



# IMPACT OF ALM ON INDIAN BANKS

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## ABSTRACT

*The basic function of commercial banks is Intermediation. In this process, banks undertake risks and reap rewards. In a regulated environment, the reward for intermediation is Net interest income, as banks accept deposits at regulated interest rates and lend at regulated rate and earn the interest spread. But with the deregulation of interest rates and the advent of ALM, interest rates were left to the market forces. So the Assets and Liabilities play a vital role in deciding interest rates, so as to maintain interest spread and profitability.*

*In the present paper, opinion survey among the managers of public and private sector banks was elicited on issues related to strengthening the ALM systems; on the interlinkages of ALM, Non-Performing Assets Management, Portfolio Management, Profitability Management and Risk Management. To explore the existing ALM system, Kendall's Co-efficient of concordance was employed.*

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# 1. Introduction

Earlier, Banks have been concentrating on the management of assets portfolio, thus expanded deposit mobilization, as it will increase their profits and the structure and composition of liabilities have been undermined. With the East Asian experience of asset liability mismatch, RBI has initiated ALM as a part of prudential monitoring measures.

The basic function of commercial banks is Intermediation. In this process, banks undertake risks and reap rewards. In a regulated environment, the reward for intermediation is Net interest income, banks accept deposits at regulated interest rates and lend at regulated rate and thus earn the interest spread. But with the deregulation of interest rates and the advent of ALM, interest rates were left to the market forces. So the Assets and Liabilities play a vital role in deciding interest rates, so as to maintain interest spread and profitability. No longer are deposits and loans the goals of bank managers. The reality is that bank should take care of profit and profit will take care of growth.

The investment policy of commercial banks is generally governed by three important principles, viz, liquidity, profitability and safety. The banker has to trade-off between liquidity and profitability, the two conflicting goals. From the sustainability and viability point of view, the liquidity, profitability and risk became parameters.

This Paper deals with the impact of ALM on the Banks Profitability (interest spread), liquidity and risk.

## 1.2. Objective

The objective of the study was to explore the prevalent ALM system on the basis of an opinion survey. The Study was based on the primary data. An opinion survey among the managers of public and private sector commercial banks was elicited on issues related to strengthening the ALM systems, so questionnaire on the interlinkages of ALM, and Profitability Management, Non -Performing Assets Management, Portfolio Management and Risk Management was prepared to elude the opinion of bank officials of Senior managers like General Manager, Assistant General Manager and Junior manager cadres.

### 1.3. Hypotheses:

$H_{(1)}$ : There is impact of ALM on the Interest spread

(Interlinkages of ALM with Profitability and Non-Performing Assets Management).

$H_{(2)}$ : The ALM does have an impact on the Bank's liquidity

(Interlinkages of ALM with Portfolio Management).

$H_{(3)}$ : The ALM does have an impact on the Bank's Risk.

(Interlinkages of ALM with Risk Management).

To test the Hypotheses, questionnaire was built on the grounds that there is an association of ALM and The Organisational Structure, Profitability, Non-performing Assets Management, Portfolio Management and Risk Management. As discussed earlier, ALM consists of Investment and Portfolio Management, NPAs Management, Profitability Management and Risk Management.

### 1.4. Kendall's Co-efficient of Concordance

Kendall's coefficient of concordance, represented by the symbol  $W$ , is an important non-parametric measure of relationship used for determining the degree of association of among several ( $k$ ) set of ranking of  $N$  objects, or individuals. When there are two sets of rankings of  $N$  objects, generally we use Spearman's coefficient of correlation, but Kendall's coefficient of concordance ( $W$ ) is considered an appropriate measure for studying the degree of association among three or more sets of rankings.

#### 1.4. a. Scope for Kendall's Co-efficient of Concordance

A total of around 350 questionnaires were mailed to bank officials, both Public sector (SBI and Nationalised Banks) and Private sector banks some of them were also interviewed. Out of them 246 gave in depth response, constituting a 70.2 % response rate. The study covered major banks in Public Sector as well as Private sector banks.

#### 1.4. b. Methodology for Kendall's Co-efficient of Concordance

In order to ascertain whether there is perfect agreement on the various issues raised in the questionnaire among the various categories of respondents, the Kendall's coefficient of concordance was calculated. The data are arranged into K\*N matrix. Each row represents the rank assigned to a particular set of employees. Then the sum of ranks  $R_j$  in each column is calculated and each is divided by "N" to obtain the mean value  $\bar{R}_j$  ; Obtain the value of s as under:

$$s = \sum (\bar{R}_j - \bar{R}_j)^2$$

Then work out the value of W using the following formula:

$$W = s / 1/12 k^2 (N^3 - N)$$

Where

$$s = \sum (R_j - \bar{R}_j)^2 ;$$

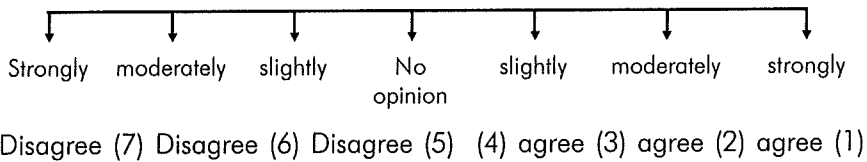
k = no of sets of rankings;

N = number of statements ranked

When perfect agreement exists between respondents, W equals to 1. When maximum disagreement exists, W equals to 0. Thus, coefficient of concordance is an index of divergence of the actual agreement shown in the data from the perfect agreement.

The questionnaire was administered consisting of 25 statements with 7 degrees. The first five questions are about the identity of the ALM. The respondent may respond in any one of the following ways:

- (i) Strongly disagree;
- (ii) Moderately disagree;
- (iii) Slightly disagree;
- (iv) Undecided or no opinion;
- (v) Slightly agree;
- (vi) Moderately agree and
- (vii) Strongly agree.



At one extreme of the scale there is strong agreement with the given statement and at the other side there is strong disagreement and between lies the intermediate points, just as above.

### 1.5. Likerts scale

Generally Likert's scale advocates of least favourable response to be given least score (say 1) and the most favourable is given the highest score (say 7). But here a small modification to the Likert's scale was made, so as to calculate the Kendall's coefficient of concordance.

Each point on the scale carries a score. Response indicating the least favourable degree is given the highest score (say 7) and the most favourable is given the least score (say 1). These score values are not known to the respondent, as only the degrees are given to mark their response. Thus each statement has a degree of response marked against them, by the respondent. The total index of the respondents opinion was calculated by multiplying the number of respondents opinion in relation to respective statement by the code assigned to the degree of response, namely strongly disagree; moderately disagree; slightly disagree; undecided or no opinion; slightly agree; moderately agree and strongly agree. On the basis of this total index, respondent's opinions were ranked.

**Significance:** The method for judging whether the calculated value of  $W$  significantly varies from zero depends on the size of  $N$ . If  $N$  is 7 or smaller, selected critical values of  $S$  in the Kendall's Coefficient of Concordance Table gives the critical values of  $S$  associated with  $W$ 's significance at 5% and 1% levels. If calculated value of  $S$  is equal to or greater than the  $S$  value that is shown in the table for a particular level of significance, then Hypothesis (i.e.,  $k$  set of rankings) may be accepted at that level of significance and  $W$  is significant.

1.6. Computation of Kendall's coefficient of concordance:

1.6.1. Profitability Management

Table: 1.1: Profitability Management

Statement	Public Sector Banks				Private Sector Banks					
	GM	AGM	M	S	R	GM	AGM	M	S	R
1. Window –dressing of the deposits decrease profits	3	4	5	12	4	6	3	6	15	5
2. Computerisation of bank services increase profits	4	3	2	9	3	1	2	2	5	2
3. Bank lending to the stock market operations discourages profits	2	1	3	6	2	3	4	3	10	3
4. Decision making power regarding ALM mix at Branch level accounting increase profits	1	2	1	4	1	2	1	1	4	1
5. Basel –II has an adverse impact on banks profitability	6	5	4	15	5	5	6	4	15	6
6. Liberalisation in lending will improve the profit of banks	5	6	6	17	6	4	5	5	14	4

### 1.6.1.a. Profitability Management: Public Sector Banks

Table: 1.1.a: Profitability Management: Public Sector Banks

k=3	$\bar{A}$	B	C	D	E	F	N=6
GM	3	4	2	1	6	5	
AGM	4	3	1	2	5	6	
M	5	2	3	1	4	6	
Sum of Ranks ( $R_j$ )	12	9	6	4	15	17	$\Sigma R_j = 63$
$(R_j - R_j)^2$	2.25	12.25	20.25	42.25	120.25	42.25	$s = 129.5$

$$(R_j) = \Sigma R_j / N = 63/6 = 10.5$$

$$\begin{aligned} W &= s/1/12 k^2 (N^3-N) \\ &= 129.5/ 1/12 * 3^3 * 6^3 - 6 = 129.5/ 9/12 * 210 \\ &= 129.5/157.5 = 0.82 \end{aligned}$$

### 1.6.1 .b. Profitability Management: Private Sector Banks

Table: 1.1.b: Profitability Management: Private Sector Banks

k=3	$\bar{A}$	B	C	D	E	F	N=6
GM	6	1	3	2	5	4	
AGM	3	2	4	1	6	5	
M	6	2	3	1	4	5	
Sum of Ranks ( $R_j$ )	15	5	10	4	15	14	$\Sigma R_j = 63$
$(R_j - R_j)^2$	20.25	30.25	0.25	42.25	20.25	12.25	$s = 125.5$

$$(R_j) = \Sigma R_j / N = 63/6 = 10.5$$

$$\begin{aligned} W &= s/1/12 k^2 (N^3-N) \\ &= 125.5/ 1/12 * 3^2 * 6^3 - 6 = 125.5/ 9/12 * 210 \\ &= 125.5/157.5 = 0.796 \end{aligned}$$

Profitability is an essential objective of Investment management in banks. To be profitable, a bank should not only show healthy short-term earnings, but it must also manage liquidity, risk and earnings through recurring business cycles for long-term survival. The interest margin is the best measure of banks profitability, since bank management main objective is to maintain the maximum spread. To achieve this Management must coordinate and balance maturity, interest rate structure and credit quality of assets and liabilities.

Decision making power regarding ALM mix at Branch level accounting increase profits. Bank lending to the stock market operations discourages profits. Computerisation of bank services increase profits.

The Kendall's coefficient of concordance 'W' calculated for Public sector banks is 0.82 and table value of S is 103.9, where as the calculated value of k as 3 and N as 6 is 129.5 at 5% level of significance. So we accept the hypothesis that there is impact of ALM on the Interest spread since ranks are in agreement.

The Kendall's coefficient of concordance 'W' calculated for Public sector banks is 0.796 and table value of S is 103.9, where as the calculated value of k as 3 and N as 6 is 125.5 at 5 % level of significance. So we accept the hypothesis that the impact of ALM on the Interest spread can be felt as ranks are in agreement.



### 1.6.2: Non-Performing Assets Management

Table: 1.2. Non-Performing Assets Management

Statement	Public Sector Banks					Private Sector Banks				
	GM	AGM	M	S	R	GM	AGM	M	S	R
1. Poor recovery administration in Advances increase NPAs	3	2	4	9	3	2	4	3	9	3
2. Loan waiver scheme increase NPAs	5	6	3	14	5	4	6	6	16	6
3. Political pressures increase NPAs	6	5	5	16	6	6	5	4	15	5
4. Poor quality of collaterals increases NPAs.	4	3	6	13	4	5	3	5	13	4
5. Decision making in sanctioning of advances by credit approving authorities decrease NPAs	2	4	1	7	2	3	2	2	7	2
6. Frequent Loan Review Management to assess the adequacy of loan policies and procedures decrease NPAs	1	1	2	4	1	1	1	1	3	1

**1.6.2.i) Non-Performing Assets Management: Public Sector Banks**

**Table: 1.2.a: Non-Performing Assets Management: Public Sector Banks**

k=3	$\bar{A}$	B	C	D	E	F	N=6
GM	3	5	6	4	2	1	
AGM	2	6	5	3	4	1	
M	4	3	5	6	1	2	
Sum of Ranks (R <sub>j</sub> )	9	14	16	13	7	4	$\Sigma R_j = 63$
(R <sub>j</sub> - R <sub>j</sub> ) <sup>2</sup>	2.25	12.25	30.25	6.25	12.25	42.25	s = 105.5

$$\overline{(R_j)} = \Sigma R_j / N = 63/6 = 10.16$$

$$\begin{aligned} W &= s/1/12 k^2 (N^3-N) \\ &= 105.5/ 1/12 *3^2*6^3-6 \\ &= 105.5/ 9/12 *210 \\ &= 105.5/157.5 = 0.66 \end{aligned}$$

**1.6.2.ii). Non-Performing Assets Management: Private Sector Banks**

**Table: 1.2.b: Non-Performing Assets Management: Private Sector Banks**

k=3	$\bar{A}$	B	C	D	E	F	N=6
GM	2	4	6	5	3	1	
AGM	4	6	5	3	2	1	
M	3	6	4	5	2	1	
Sum of Ranks (R <sub>j</sub> )	9	6	15	13	7	3	$\Sigma R_j = 63$
(R <sub>j</sub> - R <sub>j</sub> ) <sup>2</sup>	2.25	30.25	20.25	6.25	12.25	56.25	s = 127.5

$$\overline{(R_j)} = \Sigma R_j / N = 63/6 = 10.5$$

$$\begin{aligned} W &= s/1/12 k^2 (N^3-N) \\ &= 127.5/ 1/12 *3^2*6^3-6 = 127.5/ 9/12 *210 \\ &= 127.5/157.5 = 0.8 \end{aligned}$$

The Kendall's coefficient of concordance 'W' calculated for ranking of General Managers, Assistant General Managers and Managers of both the Public sector banks and the Private sector banks on the various issues related to the Non-performing Assets management. All the Managers were strongly of the opinion that the

1. Frequent Loan Review Management to assess the adequacy of loan policies and procedures decrease NPAs.
2. Decision making in sanctioning of advances by credit approving authorities decrease NPAs.
3. Poor recovery administration in Advances increases NPAs.

To statistically test whether the different categories of employees differed significantly, the Kendall's coefficient of concordance 'W' calculated for Public sector banks is 0.66 and S is 105.5. The table value of S at 5% level of confidence, where k as 3, N as 6 is 103.9. As the calculated value is greater than table value of S, the hypothesis that the ALM has interlinkage with NPA Management( ranks are in agreement) is accepted.

The Kendall's coefficient of concordance 'W' calculated for Private sector banks is 0.8 and S is 127.5, at a table value of 103.9 for 5 % level of significance for k as 3, N as 6. So W is significant. Statistically there was perfect agreement among the managers of all banks on the different issues of NPAs with respect to ALM.

### 1.6.3. Portfolio Management

Table: 1.3: Portfolio Management

Statement	Public Sector Banks				Private Sector Banks					
	GM	AGM	M	S	R	GM	AGM	M	S	R
1. Statutory requirements is responsible for low profitability	2	1	1	4	1	2	2	3	7	3
2. Social obligations to lend for the priority sectors increase NPAs	4	3	6	13	5	3	3	1	7	2
3. Raising banks income from non-fund based operations will improve the capital	3	5	4	12	4	4	5	4	13	4
4. Inefficient portfolio management increases ALM mismatches	1	2	2	5	2	1	1	2	4	1
5. Efficient assets management helps minimizing capital	5	4	3	12	3	5	4	6	15	5
6. Defective audit mechanisms of investments disturbs the investment management goals	6	7	5	18	6	6	6	5	17	6
7. Defective feasibility proposals increases credit recovery problems	7	6	7	20	7	7	7	6	20	7

**1.6.3.i) Portfolio Management: Public Sector Banks**

**Table: 1.3.a: Portfolio Management: Public Sector Banks**

k=3	$\bar{A}$	B	C	D	E	F	G	N=6
GM	2	4	3	1	5	6	7	
AGM	1	3	5	2	4	7	6	
M	1	6	4	2	3	5	7	
Sum of Ranks (R <sub>j</sub> )	4	13	12	5	12	18	20	$\Sigma R_j = 84$
(R <sub>j</sub> - R <sub>j</sub> ) <sup>2</sup>	64	1	0	49	0	36	64	s = 214

$$(\bar{R}_j) = \Sigma R_j / N = 84/7 = 12$$

$$\begin{aligned} W &= s / 1/12 k^2 (N^3 - N) \\ &= 214 / 1/12 * 3^2 * 7^3 - 7 \\ &= 214 / 9/12 * 336 \\ &= 214/252 = 0.849 \end{aligned}$$

**1.6.3.ii) Portfolio Management: Private Sector Banks**

**Table: 1.3.b: Portfolio Management: Private Sector Banks**

k=3	$\bar{A}$	B	C	D	E	F	G	N=7
GM	2	3	4	1	5	6	7	
AGM	2	3	5	1	4	6	7	
M	3	1	4	2	6	5	6	
Sum of Ranks (R <sub>j</sub> )	7	7	13	4	15	17	20	$\Sigma R_j = 83$
(R <sub>j</sub> - R <sub>j</sub> ) <sup>2</sup>	23.5	23.5	1.32	61.62	9.92	26.52	66.42	s = 212.84

$$(\bar{R}_j) = \Sigma R_j / N = 83/7 = 11.85$$

$$\begin{aligned} W &= s / 1/12 k^2 (N^3 - N) \\ &= 212.84 / 1/12 * 3^2 * 7^3 - 7 \\ &= 212.84 / 9/12 * 336 \\ &= 212.84/252 = 0.84 \end{aligned}$$

All the Public sector bank Managers were strongly of the opinion that the statutory requirements are responsible for low profitability, as there is low yield on CRR and SLR. The CRR and SLR rates had been decreased, but the banks prefer to invest in government bonds and securities. And Private sector bank managers were of the opinion that inefficient portfolio management increases ALM mismatches. Social obligations to lend for the priority sectors increase NPAs, Raising banks income from non-fund based operations will improve the capital, efficient assets management helps minimizing capital were of secondary importance to the Managers. Defective audit mechanisms of investments, disturbs the investment management goals. Defective feasibility proposals increases credit recovery problems were of the least categorized statements.

The Kendall's coefficient of concordance 'W' calculated for Public sector banks is 0.849 and table value of S is 157.3, where as the calculated value of k as 3 and N as 7 is 214 at 5 % level of significance. So accept the hypothesis, that ALM has interlinkage with Portfolio Management with respect to liquidity, as the W value is significant.

The Kendall's coefficient of concordance 'W' calculated for Private sector banks is 0.84 and table value of S is 157.3, where as the calculated value of k as 3 and N as 7 is 212.84 at 5 % level of significance. So we accept the hypothesis that ALM has a direct impact on liquidity because of interlinkages with Portfolio Management.

### 1.6.4. Risk Management

Table: 1.4: Risk Management

Statement	Public Sector Banks						Private Sector Banks					
	GM	AGM	M	S	R		GM	AGM	M	S	R	
	2	4	3	9	3		3	3	4	10	4	
3	3	2	7	2		2	4	3	9	3		
1.	1	1	1	3	1		1	1	3	1		
2.	4	5	4	13	4		4	2	8	2		
3.	5	2	6	13	5		6	5	17	6		
4.	6	6	5	17	6		5	6	16	5		

**1.6.4.i) Risk Management: Public Sector Banks**

**Table: 1.4.a: Risk Management: Public Sector Banks**

k=3	$\bar{A}$	B	C	D	E	F	N=6
GM	2	3	2	4	5	6	
AGM	4	3	2	5	2	6	
M	3	2	1	4	6	5	
Sum of Ranks (R <sub>j</sub> )	9	7	3	13	13	17	$\Sigma R_j = 62$
(R <sub>j</sub> - R <sub>j</sub> ) <sup>2</sup>	1.69	10.89	53.29	5.4	5.4	44.89	s = 121.56

$$\bar{(R_j)} = \Sigma R_j / N = 62/6 = 10.3$$

$$W = s/1/12 k^2 (N^3-N)$$

$$= 121.56/ 1/12 * 3^2 * 6^3 - 6 = 121.56/ 9/12 * 210$$

$$= 121.56/157.5 = 0.77$$

**1.6.4.ii) Risk Management: Private Sector Banks**

**Table: 1.4.b: Risk Management: Private Sector Banks**

k=3	$\bar{A}$	B	C	D	E	F	N=6
GM	3	2	1	4	6	5	
AGM	3	4	1	2	5	6	
M	4	3	1	2	6	5	
Sum of Ranks (R <sub>j</sub> )	10	9	3	8	17	16	$\Sigma R_j = 63$
(R <sub>j</sub> - R <sub>j</sub> ) <sup>2</sup>	0.25	2.25	56.25	6.25	42.25	30.25	s = 137.5

$$\bar{(R_j)} = \Sigma R_j / N = 63/6 = 10.5$$

$$W = s/1/12 k^2 (N^3-N)$$

$$= 137.5/ 1/12 * 3^2 * 6^3 - 6 = 137.5/ 9/12 * 210$$

$$= 137.5/157.5 = 0.87$$



Business Intelligence tools are utilized fully to the extent of forecasting, analyzing, and interpreting the ALM mismatches to reduce risks. SWOT analysis helps in predicting ALM risks accurately.

The Kendall's coefficient of concordance 'W' calculated for Public sector banks is 0.77 and table value of S is 103.9, where as the calculated value of k as 3 and N at 7 and 5 % level of significance, S is 121.56, So we accept the hypothesis that ALM has an impact on Risk Management.

The Kendall's coefficient of concordance 'W' calculated for Public sector banks is 0.87 and table value of S is, where as the calculated value of k as 3 and N as 7 is S is 137.5 at 5 % level of significance So we accept the hypothesis that ALM and Risk management have interlinkages.

## **1.7. Results: Interlinkages of ALM**

### ***a) Profitability Management:***

- Decision making power regarding ALM mix at Branch level accounting increase profits.
- Bank lending to the stock market operations depresses profits.
- Computerisation of bank services increase profits.

### ***b) Non-Performing Assets Management:***

- Frequent Loan Review Management to assess the adequacy of loan policies and procedures decreases NPAs.
- Decision making in sanctioning of advances by credit approving authorities decrease NPAs.
- Poor recovery administration in Advances increases NPAs.

### ***c) Portfolio Management:***

- Statutory requirements are responsible for low profitability, as there is low yield on CRR and SLR.
- Inefficient portfolio management increases ALM mismatches.

- Social obligations to lend for the priority sectors increase NPAs
- Raising banks income from non-fund based operations will improve the capital, efficient assets management helps minimizing capital.
- Defective audit mechanisms of investments, disturbs the investment management goals.
- Defective feasibility proposals increases credit recovery problems

#### *d) Risk Management:*

- Business Intelligence tools are to be utilized fully to the extent of forecasting, analyzing, and interpreting the ALM mismatches to reduce risks.
- SWOT analysis helps in predicting ALM risks accurately.

### **1.8. Summary**

Profitability is the essential objective of Asset-Liability Management in banks. To be profitable, a bank should not only show healthy short-term earnings, but it must also manage liquidity, risk and earnings through recurring business cycles for long-term survival. The interest margin is the best measure of banks profitability, since bank management's main objective is to maintain the maximum spread. To achieve this Management must coordinate and balance maturity, interest rate structure and credit quality of assets and liabilities.

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