and liquidity problems.

A2. Market risk will affect a bank's ability to generate liquidity from its trading portfolio of financial instruments. Adverse changes in the value of such portfolios may also result in volatile profits. If a bank is perceived to be subject to a high level of market risk, fund providers may require the bank to pay higher interest rates for funds or may even decline to provide any funding at all.

A3. Interest rate risk may have extensive effects on liquidity. Movements in interest rates will affect banks in terms of the income earned from assets, the market value of those assets and the cost of funding those assets. Banks' earnings may be squeezed depending on the direction of change in interest rates and their funding structure. Off-balance sheet instruments that are sensitive to interest rates (e.g. interest rate swaps) may also result in unexpected cash outflows or additional funding requirements when interest rates are volatile.

A4. Operational risk is also related to liquidity risk. Significant problems can develop quickly if operational systems fail to process, or cause delay in the execution of, transactions. In particular, the breakdown of fund transfer and securities clearing systems will directly affect the cash flows of banks. Problems in other operational systems such as electronic or credit card banking services may result in customer dissatisfaction and closure of accounts.

A5. A bank's reputation is essential for attracting funds at a reasonable cost and retaining funds during troubled times. Any negative publicity (e.g. staff fraud or scandal), whether true or not, may undermine public confidence in a bank directly or through contagion if the problems originate from its group companies. A bank's failure to honour any of its funding obligations and commitments could also be a source of negative publicity. Even if the commitment concerned is not legally binding, it may arouse suspicion and rumours about its financial strength. Negative publicity may prompt depositors and other fund providers to seek greater compensation (e.g. higher interest rates) for keeping their funds with the bank or to withdraw their funds. If this is not properly dealt with, negative publicity may, in extreme situations, trigger bank runs and result in serious problems for the bank or even the banking industry as a whole. To minimise the potential impact of reputation risk on liquidity, banks should take into account the estimated level of drawings of commitments, legally binding or not, in its day-to-day cash-flow management, seek to diversify the sources and maturity of market funding, and increase asset liquidity, as appropriate.

A6. Strategic risk may also have an impact on banks' liquidity. Before implementing any new strategy or business activity, a bank should assess the liquidity implications and ascertain whether the funding planned to support the new activity can be raised at a reasonable cost. If the liquidity impact is misjudged, strategic risk will increase. The ability to attract and maintain sufficient liquidity is particularly important for banks that are experiencing rapid asset growth.

Annex B : Examples of scenario analysis

B1. Introduction

B1.1 This Annex provides banks with the following examples of how maturity mismatch / cash-flow analyses can be conducted based on normal and stress scenarios:

- Example 1: Cash-flow analysis under normal business conditions;
- Example 2: Cash-flow analysis under an institution-specific crisis scenario; and
- Example 3: Cash-flow analysis under a general market crisis scenario.

B1.2 CBB has constructed an illustrative, hypothetical portfolio for a locally incorporated retail bank (hereinafter referred to as Bank X) to illustrate the changes in cash-flow positions under the different scenarios.

B1.3 The explanatory notes for assumptions made under each scenario, and the relevant sample worksheets, are set out in sections B2 to B5 below. **It should however be noted that the figures and assumptions used in the worksheets are solely for illustrative purposes.** Banks should develop their own methodology and assumptions based on their specific circumstances.

B1.4 As in the illustrations, banks are expected to carry out similar analyses to better understand their ability to maintain adequate liquidity under both normal and crisis situations. Although only the key liquid assets and liabilities are included in the

illustrations for crisis scenarios, banks should cover any other items (e.g. off-balance sheet activities) that are significant to them.

B1.5 There is no prescribed format for banks to conduct the analyses. Banks should adopt whatever format that is most appropriate for their operations. They may however use the sample worksheets as a reference.

B2. Explanatory notes

Example 1: Cash-flow analysis under normal business conditions

B2.1 This example illustrates how banks can estimate their net funding requirements on a daily basis under normal operating conditions. For ease of reference, the sample worksheet (see section B3 below) largely follows the format of the previous “Maturity Profile Return

B2.2 In this example, Bank X uses behavioural assumptions for a number of asset and liability items to better reflect their expected cash flows. These include customer deposits, undrawn overdraft and other commitments, and overdraft outstanding and loans payable on demand. In determining the behavioural maturity, Bank X analyses the historical trend of specific items or uses other methods such as simulation. Other items are mainly based on contractual maturity.

B2.3 In the case of customer deposits, Bank X takes the minimum outstanding balance of such deposits in the past 12 months as a “core deposit” balance and slots it under the “over 1 year” time band in the maturity profile. The remaining balance is then evenly spread over different time bands within one year. Banks may further segregate their deposits into retail and wholesale (e.g. those placed by large corporates and private banking clients), assuming that the former will be based on historical experiences on core balances while the latter will be repaid according to contractual maturity.

B2.4 Bank X has maintained placements and borrowings with some related banks. These intra-group transactions, which are made at arm’s length, are treated in the same way as other interbank transactions (i.e. assuming that the funds will be repaid on maturity).

B2.5 Marketable debt securities held by Bank X, including those held for long-term investment, are allocated to the time bands in the maturity profile according to their remaining contractual maturity. Securities in the trading portfolio that are not relied upon to meet the prudential liquidity ratios (i.e. representing surplus liquidity) are projected for sale with cash inflows estimated according to the planned selling dates and expected selling prices.

B2.6 This example assumes no balance sheet growth. Banks may however factor in the expected (or planned) balance sheet growth that needs funding as appropriate.

B2.7 Bank X has established limits to control its cumulative net mismatch position for the short-term time bands (i.e. “next day”, “7 days” and “1 month”). These limits are set within its normal borrowing capacity. As an example, banks may determine such limits with reference to the maximum level of funds they could secure from the interbank market in the past 12 months, discounted by a percentage (say, 10%).

Example 2 : Cash-flow analysis under an institution-specific crisis scenario

B2.8 Under the institution-specific crisis scenario, it is assumed that an isolated event affecting only Bank X occurs. The event is caused by rumours about the bank sustaining large credit losses that may threaten its solvency. Major cash-flow assumptions are set out below.

B2.9 It is assumed that customer deposits will run off at a daily rate of 10% during the crisis. However no withdrawal is assumed for pledged and connected deposits. The latter refers to deposits placed by major shareholders or other related entities. These deposits are expected to stay with Bank X even under crisis situations. (N.B. this assumption may not be appropriate in the case of all banks.)

B2.10 The 10% deposit run-off rate is mainly for illustrative purposes. This assumption may differ among retail banks and could be affected by a number of factors, including the bank’s deposit size and customer profile (e.g. the proportion of core deposit relationships). Banks should be able to justify their own assumptions based on analysis of the characteristics of their deposit portfolio.

B2.11 It is also assumed that all money will be withdrawn once bank placements and borrowings of Bank X mature. The same principle applies to negotiable debt instruments issued. However, no cash inflow is projected from placements with connected banks upon maturity as they too will be affected by the crisis. Due to the special nature of bank vostro and Nostro balances, the whole amounts will be withdrawn on the first day of the crisis.

B2.12 As Bank X will not be able to obtain new funding from the market during the crisis, it has to liquidate or pledge for funding its holdings in marketable debt securities at a discount (ranging from 10% for Exchange Fund Bills and Notes to 30% for other USD investment grade securities). Allowance is made for the time needed to settle the transactions (e.g. T+1 for US Treasuries).

B2.13 The results of the cash-flow analysis (see the sample worksheet under section B4 below) indicate that Bank X’s own liquidity will only be sufficient to withstand the crisis for the first two days. It will need to secure emergency funding support from other sources in order to stay in business. For example, it may seek a capital injection from major shareholders and/or temporary funding support from CBB under the LOLR framework assuming that the prescribed criteria for such support can be met. It will also have to come up with measures to boost public confidence in the bank if its problems are known.

B2.14 Based on the above results, Bank X will need to consider whether it can secure in time other sources of funding support within the two-day period. If not, it should develop plans to strengthen liquidity so as to lengthen the breathing space under a crisis.

Example 3 : Cash-flow analysis under a general market crisis scenario

B2.15 A general market crisis differs from an institution-specific crisis in that the latter involves liquidity problems specific to a bank only while the former may affect the banking sector as a whole.

B2.16 In this example, it is assumed that massive capital outflows from Bahrain have led to an abrupt tightening of liquidity within the banking sector. The impact is felt across the board, but the extent varies among banks due to different perceptions of their financial strength and credit quality. In the case of Bank X, the impact is reduced by the fact that it is perceived to be a bank with strong financials and good management systems.

B2.17 It is assumed that customer deposits (excluding connected and pledged deposits) of Bank X will run off at a daily rate of 5% during the crisis largely due to the migration of funds outside Bahrain. The run-off rate is lower than that for the institution-specific crisis scenario as there is no loss of confidence in the bank. Moreover, the impact is shared among different banks within the banking sector.

B2.18 To meet the increased funding needs, Bank X will liquidate or pledge for funding its portfolio of marketable debt securities. However, as there is a lack of market liquidity, some of the securities can only be sold at deep discounts if they are to be realised quickly. This is characteristic of a liquidity squeeze which makes it more difficult for banks to dispose of their securities holdings. More time will also be needed for selling the assets.

B2.19 It is further assumed that a portion of the interbank placements will not be repaid upon maturity as a few counterparties do not have sufficient liquidity to honour their obligations. Nevertheless, placements with connected banks will continue to be repaid upon maturity.

B2.20 The results of the cash-flow analysis (see the sample worksheet under section B5 below) show that Bank X has sufficient liquidity to weather the crisis for up to five days.

B3. Cash-flow analysis of Bank X under normal business conditions (Example 1)

B4. Cash-flow analysis of Bank X under an institution-specific crisis scenario (Example 2)

B5. Cash-flow analysis of Bank X under a general market crisis scenario (Example 3)

Annex C: Behavioural assumptions for cash-flow management

This Annex sets out the minimum criteria that banks are required to meet if they intend to use behavioural assumptions to project the expected cash flows of their assets, liabilities and off-balance sheet activities. Where necessary, CBB may review the techniques used by individual banks and request them to provide evidence or justification to support the assumptions. The minimum criteria for using behavioural assumptions are as follows:

C1. The assumptions have to be consistent and reasonable for each scenario. For example, the proportion of marketable debt securities which could be turned into cash before maturity and the applicable hair-cut should vary under different scenarios to properly reflect the management's intention / ability to turn the securities into cash under each scenario.

C2. The assumptions should be verified and supported by sufficient evidence, experience and performance rather than arbitrarily selected. Typical information sources that could be used to help formulate the assumptions include:

- historical observations or statistical analysis of cash-flow patterns / behavioural maturity under different scenarios. For instance, the past behaviour of customer deposits with no specified maturity dates may be a good indicator for estimating the amount of deposits that will be withdrawn;
- models developed by banks or vendors for calculating cash-flow analysis;
- managerial and business unit input about business and pricing strategies, since planned changes to business or repricing strategies could affect the behaviour of future cash flows of positions with uncertain maturities; and
- general economic and market trends as well as other relevant information that could affect banks' ability to access funds readily and at reasonable terms.

C3. The length of the underlying historical observation period used for the analyses and models must be at least one year.

C4. Banks should document these behavioural assumptions in their liquidity management policy statement. The type of analysis performed under each assumption should also be documented to facilitate periodic review. The details of that documentation should be consistent with the significance of the risk and complexity of the analysis.

C5. Senior management should ensure that key assumptions are evaluated at least annually for reasonableness. Changes in market conditions, competitive environments and strategies would cause assumptions to lose their validity. Therefore, banks are expected to evaluate the key assumptions should significant changes occur.

C6. The Board of Directors, or its delegated committee, should review key assumptions and their impact at least annually. The review of key assumptions should include an assessment of the impact of those assumptions on the institution's cash flow.

Annex D: Examples of liquidity ratios and limits

D1. Introduction

D1.1 This Annex provides some examples of other liquidity ratios and limits that could be used by banks in managing liquidity risk. Depending on the nature of business of individual banks, these ratios and limits may not be applicable to all.

D2. Wholesale borrowing limit

D2.1 Compared with retail deposits, wholesale deposits or liquidity facilities may be considered a more volatile funding source, given the greater size of individual deposits and the relatively small number of potential counterparties. To reduce the dependency on funding from the wholesale market, banks should examine whether there are other funding products that can diversify or expand their funding base.

D2.2 Wholesale borrowing limits (in individual or all currencies) may be established by banks to control the level of such funding. In setting such limits, a bank should have regard to the depth of the money markets and counterparties' perceived credit appetite for the bank.

D3. Undrawn commitments limit

D3.1 To ensure that sufficient funds can be raised to meet drawdowns by customers against committed lines granted to them, banks should consider setting limits on undrawn commitments of customers with reference to their unused wholesale borrowing capacity.

D3.2 For example, if a bank's wholesale borrowing limit is BD 500 million and the average level of wholesale borrowing has been maintained at around BD 400 million, its undrawn commitment limit may be set at a certain percentage of BD 100 million (i.e. BD 500 million – BD 400million), depending on the bank's risk tolerance and its ability to access additional funding from other sources.

D4. Medium-term funding ratio

D4.1 This is a ratio of liabilities to assets, both with a contractual maturity of, say, more than one year. This ratio focuses on the medium-term liquidity profile of a bank and is intended to highlight the extent to which medium-term assets are being financed by the roll-over of short-term liabilities. Banks could establish a minimum medium-term funding ratio in order to avoid over-reliance on short-term funding.

D4.2 In setting the limit, consideration should be given to the liability structure of a bank. It may be justifiable for a bank with a stable and sufficiently diversified deposit base to maintain a lower medium-term funding ratio.

B3. Cash-flow analysis of Bank X under normal business conditions (Example 1)

BD equivalent of all currencies (including BD)

(BD Million)

			Maturity							
		Next day	2 days	8 days	1 month	3 months	6 months	Over 1 year	Total	
		7 days	1 month	3 months	6 months	1 year				
LIABILITIES/ASSETS										
LIABILITY ITEMS										
1	Due to authorized institutions and other banks									
	of which: Interoffice/intra-group borrowings	138	656	1,801	161	48	59	28	2,890	
	Borrowings from other banks in Bahrain and banks outside Bahrain	69	328	901	1,022	759	932	443	4,455	
2.	Deposits									
(a)	Demand and savings deposits and current accounts	8	48	183	477	715	1,430	6,401	9,260	
(b)	Time, call and notice deposits	27	163	626	1,633	2,449	4,899	22,115	31,913	
3.	Negotiable debt instruments issued and outstanding	0	0	33	184	342	216	3,337	4,113	
4	Other liabilities	53	209	349	157	6	19	190	983	
5	Sub-total	295	1,404	3,892	3,633	4,319	7,555	32,514	53,614	
6.	Off-balance sheet									
(a)	Firm commitments	408	703	421	134	161	90	0	1,917	
(b)	Undrawn overdraft and other commitments	4	23	137	228	344	995	0	1,730	
(c)	Other payables	7	5	35	90	169	254	0	560	
7.	TOTAL LIABILITIES	714	2,135	4,486	4,085	4,992	8,895	32,514	57,821	
ASSET ITEMS										
8	Cash	197	6	0	0	0	0	0	203	
9.	Government bills, notes and bonds	1	8	31	39	36	72	281	468	
10.	Lending to banking sector									
(a)	Due from authorized institutions and other banks									
	of which: Interoffice/intra-group lending	46	470	1,448	390	597	370	72	3,392	
	Lending to other banks in Bahrain and banks outside Bahrain	23	2,341	7,235	3,509	991	1,199	1,141	16,440	
(b)	Negotiable certificates of deposits and other negotiable debt instruments	21	124	476	609	563	1,126	4,348	7,266	

Assumptions	Explanations
<i>Contractual</i>	
<i>Contractual</i>	
<i>Behavioural</i>	Core balance (minimum balance of past 12 months) classified as maturing "over 1 year" Remaining balance is spread evenly over different time bands within 1 year.
<i>Contractual</i>	
<i>Contractual</i>	
<i>Contractual</i>	Based on the payment date for commitments where such a date has been determined. Based on best estimation for commitments where only the approximate amount or payment date is known.
<i>Behavioural</i>	Based on estimated date of drawdown of such commitments by customers from past experience.
<i>Contractual</i>	
<i>Contractual</i>	Slot all cash holdings into "Next day" column. Slot cash in transit into other time bands according to the expected date of receipt.
<i>Contractual</i>	Surplus securities planned to be sold for meeting liquidity needs should be slotted into time bands according to the planned selling dates and expected selling prices.
<i>Contractual</i>	
<i>Contractual</i>	Same allocation method as in item 9 above

BD equivalent of all currencies (including BD)

(BD Million)

LIABILITIES/ASSETS	Next day	Maturity						Over 1 year	Total
		2 days to 7 days	5 days to 1 month	3 months to 6 months	6 months to 1 year				
(c) Acceptances and bills of exchange held	17	8	68	51	9	3	0	156	
11. Lending to the non-bank sector									
(a) Overdraft outstanding and loans repayable on dem11nd	227	439	932	570	121	546	0	2,834	
(b) Other loans and advances to customers	83	438	1,690	2,280	1,586	1,932	20,968	28,977	
(c) Negotiable debt instruments	7	44	169	216	199	399	1,528	2,562	
(d) Acceptances and bills of exchange held	5	5	29	45	5	0	0	90	
12. Other assets	138	65	60	77	21	5	12	379	
13. Sub-total	765	3,949	12,137	7,786	4,128	5,653	28,350	62,767	
14. Off-balance sheets									
(a) Standby facilities	0	0	0	0	0	0	0	0	
(b) Other receivables	2	15	70	205	305	562	0	1,158	
15. TOTAL ASSETS	767	3,964	12,207	7,991	4,433	6,215	28,350	63,926	
16. NET POSITION	52	1,829	7,721	3,905	-560	-2,680	-4,164	6,104	
17. CUMULATIVE NET POSITION	52	1,882	9,603	13,508	12,948	10,268	6,104	6,104	
18. LIMITS ON NEGATIVE CUMULATIVE NET POSITION FOR ALL CURRENCIES	-2,000	-2,500	-4,000						

Assumptions	Explanations
<i>Contractual</i>	Allocate according to the maturity date of all claims
	However, bills payable at sight should be allocated according to the expected date of receipt of payment
<i>Behavioural</i>	Slot the loans into different time bands according to the estimated date of repayment by customers based on past experience.
<i>Contractual</i>	
<i>Contractual</i>	Same allocation method as in item 9 above.
<i>Contractual</i>	Same allocation method as in item 10 (c) above.
<i>Contractual</i>	
No prior notice:	
<i>Next day</i>	
<i>Require prior notice'</i>	
<i>Length of the notification period required</i>	
<i>Contractual</i>	

B4. Cash-flow analysis of Bank X under an institution-specific crisis scenario (Example 2)
(Daily deposit run-off assumed to be 10%)

((BD

Million)

	Closing balance	1st day	Run-off/Discounted	2nd day	Run-off/Discounted	3rd day	Run-off/Discounted	4th day	Run-off/Discounted	5th day	Run-off/Discounted	6th day	Run-off/Discounted	7th day	Run-off/Discounted	Over 7 days
		value	value	value	value	value	value	value	value	value	value	value	value	value	value	value
		[Today T]	T+1	T+2	T+3	T+4	T+5	T+6	T+6	Beyond T+6						
LIABILITIES																
1 Customer deposits																
1.1 Connected deposits	190	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	190
1.2 Pledged deposits	607	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	607
1.3 Other deposits	40,376	4,038	10%	4,038	10%	4,038	10%	4,038	10%	4,038	10%	4,038	10%	4,038	10%	12,113
1.4 Total	41,173	4,038		4,038		4,038		4,038		4,038		4,038		4,038		12,910
2 Due to banks																
2.1 Bank vostro balances	700	700	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
2.2 Bank borrowings																
a. Connected banks	3,454	203	Contractual	0	Contractual	18	Contractual	500	Contractual	0	Contractual	1	Contractual	106	Contractual	2,627
b. Other counterparties	3,190	108	Contractual	0	Contractual	10	Contractual	265	Contractual	0	Contractual	1	Contractual	56	Contractual	2,752
2.3 Total	7,344	1,011		0		28		765		0		1		161		5,378
3 Negotiable debt instruments issued																
	3,433	0	Contractual	0	Contractual	0	Contractual	0	Contractual	0	Contractual	0	Contractual	0	Contractual	3,433
Total cash outflow:	N.A.	5,048		4,038		4,065		4,802		4,038		4,039		4,199		21,721

ASSETS₁																	
4 Cash		203	203	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
5 Due from banks																	
5.1 Bank nostro balances		429	429	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
5.2 Bank placements																	
a. Connected banks ²		2,798	0		0		0		0		0		0		0		2,798
b. Other counterparties		16,605	3,803	Contractual	189	Contractual	479	Contractual	366	Contractual	889	Contractual	600	Contractual	13	Contractual	10,265
5.3 Total		19,832	4,233		189		479		366		889		600		13		13,062
6 Securities³																	
6.1 Exchange Fund Bills and Notes ("EFBN")		390	351	90%	0		0		0		0		0		0		0
6.2 Securities eligible for rediscount at the Discount Window (other than EFBN)		1,376	1,238	90%	0		0		0		0		0		0		0
6.3 Other HKD investment grade securities		1,431	1,073	75%	0		0		0		0		0		0		0
6.4 US Treasuries & other AAA rated USD securities		1,295	0		1,101	85%	0		0		0		0		0		0
6.5 Other USD investment grade securities		4,929	0		3,450	70%	0		0		0		0		0		0
6.6 Other securities		876	0	0%	0		0		0		0		0		0		876

6.7 Total		10,296	2,662		4,551		0		0		0		0		0		876
Total cash inflow:		N.A.	7,098		4,741		479		366		889		600		13		13,938
Daily net cash balance		N.A.	2,050		703		-3,586		-4,436		-3,149		-3,439		-4,185		-7,783
Cumulative net cash balance			2,050		2,753		-833		-5,270		-8,418		-11,857		-16,043		-23,826

Notes:

- (1) Exclude all pledged assets as no cash inflow is expected.
- (2) No repayment from connected banks is assumed as the entities in the same group are also affected by the crisis and hence have to retain liquidity themselves.
- (3) The lower of the market value and the book value of the securities should be reported as the "closing balance".

B5. Cash-flow analysis of Bank X under a general market crisis scenario (Example 3) **(Daily deposit run-off assumed to be 5%)**

(BD Million)

	Closing balance	1st day	Run-off/Discounted value	2nd day	Run-off/Discounted value	3rd day	Run-off/Discounted value	4th day	Run-off/Discounted value	5th day	Run-off/Discounted value	6th day	Run-off/Discounted value	7th day	Run-off/Discounted value	Over 7 days
		[Today T]		T+1		T+2		T+3		T+4		T+5		T+6		Beyond T+6
LIABILITIES																
1 Customer deposits																
1.1 Connected deposits	190	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	190
1.2 Pledged deposits	607	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	607
1.3 Other deposits	40,376	2,019	5%	2,019	5%	2,019	5%	2,019	5%	2,019	5%	2,019	5%	2,019	5%	26,244

1.4 Total		41,173	2,019		2,019		2,019		2,019		2,019		2,019		2,019		27,041
2 Due to banks																	
2.1 Bank Nostro balances		700	700	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
2.2 Bank borrowings																	
a. Connected banks		3,454	203	Contractual	0	Contractual	18	Contractual	500	Contractual	0	Contractual	1	Contractual	106	Contractual	2,627
b. Other counterparties		3,190	108	Contractual	0	Contractual	10	Contractual	265	Contractual	0	Contractual	1	Contractual	56	Contractual	2,752
2.3 Total		7,344	1,011		0		28		765		0		1		161		5,378
3 Negotiable debt instruments issued		3,433	0	Contractual	0	Contractual	0	Contractual	0	Contractual	0	Contractual	0	Contractual	0	Contractual	3,433
Total cash outflow:		N.A.	3,029		2,019		2,047		2,783		2,019		2,020		2,180		35,853
ASSETS¹																	
4 Cash		203	203	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
5 Due from banks																	
5.1 Bank nostro balances		429	429	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
5.2 Bank placements																	
a. Connected banks ²		2,798	0		0		0		0		0		0		0		2,798
b. Other counterparties		16,605	3,803	Contractual	170	Contractual	431	Contractual	329	Contractual	800	Contractual	599	Contractual	12	Contractual	10,459
5.3 Interbank lending not repaid at maturity ³			(380)		(17)		(43)		(33)		(80)		(60)		(1)		615

5.4 Total	19,832	3,852		153		388		296		720		539		11		13,872
6 Securities																
6.1 Exchange Fund Bills and Notes ("EFBN")	390	0		293	75%	0		0		0		0		0		0
6.2 Securities eligible for rediscount at the Discount Window (other than EFBN)	1,376	0		963	70%	0		0		0		0		0		0
6.3 Other HKD investment grade securities	1,431	0		715	50%	0		0		0		0		0		0
6.4 US Treasuries & other AAA rated USD securities	1,295	0		0		1,036	80%	0		0		0		0		0
6.5 Other USD investment grade securities	4,929	0		0		3,450	70%	0		0		0		0		0
6.6 Other securities	876	0		0		0	0%	0		0		0		0		876
6.7 Total	10,296	0		1,971		4,487		0		0		0		0		876
Total cash inflow:	N.A.	4,056		2,124		4,875		296		720		539		11		14,748
Daily net cash balance	N.A.	1,026		105		2,828		-2,487		-1,299		-1,481		-2,169		-21,105
Cumulative net cash balance		1,026		1,132		3,960		1,473		174		-1,307		-3,477		-24,582

Notes:

- (1) Exclude all pledged assets as no cash inflow is expected.
- (2) No repayment from connected banks is assumed as the entities in the same group are also affected by the crisis and hence have to retain liquidity themselves.
- (3) It is assumed that 10% of the interbank lending is not being repaid at maturity.
- (4) The lower of the market value and the book value of the securities should be reported as the "closing balance".