

**International Journal of Computing and Business Research
(IJCBR)**

**ISSN (Online) : 2229-6166
Volume 4 Issue 2 May 2013**

**RISK MANAGEMENT IN BANKS (ASSETS AND LIABILITY
MANAGEMENT)**

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Abstract: Over the last few years the Indian financial markets have witnessed wide ranging changes at fast pace. 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, has brought pressure on the management of banks to maintain a good balance among spreads, profitability and long-term viability. These pressures call for structured and comprehensive measures and not just ad hoc 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 risks. This paper lays down broad view in respect of interest rate and liquidity risks management systems in banks which form part of the Asset-Liability Management

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(ALM) function. The initial focus of the ALM function would be to enforce the risk management discipline viz. managing business after assessing the risks involved. The objective of this paper is to assessment of the measurement and management of risk management in banks.

The ALM process rests on three pillars:

- ALM information systems:

- => Management Information System

- => Information availability, accuracy, adequacy and expediency.

- ALM organization:

- => Structure and responsibilities.

- => Level of top management involvement.

- ALM process:

- => Risk parameters

- => Risk identification

- => Risk measurement

- => Risk management

- => Risk policies and tolerance levels.

ALM information systems

Information is the key to the ALM process. Considering the large network of branches and the lack of an adequate system to collect information required for ALM which analyses information on the basis of residual maturity and behavioural pattern it will take time for banks in the present state to get the requisite information. The problem of ALM needs to be addressed by

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following an ABC approach i.e. analysing the behaviour of asset and liability products in the top branches accounting for significant business and then making rational assumptions about the way in which assets and liabilities would behave in other branches. In respect of foreign exchange, investment portfolio and money market operations, in view of the centralized nature of the functions, it would be much easier to collect reliable information. The data and assumptions can then be refined over time as the bank management gain experience of conducting business within an ALM framework. The spread of computerization will also help banks in accessing data.

ALM organization

- a)** 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.
- b)** 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.
- c)** 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

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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.

Composition of ALCO

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The size (number of members) of ALCO would depend on the size of each institution, business mix and organisational complexity. To ensure commitment of the Top Management, the CEO/CMD or ED should head the Committee. The Chiefs of Investment, Credit, Funds Management / treasury (forex and domestic), International Banking and Economic Research can be members of the Committee. In addition the Head of the Information Technology Division should also be an invitee for building up of MIS and related computerization. Some banks may even have sub-committees.

Committee of Directors

Banks should also constitute a professional Managerial and Supervisory Committee consisting of three to four directors which will oversee the implementation of the system and review its functioning periodically.

ALM process:

The scope of ALM function can be described as follows:

- Liquidity risk management
- Management of market risks
(Including Interest Rate Risk)
- Funding and capital planning
- Profit planning and growth projection
- Trading risk management

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The paper mainly addresses Liquidity , Interest Rate and foreign exchange risks.

Liquidity Risk (Measurement and Management): Dimensions of Liquidity Risk

- Funding risk: unanticipated withdrawals/non renewal of deposits (wholesale/retail)
- Time risk: need to compensate for non receipt of expected inflow performing assets turning into NPAs
- Call Risk: Due to crystallization of contingent liabilities and unable to undertake profitable business opportunities when desirable.

Symptoms: Offering higher rate of interest on deposits

- Delayed payment of matured proceeds
- Delayed disbursement to borrowers against committed lines of credit
- Deteriorating asset quality
- Large contingent liabilities
- Net deposit drain
- Regulatory Requirements
 - CRR / SLR
 - Call Money Borrowings prescriptions / limits
 - ALM Guidelines
 - Host country prescriptions
 - Overseas Offices of Indian Banks

Factors leads to Liquidity Risk ?

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- Lack of Coordination between Credit Administration Department and Treasury i.e. over extension of credit
- Central bank's action (CRR/ SLR)
- Central / State Government Borrowings (preemption)
- High level of NPAs and Poor asset quality
- Mismanagement
- Hot Money
- Non recognition of embedded option risk
- Reliance on few wholesale depositors
- Large undrawn loan commitments
- Lack of appropriate liquidity policy and contingent plan.

Factors may helpful to reducing Liquidity Risk

- Availability of Refinance
- LAF Facility
- Open Market Operations
- CBLO

Liquidity Risk - Measurement

- Two methods can be employed:
 - Stock approach - Employing ratios
 - Flow approach - Time bucket analysis

• Stock approach

Key Ratios are:

- Loan to Asset Ratio

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- Loan to Core Deposits
- Large liabilities less Temporary investments to Earning assets less temporary investments
- Purchased Funds to Total Assets
- Loan losses/net loans
- Liquidity Ratios

Liquidity Risk Management

- Liquidity Management Policy
- Funding strategy
- Liquidity planning under alternative scenarios
- Prudential limits
- Liquidity reporting
- Review.

Cash Flow Approach

- (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.
- (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

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respective time buckets in order to recognise the cumulative impact on liquidity.

Tools for Measuring and Managing funding requirements

- Use of maturity ladder
- Calculation of cumulative surplus or deficit of funds at selective maturity dates
- Cash flows to be placed in different time buckets based on the behaviour of assets, liabilities and off balance sheet items
- Variance analysis at least half yearly
- Impact of prepayment of loans, premature closure of deposits and exercise of put and call options after specified time.
- Difference of cash inflows and outflows in each time band

How to avoid liquidity crisis:

- Cap on inter bank borrowing / call borrowing
- Purchased funds vis a vis liquid assets
- Core deposits vis a vis Core assets i.e. CRR, SLR and Loans
- Duration of liabilities and investment portfolio
- Maximum Cumulative Outflows
- Tracking Commitment Ratio to corporate/banks to limit the off balance sheet exposure
- Swapped Fund ratio i.e. extent of Indian rupees raised out of foreign currency sources.

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- Tracking high value deposits (Rs. One crore above) • Purchased Funds to Total Assets where purchased funds include the entire inter-bank and other money market borrowings, including Certificate of Deposits and institutional deposits
- Loan Losses to Net Loans
- Loans to core deposit

Since measuring and managing liquidity needs are vital activities of commercial banks. By assuring a bank's ability to meet its liabilities as they become due, liquidity management can reduce the probability of an adverse situation developing. The importance of liquidity transcends individual institutions, as liquidity shortfall in one institution can have repercussions on the entire system. 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. Experience shows that assets commonly considered as liquid like Government securities and other money market instruments could also become illiquid when the market and players are unidirectional. Therefore 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.

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The Maturity Profile can be used for measuring the future cash flows of banks in different time buckets. The time buckets given the Statutory Reserve cycle of 14 days may be distributed as under:

- i) 1 to 14 days
- ii) 15 to 28 days
- iii) 29 days and upto 3 months
- iv) Over 3 months and upto 6 months
- v) Over 6 months and upto 12 months
- vi) Over 1 year and upto 2 years
- vii) Over 2 years and upto 5 years
- viii) Over 5 years

Within each time bucket there could be mismatches depending on cash inflows and outflows. While the mismatches upto 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. The mismatch during 1-14 days and 15-28 days should not in any case exceed 20% of the cash outflows in each time bucket. If a bank in view of its asset -liability profile needs higher tolerance level, it could operate with higher limit sanctioned by its Board / Management

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Committee giving reasons on the need for such higher limit. A copy of the note approved by Board / Management Committee may be forwarded to the Department of Banking Supervision, RBI. The discretion to allow a higher tolerance level is intended for a temporary period, till the system stabilizes and the bank is able to restructure its asset -liability pattern. 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 likely cash inflows / outflows, banks have to make a number of assumptions according to their asset - liability profiles. For instance, Indian banks with large branch network can (on the stability of their deposit base as most deposits are renewed) afford to have larger tolerance levels in mismatches if their term deposit base is quite high. 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. The RBI is interested in ensuring that the tolerance levels are determined keeping all necessary factors in view and further refined with experience gained in Liquidity Management.

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

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estimate their short-term liquidity profiles on the basis of business projections and other commitments.

Currency Risk (Management of Foreign exchange Risk)

Foreign currency exposure is the extent to which the future cash flows of an enterprise, arising from domestic and foreign currency denominated transactions involving assets and liabilities, and generating revenues and expenses are susceptible to variations in foreign currency exchange rates. It involves the identification of existing and/or potential currency relationships which arise from the activities of an enterprise, including hedging and other risk management activities.

Foreign exchange Exposure and its type:

- Transaction Exposure : A cash flow exposure
- Translation Exposure : An accounting Exposure
- Both Balance Sheet and P & L Account to be consolidated. Translating at average or end exchange rate alters profits as exchange rate varies.

Methods for Translation Exposure Accounting

There are Four Methods

- Current- Non current
- All Current (Closing Rate Method)
- Monetary/ Non Monetary Method
- Temporal Method

Current- Non Current Method

- Translates current exposure at closing rate

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- and non current exposure at historical rate.
- Long term debt is not exposed.
- The method is neither logical nor popular

All Current (Closing Rate Method)

- Translates all items denominated in foreign currency at closing exchange rate.
- Accounting exposure is given by net assets.
- Simple and popular method.

Monetary/ Non Monetary Method

- Monetary items are Assets, Liabilities and Capital at Closing rate
- Non monetary items at historic cost
- Accounting exposure is Net Monetary Assets

Temporal Method

- Uses closing rate method for all items stated at replacement cost, realisable value, market value or expected future value.
- or closing rate for all items stated at current rate.

Foreign exchange Risk Management Techniques

- Internal techniques of exposure management
- External techniques of exposure management

Internal techniques of Foreign exchange exposure management

- Netting
- Matching
- Leading and Lagging

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- Pricing Policy- Transfer Pricing
- Asset/ liability Management

External techniques of Foreign exchange exposure management

- Forward Contracts
- Swaps
- Options
- Futures
- Derivatives as an Asset/ Liability Management tool

Derivatives as an Asset/ Liability Management Tool

- Derivatives are used to minimize Interest Rate Risk by Hedging or Speculation

When Interest Rates are falling

- If $ISA > ISL$, NIM will decline
- Bank may increase its Fixed Rate Assets
- Reduce its ISA
- Increase its ISL
- The strategy carry Credit Risk and may also be cost prohibitive

Derivatives- To reduce Short Term Exposure

- Bank may purchase a one year Treasury contract in the Future Market
- or Purchasing a Call Option on Treasury Future

Derivatives- To reduce Medium and Long Term Exposure

- Banks may have Interest Rate SWAP i.e.

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- Swap a portion of variable Interest Payment stream for Fixed Rate Interest Payment Stream.
- Banks would lose the profit potential should Interest Rate rise.
- Banks can also enter into Floor Contracts with an intermediary and retain potential for profit in case interest rate increase.

When Interest Rates are rising...

- NIM will deteriorate if Banks have –ve gap.
- Banks may therefore:-
 - increase its price sensitive assets
 - decrease its price sensitive liabilities

Floating exchange rate arrangement has brought in its wake pronounced volatility adding a new dimension to the risk profile of banks' balance sheets. The increased capital flows across free economies following deregulation have contributed to increase in the volume of transactions. Large cross border flows together with the volatility has rendered the banks' balance sheets vulnerable to exchange rate movements. Dealing in different currencies brings opportunities as also risks. If the liabilities in one currency exceed the level of assets in the same currency, then the currency mismatch can add value or erode value depending upon the currency movements. The simplest way to avoid currency risk is to ensure that mismatches, if any, are reduced to zero or near zero. Banks undertake operations in foreign exchange like accepting deposits, making loans and advances and quoting prices for foreign exchange transactions. Irrespective of the strategies

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adopted, it may not be possible to eliminate currency mismatches altogether. Besides, some of the institutions may take proprietary trading positions as a conscious business strategy. Managing Currency Risk is one more dimension of Asset- Liability Management. Mismatched currency position besides exposing the balance sheet to movements in exchange rate also exposes it to country risk and settlement risk. Ever since the RBI (Exchange Control Department) introduced the concept of end of the day near square position in 1978, banks have been setting up overnight limits and selectively undertaking active day time trading. Following the introduction of "Guidelines for Internal Control over Foreign Exchange Business" in 1981, maturity mismatches (gaps) are also subject to control. Following the recommendations of Expert Group on Foreign Exchange Markets in India (Sodhani Committee) the calculation of exchange position has been redefined and banks have been given the discretion to set up overnight limits linked to maintenance of additional Tier I capital to the extent of 5 per cent of open position limit. Presently, the banks are also free to set gap limits with RBI's approval but are required to adopt Value at Risk (VaR) approach to measure the risk associated with forward exposures. Thus the open position limits together with the gap limits form the risk management approach to forex operations. For monitoring such risks banks should follow the instructions contained in Circular A.D (M. A. Series) No.52 dated December 27, 1997 issued by the Exchange Control Department.

Interest Rate Risk (IRR) Measuring Interest Rate Risk

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Interest-rate risk (IRR) is the exposure of an institution's financial condition to adverse movements in interest rates. Accepting this risk is a normal part of banking and can be an important source of portability and shareholder value. However, excessive levels of IRR can pose a significant threat to an institution's earnings and capital base. Accordingly, effective risk management that maintains IRR at prudent levels is essential to the safety and soundness of banking institutions.

Four important analytical techniques to measure and manage IRR

- Maturity gap analysis : (to measure the interest rate sensitivity of earnings)
- Duration : (to measure the interest rate sensitivity of capital)
- Simulation
- Value at Risk:

Gap Analysis

- It is a basic technique also known as:
 - Interest Rate Sensitivity Report
 - Maturity Gap Report
 - Interest Rate Gap Report
- Used in USA & Canada Financial Institutions disclose Gap report in Annual Report

Preparation of Gap Report

- It is a static report
- Balance Sheet and Off Balance Sheet position as on that day
- Determine the number of time buckets

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- Determine the length of each bucket
- Slot every Asset, Liability & off Balance Sheet item into corresponding time bucket
- Based on re pricing and Contractual Maturity e.g.
- one year loan that re prices quarterly should be slotted in 3 month bucket

Gap analysis – Prudential limits

- Compute the Gap i.e. Liquidity and IR including
 - i) all Assets and Liabilities
 - ii) RSA and RSL
- Compute the Cumulative Gap (C.G.)
- C.G. as % of Total Assets
- C.G. as % of Earning Assets
- C.G. as % of Equity

Gap analysis – Prudential limits

- A & L to be grouped into time buckets
- $GAP = RSA - RSL$
- $GAP\ Ratio = RSA / RSL$
- $GAP > 0$, $G.R. > 1$, +ve Gap
- $GAP < 0$, $G.R. < 1$, -ve Gap
- $GAP = 0$, $G.R. = 1$, Matched Position

Gap analysis – Prudential limits

- $NIM = NII / \text{Earning Assets}$

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- If Gap is +ve, increase/ decrease in interest rates causes increase / decrease in NII and NIM.
- If Gap is -ve, increase/ decrease in interest rates causes decrease / increase in NII and NIM

Gap analysis – Prudential limits

- Passive Management of IRR
 - Attempt to Hedge the GAP
- Active Management of IRR
 - Speculatively alter GAP to raise NII e.g. If IR rise is expected, make GAP +ve or more +ve
 - Transfer Price Mechanism to enhance the management of Margins i.e. credit spread, funding or liability spread and mismatch spread.
 - Rational pricing of assets and liabilities
 - *Problems* in forecasting rates

Some other limits:

- Appropriate Board and Senior Management oversight
- Adequate Risk Mgmt Policies and procedures
- Appropriate RM monitoring and Control Functions
- Comprehensive Internal Controls and Independent Audits

Altering the GAP

- Asset Restructuring
- Liability Restructuring
- Growth

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- Shrink
- Off- Balance Sheet Hedge

Duration Gap Analysis

- Duration is a measure of percentage change in the economic value of a position that will occur given a small change in the level of interest rates
- Difference between duration of assets and liabilities is bank's net duration.
- If $DA > DL$, a decrease in interest rate will increase the MVE of the bank.
- If $DL > DA$, an increase in interest rate will increase the MVE of the bank and a decrease in interest rate will decrease the MVE of the bank.
- Duration Gap Analysis recognises the time value of money.
- It fails to recognise basis risk as it assumes parallel shift in yield curve.

Simulation

- Simulation technique attempts to overcome the limitation of GAP and Duration approaches by computer modeling the bank's interest rate sensitivity.
- The modelling makes assumptions about future path of interest rates, shape of yeild curve,, changes in business activity, pricing and hedging strategies

Value at Risk

- Value at risk is the maximum potential loss in market value or income over a given time horizon, under normal market conditions, at a given level of certainty.

Value at Risk serves as Information Reporting to stakeholders.

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- Performance Evaluation i.e. return generated of individuals/business units for the risks taken and subsequently allow for comparison
- Resource Allocation (capital and personnel) to provide a higher risk adjusted profitability.
- Regulatory (to impart stability to the overall financial system)

SOUND IRR MANAGEMENT PRACTICES:

As is the case in managing other types of risk, sound IRR management involves effective board and senior management oversight and a comprehensive risk-management process that includes the following elements: effective policies and procedures designed to control the nature and amount of IRR, including clearly defined IRR limits and lines of responsibility and authority, appropriate risk-measurement, monitoring, and reporting systems, systematic internal controls that include the ,internal or external review and audit of key elements of the risk-management process

The phased deregulation of interest rates and the operational flexibility given to banks in pricing most of the assets and liabilities have exposed the banking system to Interest Rate Risk. Interest rate risk is the risk where changes in market interest rates might adversely affect a bank's financial condition. Changes in interest rates affect both the current earnings (earnings perspective) as also the net worth of the bank (economic value perspective). The risk from the earnings' perspective can be measured as changes in the Net Interest Income (Nil) or Net Interest margin (NIM). In the context of poor MIS, slow pace of computerisation in banks and the absence of total

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deregulation, the traditional Gap analysis is considered as a suitable method to measure the Interest Rate Risk. It is the intention of RBI to move over to modern techniques of Interest Rate Risk measurement like Duration Gap Analysis, Simulation and Value at Risk at a later date when banks acquire sufficient expertise and sophistication in MIS. 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/re prices contractually during the interval; iii) RBI changes the interest rates (i.e. interest rates on Savings Bank Deposits, advances upto Rs.2 lakhs, DRI advances, Export credit, Refinance, CRR balance, etc.) in cases where interest rates are administered ; and iv) it is contractually pre-payable or withdraw able before the stated maturities.

The Gap Report should be generated by grouping rate sensitive liabilities, assets and off balance sheet positions into time buckets according to residual maturity or next re pricing period, whichever is earlier. The difficult task in Gap analysis is determining rate sensitivity. All investments, advances, deposits, borrowings, purchased funds etc. that mature/reprice within a specified timeframe are interest rate sensitive. Similarly, any principal repayment of loan is also rate sensitive if the bank expects to receive it within the time horizon. This includes final principal

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payment and interim installments. Certain assets and liabilities receive/pay rates that vary with a reference rate. These assets and liabilities are re priced at pre- determined intervals and are rate sensitive at the time of re pricing. While the interest rates on term deposits are fixed during their currency, the advances portfolio of the banking system is basically floating. The interest rates on advances could be re priced any number of occasions, corresponding to the changes in PLR. The Gaps may be identified in the following time buckets: i) upto 1 month ii) Over one month and upto 3 months iii) Over 3 months and upto 6 months iv) Over 6 months and upto 12 months v) Over 1 year and upto 3 years vi) Over 3 years and upto 5 years vii) Over 5 years viii) Non-sensitive.

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. Each bank should set prudential limits on individual Gaps with the approval of the Board/Management Committee. The prudential limits should have a bearing on the total assets, earning assets or equity. The banks may work out

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earnings at risk, based on their views on interest rate movements and fix a prudent level with the approval of the Board/Management Committee. RBI will also introduce capital adequacy for market risks in due course. The classification of various components of assets and liabilities into different time buckets for preparation of Gap reports (Liquidity and Interest Rate Sensitivity) as indicated in Appendices I & II is the benchmark. Banks which are better equipped to reasonably estimate the behavioral pattern, embedded options, rolls-in and rolls-out, etc of various components of assets and liabilities on the basis of past data / empirical studies could classify them in the appropriate time buckets, subject to approval from the ALCO / Board. A copy of the note approved by the ALCO / Board may be sent to the Department of Banking Supervision.

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**International Journal of Computing and Business Research
(IJCBR)**

ISSN (Online) : 2229-6166

Volume 4 Issue 2 May 2013

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