

ASSET-LIABILITY MANAGEMENT IN THE INDIAN BANKS: ISSUES AND  
IMPLICATIONS

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**Abstract**

*The development of the banking system is always associated with the contemporary changes in the economy. The Indian banking industry has undergone a metamorphosis in the last two decades due to changes in the political, economic, financial, social, legal and technological environments. The mind boggling advances in technology and deregulation of financial markets across the countries created new opportunities, tempting banks to enter every business that had been thrown open. The banks are now moving towards universal banking concepts, while adding new channels and a series of innovative product offerings catering to various segments at an attractive price. This makes it imperative for the banks to adopt sophisticated risk management techniques and to establish a link between risk exposures and capital. Effective management of risk has always been the focus area for banks owing to the increasing sophistication in the product range and services and the complex channels that deliver them.. The challenge for the banks is to put in place a risk control system that minimizes the volatility in profit and engenders risk consciousness across the rank and file of the organization. Sound risk management will ensure a healthy bottom line for the bank as risk taken by the bank will be commensurate with return and will be within an approved risk management policy. As all transactions of the banks revolve around raising and deploying the funds, Asset-Liability Management (ALM) gains more significance as an initiative towards the risk management practices by the Indian banks. The present paper discusses the various risks that arise due to financial intermediation and by highlighting the need for asset-liability management; it discusses the Gap Model for risk management.*

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## **Introduction**

As Alan Greenspan, Chairman of the US Federal Reserve observed, 'risk taking is a necessary condition for wealth creation'. Risk arises as a deviation between what happens and what was expected to happen. Banks are no exception to this phenomenon. As a result managements have to create efficient systems to identify, measure and control the risk and asset-liability management (ALM) is just one component of the overall cluster. 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. This freedom has in fact opened the Pandora's Box for the Indian banks as they are now exposed to newer and greater risks. 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. Further, even in the absence of a formal asset-liability management program, the understanding of these concepts is of value to an institution as it provides a truer picture of the risk/reward trade-off in which the institution is engaged (Fabozzi & Kanishi, 1991).

Risk manifest itself in many ways and the risks in banking are a result of many diverse activities, executed from many locations and by numerous people. As a financial intermediary, banks borrow funds and lend them as a part of their primary activity. These intermediation activities, of banks expose them to a host of risks The volatility in the operating environment of banks aggravates the effect of the various risks. Figure 1 depicts various financial risks involved in banking.

## Financial Risks in Banking

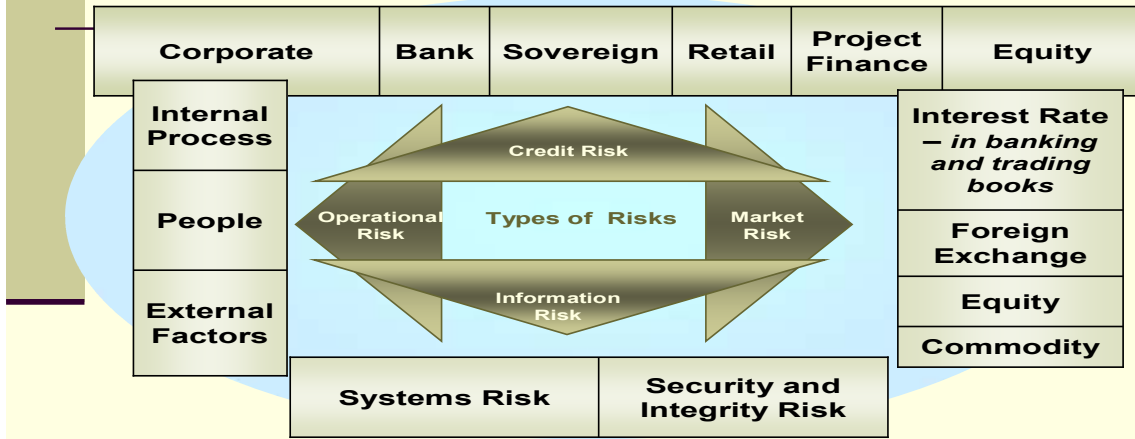


Fig-1

Based on the origin and their nature, risks are classified into various categories. The most prominent financial risks to which the banks are exposed to are:

Interest rate risk - Risk that arises when the interest income/ market value of the bank is sensitive to the interest rate fluctuations.

Foreign Exchange/Currency Risk - Risk that arises due to unanticipated changes in exchange rates and becomes relevant due to the presence of multi-currency assets and/or liabilities in the bank's balance sheet.

Liquidity risk - Risk that arises due to the mismatch in the maturity patterns of the assets and liabilities. This mismatch may lead to a situation where the bank is not in a position to impart the required liquidity into its system - surplus/ deficit cash situation. In the case of surplus situation this risk arises due to the interest cost on the idle funds. Thus idle funds deployed at low rates contribute to negative returns.

Credit Risk - Risk that arises due to the possibility of a default/delay in the repayment obligation by the borrowers of funds.

Contingency risk - Risk that arises due to the presence of off-balance sheet items such as guarantees, letters of credit, underwriting commitments etc. The intermediation activity of the banks exposes them to various risks not by chance but by choice.

There is also a definite linkage between the various risks faced by banks. For example, if the bank charges its client a floating rate of interest, in cases of increasing interest rate

scenario, the bank's interest rate risk will be lower. Consequently, the payment obligation of the borrower increases. Other things remaining constant, the default risk increases if the client is not able to bear the burden of the rising rates. There are many instances where the interest rate risk eventually leads to credit risk. However, of late, the risk has increased substantially due to various factors identified below:

Globalization: Reduction of trade barriers and liberal capital movements has made globalization to stay.

Deregulation: Interest rates and exchange rates have become market determined.

Competition: Competition has multiplied.

Bank Failures – Affecting the financial system

As bank failures are detrimental for the proper functioning of the financial system, world over they are regulated more closely than any other sector. In this process, the objective of the guidelines has been changing over the years forcing the banks to move from reactive risk management practices to proactive risk management practices. Till the seventies, guidelines of most economies shielded the banks from competitive forces. Administered interest rates enabled the banks to lock their spreads in a manner to cover their high operational costs. Regulations of this nature invariably led to market imperfections, which in turn affected the operational efficiency of the banks. Later, during 1970s as the economies began to deregulate, with no proper risk management practices in place, banks had to face the adverse impact of the exposures taken by them. Spreads narrowed as the volatility in the international interest rates enhanced. In an attempt to shore up their earnings, banks adopted aggressive strategies. The resultant mismatches in assets and liabilities and rise in risk levels, led to the bankruptcy of some banks. Against this background, evolved the concept of Asset-Liability Management as a risk management tool.

### **Importance of Risk Management**

Risk management does not aim at risk elimination, but enables the banks to bring their risks to manageable proportions while not severely affecting their income. This balancing

act between the risk levels and profits needs to be well-planned. Apart from bringing the risks to manageable proportions, they should also ensure that one risk does not get transformed into any other undesirable risk. This transformation takes place due to the interlinkage present among the various risks. The focal point in managing any risk will be to understand the nature of the transaction in a way to unbundle the risks it is exposed to. As all transactions of the banks revolve around raising and deploying the funds, Asset-Liability Management gains more significance for them. Asset-liability management is concerned with the strategic management of balance sheet involving the management of risks caused by changes in the interest rates, exchange rates and the liquidity position of the bank. While managing these three risks, forms the crux of the ALM, credit risk and contingency risk also form a part of the ALM. Due to the presence of a host of risks and due to their interlinkage, the risk management approaches for ALM should always be multi-dimensional.

To manage the risks collectively, the ALM technique should aim to manage the volume, mix, maturity, rate sensitivity, quality and liquidity of the assets and liabilities as a whole so as to attain a predetermined acceptable risk/reward ratio. The purpose of ALM is thus, to enhance the asset quality, quantify the risks associated with the assets and liabilities and further manage them. Different risks that banks are exposed to will affect the short-term profits, the long-term earnings and the long-run sustenance capacity of the bank and hence the ALM model should primarily aim to stabilize the adverse impact of the risks on the same. Depending on the primary objective of the model, the appropriate parameter should be selected. The most common parameters for ALM in banks are:

Net Interest Margin (NIM) - The impact of volatility on the short-term profits is measured by NIM, which is the ratio of the net interest income to total assets. Hence, if a bank has to stabilize its short-term profits, it will have to minimize the fluctuations in the NIM.

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 interest rate fluctuations. The target account will thus be MVE. In the case of unlisted

banks, the difference between the market value of assets and liabilities will be the target account.

*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 in fact assesses the sustenance capacity of the bank. Stabilizing this account will generally come as a statutory requirement. While targeting any one parameter, it is essential to observe the impact on the other parameters also. It is not possible to simultaneously eliminate completely the volatility in both income and market value. Thus, ALM is a critical exercise of balancing the risk profile with the long/short term profits as well as its long-run sustenance.

## **Objectives of the Study**

Though Basel Capital Accord and subsequent RBI guidelines have given a structure for ALM in banks, the Indian Banking system has not enforced the guidelines in total. The banks have formed ALCO as per the guidelines; but they rarely meet to take decisions. Public Sector banks are yet to collect 100% of ALM data because of lack of computerization in all branches. With this background, this research aims to find out the status of Asset Liability Management in the commercial banks working in India with the help the available secondary data on the subject matter. The study has following objectives to explore:

- To define the asset and liabilities in the light of RBI's Basel-II Norms.
- To study the behavior of Indian Banks in terms of nature and strengths of relationship between Assets and Liability.
- To find out the component of Assets explaining variance in Liability and vice versa
- To study the impact of ownership over Asset Liability management in Banks
- To study impact of ALM on the profitability of bank.

## **The Study**

Asset Liability Management is a risk management technique and an 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. Thus a general perspective of ALM can be laid out as - ALM is

- A hierarchy (*to execute the process*)
- A process (*to track, report and monitor risk management*)
- A tool (*to analyze relevant data*)
- A technique (*to measure risk and suggest alternatives*)
- A repository (*a versatile data warehouse*)
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### **ALM initiative in India**

Reserve Bank of India has made mandatory for banks with effect from 2002 – 03

- ♦ To form ALCO (Asset-Liabilities Committee) as a committee of the Board of Directors
- ♦ To track, monitor and report ALM

### **Indian Scenario**

While most of the banks in other economies began with strategic planning for asset liability management as early as 1970, the Indian banks remained unconcerned about the same. Till eighties, the Indian banks continued to operate in a protected environment. In fact, the deregulation that began in international markets during the 1970s almost coincided with the nationalization of banks in India during 1969. Nationalization brought a structural change in the Indian banking sector. Wholesale banking paved the way for retail banking and there has been an all-round growth in branch network, deposit mobilization and credit disbursement. The Indian banks did meet the objectives of nationalization, as there was overall growth in savings, deposits and advances. But all this was at the cost of profitability of the banks. Quality was subjugated by quantity, as loan sanctioning became a mechanical process rather than a serious credit assessment decision. Political interference has been an additional malady.

## **Paradigm Shift**

As the real sector reforms began in 1992, the need was felt to restructure the Indian banking industry. The reform measures necessitated the deregulation of the financial sector, particularly the banking sector. The initiation of the financial sector reforms, brought about a paradigm shift in the banking industry. The Narasimham Committee report on the banking sector reforms highlighted the weaknesses in the Indian banking system and suggested reform measures based on the Basle norms. The guidelines that were issued subsequently laid the foundation for the reformation of Indian banking sector. The deregulation of interest rates and the scope for diversified product profile gave the banks greater leeway in their operations. New products and new operating styles exposed the banks to newer and greater risks. Though the types of risks and their dimensions grew, there was not much being done by the banks to address the situation.

At this point, the Reserve Bank of India, the chief regulator of the Indian banking industry, has donned upon itself the responsibility of initiating risk management practices by banks. Moving in this direction, the RBI announced the prudential norms relating to Income Recognition, Asset Classification and Provisioning and the Capital Adequacy norms, for the banks. These guidelines ensured that the Indian banks followed international standards in risk management. The Prudential norms and the Capital Adequacy norms are expected to ensure safety and soundness of the banks. On a closer observation, these norms however, tackle the risks at a macro level. The capital and the provisions serve as a cushion to the banks and ensure that they sustain in the long run. But, banks do face risks in their day-to-day transactions, which alter their assets and liabilities on a continuous basis. The developments that have taken place since liberalization have further led to a remarkable transition in the risk profile of the financial intermediaries. The changes in the profile of the sources and uses of funds are reflected in the borrower's profile, the industry profile and the exposure limits for the same, interest rate structure for deposits and advances, etc. This not only has led to the introduction of discriminate pricing policies, but has also highlighted the need to match the maturities of the assets and liabilities.



The main reasons for the growing significance of ALM are volatility in operating environment, product innovations, regulatory prescriptions, enhanced awareness of top management, high percentage of the non-performing loans in India attributed to the stringent asset classification norms, which the Indian banks follow. Asset Liability Management is strategic balance sheet management of risks caused by changes in the interest rates, exchange rates and the liquidity position of the bank. To manage these risks, banks will have to develop suitable models based on its product profile and operational style. Ironically, many Indian banks are yet not ready to take the required initiative for this purpose. Though the reasons for such lack of initiative are varied, one important reason can be that the management of the banks has so far been in a protected environment with little exposure to the open market. It was lack of technology and inadequate MIS, which prevented banks from moving towards effective ALM. The apathy on the part of the banks made it imperative for the RBI to step in and push the process.

### **Basel II Accord: Impact On Indian Banks**

The New Basel Capital Accord, often referred to as the Basel II Accord or simply Basel II, was approved by the Basel Committee on Banking Supervision of Bank for International Settlements in June 2004 and suggests that banks and supervisors implement it by beginning 2007, providing a transition time of 30 months. It is estimated that the Accord would be implemented in over 100 countries, including India. Basel II takes a three-pillar approach to regulatory capital measurement and capital standards – *Pillar 1 (minimum capital requirements)*: It spells out the capital requirement of a bank in relation to the credit risk in its portfolio, which is a significant change from the “one size fits all” approach of Basel I. Pillar 1 allows flexibility to banks and supervisors to choose from among the Standardized Approach, Internal Ratings Based Approach, and Securitization Framework methods to calculate the capital requirement for credit risk exposures. Besides, Pillar 1 sets out the allocation of capital for operational risk and market risk in the trading books of banks.

Pillar 2 (supervisory oversight): It provides a tool to supervisors to keep checks on the adequacy of capitalization levels of banks and also distinguish among banks on the basis of their risk management systems and profile of capital. Pillar 2 allows discretion to supervisors to

- (a) link capital to the risk profile of a bank;
- (b) take appropriate remedial measures if required; and
- (c) Ask banks to maintain capital at a level higher than the regulatory minimum.

Pillar 3 (market discipline and disclosures): It provides a framework for the improvement of banks' disclosure standards for financial reporting, risk management, asset quality, regulatory sanctions, and the like. The pillar also indicates the remedial measures that regulators can take to keep a check on erring banks and maintain the integrity of the banking system. Further, Pillar 3 allows banks to maintain confidentiality over certain information, disclosure of which could impact competitiveness or breach legal contracts. It provides a framework for the improvement of banks' disclosure standards for financial reporting, risk management, asset quality, regulatory sanctions, and the like.

### **Approach of the Reserve Bank of India to Basel II Accord**

The Reserve Bank of India (RBI) has asked banks to move in the direction of implementing the Basel II norms, and in the process identify the areas that need strengthening. In implementing Basel II, the RBI is in favour of gradual convergence with the new standards and best practices. The aim is to reach the global best standards in a phased manner, taking a consultative approach rather than a directive one. RBI has also specified that the migration to Basel II will be effective March 31, 2007 and has suggested that banks should adopt the new capital adequacy guidelines and parallel run effective April 1, 2006. Over time, when adequate risk management skills have developed, some banks may be allowed to migrate to the Internal Ratings Based approach for credit risk measurement.

**Standardized approach as suggested by RBI may not significantly alter Credit Risk measurement for Indian banks**

In the Standardized approach proposed by Basel II Accord, credit risk is measured on the basis of the risk ratings assigned by external credit assessment institutions; primarily international credit rating agencies like Moody's Investors Service (refer Table 1). This approach is different from the one under Basel I in the sense that the earlier norms had a "one size fits all" approach, i.e. 100% risk weight for all corporate exposures. Thus, the risk weighted corporate assets measured using the standardized approach of Basel II would get lower risk weights as compared with 100% risk weights under Basel I. Basel II gives a free hand to national regulators (in India's case, the RBI) to specify different risk weights for retail exposures, in case they think that to be more appropriate. To facilitate a move towards Basel II, the RBI has also come out with an indicative mapping of domestic corporate long-term loans and bond credit ratings against corporate ratings by international agencies like Moody's Investor Services (refer Table 2).

Going by this mapping, the impact of the lower risk weights assigned to higher rated corporate would not be significant for the loans & advances portfolio of banks, as these portfolios mainly have unrated entities, which under the new draft guidelines continue to have a risk weight of 100%. However, given the investments into higher rated corporate in the bonds and debentures portfolio, the risk weighted corporate assets measured using the standardized approach may get marginally lower risk weights as compared with the 100% risk weights assigned under Basel I. For retail exposures—which banks in India are increasing focusing on for asset growth—RBI has proposed a lower 75% risk weights (in line with the Basel II norms) against the currently applicable risk weights of 125% and 100% for personal/credit card loans, and other retail loans respectively. For mortgage loans secured by residential property and occupied by the borrower, Basel II specifies a risk weight of 35%, which is significantly lower than the RBI's draft prescription of 75% (if margins are 25% or more) and 100% (if margins <25%).

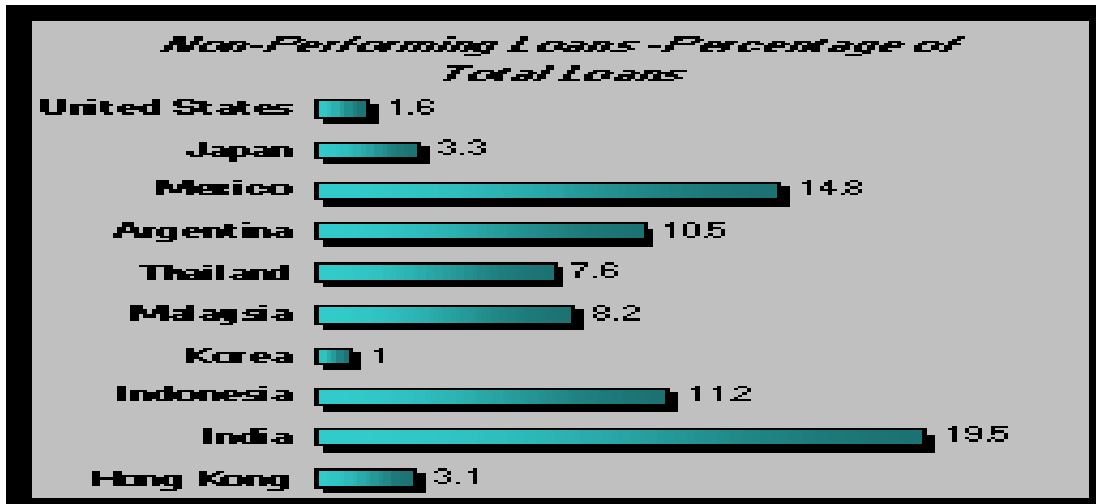
Given mortgage loan portfolio collateralized on residential property and the current credit guidelines of majority of banks giving housing loans with 20% margins, we estimate that

the risk weight applicable would be 100%. The risk weights would decline over time to 75% for residential mortgage loans, as the mortgage loan is repaid and (if) the market price of property appreciates. Most of the banks have a large short-term portfolio in cash credit, overdraft and working capital demand loans, which are currently unrated, and carry a risk weight of 100%. Similarly, in the investment portfolio the banks have short-term investments in commercial papers, which also currently carry 100% risk weight. The RBI's draft capital adequacy guidelines also provides for lower risk weights for short term exposures, if these are rated on the ICRA's short term rating scale .ICRA expects the banks to marginally benefit from these short-term credit risk weight guidelines, given the small investments in commercial papers (which are typically rated in A1+/A1 category). The banks can drive maximum benefit from these proposed short-term credit risk weights, in case they were to get short-term ratings for the short-term exposure such as cash credit, overdraft and short term working capital demand loans.

### **An Illustration**

A typical bank portfolio has an exposure to retail loans, mortgage loans, personal/credit card loans, corporate loans, cash credit, working capital demand loans, corporate bonds and commercial papers. For illustration, we have considered a bank with exposures to these loans segments and applied the current and new risk weights (under Basel II). Typically, a bank's corporate loan portfolio including cash credit and working capital demand loans has mostly unrated exposures. External ratings are used more in the investment portfolio, for investing in debentures, bonds, and commercial paper (typically A1+/A1), lowering the proportion of unrated exposures. Thus, implementation of Basel II would result in a marginally lower credit risk weights and a marginal release in

regulatory



capital needed for credit risk. As a result, we expect for most banks, Basel II would result in reduction in regulatory credit risk weights. However, if the banks were to significantly increase their retail exposures or get external ratings for the short-term exposures (cash credit, overdraft and working capital demand loans), the credit risk weights could decline significantly.

### **Operational Risk Capital allocation would be a drag on capital for Indian banks**

Basel II has indicated three methodologies for measuring operational risk:

- Basic Indicator Approach;
- Standardized Approach; and
- Advanced Measurement Approach (AMA).

RBI has clarified that banks in India would follow the Basic Indicator Approach to begin with. Subsequently, only banks that are able to demonstrate better risk management systems would be asked to migrate to the Standardised Approach and AMA. Internationally, in the US, as various papers indicate, very few banks would eventually migrate to AMA, whereas in the EU, regulators have stated that they would make AMA mandatory for banks under their jurisdiction. The Basic Indicator approach specifies that banks should hold capital charge for operational risk equal to the average of the 15% of annual positive gross income over the past three years, excluding any year when the gross income was negative. Gross income is defined as net interest income and non-interest income, grossed up for any provisions, unpaid interests and operating expenses (such as

fees paid for outsourced services). It should only exclude treasury gains/losses from banking book and other extraordinary and irregular income (such as income from insurance). ICRA has estimated the capital that Indian banks would need to meet the capital charge for operational risk.

In ICRA's estimates, Indian banks would need additional capital to the extent of Rs. 120 billion to meet the capital charge requirement for operational risk under Basel II. Most of this capital would be required by the public sector banks (Rs. 90 billion), followed by the new generation private sector banks (Rs. 11 billion), and the old generation private sector bank (Rs. 7.5 billion). In ICRA's view, given the asset growth witnessed in the past and the expected growth trends, the capital charge requirement for operational risk would grow 15-20% annually over the next three years, which implies that the banks would need to raise Rs. 180-200 billion over the medium term.

### **Impact of providing capital for Operational Risk on the tier-I capital of specific banks**

ICRA has estimated the regulatory capital after providing capital for the operational risk for the large public and private sector banks. Many of the public sector banks, namely Punjab National Bank, Bank of India, Bank of Baroda and Dena Bank, besides private sector banks like UTI Bank have announced plans to raise equity capital in the current financial year, which would boost their tier I capital.

Thus, implementation of Basel II is likely to improve the risk management systems of banks as the banks aim for adequate capitalization to meet the underlying credit risks and strengthen the overall financial system of the country. In India, over the short term, commercial banks may need to augment their regulatory capitalization levels in order to comply with Basel II. However, over the long term, they would derive benefits from improved operational and credit risk management practices.

### **ALM: The Rising Need**

#### ■ Macro Level:

Formulation of critical business policies  
Efficient allocation of capital  
Designing of products with appropriate pricing strategy

■ Micro Level:

Profitability through *price matching*  
Liquidity through *maturity matching*

**Objectives of ALM**

- ◆ Business intelligence objectives
  - Monitoring of asset-liability portfolio and the tolerance level
  - Early alerts on ALM position and risk profile
  - Localization of concern areas
  - Modern tools to address concern areas
- ◆ Compliance objectives
  - Strategy and direction by asset liability committee (ALCO)
  - Returns to be filed with central bank

**Strategy**

- ALM aims at profitability through price matching
- Price matching maintains spreads by ensuring that the deployment of liabilities will be at a rate more than the costs
- It ensures liquidity by means of Maturity matching
- “Maturity Matching” is done by grouping both assets and liabilities based on their maturity profiles. It ensures liquidity

**Basis of ALM**

- Traditional system of Accrual Accounting in Banks
- The method disguised possible risks arising from how the assets and liabilities were structured

**Example**

- Saral Bank borrows Rs 100 mn for 1 yr @ 6.00% p.a. and lends to Reputation Ltd. for 5 yrs @ 6.20% p.a.
- Gain (seemingly): 20 bps
- Risk entailed in transaction: borrow again at the end of 1 yr to finance the loan which still has 4 more yrs to mature
- Interest rate for 4 yrs maturity at the end of 1 yr: 7.00% p.a.
- – What happens??
- Earn – 6.20% p.a. & Pay – 7.00% p.a.!!
- Accrual method of accounting
- Asset =  $100 \times (1.062) = \text{Rs } 106.2 \text{ mn}$
- Liability =  $100 \times (1.060) = \text{Rs } 106 \text{ mn}$
- Earnings =  $106.2 - 106 = \text{Rs } 0.2 \text{ mn}$
- Market Value method of accounting
- Asset =  $100 \times (1.062)^5 / (1.070)^4 = 96.72 \text{ mn}$
- Liability =  $100 \times (1.060) = \text{Rs } 106 \text{ mn}$
- Loss = Rs 9.28 mn
- Root cause of problem – Mismatch between Assets & Liabilities

### ALM Components

- *Liability management* – involves management policy actions to influence deposits and non deposits (money market) liabilities of the bank.
- It incorporates –
  - ❖ Determining the amount of funds needed.
  - ❖ Obtaining the funds at lowest possible cost with the least risk exposure.
- *Asset management* – comprises selection of best investment alternatives (loans, advances, investments, fixed assets) that promise the highest rate of return for the level of risk that a bank management is prepared to assume.
- Finding an appropriate balance between profitability and liquidity consideration is the main objective.



## **ALM Framework**

The framework of ALM revolves round 3 Pillars:

ALM Organization (ALCO) Asset Liability Committee - ALCO is a decision making unit responsible for balance sheet planning from a risk return perspective including strategic management of interest and liquidity risk. To ensure commitment of the Top Management and timely response to market dynamics, the CEO/CMD/President or the ED should head the Committee.

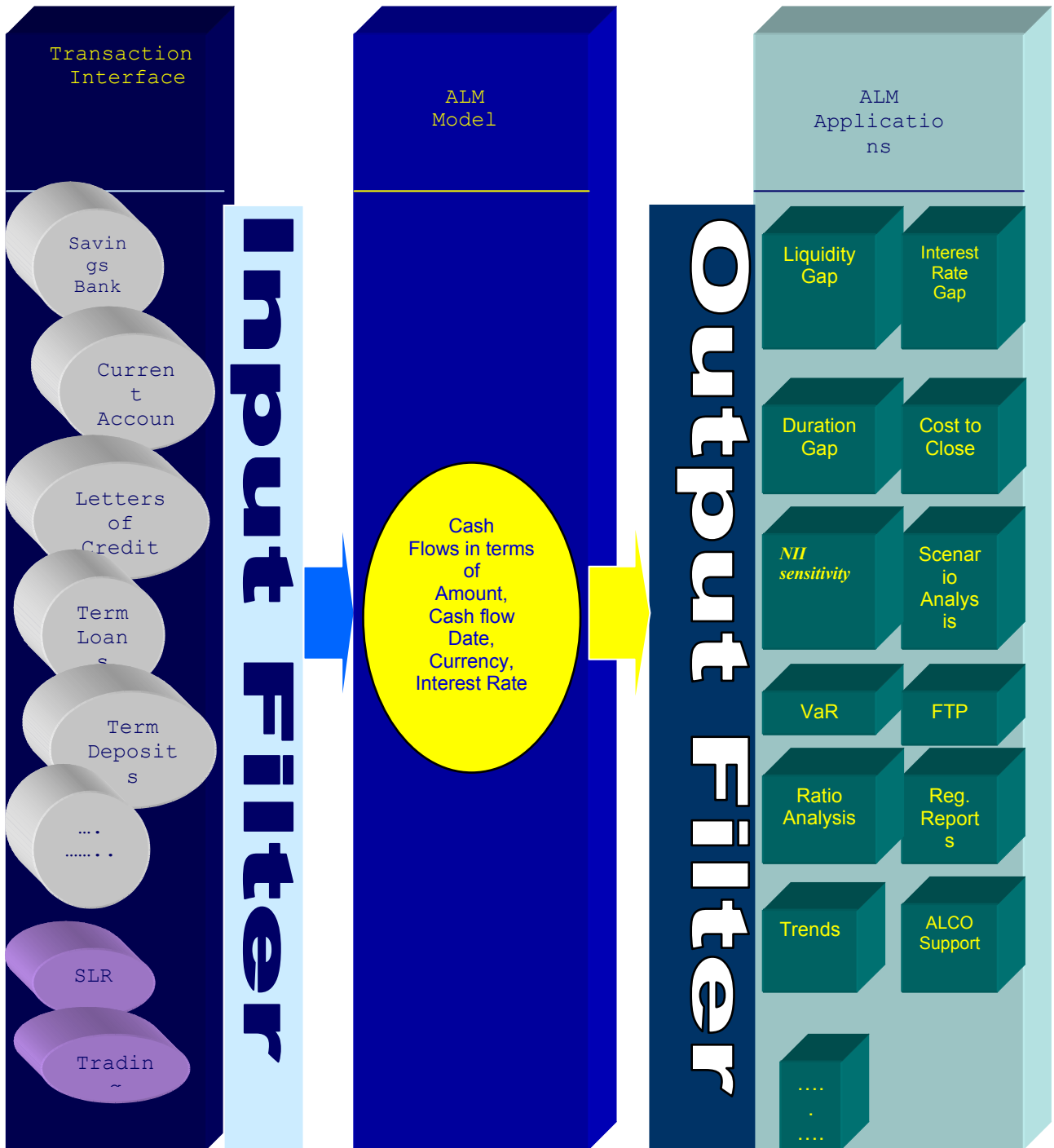
ALM Information System- It is responsible to collect information accurately, adequately and expeditiously. ALM has to be supported by a management philosophy that clearly specifies the risk policies and tolerance limits. The framework needs to be built on sound methodology with necessary supporting information system, as the central element of the entire ALM exercise is the availability of adequate and accurate information with expedience.

ALM Process- The basic ALM process involves risk identification, risk measurement, risk management risk policies and tolerance levels. The steps involved in ALM are:

- Review interest rate structure
- Compare the same to interest/product pricing of both assets and liabilities
- Examine loan & investment portfolios in the light of foreign exch. risk and liquidity
- Examine probability of credit and contingency risk
- Review actual performance against projections made.

## **Techniques to measure ALM Risk**

- Traditional Method
  - Gap Analysis (as shown in the figure below)
- Sophisticated Techniques
  - Duration Analysis
  - Simulation Exercises
  - Value at risk Method



**Gap Analysis** -This model looks at reprising gap that exists between the interest revenue earned on the bank's assets and the interest paid on its liabilities over a particular period of time (Saunders, 1997). The various steps involved are:

- Various assets and liabilities grouped under various time buckets based on the residual maturity of each item or the next repricing date, if on floating rate, whichever is earlier.
- Then the gap between the assets and liabilities under each time bucket is worked out.
- Assets and liabilities subject to repricing within a year are RSA and RSL
- Only rate sensitive assets (RSAs) and Risk Sensitive Liabilities (RSLs) are considered.

The gap is identified as:

- $RSA - RSL$  (rate sensitive assets minus rate sensitive liabilities).
- Positive gap occurs when  $RSA > RSL$ . If interest rates rise (fall), bank NIMs or profit will rise (fall). The reverse happens in the case of a negative gap where  $RSA < RSL$ .
- Based on this gap position and strategy is worked out to maximize the NII.

The decision to hold a positive gap or a negative will depend on the expectation on the movement of interest rates.

GAP Position	Change in Interest Rates	Change in Interest income	Change in Interest expenses	Change in NII
Positive	Increase	Increase	Increase	Increase
Positive	Decrease	Decrease	Decrease	Decrease
Negative	Increase	Increase	Increase	Decrease
Negative	Decrease	Decrease	Decrease	Increase
Zero	Increase	Increase	Increase	None
Zero	Decrease	Decrease	Decrease	None

### Price Matching

Aims to maintain spreads by ensuring that the deployment of liabilities will be at a rate higher than the costs

(Rs crore)								
Table 1				Table 1 (Rearranged)				
Liabilities		Assets		Liabilities		Assets		Spread
Amount	Rate	Amount	Rate	Amount	Rate	Amount	Rate	
15	0	10	0	10	0	10	0	0
25	5	20	12	5	0	5	12	7
30	12	50	15	15	5	15	12	12
30	13	20	18	10	5	10	15	10
				30	12	30	15	3
				10	13	10	15	2
				20	13	20	18	5
100	8.75	100	13.5	100	8.75	100	13.5	4.75

### Maturity Matching

Aims at maintaining liquidity by grouping assets/liabilities based on their maturing profiles. The gap is then assessed to identify future financing requirements

(Rs. Cr.) (Period in months)							
Table 2				Table 2 (Rearranged)			
Liabilities	Maturing in	Assets	Maturing in	Liabilities	Assets	Gap	Cumul. Gap
10	1	15	<1	10	15	-5	-5
5	3	10	3	5	10	-5	-10
8	6	5	6	8	5	3	-7
4	12	10	12	4	10	-6	-13
45	24	30	24	45	30	15	2
20	36	10	36	20	10	10	12
8	>36	20	>36	8	20	-12	0
100		100		100	100		

### Maturity Gap Method

- To see the effect of rate changes on Net Interest Income (NII)
- Rate Sensitive Gap (RSG) = RSA - RSL
- Use the gap to maintain/improve the NII:
  - ❖ If RSG is positive : Direct relationship between NII and rate movement
  - ❖ If RSG is negative : Inverse relationship between NII and rate movement

- ❖ If RSG is zero – No effect on NII (No speculative gain too)

NII is said to be immunized if RSG = Zero

- Impact of change in interest rates on NII:

$$\Delta NII = \text{Gap} * \Delta r$$

- More importantly, identify the target gap for given forecast of rate change:

$$\text{Gap} = (\text{Earning Assets} * \text{NIM} * \Delta c) / \Delta r$$

where,

Earning assets = Total assets of the bank

NIM = Net Interest Margin

$\Delta c$  = Acceptable change in NIM

$\Delta r$  = Expected change in interest rates

### **Limitations**

- Accuracy level of forecasts
- Gap management is a difficult task
- Ignores the time value of money
- Assumption of same effect on all assets and liabilities

### **Rate Adjusted Gap Method**

- The RSAs and RSLs are adjusted by assigning weights based on the estimated change in the rate for the different assets/liabilities for a given change in interest rates
- Rate Adjusted Gap = Weighted RSA – Weighted RSL
- Rest same as Maturity Gap approach

### **Duration Analysis**

Duration is an important measure of the interest rate sensitivity of assets and liabilities as it takes into account the time of arrival of cash flows and the maturity of assets and liabilities. It is the weighted average time to maturity of all the present values of cash flows. Duration basically refers to the average life of the asset or the liability.

$$DP / p = D ( dR / 1+R)$$

The above equation describes the percentage fall in price of the bond for a given increase in the required interest rates or yields. The larger the value of the duration, the more sensitive is the price of that asset or liability to changes in interest rates. As per the above equation, the bank will be immunized from interest rate risk if the duration gap between assets and the liabilities is zero. The duration model has one important benefit. It uses the market value of assets and liabilities.

### **Value at Risk**

Refers to the maximum expected loss that a bank can suffer over a target horizon, given a certain confidence interval. It enables the calculation of market risk of a portfolio for which no historical data exists. It enables one to calculate the net worth of the organization at any particular point of time so that it is possible to focus on long-term risk implications of decisions that have already been taken or that are going to be taken. It is used extensively for measuring the market risk of a portfolio of assets and/or liabilities.

### **Other techniques**

- *Hedging* – Use of derivative instruments, especially when there is a maturity mismatch or when forecasting is difficult
- *Sensitivity Analysis* – Assessing sensitivities and then regrouping the assets/liabilities
- *Simulation and Game Theory* – Forecasting future trends and simulating the short/medium/long term implications of the same
- *Monte Carlo Simulation* - Assures the probability of risk statistically. The name is derived from the casino city in France, where the probability of roulette winning chances was first computed by this technique.
- *Earnings at Risk* - Assures the quantum of earnings susceptible to interest rate fluctuations as against fixed interest rate commitments.

**A Diagrammatic Representation of ALM as a Risk Management Tool for Central Bank of India(CBI)**



The different ALM and risk management functions that are currently implemented at CBI include: Risk parameters ,Risk identification ,Risk measurement ,Risk management and Risk policies and tolerance levels.

**Benefits to CBI**

- Various analysis and strategies can be simulated, both at the branch level and enterprise-wide, all over the bank
- Automated data transfer from the bank's disparate legacy systems to the ALM application. System controls instituted for data consistency, accuracy and completeness. Checks with alerts and reminders
- Platform independent and scalable. Configuration of new business lines, heads of accounts or addition of new branches can be done by the bank staff themselves. Vendor support is not required
- Highly modular and parameterized in design, enabling ease of maintenance by the bank
- Extensive reporting capabilities: operational, statistical and user-customized

### **ALM Solution – Pinnacle**

ICICI Infotech's product PINNACLE provides various analytical tools that enable active asset liability management to ensure they stay balanced over time, maximize profitability, thus providing prudent capital adequacy.

- Facilitates identification of sources of risk and their measurement.
- Deals with profitability and growth management.
- Offers a variety of powerful, risk evaluation, and analytical utilities that enable strategic planning and decision-making.

### **Findings**

Implementation of Basel II is likely to improve the risk management systems of banks as the banks aim for adequate capitalisation to meet the underlying credit risks and strengthen the overall financial system of the country. In India, over the short term, commercial banks may need to augment their regulatory capitalisation levels in order to comply with Basel II. However, over the long term, they would derive benefits from improved operational and credit risk management practices.

- Among all groups, SBI & Associates have best asset- liability maturity pattern.
- They have the best correlation between assets and liabilities.
- Other than Foreign Banks - all other banks can be called liability managed banks.
- They all borrow from money market to meet their maturing liabilities.
- Across all banks Fixed Asset and Net Worth are highly correlated.
- All banks have proportionate Net worth and investment in Fixed Asset.
- Private banks are aggressive in profit generation e Banks have better Net Profit Margin and. Return on Net worth.
- Private Banks have greater equity multiplier than public sector banks, which reflects extra leverage that they have.
- After 2002, public sector banks are catching up with private banks.



## **ALM implementation – problems in banks**

*Policy:* Lack of a coherent, documented and practical policy is a big hindrance to ALM implementation. Most often, ALCO membership itself may not be aware of implications of risks being measured and impact.

*Understanding of complexities:* Many people in a bank need to understand risk measurements and risk mitigation procedures. Measurement of risk is a fairly simple phenomenon and does go on regardless. Failures inevitably occur due to lack of understanding, coupled with a feeling that top management knows all that there is in banking.

*Organisation and culture:* Risk organization in banks generally land up reporting to treasury, as they are people who come closest to understanding complex financial instruments. The fact that they are a business unit, in charge of 'risk taking' is overlooked. 'Risk Taking' and 'Risk management' are generally two distinct parts of any organization and both must report to a board completely independently. Openness and transparency are essential to a proper risk organization. Most organizations react badly to positions going wrong by taking more risks and enter a vicious cycle of risks. Thus, it is required that banks follow policy in both letter and spirit.

*Data and models:* Data may not be available at all times in requisite format. It must be remembered that many data items are assumptions and gaps must be measured in perspective. However, in modern banking, it is mapping of models to zero coupon bonds that are an issue. Once again, arguments are that this should exist within the bank. Based on sophistication required, multiple models may be used to validate this conversion. This is strictly outside ALM framework but integrates into ALM framework.

*Unrealistic goals:* A zero gap is not practical. Returns are expected for taking risks. Banks assume market and credit risk and hence they make returns. ALCO's job is to correctly determine positions and put in place appropriate remedial measures using appropriate risks. It is not to show things as good when they are not

### **Suggestions**

1. Interest rate risk and liquidity risks are 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.
2. Banks should make sure that increased balance sheet size should not result in excessive asset liability mismatch resulting in volatility in earnings.
3. There should be proper limit structures, which should be monitored by Asset Liability Management Committee (ALCO) on a regular basis. Do involve all ALCO members in decisions. Some functional heads may not be interested. It is best to have someone as a salesman for ALCO to sell ideas, how important these ideas are to implement central systems for better benefits for bank.

4. The effectiveness of ALM system should be improved with a good Fund Transfer Pricing system.
5. Have a younger person, enthusiastic in nature as ALCO secretary. This person is responsible for all pre-ALCO analysis and distribution of ALM reports to relevant people.
6. Do not deliberate a lot over non-term product distribution. It is anyway a probabilistic cash flow. Worry more about systems in place to constantly review this.
7. ALM sheet item granularity depends on distribution for non-term products. For example, 'savings bank' may be one heading or 'savings bank – salaries' could be the level at which distribution of volatility differs. Thus, discuss these items beforehand.
8. Define functional objectives completely before starting this project. Do not keep tampering with it.
9. Senior management may refer to well known books on this subject to get a quick revision.
10. Do not over-engineer your ALM sheet. Let it evolve.
11. Results of ALM are visible over a couple of years. Keep measuring what is required.

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**ASSET-LIABILITY MANAGEMENT IN THE INDIAN BANKS:**  
**ISSUES AND IMPLICATIONS**

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