

Asset-Liability Management in Banks

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ABSTRACT

Since financial sector reforms in India, banks are now operating in a fairly deregulated environment and are required to determine on their own, interest rates on deposits and advances. Intense competition coupled with increasing volatility in the interest rates exposed the banks to several major risks in the course of their business viz, credit risk, interest rate risk, foreign exchange risk, equity/ commodity price risk, liquidity risk and operational risks. The banks need to be precisely aware of the risks to which they are exposed, and the tools that are available for managing such risks. For a bank the risk management process primarily involves Asset-Liability Management (ALM). ALM is an attempt to match the assets and liabilities in terms of their maturities and interest rates sensitivities so that the risk arising from such mismatches – mainly interest rate risk and liquidity risk- can be contained within the desired limit. It is the task of ALM not to avoid risk, but to manage it, to keep different types of risk within acceptable levels, whilst to sustain profitability. The objective behind all these measures is to make banks fully prepared to face the emerging challenges.

Key words: asset liability management, liquidity risk, interest rate risk, maturity profiling, maturity bucket.

Introduction

Managing assets and liabilities is a prime concern for the banks. Financial sector reforms in India have brought about rapid changes in the structure of financial markets, more particularly in banks. Intense competition for business involving both the assets and liabilities, together with increasing volatility in the domestic interest rates as well as foreign exchange

rates, added up the risk exposure of banks. This has brought pressure on the management of banks to maintain a good balance among spreads, profitability and long-term viability. To cope with these pressures banks were required to evolve strategies to manage assets and liabilities simultaneously on a continuous basis. These strategies are executed in the form of ALM policies.

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Asset-Liability Management (ALM) is concerned with strategic management of assets (uses of funds) and liabilities (sources of funds) of banks, against risks caused by changes in the liquidity position of the bank, interest rates, and exchange rates, and against credit risk and contingency risk. ALM can be defined as an operation for assessing the above mentioned risks, actively altering the asset-liability portfolio, and for strategically taking actions and managing risks with the objective of maximizing profits. The central objective of Asset-Liability Management is to stabilize and maximize the spread between interest paid to raise funds and interest earned on the bank's assets, and at the same time to ensure adequate liquidity and to constrain risk to acceptable levels.

Purpose of the study

With this background, present study is undertaken to learn about the origin, development and significance of asset liability management and also to learn about various tools and techniques available to manage interest rate risk and liquidity risk. The major purpose of the study is to get in-depth knowledge of asset liability management in banks in Indian context.

Target audience

This study would be of immense help in getting introduced to the vital area of

modern banking, the asset liability management. Academicians, students, research scholars, and persons who are interested in this relevant topic would definitely be benefited out of this work.

Significance of the study

ALM has gained significance in the financial services sector in recent years due to the dramatic changes that have occurred in the post-liberalization period. Deregulated environment accompanied by increased volatility of markets, diversification of bank product profiles, and intensified competition between banks on a global scale, all adding to the risk exposure of banks. Thus, banks increasingly need to match the maturities of the assets and liabilities, balancing the objectives of profitability, liquidity, and risk. The RBI has introduced ALM in Indian banking with effect from 1st April 1999. This study is undertaken to acquire in-depth knowledge on the concepts of asset liability management and its usefulness in confronting the interest rate risk and liquidity risk in the modern banking arena.

Background

Flannery and James (1984) discussed the use of asset liability management tools to maximise the benefit of tax shields in an effort to maximize profits. The results show that the banks will adjust their maturity gaps between loans and deposits

in some situations to take advantage of tax shields and improve profits. **Giokas and Vassiloglou** (1991) developed a goal-programming model for bank asset and liability management. They supported the idea that apart from attempting to maximize revenues, management tries to minimize risks involved in the allocation of the bank's capital, as well as to fulfill other goals of the bank, such as retaining its market share, increasing the size of its deposits and loans, etc.

D Gosh Roy (1995) in an article points out that ALM as a tool for increased profitability and managing interest rate volatility have been in vogue in the international banking scenario in the late seventies. With the process of globalisation and deregulation setting in, Indian banks could no longer shy away from managing their assets and liabilities more so in the short run. **S R Shinde** (1998) takes the view that banks are ultimately economic entities securing profits by assuming numerous risks inherent in their financial intermediary and payment function and sophisticated ALM is the key to successful bank management. ALM also includes off-balance sheet activity such as swaps, futures and options. **O P Chawla** (1998) opined that ALM has evolved from the early practice of managing liquidity on the bank's asset side, to a later shift to the liability side,

termed liability management, to a still later realization of using both the assets as well as liabilities sides of the balance sheet to achieve optimum resources management. But that was till the 1970s. In the current decade, ALM covers the management of the entire balance sheet of a bank. **Pramod Vaidya and Arvind Shahi** (2005), and **Dr. Anurag B Singh and Ms. Priyanka Tandon** (2012) discusses in depth, the importance of liquidity risk management and interest rate risk management, various methods of measuring these risks and the challenges faced by Indian banks in managing these risks.

Parvinder Arora, Ajay Garg, and Bhavna Ranjan(2007), examines the ALM practices of six banks, using the tool of Duration GAP Analysis by looking at interest rate sensitivity statements for the period 2000-04. They concluded that the practice of ALM is the solution to most of the problems faced by banks in the recent times. It is the most scientific way to deal with the challenges put forward by the liberalization and the globalization of the financial services sector. **Dr. Kanhaiya Singh** (2013) attempted to analyze the impact of measures and strategies banks undertook to manage the composition of asset-liability and its impact on their performance in general and profitability in particular. Maturity profiling is used to determining the liquidity position and

Duration analysis to measure interest rates risk.

Definitions of ALM

The Society of Actuaries Task Force on ALM principles, Canada, offers the following definition for ALM: "Asset Liability Management is the on-going process of formulating, implementing, monitoring, and revising strategies related to assets and liabilities in an attempt to achieve financial objectives for a given set of risk tolerances and constraints".

Bank asset-liability management (ALM) may be defined as the simultaneous planning of all asset and liability positions on the bank's balance sheet under consideration of the different bank management objectives and legal, managerial and market considerations, for the purpose of enhancing the value of the bank, providing liquidity, and mitigating interest rate risk (Gup and Brooks, 1993).

Origin and growth of ALM

ALM as a practice has been in existence for quite a long time. The emergence of this concept can be traced to the mid 1970s in the US when deregulation of interest rates compelled the banks to undertake active planning for the structure of the balance sheet. The uncertainty of interest rate movements gave rise to interest rate risk, thereby causing banks to look for to manage their risk. In the wake of interest rate risk, came liquidity risk and credit risk

as inherent components of risk for banks. The recognition of these risks brought asset liability management to the centre-stage of financial intermediation.

The Indian economy has also witnessed a similar scenario. The post-reform banking scenario is marked by interest rate deregulation, entry of new private banks, and an array of new products and greater use of information technology. These changes exposed the banks to number of risks making it imperative for them to tackle the risks. A policy shift thus took place with regard to the business strategy for identifying and controlling the various risks and maintaining the capital adequacy and asset quality at any cost and is called asset liability management (ALM).

Recognizing the need for a strong and sound banking system, RBI advised banks in India in February 1999 to introduce, effective from 1st April, 1999, a scientific system of Asset Liability Management. Initially, this concept was made mandatory for all "Scheduled Commercial Banks", excluding Regional Rural Banks (R.R.B.s) (R.B.I. directive, circular no. DBOD.No.BP.BC.94/21.04.098/98 Dated 10th September 1998.). An efficient ALM technique aims to manage the volume, mix, maturity, rate sensitivity, quality and liquidity of the assets and liabilities as a whole so as to earn a predetermined, acceptable risk/reward ratio.

Purpose and objectives of ALM

The principal purpose of ALM has been to control the size of the net interest income. The control may be defensive or aggressive. The goal of defensive ALM is to insulate the net interest income from changes in interest rates. In contrast, aggressive ALM focuses on increasing the net interest income by altering the portfolio of the institution.

There are macro-level and micro-level objectives of ALM. At the macro-level, ALM leads to the formulation of critical business policies, efficient allocation of capital and designing of products with appropriate pricing strategies. And at the micro-level, the objective functions of the ALM are two-fold. It aims at profitability through price matching while ensuring liquidity by means of maturity matching.

Price matching basically aims to maintain spreads by ensuring that the deployment of liabilities will be at a rate higher than the costs. This exercise would indicate whether the institution is in a position to benefit from rising interest rates by having a positive gap (assets>liabilities) or whether it is in a position to benefit from declining interest rates by a negative gap (liabilities>assets). Similarly, liquidity is ensured by grouping the assets/liabilities based on their maturing profiles. The gap is then assessed to identify the future financing requirements.

Significance of Asset Liability Management in Indian context

Till the advent of the financial sector reforms in the early 1990s, the RBI did the real banking business and commercial banks were mere executors of what RBI decided. Bank for International Settlement (BIS), the parent bank of central banks, has standardized the practices of banks across the globe which has heightened the importance of asset-liability management in banks. With different ways to manage diversified risks, banks are trying their best to manage their individual portfolios of assets and liabilities. Hence, these days without proper management of assets and liabilities, the survival of banks is at stake. The following points strengthen the reasons for implementing asset-liability management in the Indian context:

- Several banks have inadequate and inefficient management systems that have to be altered so as to ensure that banks are sufficiently liquid.
- Indian banks are now more exposed to the vagaries of international markets, than ever before because of the removal of restrictions, especially with respect to forex transactions. ALM becomes essential as it enables a bank to maintain its exposure to foreign currency fluctuations given the level of risk it can handle.

- An increasing proportion of investments by banks are being recorded on a mark-to-market basis and as such a large portion of the investment portfolio is exposed to market risks. Countering the adverse impact of these changes is possible only through efficient ALM techniques.
- As the focus on 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 in to the capital adequacy norms specified by the regulatory authorities. This in turn, will require efficient ALM practices.

ALM framework

ALM framework rests on three pillars.

ALM Organization

i) The Board should have overall responsibility for management of risks and should decide the risk management policy of the bank and set limits for liquidity, interest rate, foreign exchange and equity price risks. The Asset Liability Committee (ALCO), consisting of the bank's senior management, including CEO, should be responsible for adhering to the limit set by the board as well as for deciding the business strategy of the bank in line with the bank's budget and decided risk management objectives. The ALM desk consisting of operating staff should be

responsible for analysing, 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.

ii) ALCO is a decision making unit responsible for balance sheet planning from a risk return perspective including strategic management of interest and liquidity risk. 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.

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.

iii) Composition of ALCO

The size of ALCO would depend on the size of each institution, business mix and organisational complexity. To ensure commitment of the Top Management and timely response to market dynamics, the CEO/CMD or the ED should head the Committee. The Chiefs of Investment, Credit, Resources Management or Planning, Funds Management / Treasury (forex and domestic), International Banking and Economic Research can be members of the Committee. In addition, the Head of the Technology Division should also be an invitee for building up of MIS and related computerisation. Some banks may even have Sub-committees and Support Groups.

iv) Committee of Directors

The Management Committee of the Board or any other Specific Committee constituted by the Board should oversee the implementation of the system and review its functioning periodically.

ALM organization broadly consists of the following structure in banks:

Board of directors



Management committee



Asset – Liability Committee (ALCO)



ALM CELL

ALM Information System

Information is the key to the ALM process. ALM Information System is for the collection of information accurately, adequately and expeditiously. A good information system, gives the bank management a complete picture of the bank's balance sheet.

ALM Process

The basic ALM process involves identification, measurement and management of risk parameters. The RBI in its guidelines has asked Indian banks to use traditional techniques like gap analysis for monitoring interest rate and liquidity risk. However RBI is making Indian banks to move towards sophisticated techniques like duration, simulation and VaR (Value at Risk).

Target accounts in ALM of banks

ALM is aimed to stabilize short-term profits, long-term earnings and long-term

sustenance of the bank. The parameters that are selected for the purpose of stabilizing Asset Liability Management of banks are

Net interest income (NII): The impact of volatility on the short term profits is measured by NII. Hence, if a bank has to stabilize its short term profits, it will have to minimize the fluctuations in the NII.

Market value of equity (MVE): The market value of equity represents the long-term profits of the bank. The bank will have to minimize adverse movement in this value due to rate fluctuations.

Economic equity ratio: The ratio of the shareholders funds to the total assets measures the shifts in the ratio of owned funds to total funds. This is in fact assesses the sustenance capacity of the bank. Stabilizing this account will generally come as a statutory requirement.

Scope of asset liability management

Liquidity risk: The current and prospective risk arising when the bank is unable to meet its obligations as they become due without adversely affecting the bank's financial conditions. From an ALM perspective, the focus is on the funding liquidity risk of the bank, meaning its ability to meet its current and future cash flow obligations and collateral needs, both expected and unexpected.

Interest rate risk: The risk of losses resulting from movements in interest rates

and their impacts on future cash flows. Generally because a bank may have a disproportionate amount of fixed or variable rates instruments on either side of the balance sheet. One of the primary causes is mismatches in terms of bank deposits and loans.

Currency risk management: The risk of losses resulting from movements in exchange rates. To the extent that cash flow assets and liabilities are denominated in different currencies.

Funding and capital management: It is a dynamic and ongoing process considering both short and longer term capital needs and is coordinated with a bank's overall strategy and planning cycles.

In addition, ALM deal with aspects related to credit risk as this function is also to manage the impact of the entire credit portfolio on the balance sheet.

The ALM scope covers both a prudential component (management of all possible risks and regulation) and an optimization role (management of funding costs, generating results on balance sheet position), within the limits of compliance. ALM is an attempt to match the assets and liabilities in terms of their maturities and interest rates sensitivities so that the risk arising from such mismatches – mainly interest rate risk and liquidity risk- can be contained within the desired limit.

Liquidity risk management

The liquidity risk of banks arises from funding of long term assets by short term liabilities, thereby making the liabilities subject to roll over or refinancing risk. Liquidity management represents the ability to meet liquidity needs, as and when they emerge, both efficiently and economically. Liquidity management in banks may be defined as the process of generating funds to meet contractual or relationship obligations, viz., new loan demands, existing loan commitments, and deposit withdrawals, etc., at reasonable prices at all times. A bank has adequate liquidity when sufficient funds can be raised either by increasing the liabilities or by converting assets, promptly and at reasonable cost.

Liquidity risk, broadly, comprises of funding risk, time risk, and call risk.

- Funding risk – need to replace net outflows due to unanticipated withdrawals/non-renewal of deposits
- Time risk – need to compensate for non-receipt of expected inflows of funds, i.e., performing assets turning into non-performing assets
- Call risk – due to crystallization of contingent liabilities and inability to undertake profitable business opportunities when desirable

These can be measured through two methods: static approach (ratio analysis), and flow approach.

Static approach

Under static approach, certain ratios are computed. Some of the ratios widely used in banks are liquid assets to demand deposits, core assets to core liabilities, inter bank borrowings to total assets, liquid assets to total assets, etc.

Flow approach

Under this approach, cash flows are segregated into different maturity ladder and net funding requirement for a given time horizon is estimated.

Bank management should measure not only the liquidity positions of banks on an ongoing basis but also examine how liquidity requirements are likely to evolve under crisis scenarios. Liquidity has to be tracked through maturity or cash flow mismatches. For measuring and managing net funding requirements, the use of a maturity ladder and calculation of cumulative surplus or deficit of funds at selected maturity dates is adopted as a standard tool. The maturity profile could be used for measuring the future cash flows of banks in different time buckets.

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 (also called residual maturity). All the liability figures are outflows while the asset figures are inflows. The time buckets are

- i. 1 to 14 days
- ii. 15 to 28 days
- iii. 29 days and up to 3 months
- iv. Over 3 months and up to 6 months
- v. Over 6 months and up to 1 year
- vi. Over 1 year and up to 3 years
- vii. Over 3 years and up to 5 years
- viii. Over 5 years.

Within each time bucket there could be mismatches depending on cash inflows and outflows. While the mismatches up to one year would be relevant since these provide early warning signals of impending liquidity problems, the main focus should be on the short term mismatches viz. 1-14 days and 15-28 days. Banks, however, are expected to monitor their cumulative mismatches (running total) across all time buckets by establishing internal prudential limits with the approval of the board/ management committee. There are limits for liquidity mismatches prescribed by RBI. The mismatch (negative gap) during 1-14 days and 15-28 days in normal course should

not exceed 20 percent of the cash outflows in each time bucket.

In September, 2007, 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 viz., next day, 2-7 days and 8-14 days. Thus, now we have 10 time buckets. The 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 Statement of Structural Liquidity may be prepared by placing all cash inflows and outflows in the maturity ladder according to the expected timing of cash flows. A maturing liability will be a cash outflow while a maturing asset will be a cash inflow. It would be necessary to take into account the rupee inflows and outflows on account of forex operations including the readily available forex resources (FCNR (B) funds, etc) which can be deployed for augmenting rupee resources. While determining the tolerance levels, the banks may take into account all relevant factors based on their asset-

liability base, nature of business, future strategy etc.

In order to enable the banks to monitor their short-term liquidity on a dynamic basis over a time horizon spanning from 1-90 days, banks may estimate their short-term liquidity profiles on the basis of business projections and other commitments.

Interest rate risk management

Deregulation of interest rates has exposed the banks to the adverse impact of interest rate risk. Interest rate risk means changes in the interest income and value of assets/liabilities due to changes in the rate of interest. IRR has potential impact on NII or NIM and net asset values.

Interest rate risk is the risk where unexpected change in the market interest rate may impact on the Net Interest Income (NII) or Net Interest Margin (NIM). Any mismatches in the cash flows (fixed assets or liabilities) or repricing dates (floating assets or liabilities), expose bank's NII or NIM to variations. A long term impact of changing interest rates is on bank's Market Value of Equity (MVE) or Net Worth as the economic value of bank's assets, liabilities and off-balance sheet positions get affected due to variation in market interest rates. The

interest rate risk viewed from these two perspectives is known as 'earnings' perspective and 'economic value' perspective respectively.

The risk from the earnings perspective can be measured as changes in the Net Interest Income (NII) or Net Interest Margin (NIM). The earning of assets and cost of liabilities are closely related to market interest rate volatility. Interest rate risk may take the form of:

- **Gap or mismatch risk:** it arises from holding assets and liabilities and off-balance sheet items with different principal amounts, maturing dates or repricing dates, thereby, creating exposure to unexpected changes in the level of market interest rates.
- **Basis risk:** the risk that the interest rate of different assets, liabilities and off-balance sheet items may change in different magnitude is termed as basis risk.
- **Embedded option risk:** significant changes in market interest rates create another source of risk on bank's profitability by encouraging prepayment of cash credit/demand loans/term loans and exercise of call/put options on bond's debentures and/or premature withdrawal of term deposits before their stated maturities.

Effects of changes in interest rates

Gap	Change in Interest rate	Change in Net interest income
Positive	Increase	Increase
Positive	Decrease	Decrease
Negative	Increase	Decrease
Negative	Decrease	Increase
Zero	Increase	Zero
Zero	Decrease	Zero

Source: managing Indian banks- the challenges ahead by vasant c joshi & vinay v joshi

These risks can be measured through different methods such as traditional maturity gap analysis (to measure the interest rate sensitivity of earnings), duration gap analysis (to measure interest rate sensitivity of capital), simulation, and value at risk (VaR) in combination or hybrid form. Before interest rate risk could be managed, they should be identified and quantified.

The gap or mismatch risk can be measured by calculating gaps over different time intervals as at a given date. Gap analysis measures mismatches between rate sensitive liabilities and rate sensitive assets (including off-balance sheet positions). An asset or liability is normally classified as rate sensitive if:

- i. Within the time interval under consideration, there is a cash flow;
- ii. The interest rate resets/reprices contractually during the interval;

- iii. The RBI changes the interest rates (i.e. interest rates on savings bank deposits, DRI advances, export credit, refinance, CRR balance, etc.) in cases where interest rates are administered; and
- iv. It is contractually prepayable or withdrawable before the stated maturities.

Gap analysis

The gap report should be generated by grouping rate sensitive liabilities, assets and off-balance sheet positions in to time buckets according to residual maturity or next repricing period, whichever is earlier. The gaps may be identified in the following time buckets:

- i. 1 to 28 days
- ii. 29 days and up to 3 months
- iii. Over 3 months and up to 6 months
- iv. Over 6 months and up to 1 year
- v. Over 1 year and up to 3 years
- vi. Over 3 years and up to 5 years

vii. Over 5 years.

viii. Non-sensitive.

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.

The gap is the difference between rate sensitive assets (RSA) and rate sensitive liabilities (RSL) for each time bucket. The positive gap indicates that it has more RSAs than RSLs whereas the negative gap indicates that it has more RSLs. The gap reports indicate whether the institution is in a position to benefit from rising interest rates by having a positive gap (RSA.RSL) or whether it is in a position to benefit from declining interest rates by a negative gap (RSL.RSA). The gap can, therefore, be used as a measure of interest rate sensitivity.

The banks can determine the target gap by assessing the percentage change in the NIM that is acceptable to the bank (Δc),

and by forecasting the magnitude and direction of the interest rate change (Δr).

$$\text{Gap} = (\text{Earning asset} \times \text{NIM} \times \Delta c) / \Delta r$$

Duration gap analysis

Duration analysis focuses directly on the market value of equity of the bank where market value represents the present value of the current and expected future income. With this analysis, durations of the assets and liabilities of the bank are computed in order to estimate the effects of changing interest rates on the market values of the assets and liabilities. Once the durations are computed, the effects of changes in interest rates can be measured simply by taking the sum of the changes in the market value of the assets and liabilities.

The term duration is the weighted average maturity based on the present value of the cash flows rather than on the actual cash flows. To calculate the duration of a security, the each of the present values of expected cash flows is multiplied by respective number of years left before that present value is received, these products are summed up and the sum is divided by the present value to get the duration of the security.

Simulation

Simulation technique attempts to overcome the limitations of both static gap and duration measures by computer modeling the bank's interest rate sensitivity. In this technique for measuring

interest rate risk, a bank simulates the performance of its business plans under alternative interest rate scenarios and assesses the resulting volatility in net interest income and other target variables. Thus simulation model provides an effective tool for understanding the risk exposure under variety of interest rate scenarios. The usefulness of the simulation technique thus depends on the structure of the model, validity of assumption, technology support and technical expertise of banks.

Value at risk

Value at risk is defined as an estimate of potential loss in a position or asset/liability or portfolio of assets/liabilities over a given holding period at a given level of certainty. VaR measures risk. It is an estimate of the loss likely to suffer, not the actual loss. VaR measures the probability of loss for a given time period over which the position is held. VaR will change if the holding period of the position changes. The holding period for an instrument/position will depend on liquidity of the instrument/ market. There are three main approaches to calculate value at risk: the correlation method, also known as the variance/ covariance matrix method, historical simulation and Monte Carlo simulation. All three methods require a statement of three basic parameters: holding period, confidence interval and the

historical time horizon over which the asset prices are observed. With the help of VaR, we can say with varying degrees of certainty that the potential loss will not exceed a certain amount. This means that VaR will change with different level of certainty.

Instruments used in ALM

A bank may use a number of financial instruments currently or potentially on its balance sheet in adjusting its assets and liabilities. Most commonly, banks use money market instruments in order to adjust their portfolios. The principal types of assets banks use to alter the interest sensitivity of the entire portfolio include overnight inter bank borrowings, short term treasuries, government agency securities, corporate deposits and repurchase agreements. Some relatively new techniques that can be used by banks to manage their asset liability portfolio include futures, options and swaps.

Conclusion

Asset liability management is the primary concern in today's banking environment. In this paper the historical evolution, growth and recent developments of asset liability management, a prime risk management tool, has been presented. The significance of this concept in particular to Indian banks has been discussed. The paper also presents the RBI guidelines on the implementation of asset liability

management system, liquidity risk management and interest rate risk management.

The mismatches between assets and liabilities leads to liquidity risk and interest rate risk, and managing these two risks is the crux of any ALM system in banks. Different approaches to manage these risks have also been presented in this study. Ever since the initiation of the process of deregulation of the Indian banking system and gradual freeing of interest rates to market forces, and consequent injection of a dose of competition among the banks, introduction of asset liability management becomes an absolute necessity.

Implications of the study

Interest rate risk and liquidity risk are the significant risks in a bank's balance sheet,

which should be regularly monitored and managed. These two aspects should be a key input in business planning process of a bank. ALM is a strategic management tool to manage these two risks faced by banks. Banks manage the risks of asset liability mismatches by matching the assets and liabilities according to the residual maturity, or matching the duration, or by hedging and securitisation.

Future areas of work

The study can be extended to include other risks like credit risk, and foreign exchange risk which will also form a part of ALM. Analytical studies to evaluate the efficiency of ALM and the risk management part of ALM can be undertaken. ALM practices followed by individual banks can be undertaken as a case study.

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