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Performance of Public Sector Banks in India - A Principal Component Analysis

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ABSTRACT

The cynosure of this study is performance of 26 public sector banks functioning in India. The study applied principal component analysis to measure the performance of public banks during the period 2013-2017. The study used Principal Component Analysis to develop a composite index score method for each individual bank by using seven variables representing soundness, productivity and profitability and then ranked the banks based upon index score obtained in relation to other banks. The study found that syndicate bank (2013 & 2014), SBH (2015), State bank of Bikaner& Jaipur (2016) and Vijaya bank (2017) achieved top performance for the period 2013-17. The results of the study provides insights on the performance of Indian banks. In order to maintain long term growth, the banks should focus on Customer centricity, Regulatory recalibration, Technology management, Mitigating cyber risk, Fintechs and big techs, and Reimagining the workforce.

1. Introduction

Banking industry is one of the main Pillar of the Indian Financial system. It plays a crucial role in functioning of financial system in the country. The adverse administration of the banking industry makes banking performance decline substantially, and created a loss of confidence in the banking system. Banks plays catalyst role in providing financial resources to various sectors and carry the collateral responsibility of accomplishing the government's activities. In emerging economies, the overall growth of the economy depends upon the soundness of the banking industry

Consequently, the performance of the banks can be expressed in terms of profitability, soundness and productivity. Therefore, it is best to study the factors affecting performance of the banks. In this background our study aims to examine the performance of various Public banks in India.

Due to the significance of Public banks to the government, public and investors, the Performance of banks is one of the most concerns. Moreover, people and investors have been always questioning the performance and efficiency of banks.

2. Review of Literature

In India there is a plethora of research on the banking performance with respect to individual bank performance evaluation and comparison with other banks, group of banks with other group of banks and comparing performance of banks belongs to particular country with other country banks.

Swami and Subrahmanyam (1994) constructed composite index of performance of banks by using taxonomic method for combining certain indicators of income and expenses.

Hansda (1995) used principal component analysis technique and constructed composite index. This study consider 28 public sector banks to judge relative performance with 25 indicators.

Sudarshan and Hariprasad (2015) evaluated the performance of the commercial banks in India for the period 2008-09. This study consider the event us sub-prime crisis in 2007-08 which affects performance of commercial banks in 2008-09. The research tool used principal component analysis to measure the performance of banks by categorized into Public banks, private banks and foreign banks.

Subhabaha,et.al (2017) examined the financial performance and comparison of 37 leading Indian banks during the period 2004-05 to 2013-14 yearly basis by using principal component analysis. The result shows that SBI has performed better than other banks.

Kosmidou and Zopounidis (2008) explained the performance of the commercial banks in Greece for the period 2003-2004. In this study the Multi Criteria Promethee (MCP) method was used to evaluate the rank of each commercial bank with respective to other banks and revealed that the commercial banks are tending to upgrade their performance and mitigate the financial risks in order to be more competitive among the European banking institutions.

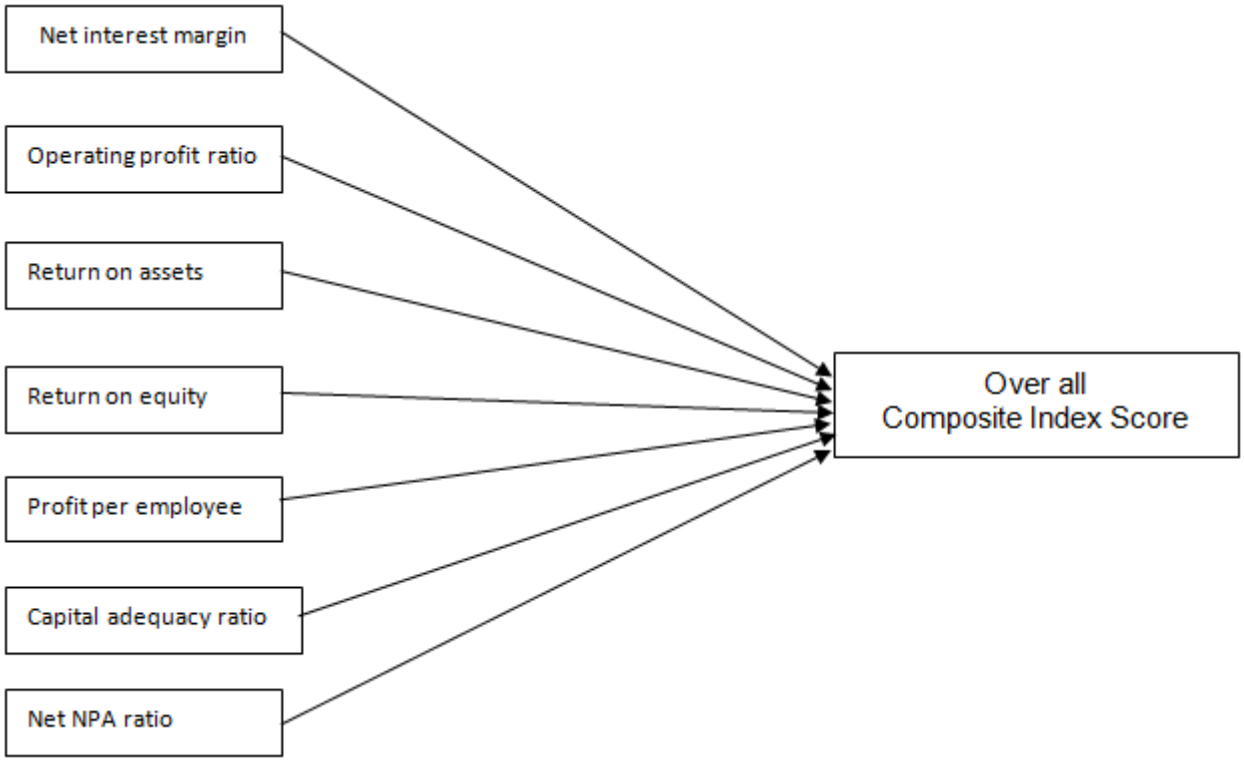
Abhijit Sinha (2018) measured the efficiency of top fifteen private banks in India for the period 2005-2016.In this study the output-oriented data envelopment approach applied under the conditions of variable returns to scale. The results show the absolute dominance of leading private banks over their peers.

3. Research Methodology

This study used data imparted by Reserve Bank of India from the year 2013 to 2017. for this purpose, the banks in India are classified into 3 categories namely Public, foreign and private banks. But this study is contemplated only public

banks. In India there are totally 27 public banks and consider only seven variables to measure the performance of the public banks in India. Public banks refer to the banks where the ownership vested in the hands of government control. In this study Bharatiya Mahila Bank has been excluded due to the limited availability of financial data. The variables employed are namely: Net interest margin, operating profit ratio, return on assets, return on equity, profit per employee, capital adequacy ratio and Net Non-performing assets ratio. All the seven variables indicate profitability, soundness and productivity of banks.

4. Construction of composite index score



5. Principal component analysis

PCA is a multi-variate technique that uses to mutate a large number of highly correlated variables into a smaller number of uncorrelated variables called principal components (PCs). The PCAs are captured by determining the eigen-values and eigen-vectors of the correlation matrix of the data. The eigen-vector with the largest eigen-value is the direction of greatest variation, the one with the second largest eigen-value is the (orthogonal) direction with the next highest variation and so on. Since, there are number of variables which mutually constitute the profitability, soundness and productivity of banks in India, principal component analysis has been employed to build composite index score, which used to measure the performance of public banks in India. The data incorporated in the seven original variables can be encapsulate into two principal components that synchronously conciliate the Kaiser (1960) rule.

The edifice of composite index score can be expressed in the following terms:

Composite index score = $w_1NIM_t + w_2OPR_t + w_3ROA_t + w_4ROE_t + W_5PPE_t + W_6CAR_t + W_7NNPA_t$

Where $w_1, w_2, \ldots w_7$ are weights of the components given by the respective eigenvector of the selected principal component. The eigen values and eigenvectors of the component matrix of performance measurement variables are as follows:

Table 1: Eigen values and Eigen vectors of the Coefficient matrix

Variables	Eigen vectors	
	PC_1	PC_2
Net interest margin (NIM)	0.146	0.506
Operating profit ratio (OPR)	0.154	0.521
Return on assets (ROA)	0.225	-0.167
Return on equity (ROE)	0.225	-0.190
Profit per employee (PPE)	0.200	-0.252
Capital adequacy ratio (CAR)	0.096	0.301
Net NPA ratio (NNPA)	-0.206	0.256
Eigen values	4.208	1.233

6. Analysis and Findings

The first principal component i.e., PC1 represents the 60% of the total variance. The seven variables that should be substituting the respective eigen values for w_i's in composite index equation. The composite index score for each bank is computed by substituting the values of NIM, OPR, ROA, ROE, PPE, CAR and NNPA by multiplying with the respective weight of the component for respective year. It is also revealed that the ROE variable has the paramount effect in the formation of

principal components. Table.2 exhibits ranks of the banks based upon composite index score is computed by using principal component analysis for the year 2013,2014,2015,2016 and 2017.

The results for 2013 revealed that among the public banks syndicate bank was placed with number one bank. Syndicate bank maintained a very good capital adequacy ratio (12.59) which means the bank had sufficient capital to meet contingent events. The return on assets of the bank was highest among the public banks (1.07). SBH, State bank of Bikaner & Jaipur, Corporation bank and Punjab national bank stood at 2nd , 3rd , 4th and 5th positions respectively. Central bank of India, united bank of India and Indian overseas bank has shown at last three ranks in the table.

During the period 2014 also syndicate bank was the best performer among the public banks. It also maintained good capital adequacy ratio (11.41) and return on equity (15.29) which indicates quality of soundness and profitability. UCO bank, state bank of Bikaner & Jaipur, bank of Baroda and SBH stood at 2nd, 3rd, 4th, and 5th positions respectively. Indian overseas bank, Central bank of India and United Bank of India has shown at last three ranks in the table.

In the year 2015 SBH was the top performer with ROA (0.89) ,ROE(14.66) ,and profit per employee (Rs.8.29 lakhs).This implies that the bank is maintaining a good balance between profitability and soundness. State Bank of Bikaner & Jaipur, syndicate bank, SBI and bank of Baroda stood at 2nd, 3rd, 4th, and 5th positions respectively. Dena bank, Punjab & Sind bank and Indian overseas bank has shown at last three ranks in the table.

In the year 2016 state bank of Bikaner & Jaipur was achieved best performance with NIM (3.11), operating profit ratio (2.17), ROA (0.83), ROE (13.34) and profit per employee (Rs.7 lakhs). These variables imply that bank is associated with profitability, soundness and productivity. SBH, SBI, State bank of Mysore and state bank of Travancore stood at 2nd, 3rd, 4th, and 5th positions respectively. Bank of India, Indian overseas bank and UCO bank has shown at last three ranks in the table.

Following 2017-year Vijaya bank became top performer with ROE (9.51) and capital adequacy ratio (12.73). This implies that the bank is maintaining a good balance between profitability and soundness. Indian bank, SBI, Bank of Baroda and Canara bank stood at 2nd, 3rd, 4th, and 5th positions respectively. state bank of Travancore, state bank of Patiala and State bank of Mysore has shown at last three ranks in the table.

7. Conclusion

The present study uses the principal component analysis to evaluate the performance of banks in India It focuses on comparison of bank performance of 26 public banks during the period 2013-17. In India Public banks have homogenous attributes in terms business models, strategies, priorities and government regulations. The present study tried to capture the overall performance of each individual bank in terms of profitability, soundness and productivity. The study used Principal Component Analysis to develop a composite index score method for each individual bank by using seven variables representing soundness, productivity and profitability and then ranked the banks based upon index score obtained in relation to other banks. The study found that syndicate bank (2013 & 2014), SBH (2015) , State bank of Bikaner& Jaipur(2016),and Vijaya bank (2017) achieved top performance for the period 2013-17.The results of the study provides insights on the performance of Indian banks. In order to maintain long term growth, the banks should focus on Customer centricity, Regulatory recalibration, Technology management, Mitigating cyber risk, Fintechs and big techs, and Reimagining the workforce.

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Table 2: Ranks Based on Composite Index Score for the Public Bank

2013	Ranking	2014	Ranking	2015	Ranking	2016	Ranking	2017	Ranking
SYNDICATE BANK	1	SYNDICATE BANK	1	STATE BANK OF HYDERABAD	1	STATE BANK OF BIKANER AND JAIPUR	1	VIJAYA BANK	1
STATE BANK OF HYDERABAD	2	UCO BANK	2	STATE BANK OF BIKANER & JAIPUR	2	STATE BANK OF HYDERABAD	2	INDIAN BANK	2
STATE BANK OF BIKANER & JAIPUR	3	STATE BANK OF BIKANER & JAIPUR	3	SYNDICATE BANK	3	STATE BANK OF INDIA	3	STATE BANK OF INDIA	3
CORPORATION BANK	4	BANK OF BARODA	4	STATE BANK OF INDIA	4	STATE BANK OF MYSORE	4	BANK OF BARODA	4
PUNJAB NATIONAL BANK	5	STATE BANK OF HYDERABAD	5	BANK OF BARODA	5	STATE BANK OF TRAVANCORE	5	CANARA BANK	5
BANK OF BARODA	6	STATE BANK OF INDIA	6	STATE BANK OF MYSORE	6	ANDHRA BANK	6	SYNDICATE BANK	6
STATE BANK OF INDIA	7	PUNJAB NATIONAL BANK	7	UNION BANK OF INDIA	7	INDIAN BANK	7	CORPORATION BANK	7
ANDHRA BANK	8	INDIAN BANK	8	UCO BANK	8	PUNJAB AND SIND BANK	8	PUNJAB NATIONAL BANK	8
DENA BANK	9	BANK OF INDIA	9	CANARA BANK	9	UNION BANK OF INDIA	9	UNION BANK OF INDIA	9
BANK OF MAHARASHTRA	10	UNION BANK OF INDIA	10	PUNJAB NATIONAL BANK	10	VIJAYA BANK	10	PUNJAB AND SIND BANK	10
INDIAN BANK	11	CANARA BANK	11	INDIAN BANK	11	BANK OF MAHARASHTRA	11	ANDHRA BANK	11
STATE BANK OF TRAVANCORE	12	ORIENTAL BANK OF COMMERCE	12	VIJAYA BANK	12	ORIENTAL BANK OF COMMERCE	12	UNITED BANK OF INDIA	12
UNION BANK OF INDIA	13	ALLAHABAD BANK	13	STATE BANK OF TRAVANCORE	13	CORPORATION BANK	13	ALLAHABAD BANK	13
STATE BANK OF PATIALA	14	DENA BANK	14	ANDHRA BANK	14	ALLAHABAD BANK	14	BANK OF INDIA	14
CANARA BANK	15	VIJAYA BANK	15	BANK OF MAHARASHTRA	15	UNITED BANK OF INDIA	15	ORIENTAL BANK OF COMMERCE	15
BANK OF INDIA	16	STATE BANK OF PATIALA	16	CORPORATION BANK	16	CANARA BANK	16	DENA BANK	16
ORIENTAL BANK OF COMMERCE	17	BANK OF MAHARASHTRA	17	STATE BANK OF PATIALA	17	CENTRAL BANK OF INDIA	17	UCO BANK	17
IDBI BANK LIMITED	18	STATE BANK OF TRAVANCORE	18	BANK OF INDIA	18	STATE BANK OF PATIALA	18	CENTRAL BANK OF INDIA	18
VIJAYA BANK	19	STATE BANK OF MYSORE	19	ALLAHABAD BANK	19	SYNDICATE BANK	19	BANK OF MAHARASHTRA	19
STATE BANK OF MYSORE	20	CORPORATION BANK	20	IDBI BANK LIMITED	20	PUNJAB NATIONAL BANK	20	STATE BANK OF BIKANER AND JAIPUR	20
ALLAHABAD BANK	21	IDBI BANK LIMITED	21	ORIENTAL BANK OF COMMERCE	21	BANK OF BARODA	21	IDBI BANK LIMITED	21
PUNJAB AND SIND BANK	22	PUNJAB AND SIND BANK	22	CENTRAL BANK OF INDIA	22	DENA BANK	22	INDIAN OVERSEAS BANK	22
UCO BANK	23	ANDHRA BANK	23	UNITED BANK OF INDIA	23	IDBI BANK LIMITED	23	STATE BANK OF HYDERABAD	23
CENTRAL BANK OF INDIA	24	INDIAN OVERSEAS BANK	24	DENA BANK	24	BANK OF INDIA	24	STATE BANK OF TRAVANCORE	24
UNITED BANK OF INDIA	25	CENTRAL BANK OF INDIA	25	PUNJAB AND SIND BANK	25	INDIAN OVERSEAS BANK	25	STATE BANK OF PATIALA	25
INDIAN OVERSEAS BANK	26	UNITED BANK OF INDIA	26	INDIAN OVERSEAS BANK	26	UCO BANK	26	STATE BANK OF MYSORE	26