Introduction

The banking system, one of the key and dominant constituents of the financial system in India as well as the world over, continues to be one of the primary engines of economic growth. The important role played by the banks in the provision of intermediation services and the capital formation process in an emerging economy such as India hardly needs to be emphasised. Banks are unique as they not only accept and deploy large amounts of uncollateralised public funds in fiduciary capacity but also leverage such funds through credit creation. As banks provide transaction services and payment systems, an efficient banking system has significant positive externalities, which increases the efficiency of economic transactions in general.

In India, prior to nationalisation, banking was restricted mainly to the urban and metropolitan areas and major portion of credit facilities were enjoyed by large industries and well established business houses which entailed failure to support some of the crucial segments of the economy like agriculture, small scale industries and other socially neglected sections of the society. Inspired by a larger social purpose and to ensure timely and adequate flow of credit into genuinely productive activities in conformity with the plan priorities, fourteen major banks were nationalised in 1969 and subsequently six more in 1980 in recognition of the potential of the banking system to promote broader economic objectives viz. growth, regional balance and diffusion of economic power. Since then the banking system in India has played a pivotal role in the Indian economy as an instrument of social and economic change and has emerged as the single most important channel of mobilising the savings of households. Despite the multifold gains, commendable and impressive progress especially in extending geographical spread and functional reach in the post nationalisation period, the important financial institutions were all state owned and were subject to several quantitative and functional restrictions and social
obligations, which had a crucial bearing on the efficiency and performance of banks in India. The financial health of the banking system deteriorated so badly that there were fears of erosion of the real value and return on the savings entrusted to them by the public. By 1991, the country’s financial system was least competitive and saddled with inefficient and financially unsound banking system mainly due to high reserve requirements, administered interest rates, directed credit, lack of competition, political interference and corruption.

Recognising these problems, several committees (Luther Committee (1977), Goiporia Committee (1991) and Narasimham Committee (1991)) set up to examine the efficiency and productivity of the banking system envisaged the need for deregulation, competitiveness, strengthening of capital base and improving customer services. From there to move over to a more comprehensive well sequenced and coordinated reform measures directed towards enhancing competition, efficiency and ensuring operational flexibility and functional autonomy with established global standards effective in 1992 was only a logical step. The areas of reform were entry deregulation, branch de-licensing, deregulation of interest rates and allowing Public Sector Banks (PSBs) to raise up to 49 percent of equity in the capital market. Other areas of change, regarding statutory norms, were gradual reduction of the Cash Reserve Ratio (CRR) and the Statutory Liquidity Ratio (SLR), setting capital adequacy norms with a view to adopting the Basel Committee (1988) framework on capital adequacy norms and imposition of stringent income recognition and provisioning norms. Banks were also directed to identify problem loans on their balance sheets and make provisions for bad loans and bring down the burgeoning problem of Non-Performing Assets (NPAs). The period 1992-97 laid the foundation for reforms in the banking system. The second Narasimham Committee Report (1998) paved the way for the second generation reforms in the Indian banking industry. It focused on issues like strengthening of the
banking system, upgrading of technology and human resource development. The report laid emphasis on two aspects of banking regulation, viz., capital adequacy, asset classification and resolution of NPA-related problems.

The Reserve Bank of India (RBI) and the Indian commercial banks are getting prepared to embrace risk management system in line with Basel II. RBI had earlier intended in June 2005 that by March 31, 2007 all commercial banks would comply with Basel II. However, taking into account the state of preparedness of the banking system, it was decided in October 2006 to provide banks some more time to put in place appropriate systems so as to ensure full compliance with Basel II. According to the new schedule, foreign banks operating in India and Indian banks having presence outside India are to migrate to the standardised approach for credit risk and the basic indicator approach for operational risk under Basel II with effect from March 31, 2008. All other scheduled commercial banks are encouraged to migrate to these approaches under Basel II in alignment with them but in any case not later than March 31, 2009.

At present, banking sector in India is on the threshold of an exciting, liberalised, competitive and challenging phase in response to bank deregulation, consolidation and global integration, which can be attributed to the dynamic integration of technological advances, government policies and market forces. Against this backdrop it is important to understand how the Indian banking sector is reacting to the emerging challenges in the period of transition and deregulation. In this context, the present study intends to empirically estimate and analyse various efficiency scores and total factor productivity growth of Indian commercial banks as a whole and across the bank groups using Data Envelopment Analysis (DEA) with special emphasis on the impact of deregulation over a time path starting from the period of deregulation since 1992-93.
There exists a rich literature pertaining mostly to developed countries, on assessing the effect of deregulation on bank efficiency using measures of efficiency and productivity and various methodologies arriving at different conclusions. Among the few bank efficiency studies so far, which have used East Asian banking data include the studies conducted by (Leightner and Lovell 1998), (Gilbert and Wilson 1998), (Shyu 1998) and (Hao 2001), among others. Indian studies on bank efficiency using different methodologies and different time periods have evolved mainly during 1990s and onwards have mixed and varied results like deregulation has positive impact on the profit efficiency of Indian commercial banks (Das and Ray 2005), the impact of deregulation was to reduce profit efficiency (Rudra Sensarma 2005), cost efficiency of Indian commercial banks has improved overtime, but the rate of improvement slowed down after the reforms (Kumbhakar and Sarkar 2004), PSBs had much higher efficiency as compared to the foreign banks and private banks (Bhattacharya, Arunava, Lovell and Pankaj 1997) and (Ram Mohan and Ray 2004), private sector commercial banks are more efficient than the PSBs ((Sarkar and Das 1997), (Sarkar and Das 1998), (Ram Mohan and Ray 2004), (Nath, Pal and Mukherjee 2005), (Chatterjee and Sinha 2006) and (Sinha 2007)), PSBs have, in general, improved their efficiency over the period ((Saha and Ravishankar 2000), (Ray and Ping 2001), (Misra 2004) and (Taneja and Singh 2004)) and PSBS have experienced a decline in overall efficiency (Das 1997). Quite a few studies have estimated Total Factor Productivity (TFP) growth in Indian banking, which is growth of output relative to input usage. Results from these studies are varied and often contrasting like technological change is the main contributor to TFP growth (Subrahmanyam 1993), deregulation has led to improvement in TFP growth (Bhatacharyya, Bhatacharyya and Kumbhakar 1997), there is no significant impact of deregulation on TFP growth of Indian banks (Kumbhakar and Sarkar 2003).
and there is no significant difference between productivity of different categories of banks (Mohan and Ray 2004).24

From the foregoing, it is amply clear that, in general, the available literature on the impact of deregulation on the efficiency of banks has been mixed and inconclusive. Hence, the present study is an addition to the growing body of literature in this area.

More specifically the present study aims at:-

1. examining the Overall Efficiency (OE) and its components viz. technical and allocative efficiency, technical efficiency further decomposed into pure technical and scale efficiency of all commercial banks as well as of two categories based on ownership viz. Public Sector Banks and Private Banks. Public Sector Banks further grouped into State Bank and its associates and Nationalised Banks, Private Banks further grouped into Domestic Private Banks and Foreign Banks in the post reform period.

2. measuring the total factor productivity growth and its components viz. technological efficiency change(frontier effect) and technical efficiency change (catching up effect), technical efficiency change further decomposed into pure technical efficiency change and scale efficiency change of commercial banks in general, as well as classified into different ownership types in the post liberalisation period.


The reference period for the present study is from 1981 to 2004. From the historical perspective of the development of Indian banking, year 1991-92 is being taken as the base year. Time path between 1992 and 2004 is chosen to
calculate the efficiency and total factor productivity growth of the banks for each year to assess the impact of deregulation. However, to analyse the efficiency of Indian banking firms in the pre and post reform period, data points are taken for the years 1981, 1985, 1991 and 1992 to 2004.

**Methodology and Input-Output**

The present study uses a two stage approach: in the first stage different efficiency scores are calculated using **Data Envelopment Analysis**. In the second stage **Malmquist total factor productivity index** is employed to calculate variation in efficiency. Both are widely used when there are multiple inputs and outputs and one lacks a clear functional relationship between inputs and outputs. The major advantage of DEA technique is that it does not require a priori restrictive functional form of production function as well as cost function. However, this method, a nonparametric one, does not take into consideration the random effects in measuring efficiencies.

For estimation of the efficiency frontier and total factor productivity growth by DEA methodology and Malmquist index, measures of inputs and outputs are required. This study has adopted the intermediation approach and considered four inputs in the calculation of various efficiency measures a) borrowed funds that includes deposits and borrowing from the other sources, b) number of employees, c) equity and d) fixed assets. The Price of borrowed funds is the total interest expense divided by borrowed funds, similarly per employee establishment expenses is taken as the price of second variable and price of fixed assets is measured by non labor operational cost per rupee amount of fixed assets. Equity is considered as quasi input without any associated price.

The outputs used in this study are a) investments, b) total credit and c) non-interest fee based income i.e. commission, exchange, brokerage etc. The associated price indicator for the first two output measures are respectively;
average interest earned on per rupee unit of investment and average interest earned on per rupee unit of total credit. For non-interest income, the total amount itself is taken as an output in value terms. Non interest income has a fairly standardised pricing mechanism. Thus the present study has assumed that the price of non interest income is unity throughout the years for all banks.

**Collection of the Data**

This study mainly relies on secondary sources of data to achieve its stated objectives. The macro level data has been collected from the annual reports and publications of the respective banks and of RBI such as: Trends and Progress of Banking in India, Statistical Tables Relating to Banks in India, Report on Currency and Finance, their Monthly Bulletins and Government of India Publications such as Economic Survey (different issues), Monthly Abstract of Statistics and Indian Banking association (IBA) Bulletin (various issues).

Important websites www.rbi.org.in and www.iba.org have also been searched for getting the useful information related to the topic.

**Contents**

The study consists of five chapters besides introduction,

**Chapter 1:** contains review of some relevant literature pertaining to the estimation analysis of efficiency and total factor productivity growth of commercial banks which have evolved in 1990s and onwards in the context of developed as well as developing countries including India which is essential to develop a conceptual framework for the present study and make good the lacunae, if any, in the existing study.

**Chapter 2:** includes an introduction and brief description of DEA approach and Malmquist index used for the calculation of efficiency and total factor productivity growth of commercial banks during the course of this study.
Chapter 3 studies the trends in important banking indicators broadly grouped into different categories viz. deposits and credit, investment, expenditure composition, income composition, total staff, number of branches and Asset Liability Management (ALM) system that includes capital to risk-weighted assets ratio, non-performing assets and return on assets during the period 1981 to 2005 to draw important inferences for the banking sector as a whole as well as for different banking groups.

Chapter 4 empirically intends to estimate and analyse the overall efficiency and total factor productivity change of the commercial banks in India with the application of DEA methodology & Malmquist analysis, and attempts to understand the factors underlying their resultant performance.

Chapter 5 summarises the main findings of the study and also provides some policy recommendations in the light of the inferences drawn to make banking system more efficient, profitable and competitive to face macro economic challenges in the largely liberalized environment and congenial for commercial activity and sustenance of growth momentum.
References


