Chapter 2:
A Conceptual Framework Of Assets And Liabilities Management

2.1 Introduction

2.2 Concept of asset-liability management (ALM)

2.3 Objectives & Purposes

2.4 ALM implementation process

2.5 ALM decisions

2.6 Liquidity and Asset-liability Management

2.7 Managing Liabilities

2.8 The Necessity of Asset Liability Management in Indian banks

2.9 ALM Organization

2.10 Management of Risk in ALM

2.11 Market Risk Management

2.12 Interest Rate Risk management

2.13 Effects of interest rate risk
2.14 The various types of interest rate risks are identified as follows

2.15 Techniques for measuring exposure of banks to interest rate risk

2.16 Liquidity and Funds Management

2.17 Tools of Credit Risk Management

2.18 Operational Risks management

2.19 Methods of operational risk management

2.20 RBI Guidelines on ALM

2.21 Emerging issues in the Indian context of ALM

2.22 Information technology and asset-liability management in the Indian context

References
2.1 Introduction

The vigorous management of financial statements maintains a mix of loans and deposits consistent with its goals for long-term growth and risk management. Banks, in the usual course of business, assume financial risk by making loans at interest rates that differ from rates paid on deposits. Deposits often have shorter maturities than loans and adjust to current market rates faster than loans. The result is a balance sheet mismatch between assets (loans) and liabilities (deposits).

The ALM is defined as "managing both assets and liabilities simultaneously for the purpose of minimizing the adverse impact of interest rate movement, providing liquidity and enhancing the market value of equity. It is also defined as “planning procedure which accounts for all assets and liabilities of a bank by rate, amount and maturity."

Banks now focus on funds management approach to manage liability management and Interest rates risk. The features of this approach are:

1. It focuses more control on volume, mix and return / cost of both assets and liabilities.

2. Effective coordination on both, the assets and liabilities, to maximize the spread, and

3. Revenues and costs affect both sides of the balance sheet. Therefore this approach suggests maximize returns and minimize costs.
The function of asset-liability management is to measure and control three levels of financial risk which are as follow:

1. Interest Rate Risk (the pricing difference between loans and deposits)
2. Credit Risk (the probability of default)
3. Liquidity Risk (occurring when loans and deposits have different maturities)

ALM policy should establish portfolio limits on the mix of balance sheet liabilities such as deposits and other types of funding, as a percentage of total assets, considering the differential costs and volatility of these types of funds. Similarly, prudent portfolio limits on the mix of balance sheet assets (e.g. loans by credit category, financial instruments, etc.) should be set by policy considering differential levels of risk and return.

This recommended practice may not be practical for smaller, less complex credit unions which have a limited membership base, a simple balance sheet without much product diversification (e.g. savings and personal loans) or which do not have sufficient financial resources to effectively promote diversification. If this is the case, ALM policy should state that an appropriate mix of deposits and other liabilities will be maintained to reflect member expectations and to correlate (by term and pricing) to the mix of assets held. The mix of assets (loans, investments) return should be guided by annual planning targets, lending licence constraints and regulatory restrictions on investments.

2.2 Concept of asset-liability management (ALM) (1)

Asset and liability management (ALM) deals with the finest investment of assets in consideration of convention current goals and future
liabilities. The keyword of ALM is the joint evaluation of risks and benefits for assets and liabilities.

ALM is to preserve a match in the stipulations of rate sensitive assets (those assets that will move in search of the most competitive interest rates) with their funding sources (savings, deposits, equity, and external credit) in order to reduce interest rate risk while maximizing profitability.

Asset-liability management (ALM) is the process of planning, organizing, and controlling asset and liability volumes, maturities, rates, and yields in order to minimize interest rate risk and maintain an acceptable profitability level. Simply stated, ALM is another form of planning. It allows managers to be proactive and anticipate change, rather than reactive to unanticipated change.

**Society of Actuaries (SOA, 2003),** ALM is the ongoing process of formulating, implementing, monitoring and revising strategies related to assets and liabilities to achieve an organization's financial objectives, given the organization's risk tolerances and other constraints.

**Investopedia, Asset-Liability Management** is a technique companies employ in coordinating the management of assets and liabilities so that an adequate return may be earned

**2.3 Objectives & Purposes (2)**

The goal of asset/liability management (ALM) is to properly manage the risk related to changes in interest rates, the mix of balance sheet assets and liabilities, the holding of foreign currencies, and the use of derivatives. These risks should be managed in a manner that contributes
adequately to earnings and limits risk to the financial margin and member equity.

Proper management of asset/liability risk is facilitated through board approved policy, which sets limits on asset and liability mix, as well as the level of interest rate risk and foreign currency risk to which the credit union is willing to expose itself. Policy should also set out guidelines for the pricing, term and maturity of loans and deposits. The use of derivatives, if any, should also be controlled by policy, which should state among other things that derivatives must only be used to limit interest rate risk and must never be used for speculative or investment purposes.

A primary objective in asset-liability management is managing Net Interest Margin that is, the net difference between interest earning assets (loans) and interest paying liabilities (deposits) to produce consistent growth in the loan portfolio and shareholder earnings, regardless of short-term movement in interest rates. The dollar difference between assets (loans) maturing or repricing and liabilities (deposits) is known as the rate sensitivity Gap (or maturity gap). Banks attempt to manage this asset-liability gap by pricing some of their loans at variable interest rates.

Besides financial institutions, nonfinancial companies also employ asset-liability management, mainly through the use of derivative contracts to minimize their exposures on the liability side of the balance sheet.

1. Review the interest rate structure and compare the same to the interest/product pricing of both assets and liabilities.

2. Examine the loan and investment portfolios in the light of the foreign exchange risk and liquidity risk that might arise.
3. Examine the credit risk and contingency risk that may originate either due to rate fluctuations or otherwise and assess the quality of assets.

4. Review, the actual performance against the projections made and analyzes the reasons for any effect on spreads.

5. Aim is to stabilize the short-term profits, long-term earnings and long-term substance of the bank. The parameters that are selected for the purpose of stabilizing asset liability management of banks are:

   1. Net Interest Income (NII)
   2. Net Interest Margin (NIM)
   3. Economic Equity Ratio.

2.4 ALM implementation process (3)

The Asset Liability Management (ALM) process involves management of liquidity risk, interest rate risk, market risk, trading risks etc. For this purpose each bank has set up Assets Liability Committee (ALCO) comprising top level management to attend the following functions:

1. Decide on interest rate and product pricing on both assets and liabilities and to, optimize Net Interest Margin (NIM) / Net Interest Income (NII) and mix of incremental Assets and Liabilities.

2. Measure and monitor liquidity risks, interest rate risk, currency risks, operational/trading risks and equity price risk.
3. Decide on the funding mix (Fixed or floating rate funds, wholesale or retail deposits, money market or capital market funding, domestic or foreign currency funding).

4. To decide maturity profile of assets and liabilities.

5. To permit and monitor the use of derivative instruments to manage risks, in accordance with applicable regulatory norms and guidelines.

2.5 ALM decisions (4)

1. Any changes in the maturity structure of the assets and liabilities can change the cash requirements and flows.

2. Savings or credit promotions to better serve clients or change the ALM mix could have a detrimental effect on liquidity, if not monitored closely.

3. Changes in interest rates could impact liquidity. If savings rates are lowered, clients might withdraw their funds and cause a liquidity shortfall. Higher interest rates on loans could make it difficult for some clients to meet interest payments, causing a liquidity shortage.

2.6 Liquidity and Asset-liability Management (5)

Asset-liability management (ALM) is the process of planning, organizing, and controlling asset and liability volumes, maturities, rates, and yields in order to minimize interest rate risk and maintain an acceptable profitability level. Simply stated, ALM is another form of planning. It allows managers to be proactive and anticipate change, rather than reactive to unanticipated change. An MFI’s liquidity is
directly affected by ALM decisions. Managers must always analyze the impact that any ALM decision will have on the liquidity position of the institution.

Liquidity refers to bank’s ability to meet its liabilities as they become due. Measuring and managing liquidity needs are vital not only to meet liabilities as they become due but also reduce the possibility of an adverse situation. It is not only important to measure the liquidity position on an ongoing basis but also to evaluate the liquidity requirement under crisis scenarios. The liquidity management is to ensure that adequate liquidity is maintained without compromising on net interest margin and without locking of funds idle in the system. The liquidity risk generally refers to situations whereby long-term assets are funded by short-term liabilities since liabilities are subject to rollover or funding risk.

2.7 Managing Liabilities (6)

This Section provides direction on setting policy constraints on the size and types of deposits and borrowings so as to minimize the cost of funds and maximize opportunities to finance growth.

Sources of funds for a credit union can be summarized into three types: capital, deposits and borrowings. Refer also to Chapter 4 on Capital Management for more details on managing funds from capital sources.

Strategy

The various strategies which management may adopt in building its liability base.
1. Attract loans to meet deposit supply.

2. Attract funds to meet loan demand.

3. Adopt a mixed approach in order to match the maturity structure of liabilities with the maturity structure of assets at the cheapest cost

As highlighted above, the first approach, reflecting deposit driven growth, generally results in limited satisfaction of members' long term lending needs because of depositors' preference for short term instruments. The approach can result in excess liquidity and reduced earnings for the credit union.

The second approach, which reflects asset driven growth, results in higher than average funding costs because of the need to guarantee financing to borrowers, which may necessitate funding by external borrowings. Both strategies may cause an unfavourable divergence from market rates.

Due to the major disadvantages inherent in the deposit driven and the asset driven strategies, a compromise approach to liability management is recommended. The credit union should rely on natural deposit growth, fostered through competitive "at market" interest rates, in order to influence loan pricing and growth.

Loan demand which exceeds the natural deposit base can be filled through limited price stimulus on deposits, assuming sufficient profitability. Term deposits, for example, may be offered at higher rates than demand deposits in order to finance the demand for longer term assets such as mortgages. Long term deposits (e.g. two to five years) should generally be sought if term mortgage loan business is available. Alternatively, an interest rate swap or a long term investment can be
purchased to match against term deposits. Interest rate swaps and other derivative instruments are discussed in more depth in Section 7210.

Alternatively, if loan growth has increased beyond the natural growth of deposits, the ALM policy could encourage the solicitation of new members with deposits who otherwise would not meet the bond of association (this may require a revision to the membership by-law). Persons normally ineligible for membership could become members under the basket membership clause of section 31 of the Act (to a limit of three per cent of total members). Deposit accounts to pursue could include community agencies which generally have an interest in improving community relations.

If loan growth continues to exceed natural deposit growth, then loan syndication, asset sales, asset securitization or loan referrals involving other co-operative institutions should be addressed by ALM policy. Under the statute, credit unions cannot accept the deposits from members of other credit unions, although they can consider taking brokered deposits. This strategy, however, is generally a high cost alternative and not a recommended practice over the long term.

Term Deposits

The following operational policy alternatives should be considered for cost effective management of the deposit base of a credit union. These strategies should be evaluated in light of corporate philosophy and members' service expectations.

1. Offer a three or four tiered deposit rate structure for term deposits in excess of certain dollar thresholds (e.g. $1,000, $5,000, $10,000) to avoid paying a premium rate on all deposits.
2. Offer an attractive first year rate on term deposits with a “wait and see” clause for subsequent annual rates.

3. Establish minimum monthly balances for short term deposits, which pay higher rates to rate sensitive members without raising the cost of all funds in these accounts.

4. Adopt a policy of substantial penalties for premature term deposit withdrawals in order to maximize available funds.

5. Offer non-callable deposits at a premium over callable deposits with like terms, for the same purpose.

6. Alternatively, offer callable deposits subject to a penalty equivalent to the applicable interest rate differential. Establish reasonable flat or volume driven service charges or termination fees for the operation of deposit accounts to offset interest costs.

7. Establish in policy the requirement for periodic measurement and analysis of the cost of funds of various deposit accounts to determine those deposit categories which may not be cost effective, and which should be redesigned or discontinued.

8. Require in policy the manager's authorization for any substantial deposit withdrawals in order to give the manager an opportunity to determine if and why funds are being transferred by members to other financial institutions.

9. Require in policy or operational procedures, how various deposit accounts are designed to operate to effectively meet different members' needs; e.g. checking accounts, checking savings, daily interest checking, regular savings, RRSP's, RRIF's, OHOSP's etc. These various accounts should be analyzed in terms of their
sensitivity to interest rate change and promote those accounts with low interest rates and low sensitivity to rates.

10. Establish in policy or operational procedures ongoing monitoring of the amount of variable and fixed rate deposits (where applicable) through a perpetual inventory system. Staff should prepare a periodic (e.g. weekly) treasury report indicating the availability of funds in the variable and term categories. Funding categories may be labelled as "excessive", "sufficient" or "low" so that loans with appropriate maturities and rates may be promoted by staff to match deposits.

11. The volume of deposits in categories where loan demand is scarce can be discouraged by unattractive deposit pricing. This practice may cause membership flight and other alternatives such as interest rate swaps should be considered to manage members demand for term loans. Refer to Section 7502 for an explanation of interest rate swaps.

12. In accordance with section 181 of the Act, operational policy should require deposit accounts to never be overdrawn. Delinquent overdrafts can increase funding costs significantly, and thus must be prohibited.

**Diversification**

In addition to minimizing the cost of its deposit base, the credit union must promote the stability of its deposits. In this regard, policy should encourage the diversification of members' deposits by origin and term structure. Operational policies should encourage that funding is not unduly concentrated with respect to:
1. an individual member;
2. market source of deposit
3. deposit term to maturity;
4. foreign currency.

Concentrated funding sources expose the credit union to potential liquidity problems because of the likelihood of unexpected deposit withdrawals. Credit unions with excessive funding concentrations should maintain additional liquid assets. Refer to Chapter 8 for further recommendations on Liquidity Management.

**Brokered Deposits**

Brokered deposits are funds referred for deposit to a credit union through an investment/deposit broker. The credit union typically solicits these deposits from local investment agents and brokers (usually for an introduction fee) in order to finance unexpectedly high loan demand. New depositors, via arrangements with a broker, will invest in a credit union because they may receive a higher rate of return than other financial institution deposits.

Brokered deposits can benefit credit unions which need immediate deposit financing to fund loan growth. However, there are risks when relying on brokered deposits. The credit union may need to:

1. pay finder fees/commissions to the deposit broker;
2. pay higher interest rates to attract brokered deposits;
3. manage greater liquidity risk due to more volatile deposit re-investment behaviour;

4. ensure the deposits are properly administered for deposit insurance purposes.

Brokered deposits generally represent a more expensive source of funds owing to potential fees and higher interest rates. Additionally, they are usually larger in size than other deposits and liquidity problems could result if large brokered deposits were suddenly withdrawn from the credit union on maturity.

With respect to administration for deposit insurance purposes, in order for any Canadian currency deposit to be eligible for deposit insurance, the depositor must qualify as a member (per the bond or the three percent basket membership clause) and hold the prescribed number of shares as outlined in the credit union’s by-laws.

In summary, brokered deposits represent a high-cost source of funds that should be regarded as temporary until more permanent financing arrangements can be put in place. When reviewing alternatives for temporary financing, credit unions should also consider league borrowings.

**Borrowings**

In addition to the deposit base, credit unions may rely on external league/bank borrowings to finance their asset portfolio. Since external borrowings may be a more expensive source of funding, policy should require limited reliance on these borrowings, and observance of the regulatory ceiling on league borrowing. External loans should always be viewed as temporary financing. Lines of credit with leagues or other
financial institutions, however, should be established in order to regulate operational liquidity; refer to Chapter 9 on Liquidity Management for further information.

Managing Assets

This Section provides direction on setting policy constraints on the size and types of loans and investments so as to make the best use of available funds maximize financial margin while maintaining an appropriate level of safety. The assets of a credit union can be classified into two broad categories: earning assets and non-earning assets. ALM policy should promote the maximization of earning assets which reward the credit union for its operating risks. Earning assets are those assets which generate direct revenues for the credit union. Refer to Schedule 7.5 for a sample classification of assets in each category.

Classification of assets

1. Earnings Assets
   a) Productive Loans
   b) Short Term Investments
   c) Long Term Investments
2. Non-earning Assets

a) Cash on Premises

b) Non-accrual Loans

c) Payroll Receivables

d) Pre-paid expenses

Non-earning assets should therefore be minimized, i.e. investment in cash, non-accrual loans/investments and capital assets.

Operational procedures should limit the maximum amount of cash left on premises. High teller floats or ATM balances, excessive funds in transit or idle cash in non-interest current accounts will increase the amount of non-earning assets and lower financial spread. In the case of teller floats or ATM balances, operational procedures should set maximum limits that can still accommodate members' needs.

Members' needs should be determined by a historical review of cyclical fluctuations in daily cash deposits/withdrawals, and estimates of future requirements. By decreasing surplus cash, management can increase financial margin; if cash balances can be reduced, for example, by $100,000, at a reinvestment rate of three per cent, annual net income will improve by $3,000.

With respect to other non-productive loans and investments, it is recommended management move quickly to identify and liquidate any assets which bear unrewarded risk.

The best contributors to earning assets in a credit union are productive loans; these assets presumably earn the highest yields. In order to maximize financial margin, ALM policy should require management to
periodically measure and compare the gross yields for various asset categories and maximize volumes in the most profitable categories without attracting unsatisfactory levels of risk.

Pricing:

ALM policy specifies that the pricing of all loans and deposits offered should be established so that overall, a net contribution to earnings is provided.

In order to ensure that deposit and lending rates are sufficiently responsive, policy may delegate to management the authority to set interest rates without board approval but in accordance with pre-established criteria as described below.

Deposit Pricing Policy

Rates offered on deposits should be tied to external benchmarks in the local market and should generally approximate the average of these market indicators (for example, the bank rate or the prime rate). Policy should allow management flexibility to negotiate more favourable rates within a prescribed range to maintain key deposit accounts. In order to protect financial margin, credit unions should avoid engaging in price wars with competitor financial institutions including other credit unions. Pricing strategies of competitor institutions will reflect the need for funds in these organizations. Liquidity requirements of the competitor institution may differ vastly from the credit union's needs; therefore, caution should be exercised when setting rates.

Loan Pricing Policy

It is recommended that loans be priced at market rates, and subject to interest rate rebates only at the end of the year, if sufficient earnings and reserves are available. The interest rates offered on loans should reflect
an adequate margin above the rates on deposits being used to fund loans, in order to cover all operating expenses and capital requirements.

Loan pricing can also be used to balance minor gap mismatches. Where funding from deposits is high for a particular term of loan, the price for these loans could be made more attractive than terms whose funding sources are scarce. For larger gap mismatches, however, a derivative instrument may be a more practical option.

Loan pricing is crucial for establishing a successful lending program. In order to establish fair interest rates for both the borrower and the credit union, the following factors should be considered:

Cost of funds and the spread required for financing the loan.

1. Market rates offered by the competition.
2. Excess liquidity position of the credit union.
3. Maturity and repayment terms of the loan.
4. Credit risk of the loan (loan purpose, size and security).
5. Length of loan amortization period (generally, the longer the period, the higher the rate).

**Share Pricing Policy**

When issuing capital shares, discretionary dividend rates should be subject to ALM policy criteria approved by the board. Dividend rates should be set with due regards to the average cost of alternative funds such as deposits, other classes of shares and borrowings. When stock
dividends are offered as an alternative to cash dividends, the future costs of increased fixed dividends should be analyzed for ongoing affordability, before stock dividends are declared. Refer to Section 4204 on Distribution of Earnings.

**Terms**

ALM policy should set reasonable limits on the terms of loans and deposits. These limits should be broad enough so that management can set varying terms for individual products in operational procedures based on product purpose, so long as these do not exceed the maximum term limits approved by the board.

There are no regulatory requirements for the maximum term on any assets or liabilities which a credit union can assume.

**Term Deposits**

It is recommended that the board establish maximum term limits on term deposits. Operational procedures can describe the availability of alternative term deposits and correlate differential pricing for these products within this limit.

The board may want to set a general five year maximum term on deposits in policy, and require that any products with terms greater than five years require special board approval.

**Term Loans**

It is recommended that the board establish maximum term limits on term loans. Operational procedures can describe the availability of alternative term loans and correlate differential pricing for these products within this limit.
The board may want to set a general five year maximum term on loans in policy, and require that any products with terms greater than five years require special board approval.

**Operational Procedures**

The criteria for offering term loans of varying length can be specified in operational procedures. Operational procedures can require that loan terms be set to similar lengths as the life of the security (e.g. large loans secured by higher valued assets would normally have longer terms to maturity). Due to the higher repayment and security risks of longer term loans, and the usually limited consumer demand for term deposits in excess of five years, it is recommended that generally, term loans be offered with five year maximum maturities.

For increased competitiveness, however, loan maturities in excess of five years may occasionally be sanctioned up to a prescribed policy limit or approved by the board on an exception basis.

Mortgage terms of seven to ten years have become more commonplace in the market but generally should only be offered by credit unions if arrangements are in place to manage the gap between five year funding deposits and those longer term mortgages. Credit unions should consult with their league for appropriate strategies prior to offering extended term mortgages.

Term loans should be substantially matched by contractual maturity dates against non-callable term deposits. For mortgages with terms exceeding one year, selective prepayment penalties should be established by operational policy.

**Interest Rate Risk**
Interest rate risk is the risk of an impact on an institution's earnings and capital due to changes in interest rates. One of the primary causes are mismatches in the terms of a credit union's deposits and loans.

Interest rate risk should be periodically measured, and can be controlled through proper management or matching of the institution's assets and liabilities. (Matching is discussed in the next Section).

**Matching Maturities**

Policy should require that, as much as possible, liability maturities and cash flows correlate to asset maturities and cash flows.

"Matching" refers to the process of structuring the balance sheet so that maturities of interest rate sensitive assets correspond closely to the maturities of interest rate sensitive liabilities. If the balance sheet is well-matched, a change in interest rates will have little or no impact on margin, because assets and liabilities re-price at the same time. The better a credit union is matched; the more likely it is to have stable profits

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2.8 The Necessity of Asset Liability Management in Indian banks (7)

ALM is introduced in Indian Banking industry from 1st April, 1999. ALM is concerned with risk management and provides a comprehensive and dynamic frame work for measuring, monitoring and managing liquidity, interest rate, foreign exchange and equity and commodity price risks of a bank that needs to be closely integrated with the banks business strategy.
The asset-liability management in the Indian banks is still in its nascent stage. With the freedom obtained through reform process, the Indian banks have reached greater horizons by exploring new avenues. The government ownership of most banks resulted in a carefree attitude towards risk management. This complacent behavior of banks forced the Reserve Bank to use regulatory tactics to ensure the implementation of the ALM. Also, the post-reform banking scenario is marked by interest rate deregulation, entry of new private banks, and gamut of new products and greater use of information technology. To cope with these pressures banks were required to evolve strategies rather than ad hoc fire fighting solutions. Imprudent liquidity management can put banks’ earnings and reputation at great risk. These pressures call for structured and comprehensive measures and not just contingency action. The Management of banks has to base their business decisions on a dynamic and integrated risk management system and process, driven by corporate strategy. Banks are exposed to several major risks in the course of their business – credit risk, interest rate risk, foreign exchange risk, equity / commodity price risk, liquidity risk and operational risk. It is, therefore, important that banks introduce effective risk management systems that address the issues related to interest rate, currency and liquidity risks.

2.9 ALM Organization (8)
The Asset - Liability Committee (ALCO) consisting of the bank's senior management including CEO should be responsible for ensuring adherence to the limits set by the Board as well as for deciding the business strategy of the bank (on the assets and liabilities sides) in line with the bank's budget and decided risk management objectives.

The ALM desk consisting of operating staff should be responsible for analyzing, monitoring and reporting the risk profiles to the ALCO. The staff
should also prepare forecasts (simulations) showing the effects of various possible changes in market conditions related to the balance sheet and recommend the action needed to adhere to bank's internal limits.

The ALCO is a decision making unit responsible for balance sheet planning from risk - return perspective including the strategic management of interest rate and liquidity risks. Each bank will have to decide on the role of its ALCO, its responsibility as also the decisions to be taken by it. The business and risk management strategy of the bank should ensure that the bank operates within the limits / parameters set by the Board. The business issues that an ALCO would consider, inter alia, will include product pricing for both deposits and advances, desired maturity profile of the incremental assets and liabilities, etc. In addition to monitoring the risk levels of the bank, the ALCO should review the results of and progress in implementation of the decisions made in the previous meetings. The ALCO would also articulate the current interest rate view of the bank and base its decisions for future business strategy on this view. In respect of the funding policy, for instance, its responsibility would be to decide on source and mix of liabilities or sale of assets. Towards this end, it will have to develop a view on future direction of interest rate movements and decide on a funding mix between fixed vs. floating rate funds, wholesale vs. retail deposits, money market vs. capital market funding, domestic vs. foreign currency funding, etc. Individual banks will have to decide the frequency for holding their ALCO meetings.

**2.10 Management of Risk in ALM (9)**

The risk management is a complex function and it requires specialized skills and expertise. Banks have been moving towards the use of sophisticated models for measuring and managing risks. Large banks and those operating in international markets should develop internal risk management models to be
able to compete effectively with their competitors. As the domestic market integrates with the international markets, the banks should have necessary expertise and skill in managing various types of risks in a scientific manner. The design of risk management functions of the bank dictated by the size, complexity of functions, the level of technical expertise and the quality of MIS.

Internationally adopted committee approaches for the risk management are the Asset-Liability Management Committee (ALCO) deals with different types of market risk; the Credit Policy Committee (CPC) oversees the credit/counterparty risk and country risk.

Risk can be defined as the chance or the probability of loss or damage. In the case of banks, these include credit risk, capital risk, market risk, interest rate risk and the liquidity risk. Since financial institutions like banks have complexities and frequent changes in their operating environments, these kinds of risks require more focus.

2.11 Market Risk Management (10)
Market risk refers to the uncertainty of future earnings resulting from changes in interest rates, exchange rates, market prices and volatilities. The Bank assumes market risk from consumer and corporate loans, position taking, and trading and investment activities.

The strategy for controlling market risk shall involve:

1. Stringent control and limits
2. Strict segregation of front and back office duties.
3. Daily reporting of positions.
4. Regular independent review of all controls and limits.

5. Rigorous testing and auditing of all pricing, trading, risk management and accounting systems

a. Trading Risk

The Bank conducts some trading activities on behalf of its customers, but also trades for its own account. Trading portfolios shall be managed with the intent to buy and sell financial instruments over a short period of time rather than hold positions for investments. Continued enhancement of the Bank’s trading risk management systems and processes will be kept up-to-date with market developments.

Trading on behalf of customers will be done only for securities listed on the Securities Exchange, including bonds, treasury bills and shares. Such trading will be done by the Bank’s Licensed Representative under the supervision of the Licensed Principal. There will be no limit for trades done on behalf of customers. Securities, whether listed on the Securities Exchange or not, traded on the Bank’s own account will be traded by the Bank’s Licensed Representative under the supervision of the Licensed Principal but will be authorized by the Bank’s officers in accordance with established investments limits.

Daily reports of profit and loss, limit overruns and compliance will be circulated to all appropriate departments and management for evaluation. Rigorous analysis and testing programs will be applied to measure risk, and to verify accuracy of various controls and limits. These will include stress testing, and sensitivity analysis.

b. Foreign Exchange Risk
The operational currency of the Bank is the EC Dollar. However, in order to meet customer needs, the Bank buys and sells a number of foreign currencies, holds assets and liabilities denominated in several foreign currencies and also as a result of its investments in foreign currencies and its international trading activities, the Bank receives income and pays expenses in foreign currency. The Bank is therefore exposed to foreign exchange risk associated with the effect of fluctuations in the rates of exchange in various currencies. To mitigate the risk of loss due to rate changes the Bank will match its positions as closely as possible.

2.12 Interest Rate Risk management (11)

The function of ALM is not just protection from risk. The safety achieved through ALM also opens up opportunities for enhancing net worth. Interest rate risk (IRR) largely poses a problem to a bank’s net interest income and profitability. Changes in interest rates can significantly alter a bank’s net interest income (NII), depending on the extent of mismatch between the asset and liability interest rate reset times. Changes in interest rates also affect the market value of a bank’s equity, earnings, value of assets, liability, off-balance sheet items and cash flow. Hence, the objective of interest rate risk management is to maintain earnings, improve the capability, ability to absorb potential loss and to ensure the adequacy of the compensation received for the risk taken and affect risk return trade-off.

Methods of managing IRR first require a bank to specify goals for either the book value or the market value of NII. the focus will be on the current value of NII and latter on the market value of equity. In either case, though, the bank has to measure the risk exposure and formulate strategies to minimize or mitigate risk.
The immediate focus of ALM is interest-rate risk and return as measured by a bank’s NIM, NII.

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\text{NIM} = \frac{\text{NII}}{\text{Earning assets}}
\]

\[
\text{NII} = \text{Interest income} - \text{Interest expense}
\]

A bank’s NIM, in turn, is a function of the interest-rate sensitivity, volume, and mix of its Earning assets and liabilities. That is, \( \text{NIM} = f(\text{Rate, Volume, Mix}) \).

2.13 Effects of interest rate risk (12)

Changes in interest rates can have adverse effects both on a bank’s earnings and its economic value.

The earnings perspective: From the earnings perspective, the focus of analyses is the impact of changes in interest rates on accrual or reported earnings. Variation in earnings (NII) is an important focal point for IRR analysis because reduced interest earnings will threaten the financial performance of an institution.

Economic value perspective: Variation in market interest rates can also affect the economic value of a bank’s assets, liabilities, and Off Balance Sheet (OBS) positions. Since the economic value perspective considers the potential impact of interest rate changes on the present value of all future cash flows, it provides a more comprehensive view of the potential long-term effects of changes in interest rates than is offered by the earnings perspective. The economic value perspective identifies risk arising from long-term interest rate gaps.

Economic Value perspective involves analyzing the expected cash inflows on assets minus expected cash outflows on liabilities plus the net cash flows or off-balance sheet items.
Banking industry in India has substantially more issues associated with interest rate risks, which is due to circumstances outside its control. This poses extra challenges to the banking sector. Over the time Asset-Liability Managers have developed a number of different ways to quantify the risk being taken. These include:

(i) Maturity: Since it takes into account only the timing of the final principal payment, maturity is considered as approximate measure of risk and in a sense does not quantify risk.

(ii) Duration: is the weighted average time of all cash flows, with weights being the present values of cash flows. It can again be used to determine the sensitivity of prices to change in interest rates.

(iii) Convexity: Because of a change in market rates and passage of time, duration may not remain constant. With each successive basis point movement downward, bond prices increases at an increasing rate. Similarly, if rate increase, the rate of decline of bond prices declines. This property is called convexity.

2.14 The various types of interest rate risks are identified as follows (13)

Gap/Mismatch risk: It arises from holding assets and liabilities and off balance sheet items with different principal amounts, maturity dates & re-pricing dates thereby creating exposure to unexpected changes in the level of market interest rates.

Basis Risk: It is the risk that the Interest rate of different Assets/liabilities and off balance items may change in different magnitude. The degree of basis risk is fairly high in respect of banks that create composite assets out of composite liabilities.
Embedded option Risk: Option of pre-payment of loan and foreclosure of deposits before their stated maturities constitutes embedded option risk.

Yield curve risk: Movement in yield curve and the impact of that on portfolio values and income.

Re price risk: When assets are sold before maturities.

Reinvestment risk: Uncertainty with regard to interest rate at which the future cash flows could be reinvested.

Net interest position risk: When banks have more earning assets than paying liabilities, net interest position risk arises in case market interest rates adjust downwards.

2.15 Techniques for measuring exposure of banks to interest rate risk (14)

Indian banks use the conventional gap reporting methodology for asset liability management for measuring interest rate risk from the earnings perspective. Gap is the measurement of the difference between risk sensitive assets and risk sensitive liabilities.

**Interest rate sensitivity and GAP management:**
This model measures the direction and extent of asset-liability mismatch through a funding or maturity GAP (or, simply, GAP). Assets and liabilities are grouped in this method into time buckets according to maturity or the time until the first possible resetting of interest rates. For each time bucket the GAP equals
the difference between the interest rate sensitive assets (RSAs) and the interest rate sensitive liabilities (RSLs).
In symbols: $\text{GAP} = \text{RSAs} - \text{RSLs}$
When interest rates change, the bank’s NII changes based on the following interrelationships:

$$\Delta\text{NII} = (\text{RSAs} - \text{RSLs}) \times \Delta r$$

$$\Delta\text{NII} = \text{GAP} \times \Delta r$$

Interrelationship between GAP and $\Delta\text{NII}$

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Type of GAP</th>
<th>Change in interest rates ($\Delta r$)</th>
<th>Change in NII ($\Delta\text{NII}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RSA = RSLs</td>
<td>Increase</td>
<td>No Change</td>
</tr>
<tr>
<td>2</td>
<td>RSA = RSLs</td>
<td>Decrease</td>
<td>No Change</td>
</tr>
<tr>
<td>3</td>
<td>RSAs ≥ RSLs</td>
<td>Increase</td>
<td>NII increases</td>
</tr>
<tr>
<td>4</td>
<td>RSAs ≥ RSLs</td>
<td>Decrease</td>
<td>NII decreases</td>
</tr>
<tr>
<td>5</td>
<td>RSAs ≤ RSLs</td>
<td>Increase</td>
<td>NII decreases</td>
</tr>
<tr>
<td>6</td>
<td>RSAs ≤ RSLs</td>
<td>Decrease</td>
<td>NII increases</td>
</tr>
</tbody>
</table>

When RSA=RSL, GAP=0; indicates A zero GAP will be the best interest-sensitive GAP position either if the bank is unable to speculate interest rates accurately or if its capacity to absorb risk is close to zero. With a zero GAP, the bank is fully protected against both increases and decreases in interest rates as its NII will not change in both cases.

When RSAs ≥ RSLs, Positive GAP,
When RSAs ≤ RSLs, Negative GAP,
In both the cases either NII may increase or decrease.

As a tool for managing IRR, GAP management suffers from three limitations:

a. Financial institutions in the normal course are incapable of out-predicting the markets, hence maintain the zero GAP.

b. It assumes that banks can flexibly adjust assets and liabilities to attain the desired GAP.

c. It focuses only on the current interest sensitivity of the assets and liabilities, and ignores the effect of interest rate movements on the value of bank assets and liabilities.

**Cumulative GAP model**

In this model, the sum of the periodic GAPs is equal to the cumulative GAP measured by the maturity GAP model. While the periodic GAP model corrects many of the deficiencies of the GAP model, it does not explicitly account for the influence of multiple market rates on the interest income. Simulation technique attempts to overcome the limitation of GAP and Duration approaches by computer modeling the bank’s interest rate sensitivity. The modeling makes assumptions about future path of interest rates, shape of yield curve, changes in business activity, pricing and hedging strategies.

**2.16 Liquidity and Funds Management (15)**

Liquidity is measured in terms of having sufficient funds available at all times, to meet fully and promptly, the legitimate demands for money made on the bank arising from deposit withdrawal, presentation of cheques, maturing investments, draws under committed loan facilities, and other financial commitments. The Bank needs to assure depositors that they can withdraw their funds when
desired, borrowers of the availability of funds to meet legitimate demands for credit expansion, and employees of the bank stability & longevity. It must be remembered however that too much liquidity will have a negative impact on profitability, while too little liquidity will increase the risk of insolvency. The Bank is deemed to have adequate liquidity when it can obtain sufficient cash promptly and at a reasonable rate (cost). The determination of the adequacy of the Bank’s liquidity position depends upon an analysis of the Bank’s position relative to the following factors:

a) historical funding requirements
b) current liquidity position
c) anticipated future funding needs
d) present and anticipated asset quality
e) present and future earnings capacity
f) sources of funds

**Liquidity Risk**

Liquidity risk is the risk of having to fund some assets by the acquisition of additional funds under unfavorable market terms. This might occur when unexpected clearing drains occur in close proximity, when depositors are leaving the bank due to a perception of increased risk, or when loan growth is very strong.

Liquidity risk is the potential inability of a bank to meet its payment obligations in a timely and cost effective manner. It arises when the bank is unable to generate cash to cope with a decline in deposits/liabilities or increase in assets.
The Asset Liability Management (ALM) is a part of the overall risk management system in the banks. It implies examination of all the assets and liabilities simultaneously on a continuous basis with a view to ensuring a proper balance between funds mobilization and their deployment with respect to their a) maturity profiles, b) cost, c) yield, d) risk exposure, etc. It includes product pricing for deposits as well as advances, and the desired maturity profile of assets and liabilities.

Tolerance levels on mismatches should be fixed for various maturities depending upon the asset liability profile, deposit mix, nature of cash flow etc. Bank should track the impact of pre-payment of loans & premature closure of deposits so as to realistically estimate the cash flow profile.

The liquidity risk in banks manifest in different dimensions:

**Funding Risk** – It is the need to replace net outflows due to unanticipated withdrawals/non-renewal of deposits (wholesale and retail)

**Time Risk** – It is the need to compensate for non-receipt of expected inflows of funds, i.e. performing assets turning into non-performing assets; and

**Call Risk** – It happens due to crystallization of contingent liabilities and unable to undertake profitable business opportunities when desirable.

RBI recommended Asset liability management system for measuring cash flow mismatches at different time bands. Banks should have to analyze the behavioral maturity profile of various components of on / off-balance sheet items on the basis of assumptions and trend analysis supported by time series analysis. Banks should also undertake variance analysis, at least, once in six months to validate the assumptions. The assumptions should be fine-tuned over
a period which facilitates near reality predictions about future behavior of on/off-balance sheet items.

Ratios The ALCO will monitor the Bank's liquidity position by reviewing the following measures:

1. Cash reserve Minimum 6% 2. Liquid assets 20% - 26% 3. Loans/Deposits 70% - 80%

The cash reserve ratio is calculated by expressing cash reserves (comprising local cash and net balances with the Central Bank) as a percentage of total deposits. The Banking Act requires that commercial banks hold 6% of their deposits with the Central Bank. The liquid assets ratio is calculated as liquid assets expressed as a percentage of total deposits, and the Central Bank guidelines provide that this should be between 20% and 25%. Liquid assets comprise total cash reserves including foreign cash, treasury bills and other risk free investments, cheques held for collection and net balances with Central Bank and other banks. The loans to deposits ratio is calculated as net loans and advances expressed as a percentage of deposits. The Central Bank prudential guidelines require a ratio between 75% and 85%. A very high ratio suggests a less liquid position and presents the risk that some loans may have to be sold at a loss to meet depositors’ claims. A low ratio indicates excess liquidity and potentially low profits.

**Funding:**
Forecasting future events is essential to adequate liquidity planning. Sound financial management can help buffer negative changes in the Bank’s economic climate and accentuate positive ones. Forecasting of future events is very subjective and fraught with potential error. Management must therefore develop contingency plans in case its projections are wrong. Effective contingency
planning involves identifying minimum and maximum liability needs and weighing the alternative courses of action designed to meet the needs. Monthly cash flow projections will be sought from large customers.

The following are alternative ways the Bank can meet its liquidity needs:

a) Increase core (retail) deposits

b) Acquire interbank deposits

c) Sell large time or notice deposits in domestic money market

d) Borrow from Lender of last resort (Central Bank)

e) Borrow on the Inter-Bank Market

f) Lengthen the average life of the bank’s liabilities portfolio

g) Maintain unused lines of credit with other financial institutions

h) Loan participations

The ALCO will review annually, as part of the annual budget preparation, or as often as necessary, the Bank’s deposit structure in relation to volume and trend of various types of deposits, maturity distribution of time deposits and rates paid compared to rates offered by competitors.

**Investments:**

Investments purchased will be consistent with a separate written investment policy. The objectives of the investment policy are to (1) provide liquidity (2) provide for interest rate risk management, and (3) provide additional profit. The investments portfolio shall be diversified to minimize the risk of loss resulting
from over concentration of assets in specific class, currency, Country, or economic sector.

The Bank shall adopt a flexible weightings approach (strategic asset allocation) involving the periodic adjustments of the weights for each category based either on the market analysis or on technical analysis (i.e., market timing). A new allocation therefore may be constructed to capture greater returns in a changing market. The initial allocation is as follows: Class Initial Allocation New Allocation Short-term investments (Money Market) 55% Fixed Income (Bonds) 45% Equities 15%.

**Credit Risk management:**

Credit risk is the risk of loss resulting from the failure of a borrower or counterparty to honor its financial or contractual obligation. Credit risk arises both in the Bank’s direct lending operations and in its funding, investment and trading activities, where counterparties have repayment or other obligations to the Bank. The management of the Bank’s credit risk shall be consistent with separate written credit policies and procedures.

**Credit Policy Objectives**

The Bank’s credit policies will seek to achieve the following major objectives:

a) Provision for loan losses / unsatisfactory assets – Maximum 10%

b) Net losses / average loans - Maximum 1%

c) Classified non-performing loans / total loans - Maximum 7.5%

**Credit Process**
Sample Bank’s credit disciplines shall be based on a division of authority, a committee system for dealing with all major exposures, and periodic independent review by the Audit Department.

Banking officers, who have client contact, will develop and structure individual proposals, and will approve credits within their individual limits. Retail credits will be assessed and authorized in branches within the criteria established by the Bank. All proposals outside the officers’ limits will be adjudicated by the Credit Committee which will analyze the financial strength of the customers and the risks inherent in the proposals. All exceptions to the credit policy of the Bank, or credits outside of the authority of the Credit Committee, must be referred to the Executive Committee for its decision or recommendation to the Board of Directors. Higher risk exposures are subject to mandatory referral to the Board of Directors.

Credit lines for off-balance sheet instruments such as credit card limits, letters of credit and guarantee, shall be managed as an integral part of the same process. At least annually, banking officers will meet formally with each commercial client to review their financial affairs and to assess the appropriateness of their credit requirements. The results will be formulated into a presentation which will be adjudicated in the same manner as a new credit. Where unusual risks exist, credits will be reviewed more frequently. In this way, the Bank will remain fully aware of customers’ risk profiles. Risk ratings will be reassessed with each credit presentation or review.

To minimize risk the Bank will only accept those credits where there is reasonable confidence that the asset will be redeemed at face value.

Limits and maximum maturity periods for various types of loans will be outlined in the Bank’s Credit Policy.
**Risk Diversification**

The Bank’s credit policies and limits are intended to ensure broad diversification across various types of credit risk. Limits will be set for individual borrowers, particular industries and certain types of lending. There various risks will be determined taking into account the relative risk of the borrower, economic activity or product type.

**Pricing for Risk**

The Bank will classify loans into risk categories by economic sector and by product and will price the loans to compensate for the risk involved.

**Accounting for Problem Loans**

The Board of Directors understands that in any portfolio there will be delinquent loans which require special accounting procedures. The Bank has therefore adopted the Central Bank Prudential Guidelines with respect to loan review, loan classification, loan provisioning, and suspension of interest and loan write-offs. The guidelines require an annual review of at least 70% of the Bank’s credit portfolio taking into consideration; the terms of the loan, the business of the borrower, evaluation of the project being financed, security, and debt service. The loans are classified into five categories: pass, special mentioned, substandard, doubtful, and loss. Any loan classified as substandard, doubtful or loss requires a provision of 10%, 50% or 100% respectfully. A 1% provision is required for the percentage of the portfolio not reviewed. Interest should stop accruing on non-performing credits classified as substandard, doubtful or loss unless adequate security exists and full collection is expected within three months. Interest on Government guaranteed loans should continue to accrue up to the limit of the guarantee. Write-off is recommended for loans that have been classified as loss for over three months.
2.17 Tools of Credit Risk Management (16)

**Exposure Ceilings:** Prudential Limit is linked to Capital Funds – say 15% for individual borrower entity, 40% for a group with additional 10% for infrastructure projects undertaken by the group, Threshold limit is fixed at a level lower than Prudential Exposure; Substantial Exposure, which is the sum total of the exposures beyond threshold limit should not exceed 600% to 800% of the Capital Funds of the bank (i.e. six to eight times).

**Review/Renewal:** Multi-tier Credit Approving Authority, constitution wise delegation of powers, Higher delegated powers for better-rated customers; discriminatory time schedule for review/renewal, Hurdle rates and Bench marks for fresh exposures and periodicity for renewal based on risk rating, etc are formulated.

**Risk Rating Model:** Set up comprehensive risk scoring system on a six to nine point scale. Clearly define rating thresholds and review the ratings periodically preferably at half yearly intervals. Rating migration is to be mapped to estimate the expected loss.

**Risk based scientific pricing:** Link loan pricing to expected loss. High-risk category borrowers are to be priced high. Build historical data on default losses. Allocate capital to absorb the unexpected loss. Adopt the RAROC framework.

**Portfolio Management** The need for credit portfolio management emanates from the necessity to optimize the benefits associated with diversification and to reduce the potential adverse impact of concentration of exposures to a particular borrower, sector or industry. Stipulate quantitative ceiling on aggregate exposure on specific rating categories, distribution of borrowers in various industry, business group and conduct rapid portfolio reviews. The existing framework of tracking the non-performing loans around the balance sheet date does not signal the quality of the entire loan book. There should be a proper & regular on-going system for identification of credit
weaknesses well in advance. Initiate steps to preserve the desired portfolio quality and integrate portfolio reviews with credit decision-making process.

**Loan Review Mechanism** This should be done independent of credit operations. It is also referred as Credit Audit covering review of sanction process, compliance status, review of risk rating, pick up of warning signals and recommendation of corrective action with the objective of improving credit quality. It should target all loans above certain cut-off limit ensuring that at least 30% to 40% of the portfolio is subjected to LRM in a year so as to ensure that all major credit risks embedded in the balance sheet have been tracked.

### 2.18 Operational Risks management (17)

“Operational Risk is defined as the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and system or from external events.” operational risk is defined as any risk, which is not categorized as market or credit risk, or the risk of loss arising from various types of human or technical error. It is also synonymous with settlement or payments risk and business interruption, administrative and legal risks. Operational risk has some form of link between credit and market risks. An operational problem with a business transaction could trigger a credit or market risk.

Under the Basel II Accord, operational risk is defined as “the risk of loss resulting from inadequate processes, people and systems or from external events.” The management of operational risk requires systems capable of identifying, recording and quantifying operational failures that may cause financial loss. The systems are essentially tracking processes that monitor the behavior and performance of existing systems and processes. The essential elements include 1) the ability to track and monitor performances of specified operational processes and systems, 2) maintenance of databases of
operational loss experience history, and 3) capacity to provide exception reporting or initiate actions to enable intervention to reduce operational risks.

Bank for International Settlement (BIS) has proposed that, as of 2006, banks should be made to carry a Capital cushion against losses from this risk.

Managing operational risk is becoming an important feature of sound risk management practices in modern financial markets in the wake of phenomenal increase in the volume of transactions, high degree of structural changes and complex support systems. The most important type of operational risk involves breakdowns in internal controls and corporate governance. Such breakdowns can lead to financial loss through error, fraud, or failure to perform in a timely manner or cause the interest of the bank to be compromised.

The objectives of Operational Risk Management is to reduce the expected operational losses that focuses on systematic removal of operational risk sources and uses a set of key risk indicators to measure and control risk on continuous basis. The ultimate objective of operational risk management is to enhance the shareholder’s value by being ready for risk based capital allocation. There is no uniformity of approach in measurement of Operational Risk in the banking system at present.

2.19 Methods of operational risk management (18)

Basel II and various Supervisory bodies of the countries have prescribed various soundness standards for Operational Risk Management for Banks and similar Financial Institutions. To complement these standards, Basel II has given guidance to 3 broad methods of Capital calculation for Operational Risk.

**Basic indicator approach:** - based on annual revenue of the Financial Institution.
**Standardized approach:** - based on annual revenue of each of the broad business lines of the Financial Institution

Advanced measurement approach: - based on the internally developed risk measurement framework of the bank adhering to the standards prescribed (methods include IMA, LDA, Scenario-based, Scorecard etc.)

The Operational Risk Management framework should include identification, measurement, and monitoring, reporting, control and mitigation frameworks for Operational Risk.

**2.20 RBI Guidelines on ALM (19)**

As per RBI guidelines, commercial banks are to distribute the outflows/inflows in different residual maturity period known as Time buckets. The Assets and Liabilities were earlier divided into 8 maturity buckets (1-14 days; 15-28 days; 29-90 days; 91-180 days; 181-365 days, 1-3 years and 3-5 years and above 5 years), based on the remaining period to their maturity residual maturity. All the liability figures are outflows while the asset figures are inflows. In September, 2007, having regard to the international practices, the level of sophistication of banks in India, the need for a sharper assessment of the efficacy of liquidity management and with a view to providing a stimulus for development of the term-money market, RBI revised these guidelines and it was provided that;

(a) The banks may adopt a more granular approach to measurement of liquidity risk by splitting the first time bucket (1-14 days at present) in the Statement of Structural Liquidity into three time buckets, next day, 2-7 days and 8-14 days. Thus, now we have 10 time buckets.
After such an exercise, each bucket of assets is matched with the corresponding bucket of the liability. When in a particular maturity bucket, the amount of maturing liabilities or assets does not match, such position is called a mismatch position, which creates liquidity surplus or liquidity crunch position and depending upon the interest rate movement, such situation may turn out to be risky for the bank. Banks are required to monitor such mismatches and take appropriate steps so that bank is not exposed to risks due to the interest rate movements during that period.

(b) The net cumulative negative mismatches during the Next day, 2-7 days, 8-14 days and 15-28 days buckets should not exceed 5%, 10%, 15% and 20% of the cumulative cash outflows in the respective time buckets in order to recognize the cumulative impact on liquidity.

The Board’s of the Banks have been entrusted with the overall responsibility for the management of risks and is required to decide the risk management policy and set limits for liquidity, interest rate, foreign exchange and equity price risks.

**2.21 Emerging issues in the Indian context of ALM (20)**

With the onset of liberalization, Indian banks are now more exposed to uncertainty and to global competition. This makes it imperative to have proper asset-liability management system in place. The following points bring out the reasons as to why asset-liability management is necessary in the Indian context.

1. In the context of a bank, asset-liability management refers to the process of managing the net interest margin within a given level of risk.

Net Interest Margin = Net interest income / Average earning assets
Net interest margin can be viewed as the spread on earning assets. Efficient management of net interest margin becomes essential as the basic objective of banks is to maximize income while reducing their exposure to risk.

2. Several banks have inadequate and inefficient management system that have to be altered so as to ensure that the banks are sufficiently liquid.

3. An increasing proportion of investments by banks is being recorded on a market-to-market basis and as such large portion of the investment portfolio is exposed to market risks. Countering the adverse impact of these changes is possible only through efficient asset-liability management techniques.

4. As the focus on the net interest margin has increased over the years, there is an increasing possibility that the risk arising out of exposure to interest rate volatility will be built into the capital adequacy norms specified by the regulatory authorities. This, in turn, will require efficient asset-liability management practices.

2.22 Information technology and asset-liability management in the Indian context (21)

Many of the new private sector banks and some of the non-banking financial companies have gone in for complete computerization of their branch network and have also integrated their treasury, forex, and lending segments. The information technology initiatives of these institutions provide significant
advantage to them in asset-liability management since it facilitates faster flow of information, which is accurate and reliable. It also helps in terms of quicker decision-making from the central office since branches are networked and accounts are considered as belonging to the bank rather than a branch.

In other words, the boundaries of asset-liability management architecture itself is changing because of substantial changes brought about by information technology, and to that extent the operations managers are provided with multiple possibilities which were not earlier available in the context of large numbers of branch networks and associated problems of information collection, storage, and retrieval.

In the Indian context, asset-liability management refers to the management of deposits, credit, investments, borrowing, forex reserves and capital, keeping in mind the capital adequacy norms laid down by the regulatory authorities.

Information technology can facilitate decisions on the following issues:

a) Estimating the main sources of funds like core deposits, certificates of deposits, and call borrowings.

b) Reducing the gap between rate sensitive assets and rate sensitive liabilities, gives a certain level of risk.

c) Reducing the maturity mismatches so as to avoid liquidity problems.

d) Managing funds with respect to crucial factors like size and duration

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**CHAPTER: 3 RESEARCH METHODOLOGIES**

3.1 Introduction

3.2 Review of the Existing Literature

3.2.1 Justification and identification of research Problems

3.3 Research Design

3.3.1 Title of the Study