National Bank of the Republic of Macedonia
Supervisory Policy Manual

Title: LR-1 Liquidity Risk Management

Date: FINAL

Purpose: To set out the approach which the NBRM will adopt in the supervision of licensed institutions' liquidity risk, and to provide guidance to licensed institutions on the key elements of effective liquidity risk management.

Issue Type: Supervisory Guidance, in conjunction with the Decision on Identifying, Assessing and Managing the Banks' Liquidity Risk ("Official Gazette of the Republic of Macedonia" No. 84/2002) adopted December 26, 2003.

Supersedes Previous Issue: Supervisory Circular No. 6 – Liquidity Risk Management, June, 2004

Application: All Licensed Institutions

Contents:

1. Introduction

1.1. Definition of Liquidity Risk

1.1.1. Liquidity risk is the current or prospective risk to earnings and capital arising from an institution's inability to meet its liabilities when they come due without incurring unacceptable losses. Liquidity risk is caused by an inability to manage unplanned outflows of funds and changes in funding sources and/or to meet off-balance sheet liabilities. Liquidity risk is also present when the institution's management fails to recognize or address changes in market conditions that affect the ability to attract funds in necessary volumes and at acceptable rates, and/or to liquidate assets quickly and with minimal loss in value.

1.2. Background

1.2.1. The purpose of this supervisory guidance is to provide an integrated review of aspects related to liquidity risk management, and to provide guidelines for effective implementation of an institution's liquidity risk management process and its involvement in the overall process of risk management of all risk exposures. The provisions of the Banking Law ("Official Gazette of the Republic of Macedonia" no. 63/2000, 37/2002, 51/2003 and 85/2003) and the Decision on Determining, Assessing and Managing the Banks' Liquidity Risk ("Official Gazette of the Republic of Macedonia" no. 84/2003), the recommendations of the Basle Committee for Banking Supervision[1], as well as the experience and the practice of several foreign supervisory bodies underlie its preparation.

1.2.2. Maintenance of an adequate liquidity level is a prerequisite for the performance of everyday financial activities, because almost each financial activity has certain effects on the liquidity position of institutions. The maintenance of an adequate liquidity position means the securing of funds required to enable normal current operations, supporting the growth of activities and ensuring settlement of institutions' due liabilities.

1.2.3. The provision and maintenance of required liquidity is a cost for an institution, determined by the institution's risk management strategy, dependent on the conditions in its market of operations and its overall risk profile. If the institution normally holds higher amounts of liquid funds then needed, it faces an opportunity cost in the form of lost income. On the other hand, if liquidity needs cannot be covered by sufficient cash flow or liquid assets, the institution will have to attract additional funding, usually at higher costs.

1.2.4. Liquidity risk arises from both the inability to properly manage unexpected changes in the sources of funds and the inability of the institution to convert its assets into cash, at minimum costs and in a timely manner. In recent years, the nature of liquidity risk has become more complex worldwide as a result of greater investment alternatives and the introduction of sophisticated off-balance sheet products.

[1] Sound Practices for Managing Liquidity in Banking Organizations – February, 2000.

1.2.5. Savings houses may, taking into account the nature, complexity and the volume of operations, adequately apply this Supervisor Guidance in their operations.

2. Effective Liquidity Risk Management

2.1. Elements of an Effective Liquidity Risk Management System

2.1.1. The first step in establishing and developing an effective liquidity risk management system is the creation of an adequate framework for its implementation, including:

- Designing and adopting a liquidity risk management policy;
- Establishing a proper organizational structure;
- Establishing suitable management information systems; and
- Developing a contingent liquidity plan in the event of an emergency.

2.1.2. The above elements should be compatible with the nature, scope and complexity of an institution's activities and corporate structure, and its current market environment. Additionally, these elements should become well established in the institution's corporate governance practices to allow more efficient adjustments as the institution's operations and market environment change, and to ensure adherence to relevant regulatory requirements.

2.2. Liquidity Risk Management Policy

2.2.1. Liquidity risk management should be based on a comprehensive policy that is in compliance and integrated with the institution's overall risk management policy. The contents of a liquidity risk management policy are contingent upon the nature and complexity of the institution's activities. A liquidity risk management policy could be a stand alone, all encompassing document, or be comprised of separate policies addressing relevant liquidity risk issues, e.g., structure of assets and liabilities, introduction of new instruments and activities, etc. Regardless of how the policy is structured, the overall risk management philosophy and relevant policies should be communicated to all organizational units that are directly or indirectly involved in liquidity risk management, and in such a way that is uniform and easily understood by all affected employees.

2.2.2. The major elements[2] of a liquidity risk management policy include:

2.2.2.1. Definition of the optimal structure of the institution's assets from the aspect of individual balance sheet and off-balance sheet asset positions. Special attention should be paid to the structure of the credit portfolio (share of non-performing and troubled loans), liquid assets, other assets; and the ability of each asset to be promptly converted to cash. Also considered are any off-balance sheet positions that may impact the institution's liquidity position.

2.2.2.2. Definition of the optimal structure of the institution's liabilities. The policy should provide guidelines as to the required structure of sources of funds, primarily, the deposit base (e.g., types of deposits, maturity, interest rates level, etc.), as well as guidelines for the diversification of total liabilities. The policy should also provide

[2] These elements could also be further developed by separate procedures.

direction as to any corrective measures that would be needed in the case management exceeds certain funding limits.

2.2.2.3. Guidelines for the introduction of new products and activities. The policy should also define to what extent the impact of new products and activities can have on the institution's liquidity position.

2.2.2.4. Precise delineation of the responsibilities of persons involved in liquidity risk management; and how the institution will ensure adequate coordination between governing bodies, organizational units and all individuals directly or indirectly involved in liquidity risk management.

2.2.2.5. Detailed liquidity contingency plan[3], giving precise details of the lines of responsibility and the liquidity risk management process in the event of an emergency.

2.2.2.6. Definition of the major indicators which are to serve as a guideline for efficient management of liquidity risk. The following are more relevant liquidity ratios that could be defined (also see Appendix B for further discussion of Ratios):

- *Quick Liquidity Ratio* - Calculated by dividing highly liquid assets by current liabilities. This ratio shows the amount of coverage that highly liquid assets provide to short term (usually less then 30 days maturity) liabilities.
- *Loans to Deposits Ratio* - This ratio indicates the extent to which an institution's deposit structure (current accounts, savings accounts, time deposits, etc.) funds the loan portfolio. If this ratio is very high (over 80%) or increasing, it means that the institution may be relying on more unstable sources of funding (for example, short-term borrowings) that may not be available if the institution begins to show financial deterioration.
- *Volatile Funding Dependence Ratio* - Calculated by subtracting liquid assets from volatile liabilities and dividing the resulting difference by earning assets such as loans and intermediate/long-term investments. This ratio indicates the degree of reliance on volatile liabilities to fund earning assets. Volatile funding sources are usually price sensitive and safety conscious. They will move out of the institution if not priced competitively, or in the event the institution is having real, or is perceived to be having, asset quality or other fundamental management or financial problems.
- *Reliance on Volatile Funding Sources* - Calculated by dividing volatile liabilities by total deposits plus borrowings. This ratio measures the portion of the institution's total non-capital funding sources that would be first to leave the institution in the event of financial deterioration. Institutions with high volumes of volatile funding sources should ensure up-to-date contingency funding plans and would normally require closer supervisory scrutiny.

[3] The Liquidity Contingency Plan in the event of emergency will be separately discussed within this chapter, as a significant aspect of the management of this risk.

- *Net short-term Liabilities to Total Assets* - Calculated by taking the difference in short-term assets from short-term liabilities and dividing by total assets. "Short term" means financial assets and liabilities with no stated maturities or with maturities 30 days or less. The ratio indicates the degree of exposure assumed by funding non-short term assets with short-term liabilities, also referred to as rollover risk. Generally, the higher the number, the more vulnerable the institution is to funding sources leaving the institution, thus requiring the institution to find new, and often costly, funding sources for existing assets.
- *On-hand Liquidity to Total Liabilities* - Calculated by dividing liquid assets (net of pledged liquid assets and mandatory reserves) by total liabilities. This ratio measures the institution's ability to meet funding losses (deposit withdrawals, maturing borrowings, etc.) from on-hand liquid assets. The lower the ratio the greater the likelihood that the institution will need to use market funding sources (borrowings) to meet growing liquidity needs.
- *Off-Balance-Sheet Items to Total Assets* - Off-balance-sheet liabilities may, depending on the type, result in unplanned use of liquid assets. If there is an upward trend in contingent liabilities, management must gain an understanding of any impact such growth may have on liquidity.

2.2.3. The above indicators may be calculated separately for the purposes of monitoring Denar and foreign exchange liquidity. In their analysis, special attention should be paid to the level and the direction of each ratio. Additionally, it is necessary to determine acceptable levels for each ratio, i.e. to determine the limits that would be acceptable given the desired level of liquidity risk. The establishment of limits should be based on historical performance over, at a minimum, the past 3 years.

2.2.4. The nature and features of limits may vary, and may be placed into the following groups (depending on their purpose):

- Limits which restrict the level of certain liquidity ratios;
- Limits which pertain to the decision making process, i.e., limits and responsibilities regarding those involved with liquidity risk management.

2.2.5. With respect to the first type of limits, the restrictions may be imposed on all ratios the institution uses in liquidity risk management, as well as on the allowed cumulative mismatch between assets and liabilities of the institution within its maturity structure (the limits might be presented as a difference between asset and liability items which mature within a given time period, or could be expressed as a percentage ratio of these two variables).

2.2.6. The second type of limits are important from the aspect of defining the responsibilities of persons involved in the liquidity risk management process, specifically with regard to their responsibility in making decisions that might directly or indirectly influence the level of liquidity risk. Thus, the policy should require limits on the types of products used for certain liquidity risk management situations (e.g., borrowing from the domestic money market vs. foreign institutions, use of swaps, sale of certain asset items, etc.).

2.2.7. Limits should be established at the overall institutional level and at the level of certain organizational units. The type and the features of limits specified by the liquidity risk management policy should fit the size, complexity and financial condition of the institution. Also, the Supervisory Board and Board of Directors should periodically review and revise the limits, in line with changes in the institution's operations, risk profile, and market environment.

2.2.8. Finally, the policy should include procedures for defining allowed exceptions with respect to limits and for delegating responsibility for approving such exceptions. The policy should also require that all exceptions to the liquidity management policy, especially noncompliance with stated limits, be reported in a timely manner to the Supervisory Board, appropriate committees, and Board of Directors.

2.3. Role of Management Bodies

2.3.1. The prerequisites for effective implementation of the liquidity risk management process is the establishment of a proper organization; and management that ensures fulfillment of the liquidity risk management policy, clearly defines of the tasks and responsibilities of the managing bodies and respective organizational units, and establishes proper communication between all those involved in liquidity risk management. In that sense institutions should have in place a liquidity management structure that can execute effectively their liquidity management strategy, policies and procedures.

2.3.2. ***Supervisory Board***

2.3.2.1. The Supervisory Board is responsible for defining the level of liquidity risk exposure. It is responsible for adopting the liquidity risk management policy and establishing the lines of responsibility for effective monitoring and control of liquidity risk. The Supervisory Board should continually monitor the institution's liquidity risk profile and conduct periodical analysis of the information which underlies liquidity risk management. This requires accurate and timely reporting of the institution's liquidity position. The level and the thoroughness of reporting largely depend on the nature of the institution's liquidity position.

2.3.2.2. During the institution's normal operation, reporting to the Supervisory Board might only include basic information on the liquidity position (maturity structure, report on major depositors, movement of liquidity ratios, results of routine stress-tests, etc.). However, more frequent and detailed reports to the Supervisory Board are warranted during times when liquidity maintenance becomes difficult or during adverse market or economic developments. Additionally, the Supervisory Board should perform a more frequent analysis of the appropriateness of the institution's liquidity contingency plan.

2.3.3. ***Risk Management Committee***

2.3.3.1. The Risk Management Committee, as a specialized body of the Supervisory Board established to monitor risk exposures, is responsible for:

- Developing procedures and practices which will ensure adherence to the liquidity risk management policy adopted by the Supervisory Board;

- Monitoring adherence to the liquidity risk management policy, which requires continuous monitoring of the liquidity position and internal/external factors which may affect liquidity, and making periodical recommendations for revising liquidity risk management policies and procedures;
- Establishing a suitable reporting system that will ensure timely monitoring of liquidity risk exposures and elimination of any possible problems in the maintenance of an adequate liquidity position; and
- Providing instructions as to what conditions activates the liquidity contingency plan in the event of an emergency.

2.3.4. ***Competent Liquidity Risk Management Body***

2.3.4.1. The Supervisory Board should directly, or indirectly through the Board of Directors, establish a special body responsible for liquidity risk management and conducting the daily operation of managing liquidity.

2.3.4.2. Normally these responsibilities are carried out by a special Committee (e.g. Asset and Liability Committee - ALCO) and a designated operational unit. The ALCO is an important feature in the effective management of the assets and liabilities of an institution. The most fundamental function of ALCO is to oversee the institution operations relating to interest rate risk and liquidity risk and in particular to ensure that the institution has adequate funds to meet its obligations. Other functions of ALCO will be dependent on the institution size and assets/liabilities mix. It is essential to have a balanced representation in ALCO to represent both the assets and liabilities sides of the balance sheet. The ALCO is therefore composed of the senior staff of the institution including usually the chief executive, the chief financial officer, the treasurer, the chief credit officer and the officer in charge of deposit-taking. Other members such as division heads of corporate and retail banking may also be found in ALCOs of larger banks.

2.3.4.3.The committee and designated operational unit are responsible for analyzing the results of stress testing, assessing and adjusting the institution's balance sheet structure to meet liquidity needs, and recommending revisions to the liquidity risk management policy. Additionally, they are responsible for the immediate implementation of the liquidity contingency plan in the event of an emergency. Liquidity management may either be centralized or decentralized, or a combination of the two may be adopted. The structure to be chosen depends on an institution size and complexity of operations. Large institutions or banking groups may tend to have a more centralized structure in which liquidity for individual business units, including branches and subsidiaries, is managed on a consolidated basis. In a decentralized structure, business units within an institution or banking group would be responsible for their own liquidity subject to limits imposed by senior management. The Diagram presented in Appendix D provides an example of the liquidity management structure of an institution. 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.

2.3.5. ***Internal Audit Department and Internal Controls***

2.3.5.1. Institutions should have proper internal control systems which integrate liquidity risk management into the overall risk management process. Additionally, the internal controls established for liquidity risk management should be an integral part of the overall internal control system established for the entire institution.

2.3.5.2. The audit of liquidity risk management should be incorporated into the annual plan of the Internal Audit Department.

2.3.5.3. The Internal Audit Department should, within its scope of operations, cover the following aspects of liquidity risk management:

- Determine the existence and effectiveness of internal controls covering the management and operational aspects of liquidity risk;
- Determine adherence to liquidity risk management policies and procedures, particularly with respect to limits and the application of allowed exceptions;
- Monitor changes in policies, procedures and practices, and assess their effect on the liquidity risk management process;
- Analyze the efficiency of those responsible for liquidity risk management;
- Analyze the timeliness and accuracy of liquidity reports to the Supervisory Board, Board of Directors and the NBRM; and
- Monitor adherence and effectiveness of the liquidity contingency plan during those times the institution may be experiencing liquidity problems.

2.3.6. ***Compliance Function***

2.3.6.1. The institution's Board of Directors shall, depending on the type, scope and complexity of activities, appoint a Compliance Officer or organize a Compliance Department.

2.3.6.2.Compliance risk is defined as the risk of legal or regulatory sanctions, material financial loss, or loss to reputation an institution may suffer as a result of its failure to comply with laws, regulations, rules, related self-regulatory organization standards, and codes of conduct applicable to its banking activities (together, “compliance laws, rules and standards”).

2.3.6.3.The compliance function plays an important role with respect to a sound liquidity risk management system. The role of the compliance function, among other things, is to ensure that liquidity risk management systems or processes adopted are in compliance with the relevant statutory provisions and regulatory requirements.

2.4. Management Information Systems

2.4.1. An institution’s management information systems (MIS) should ensure timely and accurate measuring, monitoring and controlling of liquidity risk; allowing management and other responsible individuals to make appropriate and timely decisions related to liquidity risk exposures.

2.4.2. MIS should:

- Measure and monitor the institution's liquidity position on a daily basis and in pre-determined time periods, in Denars and foreign currencies;
- Monitor adherence to liquidity risk management policies and established limits;
- Report accurately the institution's funds inflows and outflows;
- Report liquidity ratios and other data suitable for those involve in all levels of liquidity risk management; and
- Identify the institution's core deposit base, volatile deposits, large depositors, movements in funding sources, etc.

2.4.3. MIS reports should also be available for various operations that can directly or indirectly affect the institution's liquidity risk exposure. Such data would include,:

- Information on the quality of assets, particularly the credit portfolio;
- Profitability projections; and
- Effects on liquidity exposures of new products and activities.

2.5. Liquidity Contingency Plan

2.5.1. The ability of an institution to address its capacity to finance some or all of its activities on a timely basis, largely depends on the adequacy of an established Liquidity Contingency Plan in the event of an emergency (hereinafter: Plan).

2.5.2. The existence of a crisis management strategy underlies the development of the Plan**.** The Supervisory Board and Board of Directors should be informed immediately about issues and activities related to a liquidity crisis. The Supervisory Board and Board of Directors should receive, in the event of a liquidity emergency, at least the following reports:

- Largest depositors and major sources of funds;
- List of assets and liabilities that experienced the most market depreciation;
- Compliance with established limits;
- Expected inflows and outflows of funds by customer in the short term; and
- Maturity structure by currency which affect the institution's liquidity position.

2.5.3. The Plan should clearly state the assignments, competencies and responsibilities of those employees involved in liquidity risk management in a crisis situation. The reason to provide details of this nature is to ensure that measures are taken to quickly analyze the situation, implement the Plan, monitor its effectiveness, and take whatever corrective action is needed to remedy the problem.

2.5.4. The Plan should first clearly define what emergency events and/or critical indicators serve as a signal for implementation. For example:

- Substantial increase in those assets financed by volatile sources of funds;
- Significant decline in core deposits or loss of large deposits;
- Extensive withdrawal of deposits before maturity;
- Considerable and sudden decrease in asset quality, particularly the credit portfolio;
- Problems in accessing funds over an extended timeframe, such as declining marketability of assets or inability to access borrowing lines;
- Difficulties in finding sources of funds in relatively stable market conditions;

- Increase in the amount of collateral required by the institution's creditors; and/or
- Significant deterioration in the institution's profitability.

2.5.5. The Plan should determine the manner of communicating with major depositors, business partners, other customers and the public for proper liquidity risk management in crisis situations. Relations with the public and the most important depositors/customers are particularly relevant in effectively implementing the Plan and recovering from a liquidity crisis.

2.5.6. In addition to identifying asset sources of liquidity, the Plan should detail what additional funding sources are potentially available taking into consideration changes in market conditions (e.g., higher interest rates, lack of liquid money market funds, etc.) Several sources of funds can be available to an institution, with probably the most readily available being unused back-up lines of credit and borrowing from the NBRM. The existence of back-up lines of credit from domestic and foreign institutions is a significant instrument in liquidity risk management. The existence of such back-up lines of credit is most often a key element in determining the risk profile of an institution. However, in using back-up lines of credit, institutions should avoid being overly dependant, and pay particularly close attention to diversifying this type of funding source and, of course, borrowing terms, i.e., maturity, interest rate, collateral, etc.

2.5.7. The NBRM as a source of liquid funds is an important dimension in an institution's liquidity risk management process and contingency planning. In its role as the central bank of Macedonia, the NBRM issues securities and, as a "lender of last resort," provides liquidity support to an institution faced with an inability to obtain market funding. These activities of the NBRM are intended to provide and maintain stability in the Macedonian banking system.

2.5.8. Credit facilities for liquidity purposes issued by the NBRM, are usually granted after the institution has exhausted all measures and activities aimed at providing additional sources of liquidity. These facilities are most frequently collateralized by securities or other assets acceptable to the NBRM. Also, these facilities are extended under relatively unfavorable terms, specifically interest rates, and results in closer supervisory oversight by the NBRM to ensure corrective action of any internal problems that may have created the liquidity crisis.[4]

3. Asset/Liability Management and the Process of Liquidity Risk Management

3.1. Overview

3.1.1. Liquidity risk management implies adequate identification, measurement, monitoring and control of all on- and off-balance sheet items that have influence on an institution's liquidity position. Institutions use a large number of techniques for liquidity risk management,

[4] These institutions are most frequently subjected to an enhanced supervisory action, through limiting certain activities, change of the managing body, etc.

starting from the most simple calculations and static simulations to highly sophisticated modeling techniques. Whatever the methodology used, institutions must build into their risk management process the impact of any changes in market conditions and the economic environment.

3.1.2. It is equally important that liquidity risk management becomes an integrated part of the institution's overall risk management process. Other risks can, and often do, have a major impact on an institution's liquidity position. For example, a high level of credit risk resulting in unacceptable past due and non-performing credit exposures, large loan loss provisions, and/or excessive operating losses can cause an institution to experience frequent and dangerous liquidity crises. Significant increases in market risk can also adversely effect liquidity. Changes in interest rates and foreign exchange rates may cause an unacceptable increase in the cost or availability of funding. Changes in interest rates and foreign exchange rates may also cause unexpected cash flow problems if not properly understood and managed. See Appendix A for further discussion.

3.1.3. Institutions can obtain liquidity from both sides of the balance sheet and from off-balance sheet transactions. Managing liquidity risk involves understanding the characteristics and risks of different sources of liquidity, determining the appropriate funding strategies (including the mix of funding sources) to meet liquidity needs, and deploying the strategies in a cost-effective manner.

3.1.4. As mentioned earlier, in its role as a risk-bearing mediator between depositors and borrowers, the institution must balance its need for sufficient liquidity while maintaining acceptable profitability. Holding a high level of liquid assets or better matching the cash-flow profile of assets and liabilities will reduce liquidity risk, but may also reduce profitability. Conversely, higher liquidity risk (lower level of liquid assets) may increase profitability in the short run, but may result in solvency concerns. This is particularly true if an institution takes on more credit risk while maintaining a lower level of liquid assets. Furthermore, poor loan quality (e.g., high level of impaired loans) will impact both profitability and liquidity, as expected cash inflows and collection of interest income do not materialize; and of course heightens the concern about an institution's ongoing viability.

3.1.5. A highly capitalized institution should normally not experience large and sudden deposit withdrawals nor have difficulties obtaining alternate sources of funding, i.e., borrowing. However, as the solvency of an institution becomes more uncertain, liquidity becomes more of an issue. As the market begins to question an institution's ongoing viability (solvency), management usually struggles to maintain sufficient liquidity as depositors are withdrawing funds, borrowing sources begin to disappear, and strong borrowers seek financing elsewhere. Often earnings become less of a consideration when meeting liquidity demands, thus further eroding the institution's capital base. This illustration shows that management must pay special attention to the close interaction between different risk areas.

3.1.6. Although liquidity risk varies according to an institution's funding market, balance sheet composition, and marketing strategies; the principles of liquidity management are straightforward: a well-managed institution, regardless of size and complexity, must be able

to identify, measure, monitor, and control liquidity risk in a timely and comprehensive manner.

3.2. Liquidity of Assets

3.2.1. Liquidity needs may be met by managing the institution's asset structure through either the sale or planned pay-down of assets. While in theory any asset can serve as a source of liquidity, institutions must consider the length of time it takes to dispose of an asset and the price at which it can be sold. The asset portfolio of an institution can provide liquidity in three different ways; through:

- The maturity of an asset;
- The sale of an asset; and
- The use of an asset as collateral for borrowing or repurchase transactions.

3.2.2. Typically, institutions hold liquid assets (e.g. money market placements and marketable securities) to supplement other funding sources (e.g. deposits and other liabilities). However, institutions may incur liquidity risk where inflows from the realization of assets (either upon maturity or at the time of sale) are less than anticipated because of default risk or price volatility. Secured funding, including repurchase agreements, may be similarly affected if counterparties seek better quality collateral or larger discounts on collateral.

3.2.3. Determining an institution’s potential liquid assets involves an analysis of the following factors using historical patterns, seasonal analysis, or judgmental decisions:

- The proportion of maturing assets that the institution is able and willing to roll over or renew;
- The expected level of new loan requests to be approved; and
- The expected level of draw-downs of commitments to lend that need to be funded, e.g., committed commercial lines of credit.

3.2.4. In terms of marketability of assets, assets are placed into three categories according to relative liquidity:

- The most liquid category of assets includes excess over mandatory reserves and correspondent accounts with the NBRM, freely convertible foreign exchange and national currency in cash, securities issued by the government of Macedonia (if they can be sold immediately), balances of correspondent accounts with known and reputable local and foreign institutions.
- The second category is comprised of other marketable securities, e.g., equities, and inter-bank loans, which may be saleable but which may lose liquidity under adverse conditions.
- The third category is the least liquid and includes essentially unmarketable assets like loans not capable of being readily sold, premises, and investments in subsidiaries, as well as adversely classified assets. All these assets would normally be sold at a deep discount, if at all.

3.2.5. In addition, significant concentrations within the asset portfolio (e.g., in relation to the distribution of exposures by counterparty, instrument type, geographical location or economic sector) often increase the level of liquidity risk.

3.2.6. In managing asset liquidity, institutions are expected to establish a clear strategy for holding liquid assets, develop procedures for assessing the value, marketability and liquidity of asset holdings under different market conditions, and determine the appropriate volume and mix of such holdings to avoid potential concentrations

3.3. Analysis of Liabilities

3.3.1. Institutions may also employ different liability funding strategies to manage liquidity risk. Those with an extensive branch network would normally rely on relatively low cost retail deposits as a major source of funding. Others that concentrate on wholesale business activities may regard money market borrowings as the most economical way to obtain short-term liquidity. Some institutions may secure term funding (e.g., by issuing medium-term certificates of deposit) or ensure a spread of maturities for their liabilities to reduce liquidity risk. To evaluate the cash flows arising from an institution's liabilities, the institution would first examine the behavior of liabilities under normal business conditions. This would include:

- Normal level of withdrawal of deposits and other liabilities;
- Effective maturity of deposits with non-contractual maturities, such as current accounts and many types of savings accounts; and
- Normal growth in new deposit accounts.

3.3.2. In analyzing liability cash flows under abnormal circumstances (institution-specific or general market problems), the institution can classify liabilities into four categories:

- Core Deposits, i.e., sources of funding that are likely to stay with the institution under any circumstance.
- Volatile Liabilities, i.e., sources of funding that are maturing or have non-contractual maturities that can be expected to run-off immediately at the first sign of problems.
- Sources of funding that can be expected to run off gradually if problems arise. The run-off rate has to be considered as well as deposit pricing as a means of controlling the rate of runoff.
- Borrowings, e.g., back-up facilities that an institution can draw down and under what allowable circumstances.

3.3.3. Institutions should develop a liability funding strategy that is appropriate to the nature and scale of their activities, including the proper mix of liabilities to avoid potential concentrations (e.g., arising from undue reliance on a single fund provider or a closely related group of providers).

3.3.4. In managing liability liquidity, institutions should be able to distinguish the characteristics of different funding sources and monitor their trends separately. Wholesale funds, including deposits from large corporations and private banking clients, are likely to be more sensitive to credit risk and interest rates than retail deposits. Internet deposits and other deposits solicited at rates higher than market rates may also tend to be more volatile.

3.3.5. Standby or committed facilities given by other financial institutions can provide funding in the case of need. However, institutions should monitor any covenants included in the

facility agreement and, if possible, regularly test access to the funds so as to consider the extent to which such facilities can be relied upon under stressed conditions.

3.3.6. Institutions should also pay particular attention to the impact of changing market conditions on their funding structure. For example, a sudden increase in interest rates may squeeze the earnings of institutions that fund their long-term assets with short-term liabilities.

3.4. Off-balance Sheet Activities

3.4.1. Off-balance sheet items, depending on the nature of transactions, can either supply or use liquidity. The contingent nature of most off-balance sheet instruments has added complexity in liquidity management. Some examples of how such items will affect institutions' liquidity are described below.

3.4.2. Contingent liabilities, such as letters of credit and financial guarantees, represent potentially significant cash drain for an institution, regardless of its condition. An institution may be able to ascertain a "normal" level of cash outflows on an ongoing basis, and then estimate the amount of increase in these flows during periods of stress. However, a general market crisis may trigger a substantial increase in the amount of draw-downs of letters of credit because of an increase in defaults and bankruptcies in the market.

3.4.3. Loan commitments given by institutions to their customers also draws on its liquidity. Institutions should estimate and incorporate in their cash-flow projections the amount and timing of unused commitments (including those arising from mortgage loans, retail overdrafts and credit cards) that will possibly be drawn.

3.4.4. Derivatives, options and other contingent items pose more complexity for liquidity risk management. The direction and amount of cash flows for such items will normally be affected by market interest rates, exchange rates and other special terms under the contract. Institutions should estimate such cash flows with care, having regard to the nature of individual transactions and market conditions. As an illustration, if an institution pays a floating rate and receives a fixed rate in an interest rate swap, it receives a payment for the difference of the two rates as long as the fixed rate is higher than the floating rate. However, if interest rates increase and the floating rate is subsequently above the fixed rate, the institution will pay the difference of the two rates and incur a cash outflow instead.

3.4.5. Other types of off-balance sheet activities, such as credit derivatives, have also expanded in use in recent years. The liquidity impact of these transactions may even be more difficult to forecast. For instance, an institution undertakes, in return for a premium, to compensate a counterparty for any of its credit losses covered under a credit default swap. By selling credit protection, the institution concerned is exposed to a contingent liability, the cash flow of which is not readily determinable.

3.4.6. Institutions should ensure that they have the ability to assess how their involvement in off-balance sheet activities (in particular unfunded derivatives and commitments) would affect their cash flows and liquidity risk.

3.5. Analysis of Cash Flows

3.5.1. The planning of cash flow should include all types of expected inflows and outflows which influence the capacity of the institution to service its contractual liabilities. The institution determines the degree of probability that each separate cash flow transaction will occur based on several factors, which differ depending on whether it involves an on- or off-balance sheet and an asset or liability item.

3.5.2. When determining the level of cash flow from credit operations, the following four questions should be taken into consideration:

- How much of the institution's credit portfolio can be collected within contractual maturity dates?
- How much that matures will the institution be able and willing to prolong?
- What amount of new credit exposures is the institution expecting to approve?
- What is the expected level of contingent liabilities (unfunded credit commitments, off-balance sheet claims, court proceedings, etc.)?

3.5.3. When determining the level of cash flow from other types of assets, the market value of the asset item, i.e., the possibility for its conversion to cash, is considered. Continued development of secondary markets allows greater possibilities for converting assets into cash by their sale or by their use as collateral. Consequently, each institution should maintain sufficient data to support the market value of all its assets.

3.5.4. The institution should also maintain relevant data on the characteristics of sources of funds (liabilities), for the instrument itself as well as for its provider. In order to determine the degree of probability for funding certain liabilities, the institution should determine the following:

- The level of deposits or other liabilities which have contractual maturity dates, and are usually rolled over (retained);
- The anticipated retention of deposits which do not have contractual maturity dates, such as sight deposits; and
- Deposit growth rate, i.e., the expected level of new deposits;

3.5.5. These three factors help the institution to determine the level of its core deposit base. “Core deposits” are defined as deposits that will most likely not be withdrawn at maturity and which the institution assesses as a relatively stable source of liquidity funding. For the purpose of determining the core deposit base, the institution should have a sufficient information system that can tract the movements of the institution's liabilities by deposit categories and by customer/creditors.

3.5.6. When determining expected cash flows, the institution should:

- Use its historical experience for credit and deposit roll-over, the level of used credit lines, new loan applications and deposit growth;
- Use statistical analysis of seasonal and other influences affecting loan demand, the sensitivity of interest rates, and fluctuations in deposits (e.g., sight deposits); and

- Assess the reaction of each large and/or significant client/depositor to various market conditions.

3.5.7. The institution also requires funds for performing certain operations which are not directly related to basic intermediation functions. Namely, the institutions which provide correspondent services to foreign institutions or participate in the payment system have a greater need for liquid assets. In these cases, the institution is subjected to the risk of cancellation, delay, or unexpected need by its client. This requires that the institution obtain data on intra-day payments and collections which are of fundamental significance for liquidity planning.

3.5.8. When determining cash flow needs, special attention should be paid to monitoring the maturity structure of foreign currency denominated on- and off-balance sheet items. There are two main sources of liquidity risk when an institution has assets and liabilities denominated in foreign currencies:

3.5.8.1. ***Financing Denar assets with foreign sources of funds.*** Typically foreign funding sources are highly volatile, because foreign institutions and depositors tend to withdraw their funds quickly if there is the slightest indication of problems within the institution or market environment. If the solvency of the institution is threatened because of a devaluation of the Denar, foreign depositors/creditors will quickly withdraw funds. Additionally, in most cases, foreign depositors/creditors do not have sufficient information concerning the institution, but rather make decisions based on the market situation and environment within which the institution operates. Thus, negative information about market conditions could cause funds to be withdrawn, regardless of the strength and soundness of the institution. On the other hand, Denar denominated assets funded by foreign currencies have a higher degree of sensitivity to fluctuations in exchange rates. An increase in interest rates, in order to support the Denar could also have a negative impact on borrowers' ability to repay loans, thus impeding cash inflows from normal loan collections.

3.5.8.2. ***Financing of the foreign assets with Denar funds.*** Institutions lending in foreign currencies need to thoroughly and conservatively assess the likely convertibility of the currencies under the various scenarios in which they might need to switch funding from one currency to another. They further need to consider a range of possible scenarios for exchange rates, even where currencies are currently pegged or fixed. In many cases, an effective yet simple strategy for dealing with these issues would be for an institution to hold foreign currency assets in an amount equal to its foreign currency liabilities. Furthermore, institutions lending in foreign currency to domestic borrowers are vulnerable in the case of a sudden devaluation. Domestic borrowers may be unable to acquire sufficient foreign currency to service or repay their foreign currency loans, creating cash flow problems for the institution. Institutions should look carefully at the extent of foreign currency exposures built up by borrowers, and patterns across borrowers, and the extent to which borrowers have access to foreign currency earnings to service their loans.

3.5.9. Once management understands the institution's cash flows, they can estimate the level of liquid assets that is prudent. Many institutions use *cash flow reports* or *maturity breakdown reports* to measure and analyze cash flow projections. Not to be confused with the re-pricing gap report that measures interest rate risk, a maturity gap report shows future time frames when funds may be needed to pay for deposit withdrawals, other decreases in liabilities, or increases in assets. As a preliminary step to constructing the maturity breakdown table, cash inflows can be ranked by the date on which assets mature or a conservative estimate of when credit lines can be drawn down. Similarly, cash outflows can be ranked by the date on which liabilities fall due, the earliest date a liability holder could exercise an early repayment option, or the earliest date contingencies can be called. The difference between cash inflows and cash outflows in each period, the excess or deficit of funds is called net funding requirement (See Appendix C for a discussion on Behavior Assumptions).

3.5.10. When determining maturity, the residual maturity of individual assets and liabilities are taken into consideration; that is, the remaining time from the end of the period within which the item matures and its actual maturity date. The actual maturity date can be considered as the contractual maturity date, i.e., the maturity date determined in accordance with the contract between the institution and its client, and the so-called expected maturity, i.e., a period assessed by the institution in which it expects cash inflows and outflows from its assets and liabilities that have no contractual maturity date.

3.5.11. Liquidity Gap Schedule (Sample) – below is a simplified maturity gap report illustrating its basic structure.

	Days to Maturity				
	0-30	**30-60**	**60-90**	**90-180**	**Total**
Assets	10	10	10	65	95
Liabilities and Equity	50	30	15	0	95
Net outflow (assets minus liabilities)	(40)	(20)	(5)	65	0
Cumulative net outflow	(40)	(60)	(65)	0	0

3.5.12. Note that the number and width of time frames used internally to prepare the maturity gap report will vary. Most institutions use a short (perhaps daily) time frame to measure their near-term exposures and longer time frames thereafter. For example, an institution might project daily cash flows for the first two weeks of its analysis, monthly projections for the next six months to 12 months, followed by quarterly projections. For regulatory reporting purposes set out in the Decision on Identifying, Assessing and Managing Institutions' Liquidity Risk and the respective instructions for its implementation, the following time periods have been established: up to seven days, from seven days to one month, from one month to three months, from three months to six months, from six months to twelve months, over twelve months.

3.6. Stress-Testing

3.6.1. Institutions should perform stress testing using various scenarios, to identify situations that influence its liquidity position, while allowing management to set appropriate limits. Stress scenarios should be realistic taking into consideration the nature and complexity of the institution's operations and market conditions. Stress testing is more effective when changes and movements are sufficiently large to have a material impact on liquidity. Small changes are usually not useful stress-testing assumptions, because such changes are managed effectively by the use of normal monitoring techniques.

3.6.2. Stress scenarios consider negative changes of various internal and external factors that may significantly influence an institution's liquidity position. Simultaneous changes of several factors are often made (e.g., changes in the level of sight deposits, highly liquid securities, credit exposures, exchange rates, interest rates, etc.) that reflect situations management may find probable in the future. Stress scenarios can be based on certain significant events which happened in the past (i.e., historic scenario - for example, the Kosovo crisis), or hypothetical situations. Accordingly, those assumptions of changes that will have the largest influence on the final stress-test results are selected as the bases of testing. Stress scenarios and assumptions should be periodically reviewed (at least once a year) and adjusted to reflect the institution's current financial situation and risk profile, and to incorporate new sources of risk.

3.6.3. Stress scenarios can be useful in determining an institution's core deposit base. If the assumptions used in stress-testing are realistic, the following four questions can be answered:

- Which sources of funds will most probably remain in the institution, regardless of the institutions' operation?
- Which sources of funds are expected to decrease gradually in case of problems, and at what rate?
- Which sources of funds with or without contractual maturity are expected to "run" from the institution when the first signs of operating problems become evident?
- What other sources (e.g., unused or back-up lines of credit) of funding can be relied on to address liquidity concerns?

3.6.4. Stress scenarios can also determine the institution's ability/inability to fund loan demand or to collect outstanding loans. Stress scenarios can also determine which assets to sell or use as collateral to meet liquidity needs. Thus allowing the institution to determine asset marketability and the timeframe in which the institution can continue to meet short-term liability run-off by liquidating available assets.

4. Liquidity Risk Management on a Consolidated Basis

4.1. Overview

4.1.1. There are different considerations in liquidity risk management in the case of a banking group as defined pursuant to current legislation. Liquidity risk management at the banking group level is necessary because:

- Group members often cover liquidity shortages by using funds provided by other members of the group. The advantage of this is in the speed at which such funds can be provided to the target institution;
- High liquidity risk experienced by one of the group members can be easily transferred to other members if there is no integrated risk management for the entire group. The existence of high liquidity risk with one member of the group can increase the risk profile of the entire group; and/or
- The presence of so-called moral hazard. In the case where the parent entity of the group is a bank, very often, the remaining members of the group take a higher level of liquidity risk, counting on the parent institution to obtain assistance from the central bank during crisis situations.

4.2. Consideration

4.2.1. Liquidity risk management should encompass an entire banking group, as well as individual institutions within the group. This obligation especially refers to institutions which act as a parent entity within the group and are subject to consolidated supervision. Such parent institutions are responsible for monitoring all risk exposures to the banking group, and harmonizing the limits prescribed in the legal framework and internal policies/procedures for liquidity risk management. Parent institutions must establish an adequate and uniformed liquidity risk management system group-wide, with each entity within the group being required to provide sufficient data and information to manage liquidity risk on a consolidated basis. When conducting liquidity risk management at the level of the banking group, its organizational lay-out should correspond to the group's size, nature and complexity; and should enable integrated analysis of cash flows, sources of financing, liquidity indicators and limits, maturity structure, etc.

5. Supervisory Approach to Liquidity Risk

5.1. Objectives

5.1.1. A key objective of the NBRM risk-based supervisory approach with respect to liquidity risk is to ensure that institutions maintain adequate liquidity. This relates, in particular, to an institution's ability to:

- Meet its obligations as and when they fall due; and
- Maintain a sufficient stock of high quality liquid assets and/or highly reliable funding sources in the event of a liquidity crisis.

5.1.2. In supervising liquidity risk, the NBRM adopts a system based approach that focuses on the processes and controls established by the institution. Prudent management of liquidity, through the establishment of proper strategies, systems and controls, is the primary responsibility of the Supervisory Board and Board of Directors of all institutions. They are 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 an institution's activities.

5.1.3. Central to effective liquidity risk management is an institution's ability to maintain adequate liquidity in the event of a funding crisis. The NBRM will assess this ability taking into consideration:

- The amount of high quality liquid assets that the institution can readily dispose of or pledge for funding;
- The stability/reliability of the institution's funding sources and its contingency measures for dealing with crisis situations;
- The existence of concentrations in the institution deposit base and other sources of funding;
- The quality of the institution credit portfolio and the ability to promptly liquidate assets at low costs;
- The effectiveness of the institution asset/liability management practices and its cost effectiveness; and
- The results of stress tests carried out by the institution on its cash-flow and liquidity positions under different scenarios.

5.1.4. Every institution is expected to document its policies and strategies for managing liquidity risk, including how it identifies, measures, monitors and controls the risk. The documentation should be prepared in sufficient detail and approved by the Supervisory Board.

5.1.5. In assessing the overall adequacy of liquidity of a branch or subsidiary of institutions incorporated outside the Republic of Macedonia, the NBRM will take into account 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. A more flexible approach may be adopted for the supervision of these institutions, provided that their liquidity is appropriately managed and supervised on an integrated global basis.

5.2. Supervisory Process

5.2.1. The NBRM adopts a risk-based supervisory approach that includes continuous supervision of institutions' liquidity risk through a combination of risk-focused CAMEL rating on-site examinations and off-site reviews. The objectives are to obtain sufficient and timely information for the evaluation of institutions' liquidity risk profile and to assess the adequacy and effectiveness of their liquidity risk management process. See SF-1 for details of the NBRM's risk-based supervisory methodology.

5.2.2. Where necessary, the NBRM may request individual institutions to provide additional information on their liquidity positions. For example, institutions with significant foreign exchange business may be required to submit separate scenario analyses on their foreign currency positions (See Appendix D for reporting forms).

5.2.3. The NBRM monitors the liquidity risk profile of institutions during off-site reviews and evaluates the effectiveness of their liquidity risk management systems during on-site examinations. If an institution demonstrates one or more of the following weaknesses, this may call into question whether the institution is capable of maintaining adequate liquidity:

- Failure to honor obligations as they fall due;
- Insufficient liquidity to meet crisis or emergency situations;

- Evidence of imprudent liquidity management (such as serious or persistent breaches of the institution's own liquidity policies, excessively large maturity funding gaps, 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).

5.2.4. In assessing an institution's liquidity risk profile and the adequacy of its liquidity risk management process, the NBRM considers the nature and complexity of the institution's business activities and the following factors:

- Liquidity risk management policies; if approved by the Supervisory Board (or its committee); and whether the Board of Directors effectively communicates to personnel the guidelines for liquidity risk management and how they designate responsibility;
- Management's understanding of all aspects of liquidity risk;
- Management's anticipation and response to changes in market conditions;
- Liquidity risk management processes; whether they are reflective of a sound culture that has proven effective over time;
- Timeliness, completeness and reliability of management information;
- Balance sheet symmetry and the cost effectiveness of liquidity alternatives;
- Effectiveness of contingency planning taking into account all relevant factors;
- Exposure to earnings and capital from the liquidity risk profile (cash flows, current liquidity position and needs, liquidity management strategy, etc.);
- Accessibility to funding sources, and the diversification and reliance on borrowed funds;
- Availability of market alternatives given the demand for liquidity; and
- Level of support provided by the parent company.

Appendix A: Correlation of Liquidity Risk with Other Risks

A1. Any institution that takes on more credit risk may be increasing its liquidity risk. A significant rise in the level of an institution'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 institution's fund-raising capability. If the situation has cast doubt on the institution's financial viability, it may be denied any funding at all. Many bank failures were actually the combined result of severe credit and liquidity problems.

A2. Price and Foreign Exchange risk will affect an institution's ability to generate liquidity from its portfolio of financial instruments. Adverse changes in the value of such portfolios may also result in volatile profits. If an institution is perceived to be subject to a high level of market risk, fund providers may require the institution 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 institutions in terms of the income earned from assets, the market value of those assets and the cost of funding those assets. Institutions' 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 and Information Technology risk are 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 institutions. Problems in other operational systems such as electronic or credit card banking services may result in customer dissatisfaction and closure of accounts.

A5. Legal Risk and an institution'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 an institution directly or through contagion if the problems originate from its group companies. An institution's failure to honor 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 rumors 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 institution or to withdraw their funds. If this is not properly dealt with, negative publicity may, in extreme situations, trigger deposit runs and result in serious problems for the institution or even the banking industry as a whole. To minimize the potential impact of reputation risk on liquidity, institutions 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 institutions' liquidity. Before implementing any new strategy or business activity, an institution 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 institutions that are experiencing rapid asset growth.

Appendix B: Examples of Liquidity Ratios, Limits, and Warning Indicators

B1. Introduction

B1.1 This Appendix provides examples of liquidity ratios and limits that could be used by institutions in managing liquidity risk. Depending on the nature of the business of individual institutions, these ratios and limits may not be applicable to all. For example, while the loan-to-deposit ratio is regarded as a relevant measure of liquidity for retail banks, it may be less meaningful for those that concentrate on wholesale banking activities.

B1.2 Many ratios can help quantify liquidity; they can also be used to create limits that preserve it. But unless ratios are used regularly and interpreted in light of qualitative factors, ratios will not by themselves reveal material liquidity trends. Ratios should always be used in conjunction with more qualitative information about borrowing capacity, such as the likelihood of increased requests for early withdrawals, decreases in credit lines, decreases in transaction size, or shortening of term funds available to the institution. For example, a well-capitalized institution may have a loan to deposit ratio of 90 percent and not have any liquidity problems, while another institution with the same ratio may have depleted liquidity and nearly become insolvent because it relies heavily on a concentration of short-term credit-sensitive deposits for day-to-day funding.

B1.3 Liquidity ratios consider and reflect:

- Trend and stability of deposits
- Adequacy of liquid sources of funds
- Funding of long-term assets with volatile liabilities
- Funding practices

B2. Loan-to-deposit ratio

B2.1 Loan-to-deposit ratio provides a simple measure of the extent to which an institution is funding its illiquid assets (such as loans) by relatively stable liabilities (such as customer deposits). It also gives an indication of over-expansion in the loan portfolio. If this ratio is very high (over 80%) or increasing, it means that the institution may be relying on relatively unstable sources of funding (for example, short-term borrowings from the cash market) that may leave the institution at the first signs of danger.

B2.2 As mentioned above, the ratio is more relevant to institutions that rely on retail funding. Institutions engaged in wholesale banking activities normally rely more heavily on inter-bank or intra-group funding support than customer deposits. Thus, while local retail banks are expected to maintain a loan to deposit ratio of below 100%, it is not uncommon for branches of foreign banks to maintain a ratio well in excess of that. Whether or not that is a cause for concern will depend on such factors as the short-term mismatches being maintained by the institution and a qualitative assessment of the stability of its funding sources.

B2.3 Institutions should establish limits on this ratio that are appropriate to their business. As a minimum, there should be limits on the total loan-to-deposit ratio, and on Denar and

major foreign currency positions, separately. Where an institution has significant business in other currencies, limits should be established for those currencies as well.

B2.4 However, institutions should be aware that there are some limitations in this ratio. For example, it does not take into account the extent to which loans may be funded by other stable funding sources such as an institution's equity base, negotiable certificates of deposits or long-term debt capital.

B3. Reliance on Wholesale Funding

B3.1 This ratio is calculated by dividing all wholesale funding by total funding. This measures the portion of the institution's total funds that are from wholesale sources. Institutions with high volumes of wholesale funding should make sure they have up-to-date contingency funding plans.

B3.2 Compared with retail deposits, wholesale funding (deposits or borrowings) may be considered a more volatile funding source, given the greater size of individual borrowings and the relatively small number of potential counterparties. To reduce the dependency on funding from the wholesale market, institutions should examine whether there are other funding products that can diversify or expand their funding base.

B3.3 Wholesale funding limits (in individual or all currencies) may be established to control the level of such funding. In setting such limits, an institution should evaluate the depth of money markets and creditors' attitudes toward the institution.

B5. Medium-term funding ratio

B5.1 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 an institution and is intended to highlight the extent to which medium-term assets are being financed by the roll-over of short-term liabilities. Institutions could establish a minimum medium-term funding ratio in order to avoid over-reliance on short-term funding.

B5.2 In setting the limit, consideration should be given to the liability structure of an institution. It may be justifiable for an institution with a stable and sufficiently diversified deposit base to maintain a lower medium-term funding ratio.

B6. Net Non-Core Funding Dependence Ratio

B6.1 This ratio is calculated by subtracting short-term assets from non-core liabilities and dividing the resulting difference by long-term assets. Since non-core liabilities are predominantly provided by other financial institutions, this ratio indicates the degree of reliance on funds from financial institutions to fund earning assets. Because financial institutions are credit and price sensitive, these funds may be withdrawn if the institution is perceived to have asset quality or other financial problems.

B10. Warning Indicators

B10.1 Liquidity problems are often symptomatic of other more fundamental problems at an institution such as excessive credit risk or interest rate risk, inadequate capital,

operational problems, etc. Warning indicators, while not necessarily requiring drastic corrective measures, may prompt the Supervisory Board and the NBRM to conduct additional monitoring. Factors that could indicate or accelerate liquidity problems include:

- Borrowed Funds exceed 30% of Total Liabilities.
- Liquid assets (Cash, Due from Banks/NBRM, Securities with no maturity and maturities < 30 days) shrink 10 percentage points faster than peer or institutions of similar size.
- Volatile liabilities (liabilities with no maturity and with maturities < 30 days) grow more than 10 percentage points faster than peer or institutions of similar size.
- Over-reliance on wholesale funding.
- Mismatched funding: funding long-term assets with short-term liabilities, or *vice versa.*
- Declines in levels of core deposits.
- A sharp rise in funding costs.
- A sharp drop in earnings.
- An increase in non-performing assets.
- A decline in capital adequacy ratios.
- Management problems.
- Adverse publicity.

Appendix C: Behavioral Assumptions for Cash-Flow Management

C1. This Appendix sets out criteria that institutions should consider in developing behavioral assumptions when projecting expected cash flows of assets, liabilities and off-balance sheet activities. Where necessary, the NBRM may request information and/or justification to support any assumptions used by individual institutions. The minimum criteria for using behavioral assumptions are as follows:

C2. The assumptions should be consistent and reasonable for each scenario. For example, the proportion of marketable securities which could be converted into cash before maturity and the applicable hair-cut (discount) should vary under different scenarios. This would properly reflect the impact on earnings and the ability to convert marketable securities into cash under each scenario.

C3. The assumptions should be verifiable and supported by sufficient documentation, experience and/or performance rather than being arbitrary. Typical information sources used to formulate behavior assumptions include:

- Historical observations or statistical analysis of cash-flow patterns or customer behavior under different scenarios;
- Models used to measure various financial risks;
- Planned changes to business or re-pricing strategies; and
- General economic/market trends and any other related information that could affect the ability to readily access funds with reasonable terms.

C4. The underlying historical observation period used to develop assumptions should be at least one year.

C5. Institutions should document behavioral assumptions in their liquidity management policy statement. The type of analysis performed under each assumption should also be documented to facilitate periodic review. The documentation should be consistent with the significance of the risk and complexity of the analysis.

C6. Key assumptions should be reevaluated at least annually. Changes in market conditions, competitive environments and strategic plans cause assumptions to lose validity. Therefore, institutions are also expected to reevaluate key assumptions should significant changes or events occur.

C7. The Supervisory Board, or its delegated committee, should annually review the validity of all key assumptions used in cash flow management, and any stress test scenarios and modeling processes.

Appendix D: Proposed Organizational Structure for Liquidity Risk Management

SUPERVISORY BOARD

Approving liquidity strategy and policies

Oversight of ALCO activities

ALCO/ SENIOR MANAGEMENT

Liquidity policy review

Implementing Liquidity strategy and policies

Establishing Liquidity policies and manuals

Oversight over Liquidity risk management

Monitoring the efficiency of Liquidity risk management process and giving recommendations for its improvement

BANK TREASURY

Day-to-Day Liquidity risk management:

- Optimizing the cash position of the institution
- Short and Long term liquidity planning
- Providing necessary liquidity to the business units
- Access to inter-bank market and local and international FOREX markets
- Managing Inter-bank liquidity

MIDDLE OFFICE

- Recommending Liquidity risk management methodologies
- Limit/exceptions monitoring (target liquidity ratios, maturity mismatch limits, loan to deposit ratio, etc.)
- Stress-testing (cash-flow analysis under normal and stress scenarios, including the techniques and behavioral assumptions)
- Assessing stability of the Bank deposit base
- Management Reporting system for liquidity risk
- Contingency plan – which should describe the approach and strategies for dealing with various types of liquidity crisis.

BACK OFFICE

- Checking documentation related to fund disbursement
- Funds disbursement
- Measurement and reporting of Liquidity risk exposures

INTERNAL AUDIT AND COMPLIANCE

- Audit of the Liquidity risk management process
- Compliance audit (internal policies; legal, regulatory requirements and prudential limits)