

Measuring Interest Rate Risk in Indian Banks

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Abstract

*Banking and financial system are the backbone of any economy. Assets and Liabilities Management (ALM) of banks 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. Banks are always aiming at maximizing profitability at the same time trying to ensure sufficient liquidity. Should there be any disorderly adjustments in the financial markets, it may have implications for the banking sector through changes in interest rates and liquidity shifts. Sharp rise in interest rates may result in marked to market losses on the investment portfolio of banks. This concept has gained importance in Indian conditions in the wake of the ongoing financial sector reforms, particularly reforms relating to interest rate deregulation. The technique of managing both assets and liabilities together has come into being as a strategic response of banks to inflationary pressure, volatility in interest rates and severe recessionary trends which marked the global economy in the seventies and eighties. The major focus of prudential regulation in developing countries has traditionally been on credit risk. While banks and their supervisors have grappled with non-performing loans for several decades, interest rate risk is a relatively new problem. Administrative restrictions on interest rates in India have been steadily eased since 1993. This has led to increased interest rate volatility. Hence, there is a need to measure the interest rate risk exposure of Indian banks. This paper entitled **Measuring Interest Rate Risk in Indian Banks** measures the Interest Rate Risk exposure of State Bank of India (SBI), by using Gap Analysis Technique. Using publicly available information, this paper attempts to assess the interest rate risk carried by the SBI in 2006, 2007, and 2008.*

Key Words— Interest volatility, Interest Rate Risk, Indian Banks, SBI.

Introduction

Banks have twin objectives of maximizing profitability and at the same time trying to ensure sufficient liquidity. To achieve these objectives, it is essential that banks have to monitor, maintain and manage their assets and liabilities portfolios in a systematic manner taking into account the various risks involved in these areas. This concept has gained importance in Indian conditions in the wake of the ongoing financial sector reforms, particularly reforms relating to interest rate deregulation.

The technique of managing both assets and liabilities together has come into being as a strategic response of banks to inflationary pressure, volatility in interest rates and severe recessionary trends which marked the global economy in the seventies and eighties. Should there be any disorderly adjustments in the financial markets, it may have implications for the banking sector through changes in interest rates and liquidity shifts. Sharp rise in interest rates may result in marked to market losses on the investment portfolio of banks. This paper aims to measure the interest rate exposure of one of the public sector banks, *viz.*, SBI from 2005-06 to 2007-08, using Gap Analysis.

Movement in Key Policy Rates and Yield Curve

The major focus of prudential regulation in developing countries has traditionally been on credit risk. While banks and their supervisors have grappled with non-performing loans for several decades, interest rate risk is a relatively new problem. *Administrative restrictions on interest rates in India have been steadily eased since 1993.* This has led to increased interest rate volatility. Table 1 shows the movement in key policy rates in India during the study period. The yield curve has shifted upward since March 2004, with the 10-year yields moving from 5 to 7 per cent (Fig. 1). However, the longer end of the curve has flattened. The significant drop in turnover in 2004-05 and 2005-06 could be due to a 'buy and hold' tendency of the participants other than commercial banks (like insurance companies) and also due to the asymmetric response of investors to the interest rate cycle. In the absence of a facility of short selling in government securities, participants generally refrained from taking positions which resulted in volumes drying up in a falling market. The Reserve Bank's efforts to elongate the maturity profile resulted in a smooth and reliable yield curve to act as a benchmark for the other markets for pricing and valuation purposes. The weighted average maturity of securities increased from 5.5 years in 1995-96 to 14.6 years during 2006-07. The weighted average yield of securities also declined to 5.7 per cent in 2003-04 and since then, it has increased to 7.3 per cent in 2005-06 and further to 7.9 per cent in 2006-07. The Indian yield curve today compares with not only emerging market economies but also the developed world.

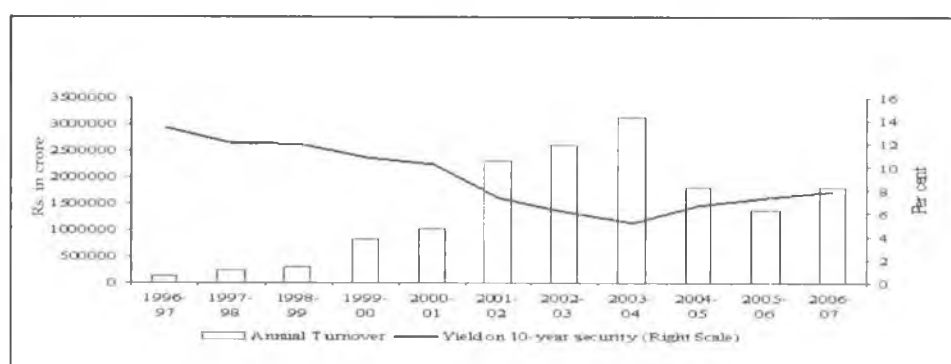
Table - 1: Movement in Key Policy Rates and Reserve Requirements (%)

Effective since	Reverse Repo Rate	Repo Rate	Cash Reserve Ratio
Mar 31, 2004	4.50	6.00	4.50
Sep 18, 2004	4.50	6.00	4.75 (+0.25)
Oct 2, 2004	4.50	6.00	5.00 (+0.25)
Oct 27, 2004	4.75 (+0.25)	6.00	5.00
Apr 29, 2005	5.00 (+0.25)	6.00	5.00
Oct 26, 2005	5.25 (+0.25)	6.25 (+0.25)	5.00
Jan 24, 2006	5.50 (+0.25)	6.50 (+0.25)	5.00
Jun 9, 2006	5.75 (+0.25)	6.75 (+0.25)	5.00

Effective since	Reverse Repo Rate	Repo Rate	Cash Reserve Ratio
Jul 25, 2006	6.00 (+0.25)	7.00 (+0.25)	5.00
Oct 31, 2006	6.00	7.25 (+0.25)	5.00
Dec 23, 2006	6.00	7.25	5.25 (+0.25)
Jan 6, 2007	6.00	7.25	5.50 (+0.25)
Jan 31, 2007	6.00	7.50 (+0.25)	5.50
Feb 17, 2007	6.00	7.50	5.75 (+0.25)
Mar 3, 2007	6.00	7.50	6.00 (+0.25)
Mar 31, 2007	6.00	7.75 (+0.25)	6.00
Apr 14, 2007	6.00	7.75	6.25 (+0.25)
Apr 28, 2007	6.00	7.75	6.50 (+0.25)
Aug 4, 2007	6.00	7.75	7.00 (+0.50)

Source: RBI Report, 2007.

Figure – 1: Yield and Annual Turnover in India



Source: Reserve Bank of India Report.

Review of Literature

In their paper titled "Interest-rate risk in the Indian Banking System", Ila Patnaik and Ajay Shah measured the interest rate risk of a sample of major banks in India, using two methodologies. The first consists of estimating the impact upon equity capital of certain interest rate shocks. They found that roughly two-thirds of the banks in the sample stood to gain or lose over 25 per cent of equity capital in the event of a 320 bps move in interest rates. The second consists of measuring the elasticity of bank stock prices to fluctuations in interest rates. They found that the stock prices of roughly one-third of the banks in the sample had significant sensitivities. Ravikant Bhat, in his report entitled "The Incidence of Interest Rate Risk in Indian Banks" made an attempt to find out the magnitude of the interest rate risk in some select Indian Banks, its causes and ways to control it. Further, majority of the studies dealt with interest rate risk to capital. Thus, the present

study, which measures the interest rate risk to earnings using the gap analysis technique recommended by RBI, is significant.

Research Methodology

This is an analytical research study. It selected State Bank of India (SBI), one of the biggest public sector banks (first largest) in India, which is listed in BSE and NSE. It used both primary and secondary data. Primary data required were collected through personal discussions with the staff to know the actual ALM practices followed in the SBI and the problems faced in the course of exchanging information required for the management. The secondary data were collected from the annual reports, and circulars of Indian Bank, reading material on ALM provided by the Bankers Staff College, websites and various journals. In this study, *Gap Analysis Technique* (prescribed by RBI) has been used for measuring the interest rate risk.

Interest Rate Risk in Banks

ALM is a system of matching cash inflows and outflows, and thus of liquidity management. Balance sheet risk can be categorized into two major types of significant risks, which are liquidity risk and interest rate risk. The ALM system rests on three pillars, *i.e.*, (a) ALM Information system (MIS), (b) ALM organization (Structure and responsibilities), and (c) ALM Process (Risk parameters, identifying, measuring, managing risks and setting risk policies and tolerance levels). 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 methods such as gap analysis, the duration gap method, the basis point value (BPV) method, and simulation methods.

Interest Rate Risk Management in SBI

Interest rate risk refers to fluctuations in Bank's Net Interest Income and the value of its assets and liabilities arising from internal and external factors. Internal factors include the composition of the Bank's assets and liabilities, quality, maturity, interest rate and re-pricing period of deposits, borrowings, loans and investments. External factors cover general economic conditions. Rising or falling interest rates impact the Bank depending on Balance Sheet positioning. Interest rate risk is prevalent on both the asset as well as the liability sides of the Bank's Balance Sheet. The Asset - Liability Management Committee (ALCO) which is responsible for evolving appropriate systems and procedures for ongoing identification and analysis of Balance Sheet risks and laying down parameters for efficient management of these risks through Asset Liability Management Policy of the Bank. ALCO, therefore, periodically monitors and controls the risks and returns, funding and deployment, setting Bank's lending and deposit rates, and directing the investment activities of

the Bank. ALCO also develops the market risk strategy by clearly articulating the acceptable levels of exposure to specific risk types (*i.e.* interest rate, liquidity etc). The Risk Management Committee of the Board of Directors (RMCB) oversees the implementation of the system for ALM and review its functioning periodically and provide direction. It reviews various decisions taken by the ALCO for managing market risk.

Interest rate risk exposure is measured with Interest Rate Gap analysis. Simulation, Duration and Value-at-Risk (VaR). RBI has stipulated monitoring of interest rate risk at monthly intervals through a Statement of Interest Rate Sensitivity (Re-pricing Gaps) to be prepared as the last Reporting Friday of each month. Accordingly, ALCO reviews Interest Rate Sensitivity statement on monthly basis. Interest rate risk in the Fixed Income portfolio of Bank's investments is managed through Duration Analysis. Bank also carries out Duration Gap analysis (on quarterly basis) to estimate the impact of change in interest rates on economic value of Bank's assets and liabilities and thus arrive at changes in Market Value of Equity (MVE). The prudential limit aims to restrict the overall adverse impact on account of market risk to the extent of 20 per cent of capital and reserves, while part of the remaining capital and reserves serves as cushion for credit and operational risk. The impact of interest rate changes on the Market Value of Equity is monitored through Duration Gap analysis by recognising the changes in the value of assets and liabilities by a given change in the market interest rate. The change in value of equity (including reserves) with 1 per cent parallel shift in interest rates for both assets and liabilities needs to be estimated. Maximum limit up to which the value of the equity (including reserves) will get affected with 1 per cent change in interest rates to be restricted to 20 per cent of capital and reserves.

Gap Analysis Technique

Gap analysis is a technique of asset-liability management that can be used to assess interest rate risk or liquidity risk. It measures at a given date the gaps between Rate Sensitive Liabilities (RSLs) and Rate Sensitive Assets (RSAs) (including off-balance sheet positions) by grouping them into time buckets according to residual maturity or next repricing period, whichever is earlier. An asset or liability is treated as rate sensitive if (i) within the time bucket under consideration, there is a cash flow; (ii) the interest rate resets/reprices contractually during the time buckets; (iii) administered rates are changed, and (iv) it is contractually prepayable or withdrawal allowed before contracted maturities. Thus, $\text{Gap} = \text{RSA} - \text{RSL}$; $\text{Gap Ratio} = \text{RSAs} / \text{RSLs}$. This gap is used as a measure of interest rate sensitivity. The positive or negative gap is multiplied by the assumed interest changes to derive the Earnings at Risk (EaR). A bank benefits from a positive Gap ($\text{RSA} > \text{RSL}$), if interest rate rises. Similarly, a negative Gap ($\text{RSA} < \text{RSL}$) is advantageous during the period of falling interest rate. The interest rate risk is minimized if the gap is near zero. Gap analysis was widely adopted by financial institutions during the 1980s. When used to manage interest rate risk, it was used in tandem with duration analysis. Both techniques have their own strengths and weaknesses. Duration analysis summarizes, with a single number, exposure to parallel shifts in the term structure of interest rates. Though gap analysis is more cumbersome and less widely applicable, it addresses

exposure to other term structure movements, such as tilts or bends. It also assesses exposure to a greater variety of term structure movements.

Results and Discussion

Table 2 provides the base data from which all calculations are done.

Table – 2: Select Items from the P&L A/c and Balance Sheet for the years 2005-06, 2006-07 & 2007-08

(Rs. in million)			
Items	2005-06	2006-07	2007-08
Interest Expended	203904	221841	319291
Interest Earned	359796	372423	489503
Provisions & Contingencies	68926	54586	63784
Deposits	3800461	4355211	5374039
Borrowings	306412	397033	517274
Advances	2618009	3373365	4167682
Investments	1625342	1491489	1895013
Gross Non Performing Assets(NPA)	96281	99982	128373

Source: Annual Reports of SBI.

Following is the procedure adopted for breaking up of assets and liabilities and their rates of interest (Table 3):

Table – 3: Break up of Assets and Liabilities - Initial conditions for Balance Sheet items

(Rs. in million)									
Items	2005-06			2006-07			2007-08		
	Volume Rs.	Rate (%)	Mix (%)	Volume Rs.	Rate (%)	Mix (%)	Volume Rs.	Rate (%)	Mix (%)
RSA	3525010	8.68	71	4050141	7.82	72	5044173	8.25	70
FRA	622061	8.68	13	714731	7.82	13	890148	8.25	12
NEA	793219	0	16	900780	0	15	1280942	0	18
Total	4940290	5.79	100	5665652	5.21	100	7215263	5.5	100
Average									
RSL	1358297	4.97	28	1664483	4.67	29	2026017	5.42	28
FRL	2748576	4.97	56	3087761	4.67	55	3865297	5.42	54
NIBL	833417	0	16	913408	0	16	1323949	0	18
Total	4940290	3.31	100	5665652	3.11	100	7215263	3.61	100
Average									

Source: Annual Reports of SBI. Values Computed. Note: NIBL- Non-Interest Bearing Liabilities

- Rate Sensitive Assets (RSAs) to Fixed Rate Assets (FRAs) trend of the bank stands at 85:15. Earning assets have been classified accordingly. Rate Sensitive Liabilities (RSLs) have been arrived at from the residual maturity statement contained in the annual reports of respective years by adding the figures under the buckets 1-14 days to 6 months to 1 year.
- Uniform rate of interest has been assigned for RSAs and FRAs and this has been followed for RSLs and Fixed Rate Liabilities (FRLs).
- Interest rate for assets has been arrived at taking into account advances and investment portfolio and the interest earnings of the bank for the respective years. *i.e.*,

$$\text{Interest Rate} = (\text{Interest Earned}) / (\text{Total Advances} - \text{NPA} + \text{Total Investment}).$$

- Interest rate for liabilities has been arrived at taking into account the deposits and borrowings portfolio and the interest expenditure of the bank for the respective years *i.e.*,

$$\text{Interest Rate} = (\text{Interest Expended}) / (\text{Total Deposits} + \text{Total Borrowings}).$$

Experimentation Methodology

Following is the procedure followed for calculating the items in Tables 5, 6, and 7:

Initial Performance Measures: From Table 3, the initial position measures regarding the Net Interest Income (NII), Net Interest Margin (NIM), Gap and Net Income (NI) for 2005-06 to 2007-08 are arrived. The formulae used are

$$\begin{aligned} \text{NII} = & (\text{Rate of RSA} * \text{Volume of RSA}) + (\text{Rate of FRA} * \text{Volume of FRA}) \\ & - (\text{Rate of RSL} * \text{Volume of RSL}) - (\text{Rate of FRL} * \text{Volume of FRL}) \end{aligned}$$

$$\text{NIM} = \text{NII} / \text{Total Performing Assets}$$

$$\text{GAP} = \text{RSA} - \text{RSL}$$

$$\text{NI} = \text{NII} - \text{Provisions and Contingencies}$$

Comparative – Static Experiment: Both negative and a positive shock of 200 basis points (2%) were introduced without any balance sheet adjustment, *i.e.*, volumes and mix remain constant. The new performance for NII, NIM and NI are calculated for 2004-05 to 2006-07

Portfolio Adjustment to Rate Changes: RSL increases to RSA as non-interest bearing liabilities and fixed rate liabilities decline. Thus, the new GAP = 0. The performance measures such as NII, NIM and NI are arrived after portfolio rebalancing in Table 4.

Market Force Counter Balance: Market forces drive RSA to increase as (Non Earning Assets) NEA and FRA decline. The GAP after market counter balance is arrived. The performance measures such as NII, NIM and NI are arrived after portfolio counterbalancing in Table 4.

Table – 4: Portfolio Adjustment due to (a) Rate Changes, and (b) Market Forces Counter Balancing

(Rs. in million)

Year	Portfolio Adjustments due to Changes					
	Rate Changes			Market Forces Counter Balancing		
	RSL	FRL	NIEL	RSA	FRA	NEA
2005-06	3525010	615280	800000	3740290	600000	600000
2006-07	4050141	915511	700000	4365652	700000	600000
2007-08	5044173	1271090	900000	5415263	900000	900000

Note: Results Computed.

The summary of experiments done for three years is shown in tables 5, 6 and 7.

Table 5 reveals that the GAP in the initial position at Rs. 21,66,713 million, the NII at Rs. 1,55,891 million, NIM at 3.8 per cent and NI at Rs. 86,966 million for the year 2005-06. When interest rate negative shock of 2 per cent was applied, it reduced the NII to Rs. 1,12,557 million, NIM to 2.7 per cent and NI to Rs. 43,631 million. However, when interest rate positive shock of 2 per cent was applied, it increased the NII to Rs. 1,99,226 million, NIM to 4.8 per cent and NI to Rs. 1,30,300 million. Then the portfolio adjustment is done. Even after the portfolio adjustment, the initial position could not be attained. Therefore, portfolio adjustment should be carried out in a better way *i.e.*, by aiming at high yielding advances. When counter balancing market forces are applied, negative shock increased the NI to Rs.97,764 million and the positive shock increased the NI to Rs. 1,06,376 million. Thus, the negative shock has brought down the NI and positive shock has increased the NI. The portfolio adjustment in this case could not increase the NI to its original position. However, the counter balancing market forces have enabled the NI to increase in both negative and positive shock scenarios.

Table - 5: Experiment Results for the year 2005-06

(Rs. in million)

Performance Measure	Initial Position	Interest Rate Shock		Portfolio Adjustment	Counter Balancing Market Force	
		- 2%	+ 2%		-2%	+2%
				-2% or +2%		
GAP	2166713	2166713	2166713	0	215280	215280
Net Interest Income	155891	112557	199226	154232	166690	175301
Net Interest Margin	0.038	0.027	0.048	0.037	0.038	0.040
Net Income	86966	43631	130300	85307	97764	106376

Note: Results Computed.

Table – 6: Experiment Results for the year 2006-07

(Rs. in million)

Performance Measure	Initial Position	Interest Rate Shock		Portfolio Adjustment -2% or +2%	Counter Balancing Market Force	
		- 2%	+ 2%		-2%	+2%
GAP	2385658	2385658	2385658	0	315511	315511
Net Interest Income	150582	102869	198295	140620	157819	170439
Net Interest Margin	0.032	0.022	0.042	0.030	0.031	0.034
Net Income	95996	48282	143709	86033	103232	115853

Note: Results Computed.

Table 6 reveals that the GAP in the initial position at Rs. 23,85,658 million, the NII at Rs. 1,50,582 million, NIM at 3.2 per cent and NI at Rs. 95,996 million for the year 2006-07. When interest rate negative shock of 2 per cent was applied, it reduced the NII to Rs. 1,02,869 million, NIM to 2.2 per cent and NI to Rs. 48,282 million. However, when interest rate positive shock of 2 per cent was applied, it increased the NII to Rs. 1,98,295 million, NIM to 4.2 per cent and NI to Rs. 1,43,709 million. Then, the portfolio adjustment is done. Even after the portfolio adjustment, the initial position could not be attained. Therefore, portfolio adjustment should be carried out in a better way *i.e.*, by aiming at high yielding advances. When counter balancing market forces are applied, negative shock increased the NI marginally to Rs.1,03,232 million and, the positive shock increased the NI to Rs. 1,15,853 million. Thus, the negative shock has brought down the NI and positive shock has increased the NI. The portfolio adjustment in this case could not increase the NI to its original position. However, the counter balancing market forces have enabled the NI to increase during negative and positive interest rate shock scenarios.

Table – 7: Experiment Results for the year 2007-08

(Rs. in million)

Performance Measure	Initial Position	Interest Rate Shock		Portfolio Adjustment -2% or +2%	Counter Balancing Market Force	
		- 2%	+ 2%		-2%	+2%
GAP	3018157	3018157	3018157	0	371090	371090
Net Interest Income	170212	109849	230575	147236	343731	186080
Net Interest Margin	0.029	0.019	0.039	0.025	0.054	0.030
Net Income	106428	46065	166791	83451	279947	122296

Note: Results Computed.

Table 7 reveals that the GAP in the initial position at Rs. 30,18,157 million, the NII at Rs. 1,70,212 million, NIM at 2.9 per cent and NI at Rs. 1,06,428 million for the year 2007-08. When interest rate negative shock of 2 per cent was applied, it decreased the NII to Rs. 1,09,849 million, NIM to 1.9 per cent and NI to Rs. 46,065 million. However, when interest rate positive shock of 2 per cent was applied, it increased the NII to Rs. 2,30,575 million, NIM to 3.9 per cent and NI to Rs. 1,66,791 million. Then, the portfolio adjustment is done. After the portfolio adjustment, the NI reduced, compared to the initial position. When counter balancing market forces are applied, negative shock increased the NI substantially and the positive shock increased the NI marginally. Thus, the negative and positive shocks have increased the NI. The portfolio adjustment in this case has not improved the NI. Further, the counter balancing market forces have enabled the NI to increase substantially in case of negative shock and marginally in case of positive shock.

Table – 8: Residual Maturity for the year 2005-06

(Rs. in Million)

Items	1-14 days	15-28days	29days-3m	3m-6m	6m-1year
Loans &Advances	425499	47464	138063	116084	102704
Investments	10439	22449	85443	48064	20610
Deposits	494043	45203	98550	117488	384591
Borrowings	95007	29027	27503	48831	18053
GAP	-153112	-4317	97453	-2171	-279330

Source: Annual Report of SBI, 2005-06

From Table 8, which contains residual maturity statement covering a period from 1-14 days to 6 months-1 year for the year 2005-06, it is revealed that the time buckets of 1-14 days, 15-28 days, 3 months-6 months and 6 months-1 year are vulnerable paving way to negative gaps of high volumes.

Table – 9: Residual Maturity for the year 2006-07

(Rs. in Million)

Items	1-14 days	15-28days	29days-3m	3m-6m	6m-1year
Loans &Advances	567742	54778	160796	154827	132819
Investments	6563	33037	95696	34760	26471
Deposits	569904	52316	179803	182663	403936
Borrowings	94666	16587	85197	43614	35796
GAP	-90265	18912	-8508	-36690	-280442

Source: Annual Report of SBI, 2006-07.

From Table 9, which contains residual maturity statement covering a period from 1-14 days to 6 months-1 year for the year 2005-06, it is clear that the time buckets of 1-14 days, 29 days-3 months, 3 months-6 months and 6 months-1 year are vulnerable paving way to negative gaps of high volumes.

Table – 10: Residual Maturity for the year 2007-08

(Rs. in Million)

Items	1-14 days	15-28days	29days-3m	3m-6m	6m-1year
Loans &Advances	783088	124676	129666	113807	152984
Investments	837	13253	37294	52090	62743
Deposits	663861	63179	229837	258717	365256
Borrowings	116294	57269	158871	41427	71305
GAP	3770	17481	-221748	-134247	-220834

Source: Annual Report of SBI, 2007-08

From Table 10, which contains residual maturity statement covering a period from 1-14 days to 6 months-1 year for the year 2007-08, it is revealed that the time buckets of 29 days-3 months, 3 months-6 months and 6 months-1 year are vulnerable paving way to negative gaps of high volumes.

Table – 11: Liquidity Risk from 2005-06 to 2007-08

(Rs. in Million)

GAP	1-14 days	15-28days	29days-3m	3m-6m	6m-1year
2005-06	-153112.4	-4316.6	97453	-2170.7	-279330.3
2006-07	-90264.5	18911.7	-8508.4	-36690	-280442.1
2007-08	3769.7	17481.4	-221747.7	-134247.5	-220834.5

Source: compiled from Tables – 8, 9, and 10.

The Table 11 shows the trend in the liquidity risk by way of gap positions of residual maturity. It is observed over the years that, the time buckets 29 days-3 months, 3 months-6 months and 6 months-1 year have negative gap and are very vulnerable. This trend may lead to call money borrowing to fill in the liquidity gap and may reduce the interest margin substantially in the increasing interest rate scenario. Thus, it is concluded that the bank is exposed to interest rate risk.

Findings of the Study

1. The ALM concept though in vogue since 1997, its inherent complexities in obtaining accurate timely information from the gross root level makes the banks in not getting the full advantage of it.

2. The computerized environment has helped the banks to achieve the objective of MIS in the area of collection of accurate and timely data required for risk management.
3. In SBI, interest rate risk is measured through the use of re-pricing gap analysis and duration analysis. Liquidity risk is measured through gap analysis.
4. SBI also uses interest rate derivatives to manage asset and liability positions.
5. During 2005-06, 2006-07 and 2007-08, the negative shock has brought down the NI and positive shock has increased the NI. The portfolio adjustment in this case could not increase the NI to its original position. However, the counter balancing market forces have enabled the NI to increase in both negative and positive shock conditions.
6. In 2007-08, the counter balancing market forces have enabled the NI to increase substantially in case of negative shock and marginally in case of positive shock.
7. The residual maturity pattern covering one year could not withstand negative shock of 200 basis points in 2005-06.
8. The general portfolio adjustment could not yield the expected results and calls for aiming at high-yielding advances.
9. The analysis of residual maturity statements of 2005-06, 2006-07, and 2007-08 covering a period from 1-14 days to 6 months-1 years reveals substantial negative gaps in one or more maturities.
10. The Bank is exposed to interest rate risk.

Conclusion

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. Proper portfolio adjustment aiming at high yielding advances and using interest rate swap could make the bank to improve its net income than ever before.*

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