

Critical Study On Asset Liability Management Of Schedule Commercial Banks In India

**CA Santoshkumar Madanmohan Ojha, Associate Professor, Vikas College of Arts, Science and Commerce College, Vikhroli, Mumbai, Maharashtra, E Mail-
casantoshojha@gmail.com**

Abstract

Banks be the economic mediator among its customers and prospect endeavors. bank take a amount from their consumers for which they're indebted to pay interest. From these deposit, they provide loan for which they get hold of interest profits. bank need to put into impact sturdy asset-legal responsibility administration to ensure among net interest income and to make sure that it could repay its purchaser deposit at any agreed time. In India asset legal responsibility mismatch in balance sheet of business bank posed extreme challenge because the banks had been following the conventional techniques of recording property and liabilities on the e book price. The liberalization manner inside the economic gadget coupled with multifaceted global tendencies uncovered banks for various sorts of risks viz. interests price risk, liquidity hazard, change risk, operational risk and so forth. that have direct impact on their operations, profitability and overall performance to compete with. The essential financial institution of the united states of America centered and suggested banks for taking concrete steps in minimize the disparity inside the asset-liability composition. There had been many brilliant influences of diverse techniques determined through banks in the final one decade. Asset and legal obligation management is one of the most essential threat manage measures at a monetary group. it's miles one in each of most important device for selection making that gadgets out to maximize stakeholder rate. however it's miles essential to follow the outside factor of the asset and legal responsibility manipulate in the market to live within the long time and to prepare for negative effects. Banking sector evaluation can be the tool to diploma the sustainability of the united states' economic area. Asset/felony duty control is the method of coping with using property and cash flow to lessen the firm's threat of loss from no longer paying a liability on time. well-managed belongings and liabilities growth industrial employer profits. The asset/liability responsibility management technique is commonly implemented to financial group mortgage portfolio and pension policy. This paper is descriptive in nature and attempted to discover the position of ALM in banking region and numerous techniques of ALM applied in banking area.

Keywords- Asset Liability Management, Financial System, Global Development, Responsibility Management, Stakeholders

Introduction Of The Study

Asset plus liability control (frequently truncated ALM) is the exercise of administering financial dangers to get up due to mismatch among the belongings and liabilities as a part of an investment method in economic accounting. ALM sit among danger management and strategic making plans. it is centered on a protracted-term attitude in place of mitigating immediately risks plus is a procedure of maximize the belongings to satisfy complicated liability that might growth productivity. ALM consists of the portion and control of belongings, fairness, interest fee and credit danger control which includes hazard overlays, and the calibration of enterprise-huge tool inside these danger framework for optimization plus control in the local authoritarian and capital surroundings.

It also entails the financial fee of equity. The idea of asset/legal responsibility management makes a specialty of the time of cash flow since employer managers have to plan for the fee of liability. The manner ought to make certain that assets are available to pay debts as they come due and that asset or profits may be transformed into cash. The asset/legal responsibility control manner applies to unique classes of property on the stability sheet.

commercial bank play an essential role inside the expansion of a country. a legitimate, revolutionary and vibrant banking arrangement is a essential requirement for monetary improvement. As an critical phase of the tertiary area of an financial system, commercial banks act as the backbone of financial increase and prosperity via appearing as a catalyst in the procedure of development. They inculcate the routine of saving and assemble budget from numerous small families and business firms unfold over a wide geographical location. The finances so mobilize are used for creative purpose in agriculture, industry and change.



Not like conventional threat control practice, ALM is a constant procedure that incessantly monitor dangers to ensure that an agency is within its chance tolerance and adhere to regulatory framework. The adoption of ALM practices extends across the monetary panorama and may be establish in businesses, such as bank, pension fund, asset manager, and coverage company.

Advantages as well as Disadvantages of asset and legal responsibility control

Enforcing ALM frameworks can offer blessings for lots groups, as it's far crucial for agencies to absolutely apprehend their asset and liability. One of the blessing of enforcing ALM is that a group can manipulate its liability deliberately to higher get ready itself for future doubts. The usage of ALM framework lets in an institute to apprehend and quantify the dangers there on its stability sheet and decrease risks attributable to a disparity of property and liabilities. Through strategically matching asset and liability, monetary establishments can gain extra competence and productivity even as lowering threat.

The downsides of ALM involve the demanding situations related to enforcing a right framework. Because of the gigantic variations among different groups, there may be no trendy framework that could observe to all businesses. Consequently, organizations might require to layout a sole ALM framework to seize precise goal, risk level, and regulatory constraint. Additionally, ALM is a protracted-time period approach that includes ahead-searching projections and datasets. The information won't be with no trouble on hand to all agencies, or even if to be had, it ought to be rehabilitated into experimental mathematical procedures.

Ultimately, ALM is a synchronized system that oversees an organization's whole stability sheet. It entails harmonization between a lot of department, which may be difficult and time-eating.

Review of Literature

Dr. Baser Narayan, 2013 tries to assess the changing views of the banks in figuring out and facing the risks and maintaining Asset exceptional on the way to ensure profitability with the help of ALM strategies. It also attempts to evaluate the effectiveness of Asset legal responsibility control as a method important to the development and improvement of the Indian banking zone especially and the economic system in trendy. Dr. Nisar, 2018 discusses the concept of NPAs, its kinds, asset category, and provisioning norms as in line with Reserve financial institution of India (RBI) guidelines. The examiner further analyses the empirical role of NPAs in Indian Scheduled business Banks (SCBs) and suggests measures for reducing them. Manoj, 2019 found out that there's a statistically sizeable difference among the wide variety of instances noted the restoration mechanisms and the quantity recovered through various recuperation channels. Jyoti Tanwar, 2020 advanced a model beneficial for bank managers in making plans and

forecasting. AHP and GP's combined approach is specific in this paper, which makes use of specialists' know-how and applies it within the version. The version is created on the financial institution's sensible dreams and constraints after carefully considering the problems faced with the aid of financial institution officers. The paper is confined to the Indian Banking system as different nations have specific stability sheet systems and constraints. Hooman, 2020 propose that Mellat financial institution, as the most important personal bank in Iran, have to reform its asset-legal responsibility allocation to attain the ultimate level. Amzad Ali, 2020 makes an try to cognizance at the developments of Gross NPA, internet NPA, the impact of NPAs, and ongoing policy projections to decrease NPAs. Manoj, 2020 unearths that there's sizeable distinction many of the variety of instances stated the 3 healing mechanisms and substantial difference in recognize of percent of quantity recovered through diverse healing channels. Dr. Ombir, 2020 makes an endeavor to reflect on consideration on the patterns of Gross NPA, net NPA, the result of NPAs and the on-going estimate taken by way of the government to decrease the NPA.

Need And Significance Of The Study

The contemporary and potential danger arise when the financial institution is unable to fulfill its responsibilities as they arrive due with no affect on the financial institution's financial condition. From an ALM perspective, the point of interest is at the investment liquidity hazard of the financial institution, that means its capacity to satisfy its present day and future coins-drift duties and collateral desires, both anticipated and unexpected. This venture as a consequence consists of the financial institution liquidity's benchmark charge inside the market. The threat of losses attributable to actions in interest fees and their effect on future cash-flows. usually since a bank can also have a inconsistent quantity of constant or changeable quotes units on both aspect of the balance-sheet. one of the primary causes are mismatches in phrases of bank deposit as well as loan. The danger of losses as a consequence of actions in exchanges charge. To the extent that money-float belongings and liabilities are denominated in exclusive currency. As all of the mechanism to make certain the maintenance of ok capital on a non-stop foundation. it's miles a active and continuing manner considering each quick- and longer-time period capital needs and is coordinated with a financial institution's typical approach and planning cycle. ALM offers with elements associated with credit score danger as this function is also to manipulate the impact of the entire credit score portfolio (which includes coins, savings, and loan) at the stability sheet. The credit score hazard, particularly within the loan portfolio, is handled through a separate hazard management characteristic and represent one of the main facts member to the ALM committee. The ALM feature scope covers both a prudential constituent (control of all viable risks and policies and regulation) and an optimization function (control of funding charges, producing outcomes on balance sheet function), inside the limits of fulfillment (implementation and tracking with inner rules and regulatory set of regulations). ALM intervenes

in those troubles of cutting-edge business sports but is also consulted to natural improvement and outside acquisition to analyze and validate the investment conditions option, situations of the initiatives and any risk.

Objective of The Study

1. To study the need of asset liability management in scheduled commercial bank.
2. To analyze the impact of ALM on the working of banking sector.
3. To examine various ALM strategies used in the banking sector.

Research Methodology

This study is theoretical in nature and based on secondary information collected through a variety of websites, journal, magazine, reports, banking journals etc.

Findings And Discussion

Objectives of Assets /Liabilities Management (ALM):

- Making plans to satisfy the Liquidity wishes: Making price range to be had at a competitive charge when they are required is the primary mission of ALM. The challenge is to achieve a proper blend of funds by using preserving the extent of non-interest budget to the naked minimum, maximize the fund allocation to high earnings areas whilst simultaneously making sure availability of price range to meet all situations.
- Arranging maturity sample of assets and Liabilities: Matching of property and liabilities over distinct time bands and maintaining a tag on their pricing by way of restricting their exposure to interest price risk are issues to be checked out in the ALM procedure. Controlling the costs received and paid to belongings /liabilities to maximise the unfold or internet interest profits is the very last obligation of ALM. The aforesaid goals are executed without exposing the financial institution to immoderate danger of default.
- Unfold management: spread or margin, recognized otherwise as interest unfold or interest margin or internet interest unfold/margin or internet interest income refers back to the distinction between interest earned on deployment and interest paid on the acquisition of economic sources.

Spread maximization method includes:

- Reducing bank's publicity to cyclical fees and stabilizing profits over the long time,
- Predicting price modifications and planning for such eventualities,
- Coordinating price structure,
- Balancing default chance on loans and investments against probable blessings, and
- Ensuring a steady but managed growth as also slow boom in profitability.

Gap management:

Gap refers to the difference between belongings and liabilities that can be impacted due to the modification in the interest rate. Such asset/liability are called rate sensitive asset (RSA) and charge sensitive liability (RSL) correspondingly.

For the gap management purpose, the property and liabilities are distributed over distinctive time bands/buckets calling for:

- Identifying and matching assets and liabilities over unique time bands,
- Optimizing the income over a complete financial cycle with out transferring to an severe role all through anybody phase, and
- Building a mechanism to expand and contract belongings/liabilities in response to fee cycle stages.

Interest sensitivity evaluation:

This analysis is an extrapolation of hole control approach. It issues with the evaluation of the effect of interest adjustments at the bank's unfold/margin and resultant general income.

Strategies in ALM Response Processes:

The approach includes:

- separating fixed and variable interest rate components of balance sheet,
- list assumptions concerning rate, quantity and blend of the projected portfolio,
- Making opportunity assumptions on rise and fall in interest prices, and
- checking out the effect of assumed adjustments within the volume and composition of the portfolio against both, growing and falling interest charge eventualities.

ALM need to be proactive and be commensurate with the commercial enterprise cycle. consideration has to receive to maintaining long time or short term belongings/liabilities with fixed and variable interest fees. addressing these troubles have to facilitate higher interest sensitivity evaluation as additionally spread and gap management.

<i>Status</i>	<i>Trickle down</i>	<i>Expansion</i>	<i>Peak</i>	<i>Contraction</i>
Monetary policy	Maximum ease	Transition from ease to tightening	Maximum tightening	Transition from tightening to ease
Possible strategy	Banks having plentiful funds Maintain maximum liquidity Keep asset maturity short Begin to lengthen the liabilities maturities	Loans expand, draw downs begin, liquidity reduced Lengthen asset maturity Keep liabilities until peak approaches Build liabilities volume	Liquidity depleted Keep asset maturities long Keep liability maturities short	Rebuild liquidity Shorten asset maturities Keep liabilities maturities short Reduce liabilities volume
Gap	Should be the widest towards the end of phase	Begin gradually narrowing gap, locking in long term fixed rate assets	Hold position Lock in fixed rate higher yield assets towards the end of phase	Gap will be the narrowest in the beginning and start widening

Pre-Requisites for ALM:

For making sure that ALM system is undertaken correctly, each financial institution has to understand the happenings inside the marketplace location. those can be:

- Volatility of interest prices:
- With the market driven economies, the forces working the market determine the interest rate structure. volatile interest charges extend possibilities as also create threats for ALM. The feasible profits or losses are compared to static and passive market conditions.
- converting deposit blend,
- increasing working costs:
- changing asset composition,
- more advantageous significance of capital adequacy concerns,
- increasing regulatory prescriptions, and specifically, and
- putting in place suitable generation as a selection support system.

The primary necessities for ALM to be useful encompass:

- Managers taking an normal than a slender purposeful view of the financial institution,
- creating means to break down complex troubles for resolution and choice making,
- allowing/recognizing adjustments in the banking surroundings,
- touching on choices beneath ALM to the maximization of shareholders' value, and development

Framework of coverage of property /Liabilities control (ALM):

development, adoption and implementation of diverse plans and regulations are important for ALM. The making plans gadget of any kind like strategic planning, long variety planning or medium time period planning or overall performance budgeting can be used alongside the laid down policies for liquidity, interest sensitivity and others. The monitoring under regular planning technique will be performed on month-to-month or quarterly basis. The ALM related policies should address to the following issues:

Background	Tenure of policy	Purpose
Applicability	Canons	Normal trade area
Clientele	Types of financing	Sector wise financing
Credit concentration	Products offered	Lending authority
Ad hoc approvals	Secured/Unsecured credits	Clean credits
Quasi equity issue	Collateral	Pricing policy
Interest rate	Penal interest rates	Repayment terms
Loan to Value (margin)	Credit appraisal	Ratios prescriptions
Review/reaffirmation	Submission of financials	Papers/file movement
Procedural issues	Credit dispensation	Monitoring
Overdue/litigated credits	Syndication/Consortium	Committees
Credit Rating system	Documentation	Legal compliances
Regulatory compliances	Credit Information exchange	Technical reports
Credit Investigation	Environmental liability	Call reports
Site visitations	Accounting	Supervisory mechanism
Allowance for Loan and Lease Loss (ALLL) reserve	Procedures for assessment of ALLL reserve adequacy	Implementation issues

Credit Policy: Credit policy should have the following components:

- Funding policy: An funding coverage is a hard and fast of extensive statements that describe the objectives, obligations, traits and boundaries on make investments portfolio. It's far the foundation on which portfolio planning and strategies are based. The portfolio strategy describes how the investment coverage is to be carried out given the contemporary and expected marketplace situations. The policy generally addresses to the problems like cause, organizational obligations, composition of portfolio, applicable tolerance tiers, decision-making strategies, and so forth.
- List of acceptable investment, their composition as consistent with percentage to total funding, pricing ranges and preferred adulthood patterns.
- Specification of investment underneath non-statutory category, minimal credit score tiers, accepted credit score rating agencies, and many others.
- Tips for buying and selling on Investments, tracking of trading operations and so forth.
- Bodily security of paper and authorizations thereto.
- Accounting methods such as 12 months-stop strategies like mark to marketplace.
- Approaches to address deviations from the policy.

Liquidity coverage: In monetary terms, liquidity method the potential of a commodity to get encashed. in the context of monetary area, it refers more to change resources of price range. The banks and other economic establishments want liquidity for meeting capacity credit call for, paying off the liabilities and making expenses.

it's far vital for them to address to the feasible volatility in the marketplace location. Having an trade investment arrangement is of importance for banks for those motives. Liquidity is vital for compensating for expected and unexpected fluctuations within the balance sheet as also for providing budget for growth and stability.

Liquidity has a fee and liquidity is inversely associated with profitability. at the same time as developing liquidity coverage, it is vital to present consideration to issues like:

- liquidity function might have on profitability,
- The price of failure to keep required liquidity (the idea used is balanced liquidity that means a managed conversion of asset into coins), hazard of failure to have good enough cash for evaluation of liquidity state of affairs.

The broad contents of liquidity policy are:

- Need for liquidity and the purpose to have a policy there approximately, concept of liquidity and impact of illiquid function,
- Managing liquidity based on situations like emerging liquidity needs as a consequence of competitive surroundings, fall in legal responsibility quantities in a large manner, better contribution of quick-time period deposits, massive credit volumes with little threat of early discount, attention of credit to ill units, etc.,
- Rationalization on detrimental situations like heavy dependence on borrowed finances, attention simplest on asset or legal responsibility control, pre-career simplest with mobilizing price range with the least cost with dismiss to maturity sample, and so on., clear reduce formats for reporting of liquidity function on a periodical foundation,
- Specification of change resources of budget inside the midst of illiquidity which include strategies like disposal of presidency securities, drawing under refinance or bankers' popularity, loan income and so on, approaches for handling deviations from policy prescriptions, and
- Liquidity management through such a policy represents the potential to accommodate efficiently and economically the decrease/boom in deposits and different liabilities in addition to increase/ decrease in property.

while liquidity coverage is aimed toward coping with liquidity threat, interest rate sensitivity coverage addresses to interest fee risk. interest rate chance refers to the capability impact on internet interest margin/income or/and marketplace value of fairness resulting from sudden changes in interest rates. The hazard arises from conserving property and liabilities with different main amounts and maturity dates/re-pricing dates.

An asset or legal responsibility is termed as price touchy within a time band if:

- It represents an intervening time/partial or final coins drift,
- The interest price resets/re-costs throughout the c program language period,
- Regulatory/financial or authorities alternate the interest prices,
- assets or liabilities are withdrawn earlier than said adulthood. and
- A wonderful gap ($RSA > RSL$) is perfect while the yield curve is shifting from flat role to poor or humped form.

The interest strategies in relation to business cycle are illustrated below:

Phases → Strategies ↓	Recovery	Prosperity	Recession	Depression
Assets side	Increase RSA Avoid fixed rate loans	Encourage fixed rates to lock in higher yield	Encourage fixed rate loans	Sell fixed rate loans and investments to book profits Increase RSA in anticipation of higher rate when recovery begins
Phases → Strategies ↓	Recovery	Prosperity	Recession	Depression
Liabilities side	Encourage fixed rate sources	Encourage short term sources Avoid high cost fixed rate sources	Raise short term sources of funds	Borrow long term at fixed rates
Recommended Gap Position	Positive RSA > RSL	Negative RSA < RSL	Negative RSA < RSL	Positive RSA > RSL

Rate sensitivity arises on the whole from the impact of future interest modifications at the financial institution's destiny profits. It depends on quantity, diversity/composition of assets/liabilities and interest pricing. seeing that banks do now not have the gain of large quantity of fixed rate liabilities or belongings, they are uncovered to interest rate chance.

The wide parameters of interest charge Sensitivity coverage are generally as follows:

- reason of the policy: The top motive of the coverage is comparing the property and liabilities, their maturity sample and composition within the context of interest pricing. Such exercising involves visualizing liquidity desires with attendant charges as also initiation of remedial moves.

- coverage Prescriptions: there is nothing like a great RSA: RSL ratio although desired situations had been narrated aforesaid. The assumptions underlying the prescription want to be documented as part of the policy. ALCO is required to evaluate their validity at the starting stage. Accuracy of assumptions is likewise to be tested by the ALCO on the tracking level.
- formats and process for Reporting: generally, regulatory authorities in every country offer the Performa for such reporting. character banks can and do modify these for-mats. Vertically, charge touchy assets and liabilities are reflected. The time bands like overnight, one month, one to three months, three to 6 months, and many others. are targeted horizontally so that it will work out the gaps in each time band as additionally on a cumulative basis.
- ALCO: The composition of ALCO and the obligations assigned to every member of ALCO are certain as part of the coverage.
- Remedial Measures: The coverage has to provide possible corrective measures in detrimental hole situations. those include expanding unfixed rate lending, shortening the maturities of investments, use of interest rate swaps, development of resources for rate based or non-interest earnings and so forth.

Even as growing such coverage, it ought to be identified that merely maintaining a balanced gap role i.e., equating RSA and RSL would no longer render the financial institution proof against interest fee threat.

Such rivalry is inaccurate due to the following:

- gap structure is arrived at a given factor of time whereas the chance is assessed on a futuristic interest charge structure.
- impact of interest charge changes isn't always uniform throughout all loans and investments.
- Visualizing the bank's strategy to move in for interest swaps isn't always facilitated through hole structure by myself.
- Re-pricable loans and investments may additionally roll over at fees notably one-of-a-kind than cutting-edge fees.
- rate sensitivity record may also show a balanced function in 1-3 months time band. however, if most of the property are due repricing within the first 45 days, interest fee chance is still considerable.

ALM and records technology: IT enabled structures bring about higher ALM. That is due to the fact, with a sophisticated IT structure, statistics seize and analysis is quicker. Until the appearance of reforms Indian Banks had now not taken into consideration ALM vital. Considering that reforms majority of the Indian banks has been reactive to the modifications and have adopted ALM. Currently maximum of the Indian banks have identified diverse duties to be performed like applying analytical techniques, the use of software program gear etc., to have powerful ALM. Troubles regarding information requirements for ALM and capture and storing of information on the branch stage and its aggregation at imperative office stage are critically being looked into.

ALM tasks and relevant management techniques are tabulated below:

<i>ALM Task</i>	<i>Management Technique</i>	<i>Remarks</i>
Gap measurement	Categorization of data	Casting of data in terms of two way tables helps the bank to (i) determine maturity composition of both assets and liabilities, (ii) measure the gap and (iii)cumulative gap at each maturity
Interest rate forecasting	Forecasting techniques	Interest rate forecasting permits the bank to monitor its spread by time frame
Projection of future income	Simulation and/or scenario building	These techniques help the bank to project future income and measure the bank's vulnerability to alternative interest-rate scenarios.
Portfolio Management	Linear Programming	Optimization models can be used to arrive at optimum investment portfolio and optimum credit portfolio etc.
Balance sheet management	Linear Programming	These models can help to arrive at different balance sheet items : assets side as well as liabilities side, both for short term results and long term rewards

The effectiveness of those strategies is a function of the quality of information on which the answer processes of such models are dependent. In the absence of branch level computerization, without statistics communiqué and core banking answer in location, bank managements will now not be able to develop needful MIS for the reason of ALM. certain facts warehousing/mining tools are very effective to help such expert technique of ALM.

Technique for Asset Liability Management

1) Gap investigation in Asset and Liability

A gap is distinct as the differentiation between Rate sensitive asset and Rate Sensitive liability.

GAP = Rate Sensitive Assets – Rate Sensitive liability

GAP Ratio = Rate Sensitive Assets/ Rate Sensitive liability

2) Asset Coverage Ratio

Asset Coverage Ratio = ((whole assets- intangible assets) – (current liability- short term debt))/total debt

Advantages

- It allows in danger dimension and control for corporations.
- Powerful assets-liability control ensure liquidity hazard administration.
- Powerful ALM protects and complements the profit and internet well worth of a enterprise.
- It will increase the internet interest profits of the banking group.
- ALM is use to quantify the diverse type of dangers in the enterprise.
- It enables in finalize the short time period and long time planning for a business enterprise.
- It help in strategizing the advent of latest products in the market.

Disadvantages

- It is able to be misleading from time to time.
- Once in a while having threat is better due to the fact high risk offers better returns.
- Its goal is to manage risk, no longer to get rid of chance.

- It's miles the procedure of taking a choice to manipulate dangers and stabilize the machine by using complementary property and liability.
- Groups have to have ok property to repay its liabilities on every occasion due.
- Organizations can use the gap analysis and asset coverage ratio to quantify this control.
- Within the banking business, it's far use to deal with the threat of assets-legal responsibility disparity due to both interest fee or liquidity danger.

Conclusion

Due to the fact the landscape of the economic services agency will become an increasing number of competitive, with growing expenses of intermediation due to better capital requirements and deposit insurance, financial establishments face a lack of spread earnings. In an effort to enhance the loss in profitability because of such traits, monetary establishments can be pressured to intentionally mismatch asset/legal duty maturities so that you can generate better spreads. ALM is a systematic technique that tries to offer a degree of safety to the risk arising out of the asset/liability mismatch. ALM consists of a framework to define, degree, show, regulate and manipulate liquidity and interest fee risk. It isn't constantly possible for economic institution to reorganize the asset and crook duty blend proper now to govern asset/criminal obligation gaps. Consequently, off-balance sheet strategies in conjunction with interest price swaps, options, futures, caps, floors, forward fee agreements, captions, and so on, can be used to create artificial hedges to control asset/ prison duty gaps. Asset legal responsibility management is an vital concept this is being utilized in numerous industries, frequently within the banking and coverage enterprise. An powerful asset control insurance framework can boom the profitability of banks with the aid of using manner of growing net interest earnings. A higher view can be visible as a coordinated approach of blending stability sheet devices into the right blend. The gist of the technique that organizations ought to have actual enough belongings to pay off its liabilities asset manage is a scientific method that can provide protection towards the risks that can rise up from the assets-liabilities obligation mismatch.

References

1. Indian Journal Of Finance And Banking , Mathematical Modeling Of Asset Liability Management In Banks Using Goal Programming And Ahp, Vol 4 No 4 (2020).
2. A Systematic Analysis Of Commercial Banks In India – A Study Of Nonperforming Assets (Npa), International Journal Of Management, 11 (9), 2020, Pp. 699-710
3. **Volume 31, Issue 1 (Ijjepr 2020)**, Multi -Objective Programming For Asset -Liability Management: The Case Of Iranian Banking Industry Hooman Abdollahi
4. The Recovery Management System Of Npas - A Case Study Of Commercial Banks In India *Manoj Kumar Sahoo, Volume Ix, Issue Iii, March/2020.
5. An Analytical Study Of Non-Performing Assets (Npa) Of Commercial Banks In India Dr. Ombirsingh, Volume Ix Issue V, May/2020.
6. Schedule Banks Performance And Prospects *Syed Mohd Minhaj, Volume Ix, Issue Ii, February/2020
7. Banking Sector Reforms And The Goals Of Nationalised Commercial Banks In India Kubendran Narayanasamy, Theoretical And Applied Economics Volume Xxvii (2020), No. 2(623), Summer, Pp. 241-262
8. Association Between Management Capacity And Profitability Of Scheduled Urban Co-Operative Banks In India Sandip Mallick And Subhamoy Das, Indo-Asian Journal Of Finance And Accounting Vol. 1, No. 1, 2020, Pp. 45-63.
9. Cost Efficiency Vis-À-Vis Revenue Efficiency Analysis Of Indian Scheduled Commercial Banks In A Dynamic Environment Aparna Bhatia, Cost Efficiency Vis-À-Vis Revenue Efficiency Analysis Of Indian Scheduled Commercial Banks In A Dynamic Environment Aparna Bhatia.
10. Assets-Liabilities Management Of Indian Commercial Banks: A Canonical Analysis Shabnam Nishat, Business Spectrum (Issn: 2249-4804) Volume Ix No. 2 July-December, 2019 An Open Access Fully Referred Peer Reviewed Bi-Annual Journal Of Iaa South Bengal Branch
11. Impact Of Institution Variables On The Non-Performing Assets Of Scheduled Commercial Banks In India, Dr.Kasa Sudarsan, <https://Archives.Palarch.Nl/Index.Php/Jae/Issue/View/126>
12. International Journal Of Accounting And Finance Review
13. International Journal Of Banking, Risk And Insurance

14. Papers.ssrn.com

15. Publishing india.com