CHAPTER I

INTRODUCTION
The importance of commercial banks in directing the activities in an economic system - be it a capitalist or a socialist, is indeed overwhelming. Not only in the highly developed industrial and non-industrial economies of the world, where in a way the commercial and industrial activities are paralysed in the absence of banks; even in the developing countries most economic activities, particularly in the economy's organised sector, are bank-based. In every economy, the vital processes of production and consumption are significantly affected by the aggregate monetary supply consisting of currency as well as demand and time deposits with the banks. In modern times, since bank money or credit constitutes bulk of the economy's aggregate money supply, it is mostly the changes in the volume of bank money or credit rather than the changes in the total supply of currency or hard money, that account for the variations in the aggregate money supply.

A well planned, organised, efficient and viable banking system is a necessary concomitant of economic and social infrastructure in an economy. Banking occupies a crucial place in undertaking the development effort and acts as a vehicle for socio-economic transformation as well as a catalyst to economic growth. Banks have an important role to
play in increasing the nation's savings rate, channelising the available savings into high investment priorities and better utilisation of available resources. The operations of the banks record the pulse of the economy. The size and composition of their transactions mirror the economic happenings in the economy. Banks play a vital role in giving a direction to economy's development by financing the requirements of trade and industry in the country. By encouraging thrift among people, banks foster the process of capital formation and thus promote entrepreneurial abilities and accelerate employment opportunities.

Indian economy is in the process of rapid development. Developments both in the service and manufacturing sectors are taking place at a rapid pace. But Indian economy, as a whole, has to go a long way to achieve the requisite levels of production and competitiveness to attain self-reliance. In building India in which the poorest will enjoy those living standards that are now available in the West, modernisation of economic apparatus, upgradation of technology and effective and efficient manpower is of utmost importance. Obviously this will require more finance and the banks, which command huge financial resources, can play a significant role in shaping the economy of a country by judiciously deploying their funds.

Banks play a prominent role in discharging social responsibilities i.e. poverty eradication, employment
generation, development of industry and agriculture, re-distribution of wealth and balanced regional development. In the industrial field, banks serve as a friend, philosopher and guide to industrial units. They nurse a large number of sick units with a view to enable them to continue their production and maintain their level of employment. Through their merchant banking divisions, several banks have entered into the field of industrial finance by taking up underwriting of capital issues. Hence, any successful plan of a nation requires a substantial expansion along with qualitative improvements in the operations of the banking system, in those areas which are in priority sector and on which the future development of a country rests. To quote Bhabha, "Banking is the kingpin of the chariot of economic progress. As such its role in expanding economy of a country like India can neither be underestimated nor overlooked. The success of our plan is dependent among other things, on the smooth and satisfactory performance of the role by banking industry of our country" [1].

With an objective of ensuring economic development of the country in desired directions, fourteen major

commercial banks having demand and time liabilities worth Rs.50 crores or more were nationalised on July 19, 1969. These banks are - Bank of India, Central Bank of India, Bank of Baroda, Punjab National Bank, Canara Bank, United Commercial Bank, Union Bank of India, Syndicate Bank, United Bank of India, Indian Overseas Bank, Indian Bank, Dena Bank, Bank of Maharashtra and Allahabad Bank.

The broad objectives of nationalisation of banks as envisaged in the then Prime Minister, Mrs. Indira Gandhi's broadcast to the nation on July 19, 1969 and her statement in the Parliament on July 21, 1969 were:

To have a control over the commanding heights of the economy with a view to mobilise adequate resources for development and to reduce the inequality between regions. The expansion of bank credit to priority sectors and encouraging a new class of entrepreneurs by granting liberal credit for new schemes. The provision of adequate as well as reasonable terms of services for bank staff. Giving professional bent to bank management by appointing professional bankers as chairmen; and economists, chartered accountants, lawyers, agriculturists and small industrialists as members of the board; and thus removing control by a few big businessmen and industrialists. Further, the public ownership of the major banks will help in eliminating the use of banks' credit for speculation and
unproductive purposes[1]

Eleven years after the nationalisation of fourteen commercial banks, the government on April 15, 1980 took over six more scheduled commercial banks, each with demand and time liabilities exceeding Rs. 200 crores. These banks are - Andhra Bank, Punjab & Sind Bank, New Bank of India, Vijaya Bank, Oriental Bank of Commerce and Corporation Bank. The decision to nationalise these banks was guided mainly by two considerations-first, to help in implementing the 20-point programme particularly in raising the share of advances to priority sectors from 33.3 per cent to 40 per cent over the period of next five years and secondly, to have more effective control over the credit policy implementation of the banking system as a whole.

Over the years, especially after the nationalisation, Indian banking system has become quite complex and varied. No longer is banking merely a process of financial intermediation: it has evolved into a technology for delivering a wide range of financial services. There has been a significant departure from the banker's earlier role of purveyors of credit and its recycling for profit considerations. The emphasis now is on meeting the credit gaps both at micro as well as at macro levels and ensuring

proper and effective use thereof, in line with the laid down priorities. The banker's activities have encompassed advisory and counselling roles as well as a monitoring function with a distinct disciplining base. Demands of innovativeness and creativity have been placed on bankers to such an extent that commercial banks are considered as one of the basic infrastructural points in promoting development.

The Indian bank-management, today, is facing a two-faceted challenge - to improve their profitability on the one hand and to serve the public in new ways with greater efficiency and effectiveness on the other. In the noble task of fulfilling the socio-economic responsibilities, commercial viability of the banking should not be ignored. Hence, profitability and social objectives are the two opposing considerations, which a bank is now required to keep in mind. Inspite of their role in financing priority sectors and contributing to the promotion of welfare of the common-man, banks, as commercial organisations, can not ignore profits. They have to earn reasonable profits not only to make a contribution to the central exchequer, but also to fulfil their social responsibilities, otherwise this giant financial edifice will crumble, thereby threatening the entire economy itself. Although, profits today are no longer the be-all and end-all of banking business: nevertheless any concern for healthy growth, long-term
viability and lasting contribution of banks must accord due emphasis on profitability. Banks in India are sensitive instruments, very much open to public gaze and criticism and if millions of people dealing with banks have to continue to repose their faith and trust in them, they must continue to function viably, efficiently and profitably [1].

Review of Literature

After nationalisation, the operating environment in banking industry is getting more and more complex. Emphasis on mass banking, priority sector lending etc. has brought in great pressures on profitability. The position has been further compounded by loan melas and loan waivers based primarily on political considerations. Under such circumstances, it becomes necessary to keep a continuous watch on the profitability of this vital sector of economy. In the past, some studies relating to financial performance of banks have been conducted and are being reviewed below:

Allison [2], Keehn [3], Joagvin [4],

Prestopino [1], Hobson [2], Wood [3] and Sapp [4] studied the different issues involved in the financial performance of banks. All these studies have been conducted in western countries and are not relevant in Indian context due to different functional and geographical environment. Nevertheless, these studies provide useful guidelines in the subject concerned.

Banking Commission [5] reviewed bank operating methods and procedures and made recommendations for improving and modernising operating methods and procedures, particularly relating to customer service, credit procedures and internal control systems. It also studied cost structure, analysed profitability and suggested measures to improve it. It also examined other important aspects of banking like information systems, management development, training and employee appraisal etc. which influence the


productivity of banks and banking system. It recommended fixing of man-hours for various types of jobs for measuring productivity of the employees. It observed that present methods of working out branch profitability are not appropriate and an integrated cost and financial reporting system is needed. It suggested use of certain ratios for the measurement of operational efficiency of branches.

Varde [1] in an empirical study on efficiency of rural branches, maintained that the success of a rural branch has to be studied in relation to the objectives of rural banking which are two fold; to act as an active catalyst in the integrated socio-economic development of the area served by the branch, and to become a commercially profitable banking unit. The study led to the conclusions that (i) Instead of a standard complement of staff, the determination of the manpower requirements for an individual rural branch will be more appropriate. (ii) The rural branches operating in groups of 4-5 sufficiently proximate branches would function more effectively than single individual branch. (iii) It is necessary as well as possible to make efforts to rescue the rural branches operating at a low volume of business and those having large volume of overdues. (iv) Location of a rural branch should be at the

hub of the activity.

Luther [1] chaired the committee appointed by Reserve Bank of India to study the productivity, efficiency and profitability of commercial banks. The committee analysed the various issues related to the planning, budgeting and marketing in commercial banks, bank management information system, criteria for evaluation of bank performance, annual accounts of banks, trends in earnings and expenses of banks, and profitability as well as pricing of banking services. The major recommendations of the committee were; (i) The capital base of banks needs to be improved. For this, banks should transfer at least 40 per cent of the disclosed profits to reserves, free of taxation. (ii) The interest on additional cash reserves in excess of the minimum 3 per cent should be related to cost of funds for banks. (iii) In the light of social obligations cast on the banks, tax laws need to be revised. (iv) To estimate the cost of various services and profitability of different activities, the Reserve Bank of India, in collaboration with commercial banks, should organise regular and systematic surveys. (v) To improve productivity, efficiency and profitability of banks, a systematic, prompt and regular

flow of information and its analysis is essential for banks to contemplate timely corrective actions. (vi) There should be uniform system of audit for all categories of banks, on the lines of the one prevailing in the State Bank of India. (vii) Simplification of systems and procedures in banks is necessary to bring economy in expenses and to provide better customer services.

Mathur [1] studied the public sector banks in Indian economy by conducting a case study of the State Bank of India. The main finding of his study was that the State Bank of India, in its two decades of service, has accelerated the growth of Indian economy in two significant ways: (i) by pursuing the policy of vigorous branch expansion in general and its rural orientation in particular, and (ii) by playing a leading role in introducing bank credit facility to the new fields of the priority sectors of the Indian economy. The bank has also played a leading role in developing the backward regions of the country.

Bhatia [2] attempted to describe and analyse the economic performance of the Indian banking system, as

reflected by its output, price and profitability during the period 1950-68. Surrogates were used to measure the output of the Indian Banking system. The price performance was analysed using the yield on financial instruments owned by the Indian banking system. Profitability of the banking system was measured by the ratios of profit (before taxes) as percentage of capital; and profit (before taxes) as percentage of assets. The hypotheses tested in the study were: (i) demand, policy and structural variables significantly affect the performance of the Indian banking system and (ii) there are insignificant differences in the performance of the various banking sectors in India. The major findings of this study were; (i) The profit performance of the Indian banking system during the period 1950-68 had an upward trend, (ii) The structure of the banking system represented by the number of bank offices and the deposit concentration ratio had an insignificant effect on its performance during the period under review. (iii) There were significant differences in the levels of intermediation of various banking sectors in India during the period 1950-68. However, none of the sectors had significant profitability differences. (iv) In order to improve the output performance of the Indian banking system, the study suggested that the banking regulations in India should not emphasise direct regulation of the rate of
return, as much as the regulation of the asset portfolio of banks.

Kulkarni [1] in his study on developmental responsibility and profitability of banks stated that while considering banks' costs and profits, social benefits arising out of banks' operations cannot be ignored. He claimed that profit maximisation approach is out of place while referring to profitability of banks. He recognised that while fulfilling the social responsibility, banks should try to make the developmental business as successful as possible, reduce costs, improve banking system and increase the overall productivity.

Shah [2] in his paper "Bank Profitability : The Real Issues", concluded that profitability cannot and will not improve merely by increasing the margin between lending and borrowing rates. On the contrary, any increase in income will be observed by latent efficiencies in cost structure. Further the spread between interest earned and interest paid is declining, not because interest margin has been squeezed but because (i) staffing and working patterns are inefficient, (ii) funds and investment management is poor, (iii) credit is not supervised and (iv) forms and procedures

are complex and wasteful.

Singh [1] studied the relationship between cost of bank credit and prices and drew the following conclusions; (i) The present high rates of interest produce has, in general, insignificant tendency for the prices to rise further, and (ii) The effect of rise in interest rates is, somewhat, significant only in case of those companies, which are inefficient and burdened with excess borrowings from commercial banks.

Ganesh [2] in his paper on the system of profit monitoring in banks emphasised that the effectiveness of monitoring system would depend upon profit plan, identification of profit centers, setting of standards for comparison and a proper management information system. The study indicated that the working funds, as the base for the purpose of comparing profitability at the branch level, is inadequate and relating it to the total business (i.e. the sum of the total deposits and total advances) will be more suitable. Finally, the study suggested a proforma of monthly profitability monitoring for reporting to central office.

Makarand [3] attempted to evaluate the performance

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of public sector banks in different spheres where much was expected from the banking sector. To prepare performance index of each public sector bank, six quantitative indicators were selected, viz., branch expansion, priority sector credit, deposit mobilisation, export credit, net profit to working funds and wage cost of business development. These indicators were assigned appropriate weights and incorporated in the Integrated Priority Index, on the basis of which inter-bank comparisons were made. The study suggested that (i) Counselling and expert advice to the priority sectors on diversified activities is essential. (ii) Apart from top management, the staff at lower level should also be actively involved in the priority sector credit, and (iii) Necessary lending powers should vest with the branch managers.

Aggarwal [1] examined the concept of social obligations of banks. The main recommendations of his study were: (i) Providing more branch offices to the public, particularly in semi-urban and rural areas and in the lead districts. (ii) Providing greater credit facilities to the public as well as to the priority and neglected sectors. (iii) Helping generation and maintenance of employment opportunities in the country. (iv) Financing the government securities and (v) Popularising the bill form of credit.

Sahir [1] advocated transfer pricing as one of the important methods for evaluating branch level performance of commercial banks. The study recommended the concept of opportunity cost for determining the transfer price for branches. The study suggested that (i) Branches should be given credit at a minimum transfer price (at which excess funds are transferred to the head-office). (ii) Other than profits, necessary weightage should also be given to management objectives, such as priority sector lending, recovery, deposit mobilisation etc. However, the profitability objective should not be lost sight of completely. When applied to a selected number of different kinds of branches of a particular nationalised bank, the suggested transfer price mechanism made the profit statement of branches more meaningful and informative for evaluating the branch level performance.

Bilgrami [2] studied the banking growth imbalances over a decade since nationalisation in branch expansion, deposit mobilisation, credit disbursement and priority sector lending. The study concluded that (i) The rapid expansion of bank branches since 1969 has substantially

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increased the average number of bank branches per million population in all regions, but such expansion could not actually prove helpful in eliminating the wide variations between backward and developed regions. (ii) The regions which were above the national average population served by a bank in 1969 recorded more progress than the regions which were below the national average. Similar trends also emerged in case of deposits, credits and priority sector lending.

Nayan [1] suggested a model for evaluation of performance of Commercial banks. His study led to the following conclusions, (i) The present system of ranking the banks on the basis of aggregate deposits fails to reflect their overall achievements. (ii) At the micro level, the existing system of performance budgeting has left much to be desired, and thus can not be objectively used for evaluation of branch level performance. (iii) On the basis of all the important and quantifiable parameters of performance, an Integrated Performance Index needs to be developed, which will act as a model for evaluating the performance of commercial banks.

Varde and Singh [2] of National Institute of Bank Management conducted a number of studies on the profitability

of commercial banks and have recently compiled them in a short book titled "Profitability of Commercial Banks". The book covers different issues related to profitability of banks like profit management in banks, productivity in banks, profit planning in banks, monitoring profitability of bank branches, measuring cost of funds for banks, matching revenues and costs of commercial banks and operating cost of rural retail banking.

Verghese [1] conducted an in-depth study on profits and profitability of commercial banks during the decade 1970-79. The major issues analysed by her were; (i) Has there actually been a declining trend in the profits and profitability of Indian commercial banks in the seventies? (ii) What are the main determinants of profits and profitability of the Indian banks during this period? (iii) Are the conventional profit accounting standards adequate to reflect a true picture of the financial performance of the Indian banks? and (iv) Are the present systems and procedures of drawing up the balance-sheets and profit and loss accounts adequate to give a true and fair picture of the banks' financial position and if not, what improvements are called for? Owing to data and time constraints, however, the scope of her study was limited to the analysis of profits

and profitability of groups of Indian commercial banks, leaving aside the analysis of financial performance of individual banks.

Punjab National Bank [1] hosted 9th Bank Economists' Meet at New Delhi. One of the topics discussed in the conference was "Profitability and Profit Planning in Banks." The major issue deliberated was that bank profitability is a function of both exogenous and endogenous factors, wherein the former play a greater role. The exogenous factors include large pre-emption of bank funds for the purpose of liquidity requirements (viz. SLR and CRR with low yields), administered interest rate structure with concessional rates on several categories of loans and massive branch expansion in the rural areas. The endogenous factors include increase in establishment expenditure, growing proportion of term deposits in the deposit-mix, inadequate non-fund business and low return from ancillary services. The major recommendations which emerged from the discussion were; (i) Paying interest on the first 3 per cent of CRR by Reserve Bank of India, although it may mean amendment in the relevant Act. (ii) Professionalisation of credit management, diversification of business, increasing service charges and computerisation of operations. (iii) 

Increase in rates of interest on priority sector credit.
(iv) Take-over of sick units and their management by banks.
(v) Better cash management and investment management. (vi) Better cost management, and (vii) Adoption of techniques like Linear Programming and Zero-based budgeting for profit planning.

Chopra [1] in her empirical work "Managing Profits, Profitability and Productivity in Public Sector Banking", studied the emerging trends in the profits and profitability of some selected public sector banks at micro level. She highlighted the need for the introduction of management essentials for the better management of profits and profitability of public sector banks and recommended proper management of both costs as well as earnings.

Vashisht [2] in his empirical work "Performance Appraisal of Commercial Banks in India", evaluated the performance of public sector banks with regard to six indicators i.e. branch expansion, deposits, credit, priority sector advances, DRI advances and net profit, over the period 1971-83. A composite weighted growth index was developed to rank the banks and to classify them into four

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performance levels viz. excellent, good, fair and poor. The study ranked Indian Overseas Bank at the top and Dena Bank at the bottom. An urgent need to check the working of commercial banks for ensuring rapid and healthy growth in future was stressed; and to improve the performance of commercial banks, the study suggested (i) the developing of marketing strategy for deposit mobilisation (ii) profit planning and (iii) SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis in banks.

Need of the study

In recent years, the profitability performance of commercial banks has become a fascinating topic for conversation, comment and debate. There is growing evidence of concern of the authorities about the declining profitability of the banking system. The Reserve Bank of India, in its Annual Report, 1983-84 [1], expressed concern about the pressures on bank profitability. Dr. Manmohan Singh, when he was the Governor of the Reserve Bank of India, fervently pleaded for safeguarding the viability of the banking system [2]. The Chairmen of Indian Banks' Association at the time of the annual general body meetings

have been lamenting over the precarious position of profitability of the banking system.

With the change in the social and economic objectives of Indian commercial banks, particularly of the nationalised banks, it becomes extremely essential to assess their profitability performance, in the wake of new banking philosophy. However, in most of the studies covering the recent period, 'profit' has been used as one of the many indicators of their performance appraisal. This dilutes the importance of profits to a large extent. As despite change in thrust, banks remain commercial organisations and profit factor cannot be ignored without endangering viability of banks and continuity of their operations. In fact, the approach of policy-makers towards profitability too has changed, with the result that low profits have become a fact of life. Therefore, it is high time to concentrate efforts on analysing the profits and profitability position of our nationalised banks, so that the confidence of the public in the soundness of the banking system remains unimpaired and the social objectives of banks do not necessarily dilute.

Objectives of the study

In the light of the above discussion and of the serious concern of the monetary authorities and the bank management about the declining profitability of banks, the study attempts to analyse the emerging trends in profits and profitability and examine the various factors
responsible for the erosion of bank profitability so as to suggest the ways to improve their profitability without jeopardising the basic objectives of nationalisation. In particular, the three broad objectives to be pursued are:

1. The primary purpose of the study is to investigate the economic performance of banks. An attempt will be made to compute the magnitude of profits and profitability of each nationalised bank.

2. The study aims at identifying and analysing the factors that influence the profitability of banks.

3. The study is expected to suggest remedial measures to improve the profits and profitability of banks.

Scope of the Study

The present study is based on macro approach to the problems of profits and profitability of the banking industry in India and seeks to analyse the profitability performance of twenty public sector banks, nationalised in 1969 and 1980, which come closest of being representative of Indian banking industry.

The period of the study is ten years 1976-85.

Sources of Data

The data relating to the financial performance of commercial banks is disseminated by various sources like 'Statistical Tables relating to Banks in India', 'Trends and Progress of Banks in India', 'Reserve Bank of India Monthly Bulletins', 'Report on Currency and Finance' and the alike.
brought out by Reserve Bank of India, 'Financial Analysis of
Banks' brought out by Indian Banks' Association and various
annual statements brought out by banks etc. and so on. Since
the prime objective of the study is to analyse the financial
performance of nationalised banks individually, the data
published by Indian Banks' Association in 'Financial
Analysis of Banks' is more suitable for the purpose of the
study and will be extensively used. However, wherever
necessary, this data will be supplemented by other sources
and will be acquainted accordingly.

Research Methodology

The performance of a bank can be measured by a
number of indicators. Profitability is the most important
and reliable indicator as it gives a broad indication of the
capability of a bank to increase its earnings [1]. For
measuring the profits and profitability of commercial banks,
the present study employs three methods viz.-trend analysis,
ratio analysis and concentration indices.

Trend Analysis

Trend analysis becomes imperative to evaluate the
overall profits and profitability performance of commercial
banks. It clearly indicates the magnitude and direction of
operations over a period of time, it helps to identify
certain banks in respect of their level of efficiency in

operations, it provides clues for developing certain feasible measures to attain reasonable growth, and it highlights the trend pattern to identify the historical developments. The study attempts to assess the profits and profitability of banks, through trend analysis of six selected parameters:

1. Net Profit
2. Profitability
3. Income
4. Expenditure
5. Spread
6. Burden

As the operations of the commercial banks normally grow from year to year and each year enables it to have an enlarged base to compound the growth rate, therefore exponential growth function shall be fitted to analyse the trends in selected parameters.

The equation of the exponential curve [1] is of the form,

\[ Y = ab^X \]

Putting the equation in logarithmic form, we get

\[ \log Y = \log a + X \log b \]

To obtain the values of constants 'a' and 'b', the two 'normal equations' to be solved are:

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\[ \Sigma \log Y = N \log a + \log b \Sigma X \]

\[ \Sigma (X \cdot \log Y) = \log a \Sigma X + \log b \Sigma X^2 \]

where 'a' is the \( Y \) intercept and 'b' the slope of the curve.

Under the growth function, growth rate is actually equal to \( \log b \), which implies that there is growth over the period, provided \( \log b > 0 \). Antilog of \( \log b \) gives the value of 'b', and the growth rate in percentage form shall be equal to:

\[ \left(\text{Antilog of } \log b \times 100\right) - 100 \]

Apart from the exponential growth rate, percentage growth rate over the base year will be calculated to analyse the trends on year-to-year basis.

The percentage growth rate over the base year is given as:

\[ \frac{V_c - V_b}{V_b} \times 100 \]

Where:

- \( V_c \) = Value of the given parameter in the current year.
- \( V_b \) = Value of the given parameter in the base year.

**Ratio Analysis**

For measuring the profitability of banks, analysis of relevant ratios is one of the reliable and commonly used tool of analysis, due to their conciseness, comparability and the direct relevance of the relationships established to
the various earning capabilities of banks. Besides, the ratios provide a convenient means of analysis and expression of the various operational aspects of banks. Three sets of ratios have been employed for assessing the profitability of commercial banks, viz. spread ratios, burden ratios and profitability ratios.

**Spread Ratios**

Spread, which is the difference between interest earned (on loans and advances) and interest paid (on deposits and borrowings) by the banks, plays a major role in determining the profitability of banks. It is the net amount available to the banks for meeting their operating, administrative and management expenses. In order to analyse the profitability performance of commercial banks, it becomes imperative to study the magnitude of this spread and its components i.e. interest earned and interest paid in relation to total working funds of banks. More specifically, the spread ratios to be studied are:

1. Interest Earned as percentage of Working Funds
2. Interest Paid as percentage of Working Funds
3. Spread as percentage of Working Funds

**Burden Ratios**

Burden is defined as the difference between non-interest expenditure and non-interest income of the banks. It represents non-interest expenditure not covered by non-interest income and is an important factor in
determining the profitability of banks. Three burden ratios to be employed in the present work are:

1. Non-Interest Expenditure as percentage of Working Funds
2. Non-Interest Income as percentage of Working Funds
3. Burden as percentage of Working Funds.

Profitability Ratios

Profitability is a ratio of earnings to the funds used. It stands for profits deflated by the size of the unit and indicates the efficiency with which a bank deploys its total resources to maximise its profits. The study seeks to analyse three profitability ratios:

1. Net Profit as percentage of Total Income
2. Net Profit as percentage of Total Deposits
3. Net Profit as percentage of Working Funds

To get a better picture of the performance of banks, these ratios shall be analysed and interpreted by calculating Mean ($\bar{X}$)*, Standard Deviation (S.D.)** and Coefficient of Variation (C.V.)*** at two levels.

* Mean ($\bar{X}$) = $\Sigma x / N$
  where $\Sigma x$ = Sum of series of observations
  $N$ = Number of items

** S.D. ($\sigma$) = $\sqrt{\Sigma x^2 / N}$
  where $x = (X - \bar{X})$, $\bar{X}$ is the mean of the series and $(X - \bar{X})$ is the deviation from the mean
  $N$ = Number of items

*** C.V. = ($\sigma / \bar{X}$) x 100
  where $\sigma$ is Standard Deviation (S.D.) and $\bar{X}$ is the mean of the series
At the bank level i.e. by computing $\bar{X}$, S.D. and C.V. for the period under study for each bank separately.

- At the yearly level i.e. by computing $\bar{X}$, S.D. and C.V. for each year for the average bank.

Concentration Indices

The overall performance of the total banking system depends upon the relative efficiency of each unit of the banking system and the information about the latter has been taken by computing Herfindhal's index of concentration [1] defined as below:

$$H_i = \frac{n}{\sum_{i=1}^{n} \left( \frac{v_i}{\sum v_i} \right)^2}$$

Where

- $H_i$ = Overall Index
- $v_i$ = 'i' th unit's share of variable
- $n$ = number of units

The study seeks to assess the relative performance of various banks, with respect to following fifteen parameters:

1. Net Profit (in absolute volume)
2. Total Income (in absolute volume)

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<td>6.</td>
<td>Net Profit</td>
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**Overall Profitability Performance**

In order to judge the overall profitability performance of various nationalised banks, following seven indices have been applied-

1. Index of Interest Earned to Working Funds
2. Index of Interest Paid to Working Funds
3. Index of Spread to Working Funds
4. Index of Non-Interest Expenditure to Working Funds
5. Index of Non-Interest Income to Working Funds
6. Index of Burden to Working Funds
7. Index of Net Profit to Working Funds

To compute these indices, at first the respective
ratios will be calculated over the period 1976-85, then these ratios shall be averaged bank wise and the respective indices be computed by the method given below:

\[
\text{Index} = \frac{\text{Average ratio for the concerned nationalised bank}}{\text{Average ratio for aggregate of all nationalised banks}}
\]

Further, the study seeks to classify the banks with regard to these selected profitability indices at four performance levels viz., excellent, good, fair and poor. 'Excellent' performance level includes the banks lying at the top 25 per cent area of the normal distribution i.e. where growth index value is greater than \((\bar{X} + 0.6745\sigma)\).

'Good' performance category stands for banks whose growth index score lies between 50-75 per cent area of the normal distribution i.e. where growth index value is between \(\bar{X}\) to \((\bar{X} + 0.6745\sigma)\). 'Fair' category includes those banks whose growth index lies between 25-50 per cent area under normal curve i.e. where growth index value is between \((\bar{X} - 0.6745\sigma)\) to \(\bar{X}\). 'Poor' category comprises the banks which show their growth lying at the bottom 25 per cent area of the normal distribution i.e. where growth index value lies below \((\bar{X} - 0.6745\sigma)\)*.

* Value of \(\pm 0.6745\sigma\) refers to the standard normal distribution, which divides the distribution at 25 per cent and 75 per cent respectively. See Stockson, John R. and Clark, Charles T., Introduction to Business and Economic Statistics, South-Western Publishing Co. Cincinnati, Ohio, 1972, pp. 215-217.
Apart from computing the profitability of banks, the study also attempts to analyse the various variables, which are expected to have influenced the profitability of banks. For this purpose, a multivariate approach viz. correlation analysis, regression analysis, factor analysis and discriminant analysis has been adopted. The data of selected variables has been pooled together for each of the nationalised bank for two periods of time namely 1976-78 and 1983-85.

**Correlation Analysis**

Correlation analysis attempts to study the relationship that exists between two or more variables. The correlation coefficient of the selected independent variables with the bank profitability has been worked out in order to identify the most important variables or the variables which have higher association with the dependent variable. Also, the correlation coefficient among the different variables has been worked out so as to arrive at a correlation matrix which incorporates correlation coefficients of all the selected variables with the dependent variable, as well as correlation coefficients among different independent variables. The test of significance has also been applied in order to identify the variables which have significant correlation.

**Regression Analysis**

Regression analysis attempts to study the
functional relationship between the variables and provides a mechanism for prediction. As profitability of banks is the result of several variables, the impact of each selected variable on bank profitability has been studied individually (through univariate regression analysis) as well as collectively (through multiple regression analysis).

**Univariate Regression Analysis**

Univariate regression analysis is concerned with estimating the expected value of one variable on the basis of observed value of another variable. The regression equation of Y (dependent variable) on X (independent variable) can be expressed as follows:

\[ Y = \alpha + \beta X + e \]

Where 'α' and 'β' are constants/parameters. The parameter 'α' determines the level of the fitted line and the parameter 'β' determines the slope of the line i.e. the change in Y per unit change in X. The symbol Y stands for the value of Y computed from the relationship for a given X plus the error component.

**Multiple Regression Analysis**

In order to investigate the effect of several independent variables on the dependent variable (Y), a multiple regression model has been used. The linear multiple regression model involving the dependent variable Y and independent variables \( X_2, X_3 \ldots X_p \) can be written as

\[ Y_i = \alpha + \beta_2 X_{2i} + \beta_3 X_{3i} + \ldots + \beta_p X_{pi} + e_i \]
Where $a$ denotes the intercept $\beta_2 \ldots \beta_p$ are the partial regression coefficients, $i = 1, \ldots, n$-observations and $e_i$ is the residual term associated with the 'i' th observation. Thus the multiple regression model gives the expected value of $Y$ conditional upon the fixed values of $X_2, X_3 \ldots X_p$ plus the error component.

Many procedures have been developed to estimate the regression coefficients of selected independent variables. The commonly used procedures are:

a) All regressions taking into consideration all the possible combinations: In this procedure, the regression equation having maximum $R^2$ (coefficient of determination) will be chosen. But the total number of regression equations, under this procedure, will end to quite large (i.e. $2^k - 1$, where $k$ is the number of variables) and it will not be feasible to handle all these equations.

b) Backward elimination or step-down procedure: In this, the regression equation with all the variables selected for the analysis is estimated and then the variables having t-values less than the specified value are progressively eliminated. In this procedure, we normally land to very few variables and the important variables on theoretical considerations might be got eliminated in the process of elimination and hence not much
useful conclusions can be drawn.

c) Forward selection procedure: This procedure involves much less computational efforts than the backward elimination procedure. Here first that variable is selected (say $X_8$) which has high simple correlation with the dependent variable ($Y$). Then the partial correlation coefficients of $Y$ with other independent variables, after including $X_8$ (i.e. $r^2_{Y|X_8}$, $r^2_{Y|X_2X_8}$ etc.) are seen and that variable is selected which has the highest partial correlation coefficient and so on. This process is continued, till $R^2$ (coefficient of determination) increases.

(d) Step-wise regression procedure: The forward selection procedure has one major drawback. A variable which may have been the best single variable at an early stage may be superfluous at a later stage. For example, in the above procedure, though $X_8$ was considered the best variable at the first step, it may be superfluous after the inclusion of other variables (say $X_2$ or $X_4$) and the results may not be unbiased in strict sense. What the step-wise procedure does in this case is the following - suppose it starts with $X_8$. Then it enters $X_2$, using forward selection procedure. After $X_2$ is entered, it looks at $x_8$ and decide
whether to retain it or not, by looking at the F-value for $X_8$. If it is retained, it enters the next variable, say $X_4$, by forward selection procedure. After $X_4$ is entered, it looks again at the F-value for the variables already in $X_2$ and $X_8$ and deletes the variables that are superfluous. Thus at each stage, the forward selection procedure is used to decide which variable to include and the backward elimination procedure is used to decide which variable to eliminate.

Hence, the step-wise regression analysis consists of procedures via which a forward inclusion is combined with the deletion of variables that no longer meet the pre-established criteria at each successive step. Normally, the step-wise regression analysis is considered better than other procedures due to its inherent advantages.

In order to study the contribution of important independent variables towards bank profitability, step-wise multiple regression analysis has been used. The problem of multicollinearity has been kept in mind and has been studied by finding out zero order correlation coefficient of the selected variables. Moreover, different combinations of variables have been tried by deleting/dropping the highly collinear variables and on the basis of theoretical considerations. The coefficient of multiple determination
and t-values have also been computed to find out the significant variables. The last equation of the step-wise regression analysis normally incorporates all the selected variables and hence is termed as multiple regression analysis. But if some variable turns out to be unimportant, the programme does not enter that variable in the estimating equation.

**Factor Analysis**

One of the major problems associated with regression analysis is that of multicollinearity. The consequences of multicollinearity are imprecise and unstable estimates [1]. (The estimates are imprecise because high standard errors reduce the statistical significance and they are unstable in the sense that they show wide though spurious variations from sample to sample.) Usually the problem of multicollinearity is solved by deleting one or more of the highly collinear variables. But this practice is objectionable on three grounds. First, loss of information is caused as variables of interest may be shed from the model. Secondly, it leads to biased and inconsistent estimates of the coefficients of retained variables [2]. Thirdly, the estimated coefficients of retained variables

embody the combined affects of the retained and omitted variables. Due to these difficulties, the technique of factor analysis is often applied to isolate the different factors. This method avoids a number of problems inherent in the conventional studies.

Adelman and Morris [1] and others have recommended factor analysis technique as an appropriate technique to the studies of developmental variables. In contrast to regression method, factor analysis deals directly with correlative dependence by arranging variables into independent linear combinations and permits any indicator to be tested as a dependent variable of a small set of underlying or common components. In addition, rather than forcing deletion of variables and loss of information, the procedure encourages an expansion of the variable set. This is an important methodology since it lessens the possibility that one or two over loaded hybrid variables will acquire greater importance than they merit. Thus the purpose of factor analysis is mainly two fold: data reduction and substantive interpretation. The first purpose concerns summarising the important information in a set of 'P' variables by a set of less than 'P' factors. The latter purpose is concerned with the search for and the testing of

constructs that underline the observed variables. 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.

Let us assume that there are k (i=1...k) variables, n(j=1...n) banks and m factors. The factor analysis model, in the matrix notation then, may be written [1] as below:

\[ X(k \times n) = A(k \times m) \times Z(m \times n) \]

where:

- \( X \) = the matrix of variables of order (kxn).
- \( A \) = the matrix of factor loadings of order (kxm).
- \( Z \) = the matrix of factors of order (mxn)

In factor analysis, factors are formed in such a way that (1) Those variables that are most clearly inter-correlated are combined within a single factor. (ii) The variables allocated to a given factor are those that are most nearly independent of the variables allocated to the other factors. (iii) The factors are derived in a manner that maximises the percentage of the total variance attributable to each successive factor (given the inclusion

of the preceding factors) and (iv) The factors are independent (uncorrelated with each other) [1].

**Discriminant Analysis**

No doubt, the technique of factor analysis brings out important factors associated with the selected indicators, but they represent a package of indicators taken simultaneously and hence, some of the indicators may get relatively higher importance in the two or more than two factors so derived. Therefore, it is important to look for the relative contribution of each variable in explaining the differences between the profitability. For this purpose, the technique of discriminant analysis has been applied.

Under discriminant analysis, the banks have been categorised into two groups—one having profitability above the mean value and another below mean profitability. Then the technique is applied to know if there exists a significant difference between the mean values of the two groups. Discriminant analysis is a broad term which refers to several closely related statistical activities. Firstly, the discriminant analysis is used to discriminate between the two groups on the basis of a set of characteristics. In this, the analyst will tell how well do they discriminate and which characteristics are the most powerful discriminators. Another important application is to derive

one or more mathematical equations for the purpose of the classifications [1]. In the analysis pertaining to the classifications, one is more interested in deriving out the discriminant function and in knowing the level of misclassification of the data, on the basis of the function so derived from the analysis.

Having obtained the discriminant function, we would be interested in knowing if it can significantly distinguish between the two groups. A quick approximate method is to use the well known test of significance for the difference between the means of two normal distributions [2]. But the normal test is only a rough guide since it takes no account of the number of variables involved.

A more exact test is given by Rao [3]. It is the variance-ratio based on $D_p^2$, which has F-distribution with $V_1$ and $V_2$ degrees of freedom. The variance ratio is given by:

$$
F = \frac{N_1 + N_2 - (P-1)}{P} \cdot \frac{N_1 N_2}{(N_1+N_2) (N_1^2 N_2 - 2)} D_p^2
$$


Where

\[ N_1 = \text{number of cases in group one} \]
\[ N_2 = \text{Number of cases in group two} \]
\[ V_1 = P \text{ (the number of variables included)} \]
\[ V_2 = N_1 + N_2 - (P-1) \]
\[ D_p^2 = \text{Mahalanobis D - square} \]

Thus, the null hypothesis of no difference between the two groups, on the basis of multiple inter-related characteristics of banks, can be tested at any pre-assigned acceptable level of significance. Therefore, analysis shows whether the considered variables taken simultaneously significantly discriminate between the two groups of banks.

In order to identify the relatively more important variables that discriminate between the two groups, the relative share of different variables has been calculated. The relative share of each variable can be calculated from the \( D_p^2 \) which can be expressed as [1]

\[ D_p^2 = \lambda_1 d_1 + \lambda_2 d_2 + \ldots + \lambda_p d_p \]

where \( \lambda_1 \) is the coefficient of first variable in the discriminant function (so arrived from the analysis) separating the two group and \( d_1 \) is the difference in the mean value of the two groups for first variable. In this

break up of $D_p^2$, $\lambda_i d_i$ gives the contribution of the 'i'th variable to the total distance $D_p^2$. The comparison of the magnitudes of the product $\lambda_i d_i$ will bring out which variable is more important in discriminating the two groups. The percentage share of each variable to the total distance has also been calculated to bring out the relatively more important variables in discriminating the two groups of banks.

Format of Reporting

Structurally, the present study comprises six chapters:

Chapter I - seeks to give introduction of the study and reviews the existing literature. It precisely explains the need, objectives, scope and research methodology of the study.

Chapter II - centres around the discussion of the various factors that have affected the profitability position of commercial banks.

Chapter III - analyses the profits and profitability position of twenty nationalised banks over the period of ten years. It attempts to rank the banks at four performance levels viz. excellent, good, fair and poor.

Chapter IV - seeks to assess the relative performance of each nationalised bank in relation to the nationalised banking industry.
Chapter V - attempts to establish the relationship between bank profitability and other identified variables with the objective to test which of the identified variables have significantly contributed towards banks' profitability in either direction.

Chapter VI - summaries the findings of the study and suggests certain remedial measures to improve the profitability of banks in India.