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Gap Analysis and its Relationship with Important Parameters of Bank of Baroda

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Abstract

Asset Liability Management is an important parameter nowadays governing the success or failure of the banks.This paper attempts to understand the asset liability management through Gap analysis taking into consideration the sample of Bank of Baroda for a sample period of 10 years from 2009 to 2018.After accessing the gap and intersest sensitivity ratio ,a regression model is created to understand the relationship of Gap with important governing factors of the bank such as return on assets, liquidity ratio,capital adequacy ratio, net interest margin ,asset composition and liability composition.The results are important for the bank and various bodies attached to the bank's such as its customers, shareholders,lenders and borrowers. This study provides an analytical insight to the important parameters of the bank and throws light on the detrioting condition of the bank.

Keywords: Gap analysis, Asset liability management, Regression

Introduction

Banks are important organizations of economic set up of every country. A well-defined and developed banking structure is considered as the most important for sustained economic development of a country. This sector reflects the larger economy – its linkages to all sectors make it a proxy for whatever happens in the overall economy. "In fact, the Indian banking sector today has the same sense of excitement and opportunity as is apparent in the Indian economy."(Dhawan 2016). "The disintermediation, blurring of conventional roles and limits, has led to the complete transformation of Indian banking sector. The ongoing growth and developments in Indian industries and government and the integration of our economy with the global economy also offer myriad opportunities to the banking sector." (Kamath, 2003) "A.P.J. Abdul Kalam, former President of India, delineated his vision to transform India into a prosperous nation by 2020 through realization of "that ideal plentitude" for the Indian masses and urged the banking community to be the vanguard in this national development process." (Kalam, 1998). Banks, undoubtedly, occupied an important space in the former President's egalitarian vision due to their unparalleled spectrum and resources in context of network, human resource, specialization, and experience. "After the first phase of economic liberalization in the year 1991, a tremendous change had taken place in the banking industry (Poongavanam 2011)". "For any economy that endeavors to attain growth and stability in dynamic and competitive global business environment, a healthy banking system is indispensable (Prasad and Veena 2011)" The banking system is major constituent of total financial system. It provides various facilities and options to its customers. Banks provide ample services like providing loans, credits, and safeguarding money, accepting deposits, checking accounts, money orders, and cashier's cheque. Banks also channelize public savings into productive activity and also provide multifarious services to their clients. Its contribution in eradicating poverty, and growth of

economy is laudable. In any developing country, banking system is focal point in financial setup. The banking system is the most important for success or failure of the economy. The basic function of banking consists of safeguarding the other people's money by keeping it in custody and lending its part to needy ones.The major source of funds for the bank comes from public as deposits and most of the deposits are short term in nature and results in shortest maturity period. Alternatively, banks believe in long term loans with longest maturity. Banks face a major risk because of the short term liquidity of payments and long term maturity of receipts. This gap between matching of maturity time frame of long term loans with short maturity funds called as Asset liability mismatch .Managing this mismatches by the bank is Asset liability management Asset-Liability Management (ALM) is one such significant technique which has a wide application in banks to mitigate the risks. ALM is a tool to effectively dissolve the risks prone to banks due to mismatch in assets and liabilities .In this study Bank of Baroda has been studied in terms of Gap analysis and Interest Sensitivity Ratio to check the health of the bank.The various parameters that affect the ALM of the bank are studied with a regression model to test the hypothesis and the results are analysed.

Literature Review

Taimur (2013) examined the asset and liability management of 8 Ethiopian Banks from 2005- 2010 by adopting the Statistical Cost Accounting (SCA) model. It is found that the asset and liability management and customer deposit management showed a positive and significant impact on profitability. Growth in GDP harmed profitability. The study recommended an increase in public awareness to mobilize more savings. The present study focused on determining the extent of association between assetliability management and profitability of select Indian commercial banks.

Karthigeyan A. and Mariappan V. et all, (2013) for this study, the Canonical correlation technique was applied to capture the predictor variables, liability, and predictive variables assets on the sample of three old and private new generation banks. The sample of three Old & New generation Private sector Banks was taken and in these banks. The finding of the paper revealed that except for ICICI banks, all other banks are in a safer zone.

Meena Amit Kumar and Joydipdhar (2014) advocated and found that the comparison of liquidity ratios and asset-liability management practices in three banks i.e. public, private, and foreign banks operating in India. The study was based upon liquidity ratios calculations and determination of maturity gap profiles of the banks. The results showed that the banks in India had a very good short term liquidity position and all banks short term liabilities were financed by long term assets.

Obarin Lilian Akwii (2015) considering that the Kenyan banking sector has been competitive and ALM is critical for the success of financial institutions, this descriptive study(thesis) set out to determine the effect of asset-liability management on profitability of commercial banks in Kenya. The study collected secondary data from published financial statements of 44 commercial banks in Kenya for the period 2010 to 2014. The regression analysis establishes that 47.7 percent of variations in financial performance proxied by ROA was explained by variations in the study independent variables namely; Size, Capital structure, and asset-liability management position of the bank.

Tee (2017) evaluated on asset-liability management and the profitability of listed banks in Ghana. The main agenda of this paper is to evaluate the influence of asset and liability management on the profitability of listed banks in Ghana. Multiple linear regression is used by taking into consideration ROA as the dependent variable, and TAS (the total asset) and TLT (the total liability) representing the asset and liability mix of the banks.

Prince Paul Antony K. and Manimegalai J. (2018) the analysis of Asset Liability Management in Indian

bank was made for the sample period from 2014 to 2018. It provided the necessary framework to define, measure, monitor, modify, and manage these risks through ratio analysis.

Thakker Khushboo and Chakraborty Tanupa (2018) this study analyzed Rate Sensitivity Assets, Rate Sensitivity Liabilities, Interest Sensitivity Ratio, Net Interest Income Ratio, and Net Interest Margin Ratio. Gap Analysis is also carried out to understand the impact of Asset Liability Management on the profitability of banks for the top ten constituent banks for the period of2007- 2016.

Rekha P. (2018) the study focused on determining the extent of association between asset-liability management and profitability of select Indian commercial banks. To study the relationship variables Camel model was selected to assess the relative financial strength of banks. The banks in India were categorized into the Public sector, Private sector, and Foreign banks. The analysis using panel data for the year 2007-2016. Financial indicators and different statistical tools like, Regression analysis, Pearson correlation, Anova, and descriptive analysis have been performed to find the relationship among variables.

Data Analysis, Tabular Presentation & Interpretation

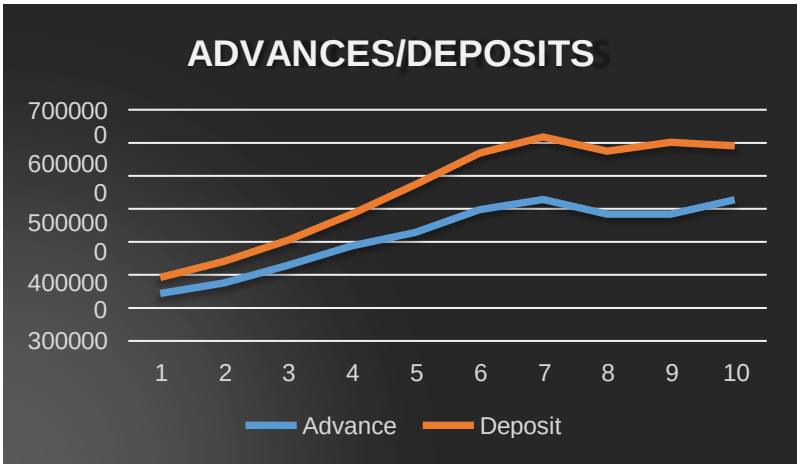
1) Gap Analysis of Bank of Baroda

Table 1: Gap Analysis of BOB

		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
BANK OF BARODA	Investments	524458.8	611823.8	713965.9	832094	1213937	1161127	1168122	1204505	1296305	1631845
	Advances	1432514	1750353	2286764	2873773	3281858	3970058	4280651	3837702	3832592	4274318
	RSA	1956973	2362177	3000730	3705867	4495795	5131185	5448774	5042207	5128898	5906164
	Deposits	1923970	2412619	3054395	3848711	4738833	5688944	6175595	5740379	6016752	5913148
	Borrowings	127679.1	133500.9	223078.5	235730.5	265792.8	368129.7	352642.8	334717	306114.4	625719.7
	RSL	2051649	2546120	3277473	4084442	5004626	6057074	6528238	6075096	6322866	6538868
	GAP = RSA-RSL	-94675.7	-183943	-276744	-378575	-508831	-925889	-1079464	-1032889	-1193969	-632704
	ISR = RSA/RSL	0.953854	0.927755	0.915562	0.907313	0.898328	0.847139	0.834647	0.82998	0.811167	0.903239

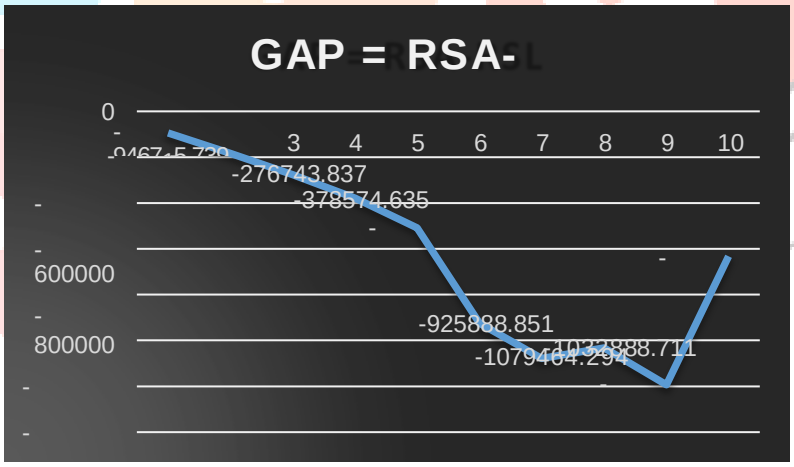
The Table 1 presents the gap analysis for the year 2008-09 to 2017-18 of Bank of Baroda, here, Gap defined by sensitive assets compare with sensitive liabilities. The gap shows that supervision sensitive assets and sensitive liabilities for a particular period. Interest Sensitive Gap ratio obtained through sensitive assets divided by the sensitive liabilities. A Bank of Baroda at a given time is asset or liability sensitive, if the bank is asset sensitive it will be a positive gap, Positive relative gap, and Interest sensitive ratio is greater than 1 and vice–versa. Sensitive assets define the total enormity of investments and advances of the bank. Same as sensitive liabilities define total enormity of deposits and borrowings of a bank, here sensitive assets and sensitive liabilities are given for the year 2008-09 to 2017-18 for 10 accounting year. Gap and interest sensitive gap ratio finds for the same particular period.

Graph 1: Advances/Deposits



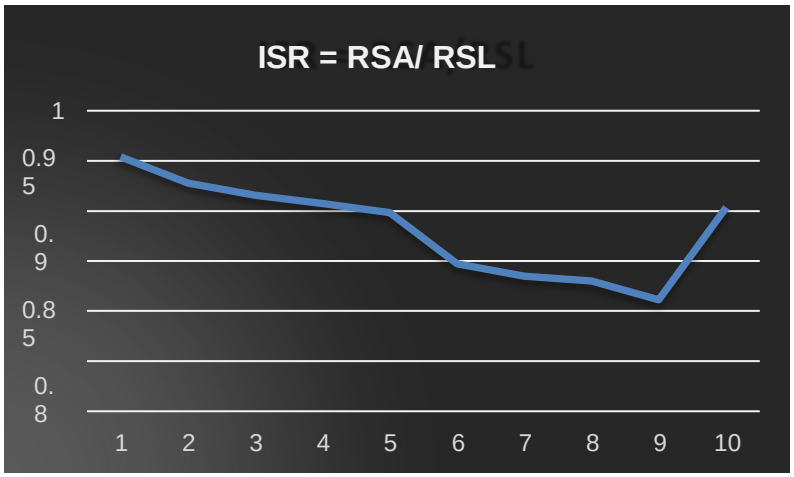
The graph 1 shows tha advances/deposits curve for the sample year 2009 to 2018.The RSA in the year 2009 was 1956973 and in the year 2018 were 5906164. The percentage contribution of investments to RSA in the year2009 is 26.80% and in the year 2018 is 27.63%, which shows that investments did not increase rapidly for 10 years. In the same ways, the percentage contribution of advances to RSA in 2009 is 73.20% and in the year 2018 is 72.37%.The RSL in the year 2009 was 2051649 and in the year 2018 was 6538868. The percentage contribution of deposits to RSL in the year 2009 is 93.78% and in the year 2018 is 90.43%, which shows that deposits decreased around 3% during 10 years. In the case of borrowings, the percentage contribution of borrowings to RSL in 2009 is 6.22% and in the year 2018 is 9.57%. The borrowings increased by more than 3% thus offsetting the decrease in deposits.

Graph 2: GAP for Bank of Baroda.



The graph 2 shows the negative gap between the RSA and the RSL, especially the Gap increased very high during the year 2015 (-1079464), 2016 (-1032889), 2017 (-1193969). It shows the highest Gap in the year 2015. The negative gap for the year 2008-09 to 2017-18 shows that there was the deficit in assets and liabilities, these negative figures show that Bank of Baroda has worst management of assets during the year 2015, 2016 and 2017. The graph 4.4.1.1 shows the ISR.

Graph 3: ISR for Bank of Baroda.



Graph 3 shows the ISR. Interest Sensitive Ratio (Assets / Liabilities) is influenced by the rate of interest that indicates the degree of sensitive of assets and liabilities of the bank. The interest sensitive ratio of Bank of Baroda was being below 1 during this tenure. The negative gap of assets and liabilities of the bank has a negative gap when interest sensitive ratio less than 1 and vice-versa. Here, interest sensitive ratios were decreased 0.95 to 0.90 during this tenure. Interest sensitive ratio valued at less than 1 which shows there might not be a wider difference financially deficit of bank during these accounting years. Consequently, the assets and liabilities of Bank of Baroda were moderate worth during this accounting tenure. The RSA needs to increase so that the bank can have a positive GAP and ISR above 1.

2) Regression Model

On the basis of the analysis and the findings on various parameters such as asset and liability structure, gap analysis and maturity bucket analysis it has been found out that Bank of Baroda is low in liquidity with Cash in hand(0.4%) and balances with RBI (3.4%), almost nill in investments(19.9%) and even the core business of the bank of giving loans and advances(60.59%) is not achieved.The bank also does not have adequate capital(0.09%).The Gap is negative throughout giving serious concerns about the health of the bank in the near future.A predictive model based on regression is used to test the hypothesis that is formulated to forecast the failure of the bank in the coming years given the deterioating parameters. A multiple linear regression model was used to determine the relative importance of each explanatory variable in affecting the performance of banks which is the explained variable.

Data and Variable View

The data has been taken from the RBI reports on which analysis has been already done for the objectives for the sample period of 2009-2018.The dependent variable is ISR denoting gap and the independent variable are percentage composition of RSA to total assets,RSL to total liabilities,Return on Assets to denote profitability, Cash in hand to Total Deposits to denote liquidity,Capital Adequacy Ratio and Net Interest Margin (net interest income to total assets) which is an important parameter to denote the financial efficiency of the banks.

Table 2:Variable Description

Variable	Measurement
ISR (dependent variable)	RSA-RSL
Asset Composition (Independent Variable)	RSA/TA
Liability Composition (Independent Variable)	RSL/TL
Return on Assets (Independent Variable)	Net profit/Total Assets
Liquidity (Independent Variable)	Cash in Hand/Deposits
Capital Adequacy Ratio (Independent Variable)	Tier 1Capital+Tier 2 Capital/Risk Weighted Assets
Net Interest Margin (Independent Variable)	Net Interest income/Total Assets

Table 3: Data view

AC	LC	ROA	LIQ	CAR	NIM	ISR
0.86	0.91	0.063	0.005	0.14	0.02	0.954
0.85	0.91	0.056	0.005	0.14	0.02	0.928
0.84	0.91	0.056	0.004	0.15	0.02	0.916
0.83	0.91	0.062	0.003	0.15	0.02	0.907
0.82	0.91	0.060	0.003	0.13	0.02	0.898
0.78	0.92	0.055	0.004	0.12	0.02	0.847
0.76	0.91	0.056	0.005	0.13	0.02	0.835
0.75	0.90	0.060	0.007	0.13	0.02	0.830
0.74	0.91	0.057	0.005	0.13	0.02	0.811
0.82	0.91	0.056	0.005	0.12	0.02	0.903

Table 4: Descriptive Statistics

MCT	AC	LC	ROA	LIQ	CAR	NIM	ISR
Mean	0.805	0.912	0.058	0.005	0.134	0.021	0.883
Median	0.014	0.001	0.001	0.000	0.003	0.001	0.015
S.D.	0.821	0.913	0.057	0.005	0.132	0.021	0.901
Minimum	0.738	0.905	0.055	0.003	0.120	0.018	0.811
Maximum	0.863	0.918	0.063	0.007	0.147	0.025	0.954

Regression Equation

According to Brooks, (2008), the general multivariate regression model with K independent variables can be written as follows: - $\pi it = \alpha 0 + \beta 1$ X it + εi (i 1, 2, 3…, n) πit =dependent variable i at time t α it = Intercept

X =independent variable i at time t.

Where πi is the ith observation of the dependent variable, X1i,…, Xki are the ith observation of the independent variables, $\alpha 0$ is the intercept and $\beta 1$ is the slope in the regression equation., εi is the ith observation of the stochastic error term, and n is the number of observationsThe regression equation has been

modeled taking into consideration all the parameters as given below:

ISR= α β1AC+ β2 LC +β3 ROA +β4 LIQ + β5 CAR + β6 NIM i, t.....1)

Hypothesis

H0: There is no significant relationship of Gap with important parameters of the bank. H1 There is significant relationship of Gap with important parameters of the bank.

The above hypothesis is tested using regression model run on MS-Excel after checking for normality and descriptive statistics.

The Regression table gives the values of the variable and the coefficients explained as below:

I. Adjusted R Square: The value of adjusted R square is 0.99 which shows that the model fit is 99% and changes in the independent variable explains 99% of changes in the dependent variable gap.

II. Significance F value: Overall reliability and validity of the model is further enhanced by the Probability (Fstatistic) value (0.00000025) which indicates strong statistical significance and the overall model is highly significant at 5% as the value is less than 5% or 0.05.

III. Coefficient: The coefficient are negative for this model for Bank of Baroda implying that there is one unit increase in the independent variables then there is one unit decrease in the dependent variable.

Output 1

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.999992417							
R Square	0.999984834							
Adjusted R Square	**0.999954502**							
Standard Error	0.000325161							
Observations	10							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	6	0.020914054	0.003485676	32967.80483	**2.58393E-07**			
Residual	3	3.17189E-07	1.0573E-07					
Total	9	0.020914371						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.901880179	0.118515924	7.60978058	0.004709705	0.524709614	1.279050744	0.524709614	1.279050744
RSA/TA	1.102019317	0.004940002	223.0807341	1.98634E-07	1.086298025	1.117740609	1.086298025	1.117740609
RSL/TL	-0.990252168	0.122482676	-8.084834505	0.003954039	-1.380046709	-0.600457627	-1.380046709	-0.600457627
PROFIT(ROA)	-0.006562382	0.136651131	-0.048022886	0.964716206	-0.44144727	0.428322506	-0.44144727	0.428322506
LIQ	-0.102867342	0.438393139	-0.234646332	0.829586467	-1.498029968	1.292295284	-1.498029968	1.292295284
CAR	-0.008194141	0.033052017	-0.247916508	0.820199431	-0.113380411	0.09699213	-0.113380411	0.09699213
NIM	-0.060519617	0.180390044	-0.335493111	0.759344775	-0.634601245	0.513562011	-0.634601245	0.513562011

Validation of the Study

The banks of late have been subjected to various challenges, such as fraud, bankruptcy, growing deposits, and not so proportionate increase in loans.The problems are many and especially in public sector banks.There are certain factors which directly affect the mismanagement of assets and liabilitites of banks which have been highlighted in the study of bank of Baroda. It can be seen that the ISR was dipping low starting from the year 2013 to the year 2017.

Table 5: Impacting Parameters of the Bank

Year	Net NPA	Net Profit	RSA
2013	4192.03	4480.72	44957.95
2014	6034.76	4541.0	51311.85
2015	069.49	3398.43	54487.74
2016	19406.46	5395.53	50422.07
2017	18080.18	1383.13	51288.98

The following table shows that:

- Net NPAs of Bank of Baroda increases by 44 percent in 2014, 34 percent in 2015, 140 percent in 2016 & decreases by 7 percent in 2017 compared to last year.
- It was found that the Net profit of Bank of Baroda increases by app. 1 percent in 2014, decreases by 25 percent in 2015, decreases by 259 percent in 2016 and increases by 124 percent in 2017 compared to last year.
- The Risk Sensitive Assets show a continuous uptrend from 2013 to 2016 and stabilises from there on implying the emphasis on growing NPA from 2013 to 2016, decreasing profit, negative GAP, and deplenishing ISR from 2013 to 2017.
- Bank of Baroda was involved in the year 2015 with a 6000 cr forex scam and this highlights the NPA increase of BOB.
- Currently in April 2020, Dena bank and Vijaya Bank were merged with Bankof Baroda.

Result

- These results provide enough validity to the fact that 99% of the dependent variable Gap is explained by these important independent variables which is a high percentage .Thus the negative value of the gap emphasises that these parameters which govern the bank are also on the lower side leading the bank towards failure.
- The null hypothesis that there is no significant relationship of Gap with parameters related to poor performance of banks is rejected at (0.00000025<0.05) and the alternate hypothesis is accepted that there is significant relationship of Gap with parameters related to poor performance of banks.
- The banks parameters are deterioting and should be taken care of before the banks slip out of government's hands.

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