

Impact of Asset-Liability Management on the Profitability of Banks

*Priyanshu Raparia

Xavier Institute of Management, Bhubaneswar

Corresponding Author: *Priyanshu Raparia

Abstract: In banking institutions, asset and liability management is the practice of managing various risks that arise due to mismatches between the assets and liabilities (loans and advances) of the bank.

Banks face several risks such as the risks associated with assets, interest, currency exchange risks. Asset Liability management (ALM) is a tool to manage interest rate risk and liquidity risk faced by various banks, other financial services companies.

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I. Introduction

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. According to Liner Model proposed by Dash and Pathak (2011) it was found that public sector banks have best asset-liability management positions. In their turn, Dash et al. (2011) found that public sector banks had a strong short-term liquidity position, but with lower profitability, while private sector banks had a comfortable short-term liquidity position, balancing profitability.

Most of the literature emphasizes the strategic aspects of asset-liability management, and very few studies have considered the impact of asset-liability management on the performance of banks. The present study tries to address the gap in the literature.

II. Methodology

The objective of the ALM project is to examine the impact of asset-liability management on the profitability of the banks.

Scope: The scope of the study covers both public private sector banks in India.

Sample Space: A sample of thirty banks was considered for the study.

Period of Study: The study period is the financial year 2015-16, with the financial position of the sample banks considered on March 31st, 2016.

Form of data: The data for the study is in the form of balance sheets of the sample banks and was collected from the Annual Reports of respective banks.

The sample banks are listed in Table 1.

The average profits of the public sector banks were Rs. 6950.86 crore, with a standard deviation of Rs. 10084.795 crore,

While that of private sector banks were Rs. 7251.58 crore, with a standard deviation of Rs. 10084.79 crore

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 day, 2 to 7 days, 8 to 14 days, 15 to 28 days, "29 days to 3 months", Over 3 months to 6 months, Over 6 months to 12 months, "Over 1 year to 3 years", "Over 3 years to 5 years", Over 5 years

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.

Sample Banks and Their Profit (in Rs. Crore) for 2015-16

Bank	OPERATING Profit (in crores)
Allahabad Bank	4134
Andhra Bank	3960
Axis Bank	16104
Bank of Baroda	4318.04
Bank of India	6036
Bank of Maharashtra	2345
Canara Bank	7147
Central Bank of India	2641.35
Corporation Bank	3095.02
Deutsche Bank	3842
Development Credit Bank	277.45
Dhanlaxmi Bank	3.28
ICICI Bank	23863
IDBI Bank	5377
Indian Bank	3032.09
Indian Overseas Bank	2885
IndusInd Bank	4141.42
Jammu and Kashmir Bank	1667.92
Karnataka Bank Ltd	854.54
Kotak Bank	2089.78
Oriental Bank of Commerce	3682
Punjab National Bank	12216
Punjab & Sind Bank	1269.89
South Indian Bank	879.28
Yes Bank Ltd	4302.5
State Bank of India	43257.81
Syndicate Bank	4209
UCO Bank	3603
Union Bank of India	5722
United Bank of India	1811.8
Vijaya Bank	1548.87

Descriptive Statistics

The descriptive statistics of the maturity mismatches and the sensitivity mismatches of public sector and private sector banks are given in below table.

Descriptive Statistics of the Maturity Mismatches of Public and Private Sector Banks

Most of the sample banks were found to have negative mismatches for shorter maturities, positive mismatch for longer maturities. All banks had positive mismatch for 1 – day maturity. In all cases, it was found that the mismatches were significantly higher for public banks.

		public	private	overall	z stat	p-value
Mismatch 1: 1 day	Mean	5,130.42	9,558.86	6,273.24	0.2665	0.2841
	Std. Dev.	24,891.93	12,489.64	26,955.77		
Mismatch 2: 2-7 days	Mean	-3,090.19	26.11	-2,285.98	0.5741	0.2829
	Std. Dev.	4,452.19	4,490.76	21,471.06		
Mismatch 3: 8-14 days	Mean	-2,013.91	-1,152.85	-1,791.70	0.7731	0.2197
	Std. Dev.	4,452.19	1,740.16	3,922.93		
Mismatch 4: 15 to 28 days	Mean	-2,100.64	94.23	-1,534.22	0.9796	0.1636

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	Std. Dev.	8,271.80	4,045.29	7,412.70		
Mismatch 5: 29 days to 3 months	Mean	-6,284.93	-4,679.67	-5,870.67	0.2665	0.3949
	Std. Dev.	23,894.83	9,578.92	20,991.08		
Mismatch 6: Over 3 months to 6 months	Mean	-13,052.53	-7,281.43	-11,563.21	0.8025	0.2111
	Std. Dev.	30,234.01	9,786.56	26,443.79		
Mismatch 7: Over 6 months to 12 months	Mean	-32,321.24	-20,190.85	-29,190.82	0.7229	0.2349
	Std. Dev.	66,482.33	26,742.36	58,628.00		
Mismatch 8: Over 1 year to 3 years	Mean	33,526.07	14,730.18	28,675.52	-0.9221	0.1782
	Std. Dev.	89,603.19	23,044.10	77,984.24		
Mismatch 9: Over 3 years to 5 years	Mean	-6,989.31	-6,239.79	-6,795.89	0.0279	0.4889
	Std. Dev.	1,19,246.10	28,894.69	1,03,066.25		
Mismatch 10: Over 5 year	Mean	24,189.41	16,547.32	22,217.26	-0.6735	0.2503
	Std. Dev.	43,285.58	19,452.91	38,390.82		

Factor Analysis

As the maturity mismatches must sum to zero, there is expected to be a high degree of multicollinearity among the independent variables. To deal with this multicollinearity, factor analysis was performed.

Rotated Component Matrix^a

	Component			
	1	2	3	4
1 day		-.827		
2 to 7 days		.892		
8 to 14 days	.781			
15 to 28 days	.918			
29 days to 3 months	.815			
Over 3 months to 6 months	.940			
Over 6 months to 12 months	.888			
Over 1 year to 3 years				
Over 3 years to 5 years			.951	
Over 5 years				.887

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

III. Conclusion of Factor analysis & Regression Output

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.762741099							
R Square	0.581773984							
Adjusted R Square	0.51743152							
Standard Error	6624.875123							
Observations	31							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	4	1587347426	3.97E+08	9.041836	0.000102559			
Residual	26	1141113230	43888970					
Total	30	2728460656						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	3714.702212	1433.30168	2.59171	0.015461	768.508414	6660.896	768.5084	6660.896
1-7d	0.192726748	0.075257987	2.560881	0.016593	0.03803174	0.347422	0.038032	0.347422
1d-12m	-0.051861557	0.019375597	-2.67664	0.012704	-0.091688667	-0.01203	-0.09169	-0.01203
1d-5y	-0.003951791	0.037326535	-0.10587	0.916497	-0.080677582	0.072774	-0.08068	0.072774
total	0.001535989	0.033643074	0.045655	0.963934	-0.067618341	0.07069	-0.06762	0.07069
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1d-5y	-0.003951791	0.037326535	-0.10587	0.916497	-0.080677582	0.072774	-0.08068	0.072774
total	0.001535989	0.033643074	0.045655	0.963934	-0.067618341	0.07069	-0.06762	0.07069

- Profit, $Y = 3714.702 + 0.139 * (\text{Maturity Mismatch:1-7days}) - 0.05428 * (\text{Maturity Mismatch:8days-12months})$
- Since the values of p for buckets 3-5 years and >5 years, we will not consider them in our outputs
- We have taken a default cutoff of 0.6 and SPSS identified 4 main factors-
 - 1-7 days
 - 8days-12 months
 - 3-5 years
 - >5years
- The same procedure was used for cumulative maturity mismatches; 4 maturity mismatches were derived
- **Conclusion**
- **Model I** was significant, explaining 52% of the variation in profit of the sample banks. The constant term was significant, indicating a significant interest rate spread. A positive maturity mismatch for the 1-7 day bracket was found to have a significant negative impact on profit, while a negative maturity mismatch for the 8 days-12 months bracket was found to have a significant positive impact on profit. Hence, there is a

tradeoff between negative maturity mismatch and its effect on profitability. For 3-5 years and >5years, the values were insignificant

- **Model II** was also significant, explaining 52% of the variation in profit of the sample banks. The constant term was significant, indicating a significant interest rate spread. A positive maturity mismatch for the 1-7 day bracket was found to have a significant negative impact on profit, while a negative maturity mismatch for the 8 days-12 months bracket was found to have a significant positive impact on profit. Hence, there is a tradeoff between negative maturity mismatch and its effect on profitability. For 3-5 years and >5years, the values were insignificant

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