

IDENTIFYING MAJOR DETERMINANTS OF PROFITABILITY FOR SELECTED NATIONALIZED BANKS IN INDIA

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Abstract

Banking in India originated in the last decades of the 18th century. After the nationalization of banks, the major concern was the productivity and profitability of public sector banks. It was believed that the new direction given to the banks since their nationalization in 1969, and the slacking productivity, has led to declining trends in the profits and profitability. This study is conducted to know the determinants of profitability of selected Nationalized Indian banks. In order to access and evaluate the profitability of selected nationalized banks of India, the relationship between financial ratios of the different banks have been studied using statistical techniques such as Correlation Analysis, Multiple Regression technique, Factor Analysis and Trend Analysis. The study shows that the major determinants of profitability of the selected nationalized banks differ for each bank and have been identified separately for each bank. Also the most commonly influencing five factors affecting profitability of the banks have been identified using Factor Analysis. Profitability has a fluctuating trend over the selected period of study, with an increase in recent two-three years.

Key Words: Profitability, Nationalized Banks, Correlation, Multiple Regression, Factor Analysis, Trend Analysis

Introduction

The terms 'Profit' and 'Profitability' are used interchangeably sometimes. But in real sense, there is a difference between the two. Profit is an absolute term, whereas, the profitability is a relative concept. However, they are closely related and mutually interdependent, having distinct roles in business. Profit refers to the total income earned by the enterprise during the specified period of time, while profitability refers to the operating efficiency of the enterprise. It is the ability of the enterprise to make profit on sales. It is the ability of enterprise to get sufficient return on the capital and employees used in the business operation.

As Weston and Brigham rightly notes "to the financial management profit is the test of efficiency and a measure of control, to the owners a measure of the worth of their investment, to the creditors the margin of safety, to the government a measure of taxable capacity and a basis of legislative action and to the country profit is an index of economic progress, national income generated and the rise in the standard of living", while profitability is an outcome of profit. In other words, no profit drives towards profitability. Firms having same amount of profit may vary in terms of profitability. That is why R. S. Kulshrestha has rightly stated, "Profit in two separate business concerns may be identical, yet, many a times it usually happens that their profitability varies when measured in terms of size of investment".

Banking Sector Reforms have changed the face of Indian banking industry. These reforms have led to an increase in resource productivity, increasing level of deposits, credits and profitability and decrease in non-performing assets. However, the profitability, which is an important criteria to measure the performance of banks in addition to productivity, financial and operational efficiency, has come under pressure because of changing environment of banking. An efficient management of banking operations aimed at ensuring growth in profits and efficiency requires up-to-date knowledge of all those factors on which the banks profit depends. Profitability is a rate expressing profit as a percentage of total assets or sales or any other variable to represent the relationship. In fact, there may be various dimensions of profitability analysis.

Literature Review

S.G.Shah (1979)In his various papers discussed bank profitability and productivity. He expressed concern about increased expenses and overheads. Slow growth in productivity and efficiency, wasteful work of banks that higher profitability can result from increased spread and that innovations have a limited role. He favored written job descriptions for improvement to staff productivity. **Kiran Chopra (1987)**In her book entitled *Managing Profits, Profitability and Productivity in Public Sector Banking*, studied the emerging trends in profits and profitability of some selected public sector banks. She is of the opinion that there is a need to introduce management essentials for the better managements of profits and productivity of public sector banks and recommended proper management of both costs as well as earnings. **Amandeep (1991)**She is of the opinion that the PSBs have become an instrument to meet effectively the needs of the development of the economy to affect the total socio-economic transformation, so the profitability of the bank operations has been affected adversely. According to her, the profitability of a bank is determined and affected mainly by two factors: spread and burden. The other factors determining bank's profitability are credit policy, priority sector lending, massive geographical expansion, increasing establishment expenses, low non-fund income, deposit composition etc. She has chosen 11 factors affecting Bank's profitability to identify the most significant variable affecting bank profitability. She has used correlations and regression analysis. She concluded that priority sector lending was not a drag on bank's profitability. She recommended the banks to focus attention on the management of spreads, burden, establishment expenses, non-fund income and deposit composition. **Imran Saleem (1995)**He is of the opinion that Indian financial system is characterized by predominance of public sector units and high degree of regulations, motivated mainly by socio-economic considerations, as a result of liberalization, the existing institutional arrangement of banking sector has become deficient in various ways the major issues related to international competitiveness consists of financial soundness, operational efficiency, viability, profitability. Mainly Indian banking system by two major factors, they are external and internal. Internal factors including lack of proper supervision, low productivity and performance of employees etc. whereas the external having bearing on the profitability have centered on pre-emption in the form SLR, CRR, and the administered structure of interest rates. **Murty (1996)**He analyzed various factors, which can be helpful to improve the profitability of public sector banks. The study examine the impact of monetary policy and market interest rates on the bank profitability and also suggest various measures to improve the profitability of the public sector banks in India. **Sarker and Das (1997)**They compares the performance of public, private and foreign banks for the year 1994-95 by using measures of profitability, productivity and financial management. They found PSBs performing poorly with the other two categories. However, they give caution that no firm inference can be derived from a comparison done for a single year. **Das (1999)**Das compares performance among public sector banks for three years in the post-reform period, 1992, 1995 and 1998. He finds a certain convergence in performance. He also notes that while there is a welcome increase in emphasis on non-interest income, banks have tended to show risk-averse behavior by opting for risk-free investments over risky loans. **Kaveri (2001)**In his study attempts to extend the study conducted by the Verma Committee more specifically to ascertain whether enough signals of weakness were indicated much before the event. The present study considers 1998-99 as the year of event when the Verma Committee identified weak banks, strong banks and potential weak banks. This article has given some evidence to indicate that no bank can be weak or potential weak all of a sudden. There is a gradual deterioration in the position of loan default and profitability. Hence, it is to be suggested to develop a ratio model to arrive at a single score to classify banks into three categories i.e. weak, strong and potential weak. **Shveeta and Satish Verma (2002)**They analyzed the inter-temporal profitability behavior of SBI group, other nationalized and foreign banks in India. They empirically

estimated factors influencing the profitability of banks. They concluded that priority sector advances (in case of PSBs) and spread and burden (for all categories of banks) were the major and significant factors that influence the profitability of banks. **Thaigarajan et. al. (2011)** They have carried out an analysis to empirically evaluate the determinants of profitability in the public and private sector banks in India using statistical tools such as correlation analysis, Multiple Regression Analysis and Factor analysis. They have used ROA as the measure of profitability of the banks. This paper is the base for our study. On the same line as theirs, I have carried out a similar analysis for the selected nationalized Banks, to identify the bank wise profitability determinants.

Research Methodology

Objectives

The current study aims at analyzing the bank specific variables influencing the profitability of the selected nationalized banks in India. The main objectives of the study are as follows,

1. To analyze the profitability of selected nationalized banks.
2. To identify the factors which have led to the current position of nationalized banks.
3. To analyze the impact of these factors on profitability of the respective banks.

Data Collection

This study is an attempt to identify the key determinants of profitability of selected Public Sector Banks in India. As far as scope of the study is concerned, it covers 5 major nationalized banks functioning in India. These are:

Bank Of India, Central Bank, Punjab National Bank, Canara Bank, Dena Bank

These banks are purposely selected for the study keeping in view their role in involvement in shaping the economic condition of India, specifically in terms of advances, deposits, manpower employment, branch networks, etc. The study has been conducted on the basis of secondary data mainly comprising of the Annual Reports of the selected Banks, using temporal data for last ten years from 2001-02 to 2010-11.

Data Analysis Techniques and Variables

Bank wise analysis is done using Correlation Analysis, Multiple Regression Analysis, Factor Analysis and Trend Analysis of the variables under study. To identify the prominent factors responsible for the profitability of the selected nationalized banks and to measure the extent of influence of the independent variables on the dependent variable the following ratios are analyzed to examine the performance of the selected nationalized banks:

Ratios

Return on Assets (ROA) X_1

ROA gives an idea as to how efficient management is at using its assets to generate earnings. Calculated by dividing a bank's annual earnings by its total assets, ROA is displayed as a percentage.

$$ROA = \text{Net Profit} / \text{Total Assets}$$

Cash to Deposit Ratio X_2

Cash to deposit ratio gives an idea about available cash with bank and with RBI against total deposits. This ratio should be higher then it is called favorable one.

$$\text{Cash to deposit ratio} = (\text{Cash in hand} + \text{Balances with RBI}) / \text{Deposits}$$

Credit to Deposit Ratio X_3

Credit to deposit ratio shows advances with the bank against total deposits. Generally, the proportion of advances is lower than the deposits.

$$\text{Credit to deposit ratio} = \text{Total Advances} / \text{Total Deposits}$$

Ratio to term deposit to total deposit X_4

Term deposit to total deposit ratio indicate that total proportion of term deposits in the total deposits.

Term deposit to total deposit = Term Deposits / Total Deposits

Ratio of priority sector to total advances X₅

This ratio indicate that the total proportion of priority sector in the total advances. This ratio shows the sectoral classification of advances. Higher ratio of priority sector to total advances is favorable.

Priority sector to advances = Priority sector credit / Total Advances

Ratio of term loan to total advances X₆

This ratio indicate that the proportion of term loan in total advances.

Term loan to total advances = Term loan / Total advances

Ratio of interest income to total assets X₇

This ratio shows how efficiently assets are used for generating interest income. Higher the ratio of interest income to total assets is favorable.

Ratio of interest income to total assets = Interest earned / Total assets

Ratio of net interest margin X₈

More earned interest and less interest paid indicates higher ratio which is favorable. The net interest margin is generating through the use of total assets of banks.

Ratio of net interest margin to total assets = (Interest earned - Interest paid) / Total assets

Ratio of non interest income to total assets X₉

This ratio indicates the other income which means not the interest income is earned by bank against the total assets.

Ratio of non-interest income to total assets = other income / Total assets

Wages as % to total expenses X₁₀

It shows the Profit per Employee against the total expenditure. In this case, higher ratio of wages as % to total expenses is favorable.

Ratio of wage bill to total expenses = PPE / Total expenses

Interest expended to total assets X₁₁

It ratio shows total interest expenditure spend by banks against the total assets.

Ratio of interest expended to total assets = total interest expended / total assets

Ratio of operating profit to total assets X₁₂

Ratio can be obtained by dividing operating profit by total assets. Higher the ratio, higher will be the profitability. *Ratio of operating profits to total assets = Operating profit / Total assets*

Return on equity X₁₃

The amount of net income returned as a percentage of shareholders equity and reserves and surplus. Return on equity measures a bank's profitability by revealing how much profit a bank generates with the money shareholders have invested. Higher ratio of ROE is favorable.

Return on Equity = Net Profit / (Capital + Reserves and Surplus)

Cost of deposit X₁₄

It shows the proportion of Interest per Deposit against total deposits. It should be lower ratio which is favorable to the banks.

Cost of Deposits = IPD / Deposits

Cost of funds X₁₅

In this ratio, there is addition of Interest Per Deposit and Interest per borrowing is taken. This addition is dividing by another addition of total of deposits and borrowings.

Cost of Funds = (IPD + IPB) / (Deposits + Borrowings)

Return on advances X₁₆

Ratio of return on advances is the result of Interest Earned on Advances divide by total advances. And from that cost of funds deducted. It indicates return on advances adjusted to Cost of Funds.

Return on Advances adjusted to Cost of Funds = Return on Advances – Cost of Funds

Return on Advances = IEA / Advances

Business per employee (in lakhs) X₁₇

It shows the proportion of total business done by the employee divided by number of employees. Higher the ratio gives the positive impact of the bank.

Business Per Employee = Total business / total number of employees

Profit per employee (in lakhs) X₁₈

It is the result of total profit divide by number of employees. It should be higher the ratio for showing the profitability of banks.

Profit per employee = total profit/ number of employees

Capital Adequacy Ratio (CAR X₁₉)

Division of Capital by risk-weighted assets shows Capital Adequacy Ratio.

Capital to risk-weighted assets ratio = capital/ risk-weighted assets

Net NPA ratio to net advances X₂₀

This ratio shows division of net Non Performing Assets by net advances and it should be the lower one. Because lower the net NPA, higher the interest and then profit.

Net NPA to net advances = net NPA/ net advances

Return on Net worth (%) X₂₁ :

It is the proportion of net income against total net worth. This ratio should be higher for increase of net income.

Return on net worth = net income/ total net worth

Provision and contingency to total assets X₂₂ :

Addition of provisions and contingency is dividing by the total assets. In these provisions, there is existence of taxation which should be the lower one. If the volume of taxation is low then and then the net income would be increased.

Provision and contingency to total assets = provisions + contingency/ total assets.

Data Analysis

Correlation Analysis between ROA and Selected Variables

Correlation analysis attempts to study the degree of relationship between the profitability measure ROA and the other selected variables.

Table 1: Correlation Analysis between ROA and Selected Variables

	Bank Of India	Central Bank	Punjab National Bank	Canara Bank	Dena Bank
X ₂	.212	.126	-.613	-.294	.422
X ₃	.294	-.108	.839	.027	.593
X ₄	.329	-.029	.537	-.116	.445
X ₅	-.023	.054	-.817	-.234	-.245
X ₆	.215	.168	.707	-.145	-.457
X ₇	.253	-.069	-.618	-.208	-.391
X ₈	.467	.194	-.359	.059	-.307
X ₉	.507	.340	-.314	.121	-.200
X ₁₀	-.424	.014	-.510	.104	-.638
X ₁₁	.320	.057	-.361	-.229	-.236
X ₁₂	.715	.057	.172	.366	.043

X ₁₃	.222	.136	.600	.543	.617
X ₁₄	.338	.247	-.210	-.231	.068
X ₁₅	.515	-.295	-.090	-.316	.005
X ₁₆	.402	.251	.715	.623	.465
X ₁₇	.037	.199	.850	.407	.619
X ₁₈	.540	.498	.894	.598	.823
X ₁₉	.559	.440	-.552	.314	.442
X ₂₀	-.052	-.131	-.731	.142	-.559
X ₂₁	.599	.136	.463	.349	.056
X ₂₂	.071	.012	-.328	-.222	-.530

Interpretation

1. Bank of India

The above table indicates that in case of Bank of India, X₅, X₁₀ and X₂₀ are inversely related with ROA while the rest of the variables are positively related with ROA. **Ratio of operating profit to total assets** X₁₂ has the highest degree of positive correlation of 0.715 with ROA, followed by **Return on Net worth (%)** X₂₁. **Ratio of priority sector to total advances** X₅ has lowest negative correlation with ROA.

2. Central Bank

In case of Central Bank, X₃, X₄, X₇, X₁₅, X₂₀ are inversely related with ROA while the rest of the variables are positively related with ROA. **Profit per employee (in lakhs)** X₁₈ has the highest degree of positive correlation of 0.498 with ROA, followed by **Capital Adequacy Ratio CAR** X₁₉, **Provision and contingency to total assets** X₂₂ has lowest positive correlation with ROA.

3. Punjab National Bank

In case of Punjab National Bank, X₃, X₄, X₆, X₁₂, X₁₃, X₁₆, X₁₇, X₁₈ and X₂₁ are positively related with ROA while the rest of the variables are inversely related with ROA. X₁₈ has the highest degree of positive correlation of 0.894 with ROA, followed by **Business per employee (in lakhs)** X₁₇, followed by **Credit to Deposit Ratio** X₃. **Cost of funds** X₁₅ has lowest negative correlation with ROA.

4. Canara Bank

In case of Canara Bank, X₃, X₈, X₉, X₁₀, X₁₂, X₁₃, X₁₆, X₁₇, X₁₈, X₁₉, X₂₀ and X₂₁ are directly related with ROA while the rest of the variables are inversely related with ROA. **Return on advances** X₁₆ has the highest degree of positive correlation of 0.623 with ROA, followed by **Profit per employee (in lakhs)** X₁₈, followed by **Return on equity** X₁₃. **Credit to Deposit Ratio** X₃ has lowest positive correlation with ROA.

5. Dena Bank

In case of Dena Bank, X₂, X₃, X₄, X₁₂, X₁₃, X₁₄, X₁₅, X₁₆, X₁₇, X₁₈, X₁₉ and X₂₁ are directly related with ROA while the rest of the variables are inversely related with ROA. **Profit per employee (in lakhs)** X₁₈ has the highest degree of positive correlation of 0.823 with ROA, followed by **Wages as % to total expenses** X₁₀, followed by **Business per employee (in lakhs)** X₁₇. **Cost of funds** X₁₅ has lowest positive correlation with ROA.

Multiple Regression Analysis

Multiple Regression Analysis is a statistical procedure that attempts to assess the relationship between a dependent variable and two or more independent variables. Here return on assets (the dependent variable Y) is related to 21 other variables such as cash to deposit ratio, interest income to total assets, and so on (the independent variables)

Table 2 Results of Multiple Regression Analysis

	<u>Bank of India</u>	<u>Central Bank</u>	<u>Punjab National Bank</u>	<u>Canara Bank</u>	<u>Dena Bank</u>
Constant	-.647	6.278	2.398	2.186	4.158
X ₂	-.030	-.047	-.027	.071	0.00
X ₄	.045	0.00	0.00	-.031	.071
X ₅	0.00	0.00	-.014	0.00	0.00
X ₆	0.00	0.00	0.00	-.016	-.092
X ₈	.460	-.737	-.428	.301	-.187
X ₉	1.055	1.231	0.00	0.00	0.00
X ₁₀	-.040	0.00	0.00	0.00	0.00
X ₁₁	0.00	.173	-.067	0.00	0.00
X ₁₂	.384	0.00	.565	0.00	1.265
X ₁₃	0.00	0.00	-.013	.062	-.103
X ₁₄	0.00	-1.206	0.00	-.001	-.147
X ₁₅	0.00	-.348	0.00	0.00	0.00
X ₁₆	0.00	0.00	.082	-.024	-.527
X ₁₉	-.265	.478	-.009	.002	0.00
X ₂₁	-.003	-.071	0.00	0.00	.066
X ₂₂	-.691	-.380	.108	-.465	-.916
R square	0.976	0.967	0.775	0.819	0.786

Interpretation**1 Bank of India**

The estimated regression model for Bank of India is

$$Y = -0.647 - 0.030(X_2) + 0.045(X_4) + 0.460(X_8) + 1.055(X_9) - 0.040(X_{10}) + 0.384(X_{12}) - 0.265(X_{19}) - 0.003(X_{21}) - 0.691(X_{22})$$

The coefficients for each of the variables indicates the amount of change one could expect in return on asset(Y) given a one-unit change in the value of that variable, given that all other variables in the model are held constant. In this model, **Ratio of non interest income to total assets** X₉ has the largest contribution and positive to ROA with the highest coefficient, 1.055, and **Return on Net worth** X₂₁ has the smallest contribution and inverse relation with ROA as indicated by the coefficient -0.003. The R-squared is 0.976, meaning that approximately 97.6% of the variability of **return on assets** (Y) is accounted for by the variables in the model.

2 Central Bank

The estimated regression model for Central Bank is

$$Y = 6.278 - 0.047(X_2) - 0.737(X_8) + 1.231(X_9) + 0.173(X_{11}) - 1.206(X_{14}) - 0.348(X_{15}) + 0.478(X_{19}) - 0.071(X_{21}) - 0.380(X_{22})$$

In this model, **Ratio of non interest income to total assets** X₉ has the largest contribution and positive to ROA with the highest coefficient, 1.231, and **Cash to Deposit Ratio** X₂ has the smallest contribution and inverse relation with ROA as indicated by the coefficient -0.047. The R-squared is 0.967, meaning that approximately 97% of the variability of **return on assets** Y is accounted for by the variables in the model.

3 Punjab National Bank

Here the estimated regression model for Punjab National Bank is

$$Y = 2.398 - 0.027(X_2) - 0.014(X_5) - 0.428(X_8) - 0.067(X_{11}) + 0.565(X_{12}) - 0.013(X_{13}) + 0.082(X_{16}) - 0.009(X_{19}) + 0.108(X_{22})$$

In this model, **Ratio of operating profit to total assets** X_{12} has the largest coefficient of 0.565, contributing positively to ROA and **Capital Adequacy Ratio(CRAR)** X_{19} has the smallest coefficient -0.009, indicating inverse relation with ROA. The R-squared is .775, meaning that approximately 77.5% of the variability of **return on assets** (Y) is accounted for by the variables in the model.

4. Canara Bank

The estimated regression model for Canara Bank is

$$Y = 2.186 + 0.071(X_2) - 0.031(X_4) - 0.016(X_6) + 0.301(X_8) + 0.062(X_{13}) - 0.001(X_{14}) - 0.024(X_{16}) + 0.002(X_{19}) - 0.465(X_{22})$$

In this, **Provision and contingency to total assets** X_{22} has the largest coefficient, -0.465, indicating inverse relation with ROA and **Cost of deposit** X_{14} has the smallest coefficient of -0.001, indicating inverse relation with ROA. The R-squared is 0.819, meaning that approximately 82% of the variability of **return on assets** (Y) is accounted for by the variables in the model.

5. Dena Bank

The estimated regression model is

$$Y = 4.158 + 0.071(X_4) - 0.092(X_6) - 0.187(X_8) + 1.265(X_{12}) - 0.103(X_{13}) - 0.147(X_{14}) - 0.527(X_{16}) + 0.066(X_{21}) - 0.916(X_{22})$$

In this model, **Ratio of operating profit to total assets** X_{12} has the largest coefficient, 1.265, and **Return on Net worth** X_{21} has the smallest coefficient of 0.066, both indicating positive relation with ROA. The R-squared is 0.786, meaning that approximately 78.6% of the variability of **return on assets** (Y) is accounted for by the variables in the model.

The above table also indicates that **Ratio of net interest margin** X_8 and **Provision and contingency to total assets** X_{22} are the commonly contributing variables to ROA of all the banks. The rest of the variables have variations in explaining ROA for different banks. **Ratio of non interest income to total assets** X_9 has the largest contribution and positive to ROA in case of both Bank of India and Central Bank whereas, **Ratio of operating profit to total assets** X_{12} has the largest contribution and positive to ROA in case of both Punjab National Bank and Dena Bank.

Factor Analysis

The procedure of Factor Analysis attempts to estimate the value for the coefficients of regression when the variables are regressed upon the factors. These coefficients are referred to as “Factor Loadings”. The matrix of factor loadings provides the basis for grouping the variables into common factors. Each variable is assigned to the factor, where it has the highest loading. The VARIMAX Rotation is used in Factor Analysis.

1. Bank of India

Table 3 below presents the results of Factor Analysis for Bank of India.

Table 3: Factor Loadings after Rotation for BOI

	Factors					Communality
	1	2	3	4	5	
X_1	.174	.219	.765	.504	.001	.917
X_2	.637	-.022	-.139	.364	.564	.876
X_3	.816	-.396	.063	.332	.088	.944
X_4	.871	.086	.189	.002	.383	.949

X ₅	.097	-.962	.061	.183	-.093	.980
X ₆	.633	-.637	.341	.051	-.027	.927
X ₇	.008	.989	.094	-.091	.046	.997
X ₈	.272	.203	.187	.541	.713	.951
X ₉	-.514	.462	.622	-.064	-.269	.942
X ₁₀	-.883	-.108	-.129	-.323	-.057	.915
X ₁₁	-.070	.975	.103	.088	-.127	.989
X ₁₂	.075	.179	.840	.131	-.193	.798
X ₁₃	-.168	.155	.225	.091	-.912	.944
X ₁₄	.884	-.217	.140	.245	-.273	.982
X ₁₅	.085	.923	.229	.266	-.022	.984
X ₁₆	.556	-.080	-.086	.748	.289	.966
X ₁₇	.883	-.177	-.056	-.086	.392	.975
X ₁₈	.860	-.036	.294	.295	.203	.956
X ₁₉	.499	-.181	.796	-.135	.139	.954
X ₂₀	-.655	.611	.154	-.395	-.126	.998
X ₂₁	.230	-.154	.258	.887	-.068	.934
X ₂₂	-.470	.833	.129	-.203	-.138	.991
Eigen values	6.996	5.856	2.889	2.762	2.366	
% of Variance	31.798	26.620	13.133	12.554	10.755	
Cumulative %	31.798	58.418	71.551	84.105	94.860	

Extraction method: principal component analysis:

Principal component analysis works on initial assumption that all the variance is common; therefore before extraction the communalities are all one. From the above Table 3 communality for the first variable is 91.7% of variance associated with X₁ is common or shared variance. Rotated component matrix is the factor loadings for each variable onto each factor. Rotation has the effect of optimizing the factor structure and one consequence for these data is that the relative importance of the four factors is equalized. Before rotation, most variables loaded highly onto the first factor and remaining factors did not really get a look in. Variance explained by the 5 factors individually has changed slightly after rotation. But the communality from the component matrix and from the rotated component matrix will be the same.

From Rotated Component Matrix Communality for X₁ = $(.174)^2 + (.219)^2 + (.765)^2 + (.504)^2 + (.001)^2 = 0.9175$

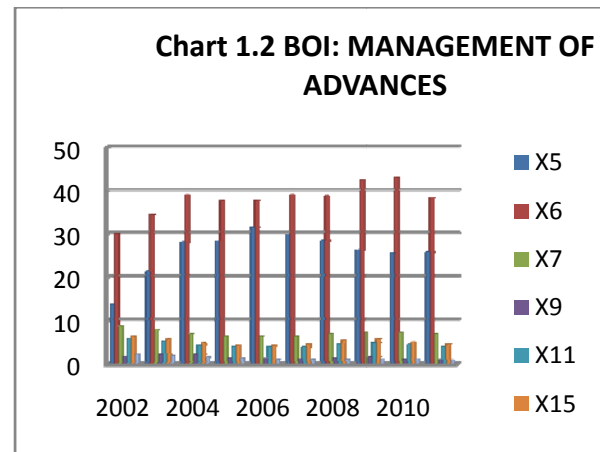
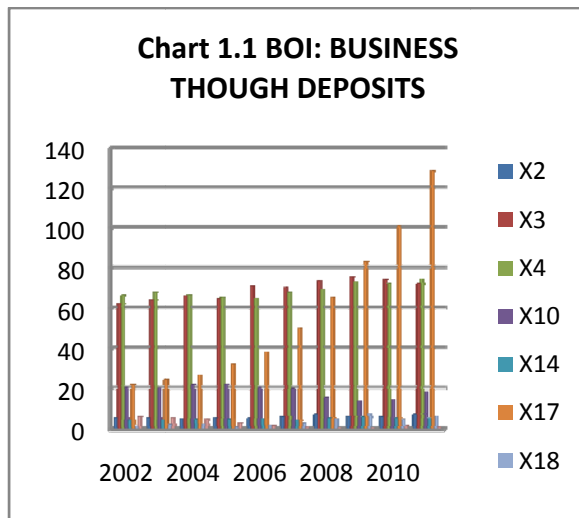
Table 3 also gives result of **Total Variance Explained**, The Eigen values associated with each factor represent the variance explained by that particular linear component Extracting all the factors with Eigen values greater than 1, which leaves us with 5 factors which are again displayed as % of variance

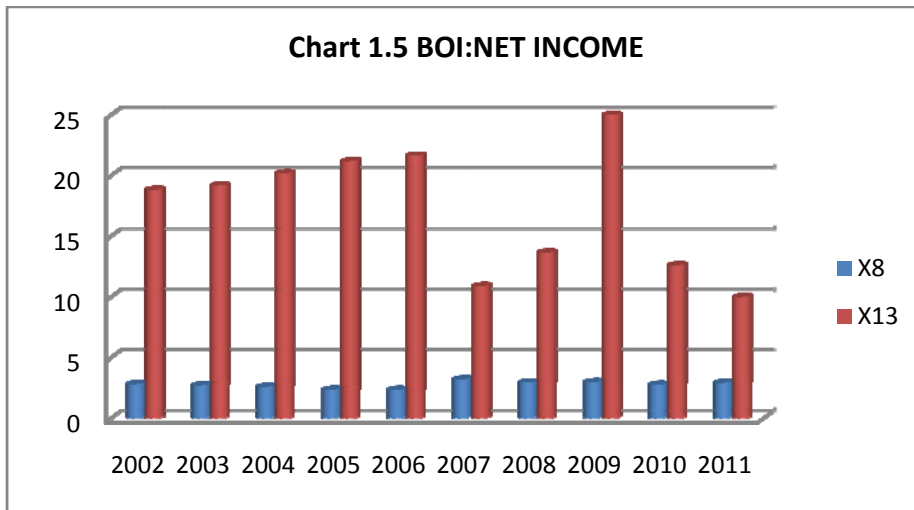
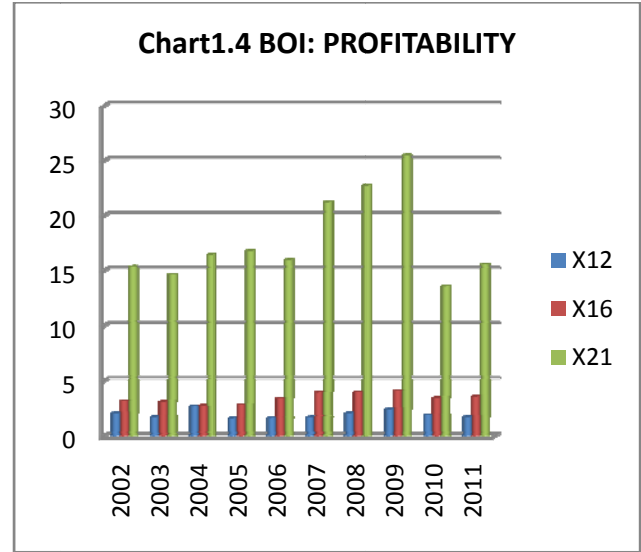
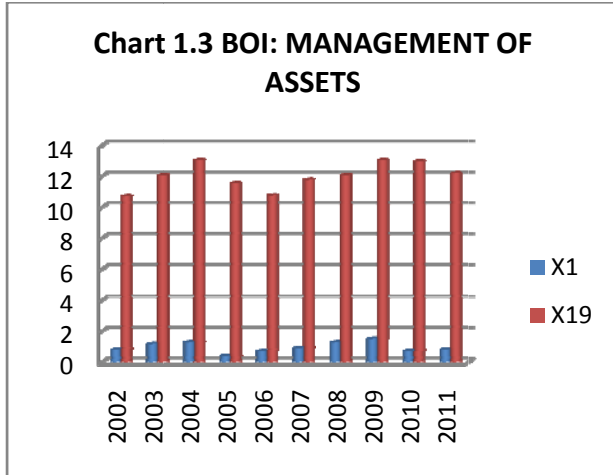
explained. Factor 1 explains 31.798% of total variance. Here first 5 factors explain relatively large amount of variance, especially factor 1 whereas subsequent factors explain only small amount of variance. After rotation factor 1 accounted 31.798% as compared to 26.62%, 13.133%, 12.554% and 10.755% for factors 2, 3, 4 and 5 respectively. . All the five factors taken together could explain 94.86% cumulative variance.

After rotation, the task of labeling or naming the factor comes:

1. **Factor 1** comprises of variable: X_2 =cash to deposit ratio, X_3 =credit to deposit ratio, X_4 =ratio to term deposit to total deposit, X_{10} =Wages as % to total expenses , X_{14} =Cost of deposit, X_{17} =Business per employee (in lakhs), X_{18} =Profit per employee (in lakhs), X_{20} =Net NPA ratio to net advances. The name of factor 1 is **“business development through deposits”**.
2. **Factor 2** comprises of variable X_5 =ratio of priority sector to total advances, X_6 =Ratio of term loan to total advances, X_7 =Ratio of interest income to total asset, X_9 =Ratio of other income to total asset, X_{11} = Interest expended to total asset, X_{15} =Cost of funds, X_{22} =Provision and contingency to total assets. Name of the factor 2 is **“management of advances”**.
3. **Factor 3** comprises of variable X_1 =Return on Assets and X_{19} =Capital Adequacy Ratio (CRAR). Name of the factor 3 is **“classification of assets”**.
4. **Factor 4** comprises of variable X_{12} =Ratio of operating profit to total asset, X_{16} =Return on advances and X_{21} =Return on Net Worth (%). Name of the factor 4 is **“profitability ratios”**.
5. **Factor 5** comprises of variable In factor 5, it will comprise variable: X_8 =Ratio of net interest margin to total asset, X_{13} =Return on equity. Name of the factor 5 is **“net income”**.

Trend Analysis over the period of study is carried out using Bar Charts, for the variables within each factor for each of the selected banks. For Bank of India the following charts describe the trend of each of the variables within five extracted factors:





From the above all graphs, it is says that overall trends are increasing till 2009. After 2009, there is little decrease in these values or ratios.

2. Central bank

Table 4 below presents the results of Factor Analysis for Central Bank.

Table 4: Factor Loadings after Rotation for Central Bank:

	Factors				Communality
	1	2	3	4	
X ₁	.132	-.093	.708	.270	.600
X ₂	.413	.819	.235	.022	.897
X ₃	-.974	.126	.047	.144	.988
X ₄	-.212	.960	.040	.134	.986
X ₅	.687	-.635	-.231	.048	.931
X ₆	-.907	.044	.402	.076	.992

X ₇	.903	.303	-.216	.041	.955
X ₈	.817	-.271	.154	.296	.852
X ₉	.826	.079	.356	-.220	.864
X ₁₀	.783	-.555	-.139	.117	.954
X ₁₁	.120	.689	.077	.594	.848
X ₁₂	.980	.020	-.153	-.044	.985
X ₁₃	.555	.025	-.246	.716	.883
X ₁₄	-.347	.207	.728	-.525	.969
X ₁₅	.014	.939	-.207	-.210	.968
X ₁₆	.792	-.067	.210	.421	.853
X ₁₇	-.699	.318	.402	.475	.977
X ₁₈	-.500	.238	.544	.623	.990
X ₁₉	-.173	.036	.910	-.201	.899
X ₂₀	.886	.219	-.363	-.111	.977
X ₂₁	-.273	-.021	-.040	.835	.774
X ₂₂	.628	-.598	.120	-.188	.801
Eigen values	9.307	4.47	3.131	3.035	
% of Variance	42.305	20.317	14.234	13.795	
Cumulative %	42.305	62.622	76.856	90.65	

From the above Table 4 communality for the first variable is 60% of variance associated with X₁ is common or shared variance. Before rotation, most variables loaded highly onto the first factor and remaining factors did not really get a look in. Variance explained by the 5 factors individually has changed slightly after rotation. But the communality from the component matrix and from the rotated component matrix will be the same.

From Rotated Component Matrix Communality for X₁ = $(.132)^2 + (-.093)^2 + (.708)^2 + (.270)^2 = 0.600$

Table 4 also gives result of **Total Variance Explained**, The Eigen values associated with each factor represent the variance explained by that particular linear component Extracting all the factors with Eigen values greater than 1, which leaves us with 4 factors which are again displayed as % of variance explained. Factor 1 explains 45.637% of total variance. Here first 4 factors explain relatively large amount of variance, especially factor 1 whereas subsequent factors explains only small amount of variance. After rotation factor 1 accounted 42.305% as compared to 20.317%, 14.234% and 13.795% for factors 2, 3, and 4 respectively. . All the four factors taken together could explain 90.65% cumulative variance.

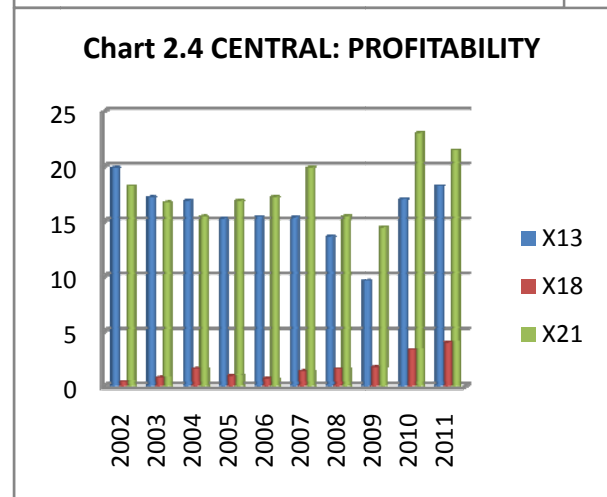
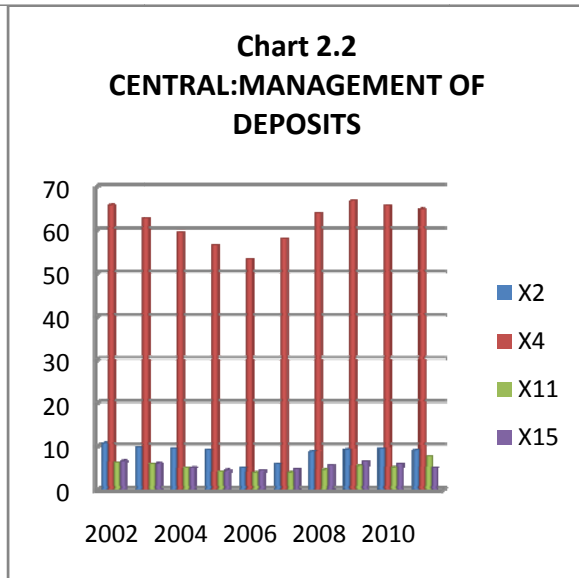
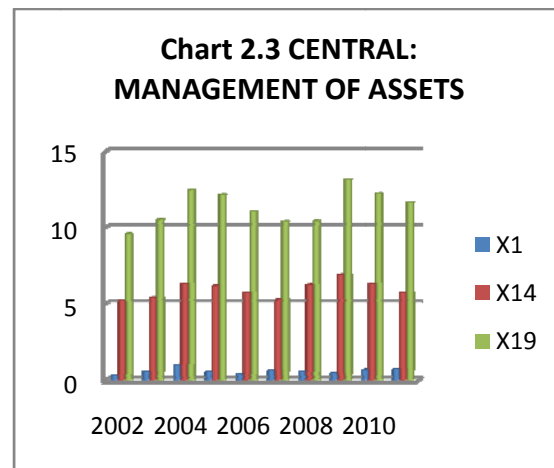
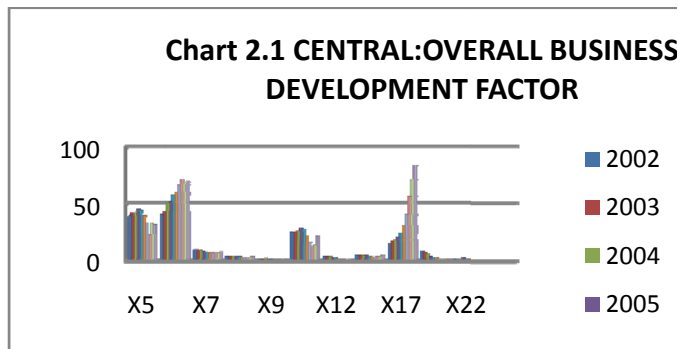
After rotation, the following four factors can be identified for Central Bank:

- **Factor 1** comprises of variable X₃ =Credit to deposit ratio, X₅ =Ratio of priority sector to total advances, X₆ =Ratio of term loan to total advances, X₇=Ratio of interest income to total assets , X₈ =Ratio of net interest margin to total assets, X₉ =Ratio of other income to total assets, X₁₀=Wages as % to total expenses , X₁₂ =Ratio of operating profit to total assets, X₁₆=Return on advances , X₁₇

=Business per employee (in lakhs), X_{20} =Net NPA ratio to net advances and X_{22} =Provision and contingency to total assets. Name of this factor is **“overall business development factor”**.

- **Factor 2** comprises of variable X_2 =Cash to deposit ratio, X_4 =Ratio to term deposit to total deposits, X_{11} = Interest expended to total assets, X_{15} =Cost of funds. Name of this factor is **“management of deposits”**.
- **Factor 3** comprises of variable X_1 =Return on Assets, X_{14} =Cost of deposits and X_{19} =Capital Adequacy Ratio (CRAR). Name of this factor is **“management of assets”**.
- **Factor 4** comprises of variable X_{13} =Return on equity, X_{18} = Profit per employee (in lakhs) and X_{21} =Return on Net Worth (%).Name of this factor is **“profitability”**.

For Central Bank the following charts describe the trend of each of the variables within four extracted factors:



From the above all graphs, it is says that overall trends are increase in 2011. After 2009, there is little increase in various values or ratios.

3. Punjab National Bank

Table 5 below presents the results of Factor Analysis for Punjab National Bank.

Table:5 Factor Loadings after Rotation for PNB

	Factors				Communality
	1	2	3	4	
X ₁	.695	-.466	.064	.512	.967
X ₂	-.316	.004	.093	-.814	.771
X ₃	.873	-.358	-.292	.153	.999
X ₄	.869	.320	.032	.201	.899
X ₅	-.842	.184	.294	-.304	.922
X ₆	.320	-.820	-.283	.150	.878
X ₇	-.340	.902	.145	.020	.951
X ₈	.022	.221	.583	-.611	.762
X ₉	-.225	.615	.629	.159	.850
X ₁₀	-.810	-.444	.070	-.294	.944
X ₁₁	.045	.979	-.091	.089	.976
X ₁₂	.114	.095	.857	.030	.757
X ₁₃	.604	.194	.475	.530	.909
X ₁₄	.208	.954	-.009	.148	.975
X ₁₅	.228	.493	-.803	.040	.941
X ₁₆	.946	-.192	.149	-.052	.957
X ₁₇	.895	-.281	-.057	.227	.935
X ₁₈	.862	-.279	-.013	.333	.932
X ₁₉	-.912	.028	.252	.159	.921
X ₂₀	-.245	.883	.131	-.275	.932
X ₂₁	.218	.246	.559	.759	.996
X ₂₂	-.369	.176	.851	-.035	.893
Eigen values	7.724	5.815	3.783	2.745	
% of Variance	35.111	26.43	17.193	12.477	
Cumulative %	35.111	61.541	78.734	91.211	

From the above Table 5 communality for the first variable is 96.7% of variance associated with X₁ is common or shared variance. Variance explained by the 4 factors individually has changed slightly after rotation. But the communality from the component matrix and from the rotated component matrix will be the same.

From Rotated Component Matrix Communality for X₁ = (.132)² + (-.466)² + (.064)² + (.512)² = 0.967

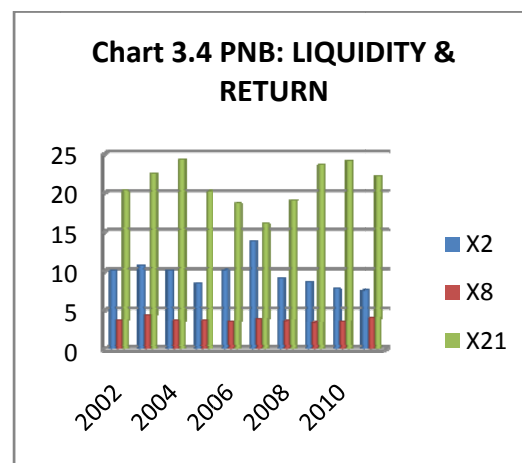
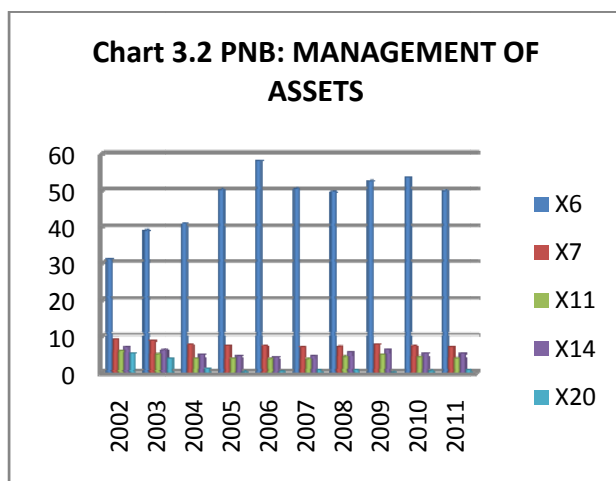
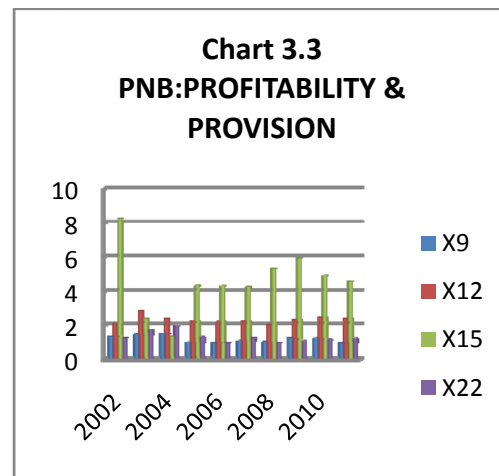
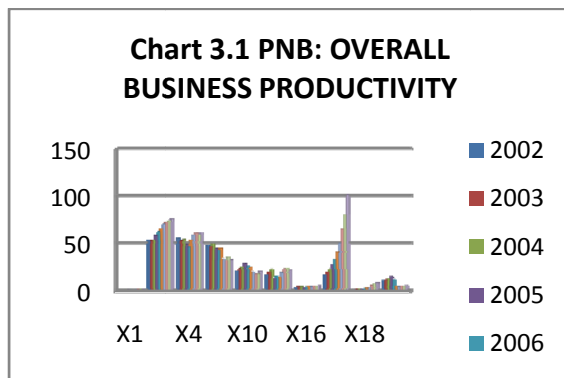
Table 5 also gives result of **Total Variance Explained**. Extracting all the factors with Eigen values greater than 1, which leaves us with 4 factors which are again displayed as % of variance explained. Factor 1 explains 35.117% of total variance. Here first 4 factors explain relatively large amount of variance, especially factor 1 whereas subsequent factors explain only small amount of variance. After

rotation factor 1 accounted 35.11% as compared to 26.43%, 17.19% and 12.47% for factors 2, 3, and 4 respectively. . All the four factors taken together could explain 91.21% cumulative variance.

After rotation, the following four factors can be identified for Punjab National Bank:

1. **Factor 1** comprises of variable X_1 =Return on Assets, X_3 =Credit to deposit ratio , X_4 =Ratio to term deposit to total deposits , X_5 =Ratio of priority sector to total advances, X_{10} =Wages as % to total expenses , X_{13} =Return on equity , X_{16} =Return on advances, X_{17} =Business per employee (in lakhs) , X_{18} =Profit per employee (in lakhs) and X_{19} =Capital Adequacy Ratio(CRAR). Name of this factor is **“overall business productivity”**.
2. **Factor 2** comprises of variable X_6 =Ratio of term loan to total advances, X_7 =Ratio of interest income to total assets, X_9 =Ratio of other income to total assets, X_{11} = Interest expended to total assets, X_{14} =Cost of deposits and X_{20} =Net NPA ratio to net advances. Name of this factor is **“Management of assets”**.
3. **Factor 3** comprises of variable X_9 =Ratio of other income to total assets, X_{12} =Ratio of operating profit to total assets, X_{15} =Cost of funds and X_{22} =Provision and contingency to total assets. Name of this factor is **“profitability and provision”**.
4. **Factor 4** comprises of variable X_8 =Ratio of net interest margin to total assets, X_2 =Cash to deposit ratio and X_{21} =Return on Net Worth (%).Name of this factor is **“liquidity and return”**

For Punjab National Bank the following charts describe the trend of each of the variables within four extracted factors:



From the above all graphs, it is says that overall trends are many fluctuations. After 2008, there is little increase in various values or ratios.

4. Canara bank

Table 6 below presents the results of Factor Analysis for Canara Bank.

Table:6 Factor Loadings after Rotation for Canara Bank

	Factors			Communality
	1	2	3	
X ₁	-.023	-.245	.899	.870
X ₂	-.500	.368	-.387	.536
X ₃	-.972	-.120	-.038	.962
X ₄	-.957	.032	-.099	.926
X ₅	.891	-.234	-.333	.960
X ₆	-.422	.723	-.061	.705
X ₇	.799	.564	-.058	.960
X ₈	.606	-.738	-.095	.920
X ₉	.931	.060	.061	.874
X ₁₀	.692	-.684	-.047	.949
X ₁₁	.386	.919	-.001	.994
X ₁₂	.832	-.385	.227	.892
X ₁₃	-.186	.508	.763	.874
X ₁₄	.003	.943	.034	.890
X ₁₅	.152	.969	-.078	.968
X ₁₆	.075	-.013	.807	.657
X ₁₇	-.876	.142	.432	.975
X ₁₈	-.759	.074	.602	.943
X ₁₉	-.705	.229	.472	.772
X ₂₀	.947	.161	.242	.980
X ₂₁	.082	.724	.591	.880
X ₂₂	.935	.107	-.118	.899
Eigen values	9.956	5.841	3.588	
% of Variance	45.253	26.549	16.308	
Cumulative %	45.253	71.802	88.11	

From the above Table 6 communality for the first variable is 87% of variance associated with X₁ is common or shared variance. Variance explained by the 4 factors individually has changed slightly after rotation. But the communality from the component matrix and from the rotated component matrix will be the same.

From Rotated Component Matrix Communality for X₁ = $(-0.023)^2 + (-0.245)^2 + (.899)^2 = 0.87$

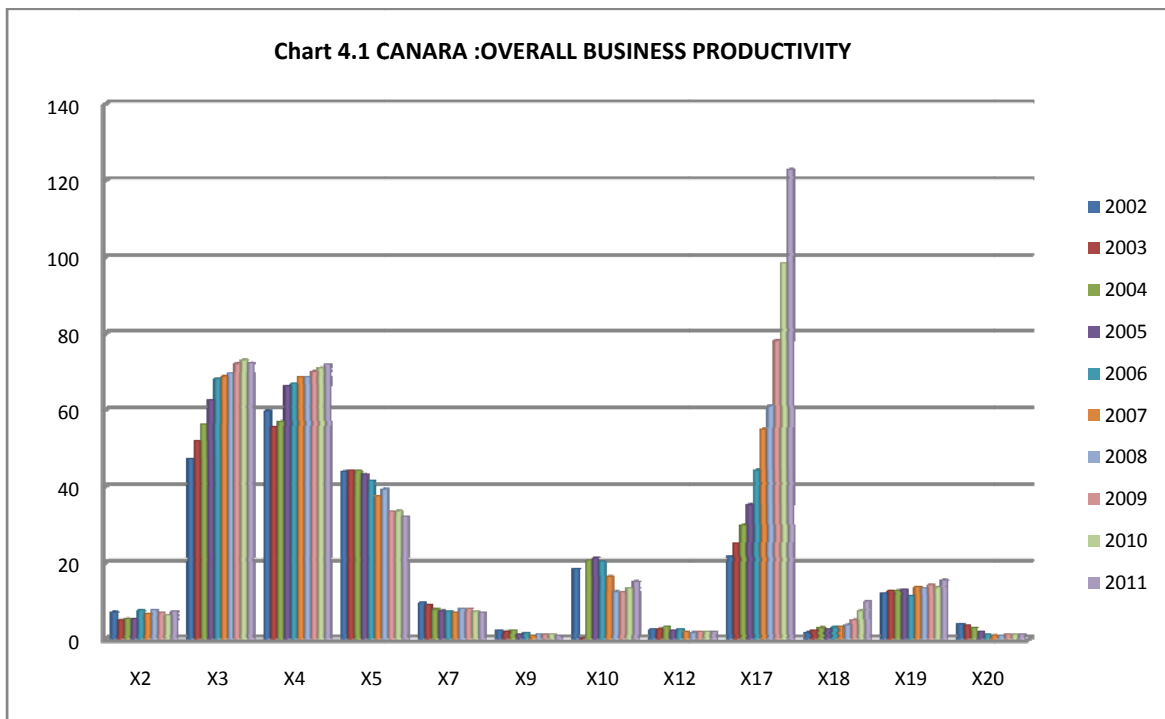
Table 5 also gives result of **Total Variance Explained**. Extracting all the factors with Eigen values greater than 1, which leaves us with 4 factors which are again displayed as % of variance explained.

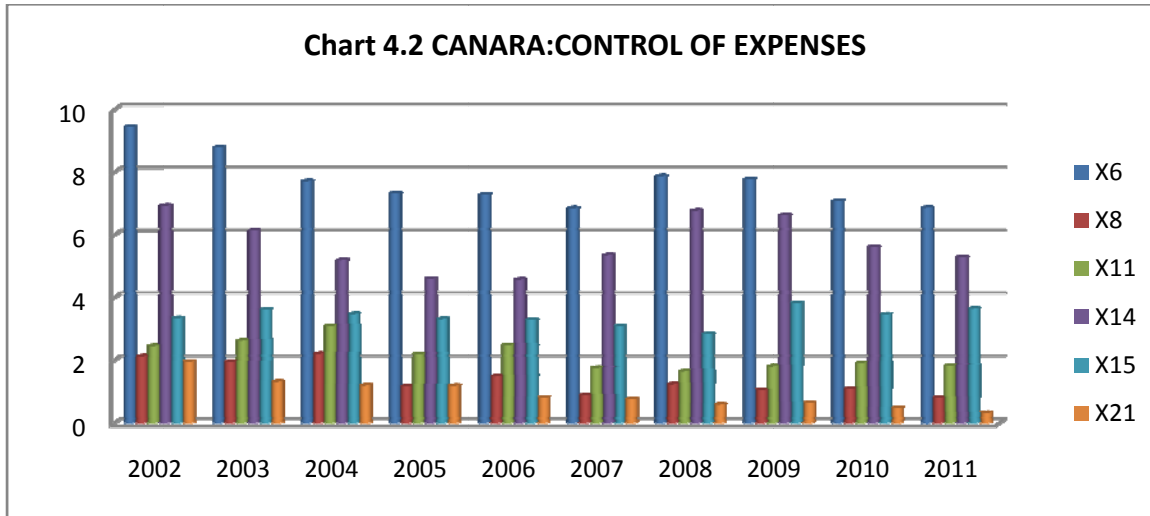
Factor 1 explains 45.25% of total variance. Here first 3 factors explain relatively large amount of variance, especially factor 1 whereas subsequent factors explain only small amount of variance. After rotation factor 1 accounted 45.25% as compared to 26.54% and 16.31% for factors 2, and 3 respectively. . All the three factors taken together could explain 88.11% cumulative variance.

After rotation, the following four factors can be identified for Canara Bank:

1. **Factor 1** comprises of variable X_2 =Cash to deposit ratio, X_3 =Credit to deposit ratio, X_4 =Ratio to term deposit to total deposits , X_5 =Ratio of priority sector to total advances, X_7 =Ratio of interest income to total assets, X_9 =Ratio of other income to total assets, X_{10} =Wages as % to total expenses, X_{12} =Ratio of operating profit to total asset, X_{17} =Business per employee (in lakhs), X_{18} =Profit per employee (in lakhs), X_{19} =Capital Adequacy Ratio(CRAR) and X_{20} =Net NPA ratio to net advances. Name of this factor is **“overall business productivity”**.
2. **Factor 3** comprises of variable X_6 =Ratio of term loan to total advances, X_8 =Ratio of net interest margin to total assets, X_{11} = Interest expended to total assets, X_{14} =Cost of deposits, X_{15} =Cost of funds and X_{21} =Return on Net Worth (%). Name of this factor is **“control of expenditure”**.
3. **Factor 3** comprises of variable X_{13} =Return on equity, X_{16} =Return on advances, X_1 =Return on Assets and X_{22} =Provision and contingency to total assets. Name of this factor is **“profitability & provision”**.

For Canara Bank the following charts describe the trend of each of the variables within three extracted factors:





From the above all graphs, it is says that overall trends are many fluctuations. After 2006, there is little increase in various values or ratio.

5. Dena bank

Table 6 below presents the results of Factor Analysis for Dena Bank.

Table:7 Factor Loadings after Rotation for Dena Bank:

	Factors				Communality
	1	2	3	4	
X ₁	.331	-.167	.817	-.117	.819
X ₂	.853	.015	.165	.426	.936
X ₃	.787	-.479	.351	.084	.980
X ₄	.826	.215	.262	.022	.797
X ₅	-.742	.528	.162	-.015	.856
X ₆	-.449	-.472	-.539	-.110	.727
X ₇	-.387	.897	-.143	-.099	.985
X ₈	-.019	-.275	-.562	-.174	.423
X ₉	-.914	.324	.090	-.052	.952
X ₁₀	-.796	-.199	-.488	-.076	.917
X ₁₁	-.149	.979	-.032	-.033	.982
X ₁₂	-.901	.006	.327	-.172	.949
X ₁₃	-.021	-.112	.900	.117	.836
X ₁₄	.180	.957	.182	.045	.984
X ₁₅	.119	.977	.097	-.055	.982
X ₁₆	.664	.104	.345	.015	.571
X ₁₇	.809	-.217	.441	-.192	.933
X ₁₈	.713	-.140	.639	-.187	.971

X ₁₉	.673	-.657	.117	-.204	.940
X ₂₀	-.585	.742	-.281	-.135	.990
X ₂₁	.070	-.106	.112	.959	.949
X ₂₂	-.920	.191	-.183	.114	.930
Eigen values	8.643	5.779	3.607	1.379	
% of Variance	39.284	26.268	16.396	6.266	
Cumulative %	39.284	65.553	81.948	88.215	

From the above Table 7 communality for the first variable is 82% of variance associated with X₁ is common or shared variance. Variance explained by the 4 factors individually has changed slightly after rotation. But the communality from the component matrix and from the rotated component matrix will be the same.

From Rotated Component Matrix Communality for X₁ = $(0.331)^2 + (-0.167)^2 + (.817)^2 + (-0.117)^2 = 0.819$

Table 7 also gives result of **Total Variance Explained**. Extracting all the factors with Eigen values greater than 1, which leaves us with 4 factors which are again displayed as % of variance explained. Factor 1 explains 39.28% of total variance. Here first 4 factors explain relatively large amount of variance, especially factor 1 whereas subsequent factors explains only small amount of variance. After rotation factor 1 accounted 39.28% as compared to 26.26%, 16.39% and 6.27% for factors 2, 3 and 4 respectively. . All the three factors taken together could explain 88.22% cumulative variance.

After rotation, the following four factors can be identified for Dena Bank:

1. **Factor 1** comprises of variable X₂=Cash to deposit ratio, X₃ =Credit to deposit ratio, X₄ =Ratio to term deposit to total deposits, X₅ =Ratio of priority sector to total advances, X₉=Ratio of other income to total assets, X₁₀=Wages as % to total expenses, X₁₂=Ratio of operating profit to total assets, X₁₆=Return on advances , X₁₇=Business per employee (in lakhs) , X₁₈ = Profit per employee (in lakhs), X₁₉=Capital Adequacy Ratio (CRAR) and X₂₂=Provision and contingency to total assets. Name of this factor is **“overall business productivity”**.
2. **Factor 2** comprises of variable X₇=Ratio of interest income to total assets, X₁₁ = Interest expended to total assets, X₁₄=Cost of deposits, X₁₅=Cost of funds and X₂₀ =Net NPA ratio to net advances. Name of this factor is **“control of expenditure”**.
3. **Factor 3** comprises of variable X₁ =Return on Assets, X₆ =Ratio of term loan to total advances and X₁₃=Return on equity. Name of this factor is **“profitability”**.
4. **Factor 4** comprises of variable X₈=Ratio of net interest margin to total assets and X₂₁ =Return on Net Worth (%). Name of this factor is **“productivity”**.

For Dena Bank the following charts describe the trend of each of the variables within three extracted factors

(5.1) Summary

Major findings of the study are summarized as under

In BOI, return on assets is positively correlated with ratio of operating profit to total assets. . In the estimated regression model of BOI, ratio of other income to total asset has the highest contribution to return on assets with positive 1.055 So it can be interpreted that increase of 1 In case of BOI, cash to deposit ratio, ratio to term deposit to total deposits and cost of deposits are also most affecting variables

and contributing in improve the profitability. There is positive correlation coefficient between other income and return on assets.

In PNB, there are many variables which are highly correlated with return on assets. Like credit to deposit ratio, business per employee, profit per employee are positively correlated, while priority sector advances to total advances and Net NPA ratio to net advances are negatively correlated. In that highest positive correlation of return on asset is with profit per employee and is highest negative correlation is with ratio of priority sector to total advances.

In Central Bank, return on assets is positively correlated with profit per employee. In this case, the correlation is not much high but this correlation is highest compared to other positively correlated variables. In Central bank, regression coefficient is highest in case of ratio of other income to total asset with the value 1.231(positive). Hence it can be interpreted that increase of 1 unit in ratio of other income to total asset there is increase 1.231 in return on assets. There is positive correlation coefficient between Cost of deposits and return on assets. It is favorable to the bank as deposit income increases, return on assets also increases. In this bank, ratio of interest income to total assets, ratio of net interest margin to total assets, ratio of other income to total assets, ratio of operating profit to total assets, return on advances and ratio of provision and contingency to total assets are the important determinants of profitability.

In Canara Bank, return on assets is positively correlated with the return on advances and profit per employee. In this case the regression coefficient of provision and contingency to total assets is highest but negative with the value as -0.465(negative). Hence increase of 1 unit in provision and contingency to total assets, there is decrease 0.465 in return on assets. There is negative correlation coefficient between provision and contingency to total assets and return on assets. In this bank, cash to deposit ratio, ratio to term deposit to total deposits, ratio of interest income to total assets, ratio of other income to total assets, ratio of operating profit to total assets and capital adequacy ratio(CRAR) are the major determinants of profitability identified by the “Overall Business Productivity” Factors.

In Dena Bank, return on assets is positively correlated with profit per employee. Here, the regression coefficient is highest in case of ratio of operating profit to total asset with the value as 1.265(positive). Hence increase of 1 unit in ratio of operating profit to total asset, there is increase 1.265 in return on assets. There is positive correlation coefficient between ratio of operating profit to total assets and return on assets. It is favorable to the bank. Here, cash to deposit ratio, ratio to term deposit to total deposits, ratio of other income to total assets, ratio of operating profit to total assets, return on advances, Capital Adequacy Ratio(CRAR) and provision and contingency to total assets are the major determinants of profitability of this bank.

There are some variables which are common to mostly all five banks. The variables which are most commonly influencing the profitability of all nationalized banks as identified through Factor Analysis are Overall Business Productivity Factor, Ratio of credit to total deposit, Ratio of priority sector to total advances, Wages as % to total expenses, Business per employee (in lakhs), profit per employee (in lakhs) and Net NPA ratio to net advances are the most affecting.

Conclusion

From the above summary, we can see that profitability of nationalized banks mostly influenced by “Overall Business Productivity Factor”. The major determinants of profitability of the selected nationalized banks differ for each bank but the most commonly influencing five factor shave been

identified. It is clearly seen from the graphs that profitability is constantly decreasing till year 2007-08 but after that there is little bit increase in important ratios. Thus, profitability has a fluctuating trend over the selected period of study, with an increase in recent two-three years.

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