Review Paper on Asset Liability Management in Banking System

S. P. Joshi\textsuperscript{1} & Dr. R. V. Sontakay\textsuperscript{2}
\textsuperscript{1}Dept. of Business Management RTMNU Nagpur
\textsuperscript{2}C.P.& Berar College, RTMNU Nagpur

Abstract: Asset and Liability Management (ALM) plays key role in banking and finance industries. Any bank or financial industry will collapse without the use of ALM tactics. Therefore to survive in the market, the ALM analysis is carried out timely by these industries to measure the value of risk factors involved. ALM analysis not only minimizes the risk but also it helps to achieve the financial goals of the industry. In this paper, we present a survey of various ALM techniques reported in the literature, aiming to financial stability. The survey helps for emerging banks to decide the different ALM process used by the banking industries and to select the efficient process out of the reported techniques.

1. Introduction

Asset Liability Management (ALM) is a process of planning, organizing, controlling and managing the various risk of the bank. ALM is consists of combinations of portfolio management techniques into a synchronized process. ALM is the coordinated management of a bank’s entire balance sheet. It helps the banks to focus on minimizing the risk and gaining maximum profit. Banks faces many risks which includes market risks, liquidity risk, credit risk etc. ALM is a tool to manage the risk properly. ALM plays a crucial role for managing the liquidity needs of the banks. ALCO (Asset Liability committee) is a decision making unit of the banks, which includes the top most employees of the bank such as CEO, Board of Directors etc. it is the responsibility of members of ALCO for the smooth running of ALM tools.

This paper reviews the various methodologies that are used to manage the assets and liabilities. We present the detailed research approaches reported in past to minimize the possible risk involved in banking sectors. The paper is arranged as follows section II includes the review of literature reported in the past for ALM. We conclude our views from the findings of the reviewed papers in section III. Section IV is references.

2. Related Work

Considerable work has done by the scholars in the field of ALM. Worldwide Basel committee was one of the key motivators of asset liability management. Basel committee is a committee of banking supervisory authorities that was established by the central bank governors of 10 countries in 1988. Basically it was the first set of instructions focusing minimum capital requirement for banks, which were known as Basel I. Their main focus was on credit risk. In (2004) Basel II was introduced, which includes instructions for capital adequacy as well as for risk management. In 2008, it was felt that the global financial crisis was due to failing of Basel II norms. Therefore, Basel III norms were proposed in 2010. Their main principle was to encourage more flexible banking system by focusing on four main banking principles i.e. Capital, leverage, funding and liquidity.

R. Vaidyanathan [1], in his paper, he had discussed various issues in asset-liability management and elaborated the various categories of risk. The paper further deals with the specificity of financial institutions in India and the new information technology that beneficially affect asset liability management.

The scholar has discussed the earlier phase of banks. Further he explained the various categories of risks involved in banking, with some banking examples. Also he has thrown light on other important issue such as legal reforms, delays and loopholes in legal system. Further he discussed about various categories of risk.

1) Credit risk: It is the failure of counterparty in meeting the payment obligation on the specific date. Its management is very crucial for financial institutions failing which may lead to failure of banks. The other vital issue is contract enforcement in countries like India. Legal reforms are very critical in order to have timely contract enforcement. Delays and loopholes in the legal system significantly affect the ability of the lender to enforce the contract. Many cases are pending in the courts. The required rate of return due to weak contract enforcement mechanisms becomes larger in
countries like India. It is also linked to market risk variables. Therefore it is important for the banks that they focus more on lending practices and credit processing assessments in the changed scenario. In case of proprietorship and partnership firm the task of credit risk assessment is more complicated due to lack of reliable and continuous financial information.

2) **Capital risk**: The maintenance of adequate capital on continuous basis is one of the important parts of banking practice. To bring commonality and standardization in international practices attempts are being made globally. Capital adequacy also focuses on weighted average risk of lending; banks are in position to realign their portfolios between more risky and less risky portfolios.

3) **Market risk**: It is related to financial condition, which consequences in adverse movement in market price. When there is a significant increase in the term structure of interest rates or violent fluctuations in the rate structure, one finds considerable erosion of the value of securities held.

4) **Liquidity Risk**: It is potential inability to generate adequate cash to cope up with decline in deposits or increase in assets. It is due to mismatch in the maturity pattern of assets and liabilities.

5) **Interest rate risk**: The change in prices of bonds due to change in interest rate is termed as interest rate risk. Earlier it was not considered as serious but as rates of interest become more volatile they felt need for explicit means of monitoring and controlling interest gap. In 1970s and 1980s the government used to borrow loans from banks at artificially low rates ranging between 4.5% to 8% (The World Bank, 1995.) The smaller the coupon rate of bonds, larger is the fluctuation associated change in associated rate of structure. Because of artificially fixed low coupon rates, commercial banks faced adverse situations when the interest rate structure was liberalized to align with market rates. India has substantially more issues associated with interest rate risk, which is due to circumstances outside its control. Therefore it is needed to handled the risk properly and to adopt innovative and sophisticated techniques to meet this challenges faced by various banks. There are certain measures available to measure interest rate risk. They are explained in Table 1.

The author discussed about risk measurement techniques which includes Gap analysis model, Duration model, Value at Risk and Simulation, the details of the same are tabulated in the Table 2.

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Interest rate risk</td>
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</tr>
<tr>
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</tr>
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Further the author throw lights on strategies for correcting mismatch of ALM. Further he discussed the advantage of using information technology in Indian banking system. He also explains the importance of electronic fund transfer system and the integration of different financial instruments and institutions provide greater opportunities for emerging markets like India to aim for higher return in the context of minimizing risk.

Dr. Manjula Jain, Dr. Monica Singh and Amitabh Pandey, among others, discuss 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. 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.

Further the scholars has described the various risk involves in banking. The purpose of ALM is thus, to enhance the asset quality, quantify the risks associated with the assets and liabilities and further manage them. The ALM model should primarily aim to stabilize the adverse impact of the risks on the same. Depending on the primary objective of the

**Table 1: Interest rate risk techniques**

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>Maturity</td>
<td>Since it takes into account only the timing of the final principal payment, maturity is considered as an approximate measure of risk and in a sense does not quantify risk. Longer maturity bonds are generally subject to more interest rate risk than shorter maturity bonds.</td>
</tr>
<tr>
<td>Duration</td>
<td>Is the weighted average time of all cash flows, with weights being the present values of cash flows. Duration can again be used to determine the sensitivity of prices to changes in interest rates. It represents the percentage change in value in response to changes in interest rates.</td>
</tr>
<tr>
<td>Dollar Duration</td>
<td>Represents the actual dollar change in the market value of a holding of a bond in response to percentage change in rates.</td>
</tr>
<tr>
<td>Convexity</td>
<td>Due to change in market rates and because of passage of time duration possibly not remain constant. With each successive basis point movement downward, bond prices increase at an increasing rate. Similarly if rates increase, the rate of decline of bond prices declines. This property is called convexity.</td>
</tr>
</tbody>
</table>

Source: Asset-liability management: Issues and trends in Indian context, by R. Vaidyanathan
model, the appropriate parameter should be selected. The author has described the most common parameters for ALM as follows:

- **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.

<table>
<thead>
<tr>
<th>Table 2: Types of Model [1]</th>
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<tbody>
<tr>
<td><strong>Gap Analysis Model</strong></td>
</tr>
<tr>
<td>Measures the direction and extent of asset-liability mismatch through either funding or maturity gap. It is computed for assets and liabilities of differing maturities and is calculated for a set time horizon.</td>
</tr>
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\[
\Delta \text{NII}_i = \Delta R_i (\text{GAP}_i) \\
\text{DP}/p = \text{D} \frac{(\text{dR}/1+R)}{1+b}
\]

While NII is the net interest income, \( R \) refers to the interest rates impacting assets and liabilities in the relevant maturity bucket and GAP refers to the differences between the book value of the rate sensitive assets and the rate sensitive liabilities. Thus when there is a change in the interest rate, one can easily identify the impact of the change on the net interest income of the bank.

- **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.

The study further describes the general perspective of ALM which is explained below shortly:

1) A hierarchy (to execute the process)
2) A process (to track, report and monitor risk management)
3) A tool (to analyze relevant data)
4) A technique (to measure risk and suggest alternatives)
5) A repository (a versatile data warehouse)

Further the author describes the ALM initiative in India and Indian scenario for ALM. Further the study discuss about the Basel II Accord.
The study throws light on various techniques to measure ALM which includes traditional method (GAP Analysis) and sophisticated methods (Duration Analysis, Simulation Exercise & Value at Risk). The author has explained GAP analysis as follows:

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:

1. 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.
2. Then the gap between the assets and liabilities under each time bucket is worked out.
3. 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.
4. 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. [2] 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 as shown in Fig 1.

**Fig 1: Holding decision [2]**

<table>
<thead>
<tr>
<th>GAP Position</th>
<th>Change in Interest Rate</th>
<th>Change in Interest expense</th>
<th>Change in Interest income</th>
<th>Change in NII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>Increase</td>
<td>Increase</td>
<td>Increase</td>
<td>Increase</td>
</tr>
<tr>
<td>Positive</td>
<td>Decrease</td>
<td>Decrease</td>
<td>Decrease</td>
<td>Decrease</td>
</tr>
<tr>
<td>Negative</td>
<td>Increase</td>
<td>Increase</td>
<td>Increase</td>
<td>Increase</td>
</tr>
<tr>
<td>Negative</td>
<td>Decrease</td>
<td>Decrease</td>
<td>Decrease</td>
<td>Decrease</td>
</tr>
<tr>
<td>Zero</td>
<td>Increase</td>
<td>Increase</td>
<td>Increase</td>
<td>None</td>
</tr>
<tr>
<td>Zero</td>
<td>Decrease</td>
<td>Decrease</td>
<td>Decrease</td>
<td>None</td>
</tr>
</tbody>
</table>

Manish Kumar & Ghanshyam Chand Yadav[3]. This paper showcase on liquidity risk. It is bank’s capacity to fund increase in assets and meet both expected and unexpected cash and collateral obligations at reasonable cost and without incurring unacceptable losses. This paper examines the sound practices for the liquidity risk management in banks. The author’s studies goes along with the suggestions of the Basel Committee and Reserve Bank of India on management of liquidity risk. In this paper, we explain the meaning of liquidity, liquidity risk and liquidity risk management. It also discusses the process of building up of a liquidity risk management system.

Basel II takes a three-pillar approach to regulatory capital measurement and capital standards:

1. **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 I 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 I sets out the allocation of capital for operational risk and market risk in the trading books of banks.[2]

2. **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.[2]

3. **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.[2]

The study further shows the rising need for ALM at Macro and Micro level. The study has described about the Objectives of ALM. The author has described the framework of ALM in short as follows. ALM framework stands on 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.

**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.

**ALM Process:** The basic ALM process involves risk identification, risk measurement, risk management risk policies and tolerance levels.
Further the author describes liquidity risk and 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 rollover or refinancing risk. Liquidity risk is usually of an individual nature, but in certain situations may compromise the liquidity of the financial system.

Liquidity is the ability to efficiently accommodate deposit as also reduction in liabilities and to fund the loan growth and possible funding of the off-balance sheet claims. The cash flows are placed in different time buckets based on future likely behavior of assets, liabilities and off-balance sheet items. The liquidity risk is closely linked to other dimensions of the financial structure of the financial institution, like the interest rate and market risks, its profitability, and solvency, for example. The interest rate risk that results from mismatches of maturities or the dates for interest rate adjustments may appear as either market or refinancing (and/or reinvestment) risk.

The author throws light on organizational framework of liquidity management in banks. Further the author has discussed the critical ratios in respect of liquidity risk management and their significance for banks. There as follows:

1) (Volatile liabilities – Temporary Assets) / (Earning Assets – Temporary Assets)
   Whereas, Volatile Liabilities: (Deposits + borrowings and bills payable up to 1 year).
   Letters of credit – full outstanding. Component-wise CCF of other contingent credit and commitments.
   Swap funds (buy/ sell) up to one year.
   Current deposits (CA) and Savings deposits (SA) i.e. (CASA) deposits reported by the banks as payable within one year (as reported in structural liquidity statement) are included under volatile liabilities. Borrowings include from RBI, call, other institutions and refinance.

2) Temporary assets = Cash + Excess CRR balances with RBI + Balances with banks + Bills purchased/discounted up to 1 year + Investments up to one year + Swap funds (sell/ buy) up to one year.
   Earning Assets = Total assets – (Fixed assets + Balances in current accounts with other banks + Other assets excluding leasing + Intangible assets)

3) Core deposits / Total Assets whereas; Core deposits: All deposits (including CASA) above 1 year (as reported in structural liquidity statement)+ net worth
   4) (Loans + mandatory SLR + mandatory CRR + Fixed Assets )/Total Assets
   5) Temporary Assets / Total Assets
   6) Temporary Assets / Volatile liabilities
   7) Volatile liabilities / Total assets

The author further studies the fundamental principles [3] for the management and supervision of liquidity risk.

Principle 1) the bank is responsible for the sound management of liquidity risk. Supervisors should assess the adequacy of both a bank’s liquidity risk management framework and its liquidity position and should take prompt action if a bank is deficient in either area in order to protect depositors and to limit potential damage to the financial system.

Principle 2) A bank should clearly articulate a liquidity risk tolerance that is appropriate for its business strategy and its role in the financial system.

Principle 3) Senior management should continuously review information on the bank’s liquidity developments and report to the board of directors on a regular basis. A bank’s board of directors should review and approve the strategy; policies and practices related to the management of liquidity at least annually and ensure that senior management manages liquidity risk effectively.

Principle 4) A bank should incorporate liquidity costs, benefits and risks in the internal pricing, performance measurement and new product approval process for all significant business activities (both on- and off-balance sheet), thereby aligning the risk-taking incentives of individual business lines with the liquidity risk exposures their activities create for the bank as a whole.

Principle 5) A bank should have a sound process for identifying, measuring, monitoring and controlling liquidity risk. This process should include a robust framework for comprehensively projecting cash flows arising from assets, liabilities and off-balance sheet items over an appropriate set of time horizons.

Principle 6) A bank should actively monitor and control liquidity risk exposures and funding needs within and across legal entities, business lines and currencies, taking into account legal, regulatory and operational limitations to the transferability of liquidity.

Principle 7) A bank should regularly gauge its capacity to raise funds quickly from each source. It should identify the main factors that affect its ability to raise funds and monitor those factors closely to ensure that estimates of fund raising capacity remain valid.

Principle 8) A bank should actively manage its intraday liquidity positions and risks to meet payment and settlement obligations on a timely basis under both normal and stressed conditions and thus contribute to the smooth functioning of payment and settlement systems.

Principle 9) A bank should actively manage its collateral positions, differentiating between encumbered and unencumbered assets. A bank should monitor the legal entity and physical location...
where collateral is held and how it may be mobilized in a timely manner. 

Principle 10) A bank should use stress test outcomes to adjust its liquidity risk management strategies, policies, and positions and to develop effective contingency plans. 

Principle 11) A bank should have a formal contingency funding plan (CFP) that clearly sets out the strategies for addressing liquidity shortfalls in emergency situations. 

Principle 12) A bank should maintain a cushion of unencumbered, high quality liquid assets to be held as insurance against a range of liquidity stress scenarios, including those that involve the loss or impairment of unsecured and typically available secured funding sources. There should be no legal, regulatory or operational impediment to using these assets to obtain funding. 

Further the scholar concludes that the bank should establish a robust liquidity risk management framework. Top management/ALCO should continuously review information on bank’s liquidity developments and report to the Board of Directors (BoD) on a regular basis. Liquidity Risk being one of the reasons for financial distress should not be ignored. Following the Basel Committee recommendations and framing an effective liquidity risk management system is the only way to fight out its ill effects. 

Lina Novickytea, Indre Petraitytea [4] The study describes that ALM is one of the most important risk management measures at a bank. Also it is one of most important tool for decision making that sets out to maximize stakeholder value. This paper showed Lithuanian banking sector asset and liability management activity and make assumptions of how sustainable the sector are during the different business cycle stages and how banks can manage their risks according to business cycles. The analysis revealed that banks tend to take more risk over time. 

The cycles of bank assets and liability are not identical to the cycles of business activity level, therefore it is seen that banks manage their assets and liability and attempt to influence their activity and profitability. The results indicate why the banks tend to enhance their risk levels before and during the financial crisis. 

The author has divided the article in five sections. The second section presents the literature review highlighting the principal role of ALM. Third section provides a brief methodological research techniques background and its application. Results of the study are presented in section four, and section five concludes the paper. It is described in the paper that the ALM manages the interest rate risk and liquidity risk. The author contributes to the survey with the following discussion [4] 

ALM deals with the optimal investment of assets in view of meeting current goals and future liabilities. Choudhry (2007)[5] said, that the definitions of assets, liabilities, and risks are specific to each institution, but, very generally, assets may be viewed as expected cash flows, and liabilities as expected cash outflows. Although short term risks arising from the possibility that an institution's assets will not cover its short-term obligations are important to assess and quantify, ALM is usually conducted from a long-term perspective. As such, ALM is considered a strategic discipline as opposed to a tactical one. 

Mitra & Schwaiger (2011) [6] explain, that ALM is a financial (analytic) tool for decision making that sets out to maximize stakeholder value. Its overall objective is to make judicious investments that increase the value of capital, match liabilities and protect from disastrous financial events. An integrated asset and liability management model sets out to find the optimal investment strategy by considering assets and liabilities simultaneously. Simply stated, the purpose of such an approach is to reduce risk and increase returns. 

ALM is a future oriented process involving simultaneous asset and liability management to measure, monitor and control the impact of changing interest rates on the bank's earnings, asset value, liquidity and capital requirements (Brick, 2012)[7]. 

The analysis of balance sheet items changes of commercial banks and foreign banks branches in Lithuania revealed that during the economic upturn financial sector tended to take more risk in ALM. During the economic shocks can be visible different variation. The moral hazard is apparent in Lithuanian financial sector as the most risky balance sheet items change in risk-free manner only after the Bank of Lithuania deploys conservative measures[4]. 

The ALM analysis showed that there are differences in relationship between the primary data and time series cyclical component of the same data. This can be equated as ALM effect. Despite the fact that there is some evidence that ALM policy tend to resist the economic cycle, there is evident that the risk had enhanced before the financial crisis in 2008 and since then it diminished moderately. This can be determined as the lesson learnt during the recession as risk enhancement caused a lot of damage to different commercial banks of Lithuania. As the banking sector in Lithuania is pro-cyclical, the banks should plan and forecast the different scenarios of their operational effectiveness as the higher risks involved might cause the higher losses.[4] 

Svetlana Saksonova [8] explains that the key problems of banks are the need to dynamically optimize asset and liability structure, to ensure profitability of operations and to minimize risks. These can be addressed by jointly structuring asset
and liability portfolios, using the gap method for interest rate risk and expanding the range of profitable operations.

The author proposes the following management principle that is related to asset transformation short term liability transformation into long-term assets is acceptable only within the speculative portfolio and it cannot be permitted within conservative and moderate portfolios. This can be justified by the need to decrease the risk of asset loss for banks because in case of a significant outflow of liabilities, asset portfolios are being decreased in the following order: speculative asset portfolio, moderate asset portfolio, conservative asset portfolio, and finally fixed asset portfolio.

The author proposes the following management techniques to maximize profitability, while controlling risks:

1. Lowering relative funding costs (e.g. by increasing the proportion of equity, lowering dividends if possible) [8]
2. Diversifying profitable operations by financial innovation. Of course, the latter was also the contributor to the 2008 financial crisis; therefore the question about how effective it remains controversial. Among the implementation risks are the dispersion of resources and not providing sufficient capital to traditional and profitable business lines.[8]

The management techniques outlined in this paper comprise a high level blueprint for a successful operation of a commercial bank.

Feedback loops are new both to regulators and bank management and much research is required in this area.[8]

P. Sheela & Tejaswini Bastry[9] the study reveals that (ALM) is a comprehensive and dynamic framework for measuring, monitoring and managing the market risk of a bank. It is the management of balance sheet structure (Asset-Liability) in such a way that the net earnings from interest are maximized within the overall risk-preference (present and future) of the banks.

Following are the findings of study:[9]

1. The ALM concept though in vogue since 1997, its inherent complexities in obtaining accurate timely information from the grass root level is making difficult for the banks to make full advantage of it.
2. The up gradation of technology by the banks has helped the banks to achieve the objective of fully utilizing management of information systems (MIS) in the collection of accurate and timely data required for managing their Asset Liability.
3. It was understood through the study, that interest rate risk is measured through the use of re-pricing gap analysis and duration analysis where as the Liquidity risk is measured through gap analysis.
4. Through the study it was observed that both the banks were exposed to interest rate risk throughout the study period.
5. To fill the short term liquidity gap, banks resort to market borrowings at higher rate of interest which was the cause in the reduction of interest margin and the profitability of the banks.

The author concludes that, the studies with the onset of liberalization Indian banks are now more exposed to uncertainty and to global competition. This makes it imperative to have proper asset liability management system in place. Through effective liquidity risk management banks can avoid unprofitable sale of assets and reduce borrowings from central bank and can demonstrate itself as a safe bank. Maintaining a good interest risk management is vital for Indian banks in the present scenario. It enables the bank to reduce earnings volatility and gives opportunity to get benefited from changing interest rates.[9]

Mihir Dash, K.A.Venkatesh & Bhargav B.D[10] the study reveals that Asset-liability management is concerned with the strategic management of assets and liabilities aimed to optimize bank profitability, while ensuring liquidity, and protecting the bank against interest rate risk, exchange rate risk, liquidity risk, credit risk, and contingency risk.

The study applied maturity gap analysis to measure the liquidity position of the sample banks and to assess the match between assets and liabilities, with the following maturity brackets: 1-14 days, 15-28 days, 1-3 months, 3-6 months, 6-12 months, 1-3 years, 3-5 years, and 5+ years. This was done by placing all cash inflows (maturing assets) and cash outflows (maturing liabilities) in the maturity bracket according to the expected timing of cash flows. The assets and liabilities were allocated into different maturity brackets in accordance with RBI’s guidelines (ALM System, 1999). Within each maturity bucket, the mismatch between cash inflows and outflows was calculated.

The author found that Most of the sample banks were found to have negative mismatches for shorter maturities, and all banks were found to have positive mismatch for the 3-5 years and 5+ years maturity brackets. Thus, there was found to be a high exposure to short-term risks. The Mann-Whitney test indicated that the negative maturity mismatches were significantly worse for the public sector banks in the 15-28 days, 1-3 months, and 3-6 months maturity brackets.

The author concluded his study that most of the banks are exposed to short term risk, with negative maturity mismatches in the 1-90 days bracket, and more so for public sector banks.
However, the regression results indicate that there is an incentive to maintain negative maturity mismatch in the short-term, as this improves profitability. Thus, there is a risk-return trade-off for short-term maturity mismatch.

Dr. B. Charumati,[11] explains ALM is a dynamic process of planning, organizing, coordinating and controlling the assets and liabilities – their mixes, volumes, maturities, yields and costs in order to achieve a specified Net Interest Income (NII). The NII is the difference between interest income and interest expenses and the basic source of banks profitability. The easing of controls on interest rates has led to higher interest rate volatility in India.

Interest rate risk is the risk to earnings or capital arising from movement of interest rates. It arises from differences between the timing of rate changes and the timing of cash flows (repricing risk); from changing rate relationships among yield curves that affect bank activities (basis risk); from changing rate relationships across the spectrum of maturities (yield curve risk); and from interest-rate-related options embedded in bank products (option risk). The value of a bank’s assets, liabilities, and interest-rate-related, off-balance-sheet contracts is affected by a change in rates because the present value of future cash flows, and in some cases the cash flows themselves, is changed. For measuring interest rate risk, banks use a variety of method such as gap analysis, the duration gap method, the basis point value (BPV) method, and simulation methods.[11]

The two types of banks’ balance sheet risks include interest rate risk and liquidity risks. Their regular monitoring and managing is the need of the hour. Banks should use the information about these risks as key input in their strategic business planning process. While increasing the size of the balance sheet, the degree of asset liability mismatch should be kept in control. Because, the excessive mismatch would result in volatility in earnings. Banks can also use sensitivity analysis for risk management purpose. This study used gap analysis for measuring the interest rate risk under different assumptions such as introduction of negative and positive interest rate shock, adjusting and counter balancing the portfolio. It is found that the bank is exposed to interest rate risk.[11]

Sulagna Das & Abhijit Dutta [12] explain, Non-Performing Assets are a burning topic of concern for the public sector banks, as managing and controlling NPA is very important. Today non-performing assets are the subject of major concerns to the banking sector and the other non-banking financial institutions. A loan or lease that does not meet the stated principal amount and the interest amount payments is termed as non-performing assets. NPA can be classified into commercial loans which are overdue for more than 90 days, and consumer loans which are due for more than 180 days, and rise in NPA is due to the overdue of the commercial loans, there are a lot of pending cases which are being handled by the Indian banks and other financial institutions. (RBI Website, n.d)

Further the study classifieds the (NPA) Non-performing assets are further classified into three categories based on the span for which the asset has remained non-performing and the recovery of the dues:

i. Substandard Assets

With effect from March 31, 2005, a substandard asset would be the one, which has remained as a non-performing asset for a period of less than or equal to 12 months. Substandard assets have credit weaknesses that jeopardise the liquidation of the debt and there are also possibility of incurring and sustaining some losses if the deficiencies are not corrected.

ii. Doubtful Assets

With effect from March 31, 2005, an asset is classified as doubtful if it has remained as a substandard asset for a period of 12 months. A loan classified under the doubtful category has all the weakness characteristics as defined for the substandard assets; also it has added characteristics that the weakness makes full liquidation or collection, on the basis of the currently known conditions, facts, and values that are highly doubtful and questionable.

iii. Loss Assets

A loss asset is one where loss has been identified by the bank’s internal auditors and RBI’s external auditors, but the amount has not been written off fully. These kinds of assets are also considered as uncollectible, and of little value that its continuance or maintenance as a bankable asset is not warranted or acceptable though there may be some salvage or recovery value. (RBI Website, n.d.)

Dutta. A (2014); This paper studied the growth of NPA in the public and private sector banks in India, and analysed sector wise non-performing assets of the commercial banks. For the purpose of the study data has been collected from secondary sources such as report on Trend and Progress of Banking in India, RBI, Report on Currency and Finance, RBI Economic Surveys of India.

Das, S. (2021): In this paper the author has tried to analyse the parameters which are actually the reasons of NPAs, and those are, market failure, wilful defaults, poor follow-up and supervision, non-cooperation from banks, poor Legal framework, lack of entrepreneurial skills, and diversion of funds.
Ahmad, Z., Jegadeeshwaran, M. (2013): The current paper is written on the NPA, and causes for NPA. Secondary data was collected for a period of five years and analysed by mean, CAGR, ANOVA and ranking banks. The banks were ranked as per their performance in managing the NPA’s. The efficiency in managing the NPA by the nationalised banks was tested.

Ranjan, R., Dhal, S.C. (2013): This paper explores an empirical approach to the analysis of the Indian commercial banks’ nonperforming loans by regression analysis. The empirical analysis evaluates as to how the NPLs are influenced by three major sets of economic and financial factors, i.e., terms of credit, bank size induced risk preferences and macroeconomic shocks.

NPA or Non-Performing Assets are the types of assets which are the subject of major concerns to the banking sector and the other non-banking financial institutions. A loan or lease that does not meet the stated principal amount and the interest amount payments is termed as non-performing assets. The current study deals with the types of NPA and its causes as well as its impact on the banking sector and the economy as a whole[12].

The main objective of the study was to find out whether there is any difference in the NPA occurrence between the various banks during the period of the study. The study finds out that there is no significant deference between the means of NPA of the banks at five percent level of significance. Hence one can safely conclude that banks irrespective of their operations have similar NPAs in the recent years [12].

3. Conclusion

The paper reviews the milestone research work in assets and liability management of banks. A study carried out in all referred papers shows that ALM plays a crucial role in banking system. Every bank must have an appropriate ALCO committee to look upon the risk associated with each step a bank to take for its growth. We find all the scholars used GAP model to achieve the balance between the assets and liabilities. We conclude this study with the following outcome i.e. to ensure profitability with minimum risk a joint structure of assets and liability portfolios should be used. To do so, relative funding cost should be lowered and profitable options are to be diversified.

4. References:

2. “Assets Liability in Indian Banks: Issues and Implications” by Dr.Manjula Jain, Dr. Monica Singh and Amitabh Pandey.
12. “ A study on NPA of public sector banks in India” by Sulagna Das & Abhijit Dutta;