

An intelligent assessment approach to Comparative efficiency for Indian banking sector based on data mining technique

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Abstract

Analyzing banking efficiency is complicated and different than the other organization. The bank sector is most effective part of the country's economy as banking sector reflects the country's economy health. The complication in assessment efficiency arises as the business is diversified and complicated. The proposed paper describes an approach to generate intelligence to do comparative efficiency assessment of banks based on their financial details produced in results. We have tested the approach with the data available of top 5 Indian public sector banks based on their market capitalization. In this approach intelligent achieved through implementing data mining techniques. The outcome of the paper may helpful to bank to drill down the reason of present performance and opportunity to plan to improve efficiency.

Keywords: Data Mining, Banking Sector, Profit Analysis, Portfolio, Market Capital

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1. Introduction

This study dealt with the comparative financial performance analysis of the Indian Public Sector Banks. This study focus on the banking sector to ranking the bank by analyses the different ratios and financial matters. The Banking sector have so many parameters to analyses the performance. Basically this study focus on analytical part of banking sector. The CAMELS approach is one of the major factor for this study. It helps attain optimal allocation of scarce national resources through accumulation of savings in the form of deposits from surplus economic units and provide this deposit to deficit economic units in the form of loans and advances.

Jha and Hui (2012) explain that;

“Financial sector is the backbone of the economy of a country. It works as a facilitator for achieving sustained economic growth through providing efficient monetary intermediation. A strong financial system promotes investment by financing productive business opportunities, mobilizing savings, efficiently allocating resources and makes easy the trade of goods and services (p. 7601).”

The banking analysis is one of the financial component which is most effectively used by the investors, other users, depositors, managers and all [5]. The short term banking profit maximization is analyzed by return on equity, return on asset [11] and net interest marginal effect.

2. CAMEL Approach

In 1979, the Uniform Financial Institutions Rating System (UFIRS) was implemented in U.S. banking institution and later globally recommendation by the U.S. Federal Reserve. The system became internationally known as CAMEL. The CAMEL rating system was first introduced by U.S. supervisory authorities as a system of rating for on-site examinations of banking institutions. The CAMEL include five key assessment components: Capital, Assets quality, Management, Earning and Liquidity [1][7][9][15] to evaluate bank's overall condition like financial performance, financial condition, operating soundness and regulatory compliance of the banking institution. In 1995, the Federal Reserve and OCC adding sixth component as (S)ensitivity to Market Risk, especially Interest rate risk and the model name CAMEL replaced with CAMELS. The rating system consists of a score from 1 to 5 in which score 1 considered as best and score 5 considered as worst. Bank which obtain the score 1 are considered as most stable, banks with score 2 and 3 are considered as average and banks with score 4 and 5 considered as below average and are subjected to supervisory scrutiny.

3. Analytical Methodology

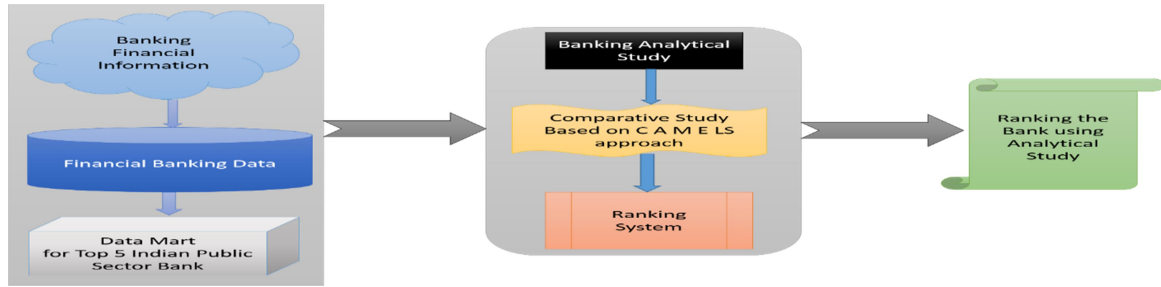
The analysis of bank stock details is different than the other manufacturing company so the different business model and methods are used to evaluate the bank stock. Banks play a key role in the mobilization and allocation of resources in an economy of country [6][12]. For our study purpose out of all Indian public sector banks we used top 5 banks based on their market cap. The present study cover the last 5 years data starting from Mar 2013 to Mar 2017. The only secondary data used for this study and the financial data collected from the moneycontrol.com [3] and zuarimoney.com [4] which is India's leading financial information source. For analytical study Based on the CAMEL approach the specific ratios and some other parameters are covered and classified into six performance indicator which are Capital Adequacy, Assets quality, Management Efficiency, Earning Quality and Liquidity and Sensitivity [2] to study the comparative analysis of the Indian public sector banks. All the statistical calculation done in M.S. Excel data analytics for statistical and financial analysis regarding banking sector. Finally the outputted result in rank that is helpful in evaluating the efficiency and past trends of the banks. It would be also helpful to rank the likely performance and improve the efficiency in future as well. Here the Table 1 show the analytics data of study top 5 Indian Public Sector Bank (2013-2017) based on Market Cap, net Interest Income, Net Profit and Total Assets

[Table 1: Analytical Data of Top 5 Indian Public Sector Bank (2013-2017)]

Bank Name	Market Cap (Rs. cr)	Net Interest Income	Net Profit	Total Assets
State Bank of India	272,686.47	175,518.24	10,484.10	2,705,966.30
Bank of Baroda	38,804.01	42,199.93	1,383.13	694,875.41
Punjab National Bank	38,050.75	47,275.99	1,324.80	720,330.55
Bank of India	21,914.11	39,290.87	-1,558.34	626,309.27
Canara Bank	21,771.23	41,387.64	1,121.92	583,519.45

4. The Proposed Computational Model

The Proposed model used to analyses banking financial performance. There are various data sources are available for financial data in which we used top 5 Indian public sector banks data based on their market cap. The banking analytical study done based on the CAMELS approach and assign rank to different components. The generated output as rank wise and it show which bank is most efficient.



[Fig. 1 The Proposed Computational Model]

5. Comparative Study

- I. CAPITAL ADEQUACY: Capital adequacy reflects the overall financial condition of the banks and also the ability of the management to meet the need for additional capital. The Capital Adequacy Ratio or Capital-to-Risk weighted Assets Ratio (CRAR) is expressed as a percentage of a bank's risk weighted credit exposures. It is used to protect depositors and promote the stability and efficiency of financial systems around the world. The Capital Adequacy Ratio, Debt Equity Ratio, Total Advance to Total Asset Ratio and Government Securities to Total Investments Ratio are used to measure the Capital Adequacy.

[Table 2: Top 5 Indian Public Sector bank’s average Capital Adequacy (2013-2017)]

C: CAPITAL ADEQUACY										
Bank Name	Capital Adequacy Ratio	Rank	Debt Equity Ratio	Rank	Total Advance to Total Asset Ratio	Rank	Government Securities to Total Investments	Rank	Group Rank Average	Group Rank
State Bank Of India	12.82	2	1.69	5	64.12	1	81.59	4	3	2
Bank of Baroda	12.9	1	0.87	1	58.47	5	84.65	3	2.5	1
Punjab National Bank	12.13	3	1.32	3	62.2	2	80.42	5	3.25	5
Canara Bank	11.51	4	1.08	2	59.5	4	87.02	2	3	2
Bank of India	11.17	5	1.46	4	62.2	2	88.25	1	3	2

As per the above analysis the Bank of Baroda at top position and Punjab National Bank at last position due to the poor performance in Government Securities to Total Investments.

- II. **ASSET QUALITY:** Asset quality is important components to measure the strength of the bank. The core parameter is non-Performing Assets (NPA) as a percentage of the total assets to measuring the asset quality. Asset quality refers to the quality of the bank's loan. It also used to measures the risk facing a bank, i.e., the loss derived from delinquent loans. Net NPA to Net Advance, Net NPA to Total Assets, Total Investments to Total Assets are used to measure the Asset Quality

[Table 3: Top 5 Indian Public Sector bank's average Asset Quality (2013-2017)]

A: ASSET QUALITY								
Bank Name	Net NPA to Net Advance (%)	Rank	Net NPA to Total Assets (%)	Rank	Total Investments to Total Assets	Rank	Group Rank Average	Group Rank
State Bank of India	2.86	1	1.82	2	23.65	3	2	2
Bank of Baroda	2.87	2	1.65	1	18.7	1	1.333333333	1
Punjab National Bank	5.12	5	3.14	5	25.58	4	4.666666667	5
Canara Bank	3.91	3	2.31	3	26.63	5	3.666666667	4
Bank of India	4.42	4	2.68	4	20.02	2	3.333333333	3

As per the above analysis the Bank of Baroda at top position and Punjab National Bank at last position due to the poor performance in all ratio of Asset quality.

- III. **MANAGEMENT EFFICIENCY:** The bank efficiency refers to the quality of the bank's management. How bank deploying its resources efficiently, income maximization, and reducing operating costs considered as bank management. Total Advance to Total Deposit Ratio , Business per Employee, Profit per Employee and Return on Equity ratio are used to measure the Management Efficiency

[Table 4: Top 5 Indian Public Sector bank's average Management Efficiency (2013-2017)]

M: MANAGEMENT EFFICIENCY										
Bank Name	Total Advance to Total Deposit Ratio	Rank	Business per Employee	Rank	Profit per Employee	Rank	Return on Equity	Rank	Group Rank Average	Group Rank
State Bank Of India	83.51	1	13.54	4	5.4	1	9.45	1	1.75	1
Bank of Baroda	67.78	5	19.6	2	3.88	3	7.72	2	3	3
Punjab National Bank	74.83	2	12.78	5	2.65	5	7.29	4	4	5
Canara Bank	69.2	4	14.72	3	2.71	4	7.37	3	3.5	4
Bank of India	73.39	3	20.25	1	4.35	2	5.21	5	2.75	2

As per the above analysis the State Bank of India at top position and Punjab National Bank at last position due to the poor performance in Business per Employee and Profit per Employee ratio of Management efficiency.

- IV. **EARNING QUALITY:** Earnings and profitability is the prime source of increase in capital base. The different ratio are used to measure the profitability of the bank but RoA is core of them. To secure the present and better future operation the strong earnings and profitability profile required for any banks because this determines the capacity to absorb losses, finance its expansion, pay dividends to its shareholders, and build up an adequate level of capital. Return on Asset, Interest Income to Total Income, Other Income to Total Income and Operating Profit to Total Assets ratio are used to measure the Earning Quality

Table 5: Top 5 Indian Public Sector bank's average Earning Quality (2013-2017)

E: EARNING QUALITY										
Bank Name	Return on Asset	Rank	Interest Income to Total Income	Rank	Other Income to Total Income	Rank	Operating Profit to Total Assets	Rank	Group Rank Average	Group Rank
State Bank Of India	0.59	1	62.81	4	13.64	1	-0.54	2	2	1
Bank of Baroda	0.27	3	62.57	5	10.58	3	-0.46	1	3	3
Punjab National Bank	0.34	2	65.11	1	11.71	2	-0.65	4	2.25	2
Canara Bank	0.27	3	64.39	2	10.47	4	-0.64	3	3	3
Bank of India	0.02	5	64.28	3	10.47	4	-0.76	5	4.25	5

As per the above analysis the State Bank of India at top position and Bank of India at last position due to the poor performance in Return on Asset and Operating Profit to Total Assets ratio of Earning Quality.

- V. **LIQUIDITY:** Liquidity management refers to the ability of the bank to fulfill its requirements, mainly of depositors. A suitable liquidity position refers to a situation, where institution can obtain sufficient funds, either by increasing liabilities or by converting its assets quickly at a reasonable cost. Liquidity Asset to Total Asset, Government Securities to Total Asset, Liquidity Asset to Demand Deposit and Liquidity Asset to Total Deposit ratio are used to measure the Liquidity.

[Table 6: Top 5 Indian Public Sector bank's average Liquidity (2013-2017)]

L: LIQUIDITY										
Bank Name	Liquidity Asset to Total Asset	Rank	Government Securities to Total Asset	Rank	Liquidity Asset to Demand Deposit	Rank	Liquidity Asset to Total Deposit	Rank	Group Rank Average	Group Rank
State Bank Of India	7.41	5	19.17	3	118.39	5	9.65	5	4.5	5
Bank of Baroda	19.56	1	15.84	5	304.48	2	22.68	1	2.25	1
Punjab National Bank	9.29	4	20.57	2	159.44	4	11.13	3	3.25	4
Canara Bank	9.35	3	23.15	1	255.49	3	10.88	4	2.75	3
Bank of India	13.35	2	17.66	4	334.08	1	15.74	2	2.25	1

As per the above analysis the Bank of Baroda and Bank of India at top position.

- VI. **SENSITIVITY** : Sensitivity to market risk reflects the degree to which changes in interest rates, foreign exchange rates, commodity prices, or equity prices can adversely affect a financial institution's earnings or economic capital

[Table 7: Top 5 Indian Public Sector bank's average Sensitivity (2013-2017)]

S: SENSITIVITY		
Bank Name	Net Interest Margin	Rank
State Bank Of India	2.61	2
Bank of Baroda	1.91	3
Punjab National Bank	2.63	1
Canara Bank	1.79	5
Bank of India	1.9	4

As per the above analysis the Punjab National Bank at top position.

6. Result and Conclusion

Composite Ranking has been calculated from the average group ranking of all components of CAMALES model and final results show the overall performance of top 5 public sector banks in India for the period of 2013 2017. Based on analysis Bank of Baroda at first position.

[Table 8: Top 5 Indian Public Sector bank's Analytical Result]

CAMELS ANALYTICS RESULT (COMPOSITE RANKING)								
Bank Name	Group Rank Of Capital Adequacy	Group Rank Of Asset Quality	Group Rank Of Management Efficiency	Group Rank Of Earning Quality	Group Rank Of Liquidity	Group Rank Of Sensitivity	Average Rank	Rank
State Bank Of India	3	2	1.75	2	4.5	2	2.54166667	2
Bank of Baroda	2.5	1.33333333	3	3	2.25	3	2.51388889	1
Punjab National Bank	3.25	4.66666667	4	2.25	3.25	1	3.06944444	3
Canara Bank	3	3.66666667	3.5	3	2.75	5	3.48611111	5
Bank of India	3	3.33333333	2.75	4.25	2.25	4	3.26388889	4

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