CHAPTER- 2

REVIEW OF RELATED LITERATURE

A lot of research has already been done across the world to analyse the financial performance of banking sector but there are very few studies which really explore the impact of global crisis on the efficiency of developing countries, especially in the Banking sector. Brief review of related literature on the present study is given in this chapter.

INTRODUCTION

There is a popular saying on banking that “Banking is a heaven for the researchers and hell for the practitioners” very few knows weather it is a hell for practitioners or not, but definitely it is a heaven because number of research studies have been carried out in different universities around the world. Some relevant studies relating to the present topic are reviewed here under. (Suryachandra Rao, 2008)

The review of existing and related literature is very important to investigate the problem in an efficient and effective manner. If researcher failed to build this foundation of knowledge provided by the review of literature, work likely to be shallow and waive and will often duplicate work that has already been done better by someone else. Thus, the review of literature justifies the study, checks the repetitive research work on the same subject matter, eliminates the chances of academic privacy and gives the researchers an understanding of what still remain to be done in the area of subject under the study. It helps in identifying the issue which needs further investigation and gives ideas for adopting appropriate methodology for this study. Therefore, keeping in view the importance of review of related literature, the researcher’s attempt here was to review the available literature on the subject under study.

Vassiloglon, M. and D. Gioks (1990) analysed the relative efficiency of 20 branches of commercial banks of Greek from the Athens area. The study was based on bank’s 1987 budget. The Data Envelopment Analysis (DEA) technique was used to find out efficiency of banks branches by using standard linear programming software (ESP’s LP88). The
study used four inputs such as square meter of branch space (Sq. m), person-hours (PH), supplies expenses (SE), number of computer terminals branch and output was measured in terms of number of transaction processed at each branch. The study found that out of 20 branches, nine have a maximum efficiency rating of 1. The remaining 11 branches have efficiency less than one.

**Sherman D.H. and George Ladino (1995)** evaluated the efficiency of 33 branches of growth Bank by using Data Envelopment Analysis (DEA). These studies provided a solution to managers in locating which branch is more efficient than other branches with the help of DEA method. In the study, teller, Platform, manager personnel full time equivalents (FTEs), operating expenses excluding personnel, rent and square feet of office space were five inputs and 15 services combined into five sets of services were used as outputs. The study found that out of 33 branches only 10 branches were 100% efficient while remaining 23 were less productive branches. The study also found that total potential servings indentified were about $ 9 million and bank can reduced its staff by about 20 percent.

**Quy – Jen Yeh (1996)** made an attempt to evaluate the performance of six old commercial banks in Taiwan by data Envelopment Analysis (DEA). This study is confined to the period 1981 to 1989. In his study interest income, non interest income and total loan were taken as outputs while inputs include interest expenses, non-interest expenses and total deposits. To examine the difference in financial performance between banks, they were classified into three groups- high, medium, low – in accordance with their respective DEA efficiency score. In his study 12 financial ratio were selected and Principal Factor Analysis was used to find four factors which account for approximately 88.61% of the common variance in the items. Yeh in his study felt that banks which were more DEA efficient had less leveraged and more aggressive in employing their deposits and assets to generate revenue than those who were less DEA efficient. His study also revealed that external economic conditions affect bank performance.

**Piyu Yue (1992)** examined the technical and scale efficiency of 60 Missouri commercial banks for the period from 1984 to 1990 using Data Envelopment Analysis. He considered
four input variables- Interest expenses, Non-interest expenses, Translation deposits, Non-translation Deposits and three output variables- Interest income, Non-interest income and total loan. The DEA scores and return to scale were measured by applying CCR and Additive DEA model. With the help of window analysis, he identified the best and the worst banks in a relative sense, as well as the most stable and most variable banks.

Bhatacharya et al. (1997) examined 70 Indian banks during 1986-97 of the ongoing period of liberalization. Data Envelopment Analysis (DEA) is used to calculate radial technical efficiency scores. In his study, the publicly owned Indian Banks are found to have been the most efficient, followed by foreign owned banks and privately owned Indian Banks. There were temporal improvements in the performance of foreign owned banks, virtually no trend in the performance of privately owned Indian banks and a temporal define in the performance of publicly owned Indian banks. These patterns are explained in terms of the governmental regulatory policies.

Pradeep Srivastava (1999) examined all scheduled commercial banks in India (public & private) which excluded regional rural banks. Bank size was based at the end of fiscal year 1995-96. The major objective of the study was to find answers of the two questions: “Have bigger banks been better for cost minimization?” and “Have financial reforms made Indian banks more efficient?” The paper presented three different measures of economic scale and scope in banking. The results showed that virtually all banks in India well operating below minimum cost scale, including the public sector banks. The finding suggested that any effective distancing of the government from the ownership management and operation of Indian banks would lead to considerable activity in mergers and acquisitions. Therefore there is a need to develop a framework “Competition policy” in banking as a part of further financial sector reforms.

Saha and Ravisankar (2000) examined the efficiency of the Indian Public Sector Banks in two phases during the period 1992-95. In the first phase, certain key ratios like deposit to establishment expenses and advances to establishment expenses and deposit to staff and advances to staff were considered. The banks were plotted in a two dimensional graph to identify the better performing bank. In the second phase they estimate the efficiency of some commercial banks using the DEA method. They considered interest
expenditure, establishment expenditure, non-establishment expenditure as three input variables and six output variables: deposits, advances, investment, non-interest income, interest spread and total income. The results obtained by them show the performance of the public sector banks (with the exception of a few) had improved over the years of the study.

Niranjan Chipalkatti and Meenakshi Rashi (2000) investigated whether Indian banks under provide for loan loss provisions and understate their gross non-performing assets in order to boost earnings and capital adequacy ratios. The paper examined the behaviour of Indian banks in the context of tighter regulatory standards that became effective after 1999. This paper examined whether weaker Indian banks may have had an incentive to under provide for loan loss provisions (LLPs) and understate gross non-performing assets (NPAs) in order to boost their earnings and capital adequacy ratios (CARs) by examining bank behaviour in India over the 1996-2002 times period. The paper concluded that the true nature of India’s bad loan problem may be more serious than alluded to in recent studies.

Sayuri Shiari (2001) analyzed the impact of the reform on Indian banking system by examining seven hypotheses. It concluded that the financial reform have a moderately positive impact on reducing the concentration of the banking sector (at the lower end) and improving performance. The empirical estimation showed that regulation (captured by time variable) lowered the profitability and cost efficiency of public-sector banks at the initial stage of the reforms, but such a negative impact disappeared once they adjusted to the new environment.

Mukherjee, Nath, and Pal (2002) explored the linkage between performance benchmarking and strategic homogeneity of Indian commercial banks by using DEA. The data was collected from 68 bank of the period of 1996 to 1999. The study revealed that the public sector banks were more efficient in India than private or foreign banks. Their findings were supported by Saha and Ravinhankar (2000) who found that the performance of public sector banks had improved over the year except a few banks which continued to be at the lower end during the period of study.
Mukherjee, Nath and Pal (2003) measured the efficiency of 27 Indian public sector banks taking into account physical and human resource, service quality and performance. In this study, a modified version of SERVQVAL is used to understand the role of service quality in improving overall performance. DEA technique was used for two stage service efficiency measurement. In the first stage quality efficiency was calculated taking establishment infrastructure, technology, employer quality, marketing effort as input and tangibility, responsiveness, reliability, assurance and empathy as outputs. In the second stage profitability efficiency was calculated taking above five outputs including operating expense as inputs and deposits, advance, non-interest income as outputs. With help of quality efficiency and profitability efficiency overall efficiency was measured. The study found that 60% of the banks performing excellently and only 10% of the banks failed to deliver high service to their customers.

Ram Mohan and Ray (2004) compared performance of 58 public private sector and foreign banks using a revenue maximization efficiency approach for the period 1992-2000. Loan, investments and other income were taken as bank outputs. Ram Mohan and Ray took deposits and operating costs as inputs for their study. They argued that during the period, Indian banks did not have much freedom in trimming costs especially the costs of labours. Under the circumstances, revenue maximization best describes the objective that banks have been focusing during the period. The result obtained by them relating to revenue maximization efficiency, technical efficiency and allocative efficiency reveal the following: Public sector banks are significantly better placed than private sector banks on revenue maximization efficiency. It was also observed that public sector banks were significantly better than private banks in respect of technical efficiency but not in respect of allocative efficiency.

Chakrabarti and Chawla (2005) evaluated the relative efficiency of 70 commercial banks during the 1990-2002 period using DEA approach. The study used two basic models. In first model interest expenses and operating expenses were taking as input while advances, investments and deposits were taken as outputs. In second model, study used interest and non-interest expenses as inputs and interest and non- interest income as outputs. Foreign banks have been considerably more efficient than all other bank group,
followed by the Indian private banks using second model. On the basis of first model Indian private banks were the best while the foreign banks were the worst performers.

**Kumbhakar and Sarkar (2005)** used the stochastic cost frontier analysis to examine the efficiency of the Indian banking system using panel data for the period 1986-2000. They used a translog specification of the cost frontier to estimate the efficiency of the individual banks. The data set related to 27 public sector banks and 23 private sector banks. Their result indicated that Indian banks, on average, do exhibit the presence of cost inefficiency in their operations. However, there is tendency for the inefficiency to decline over time. Further, they found that deregulation in the Indian banking sector resulted in an increase in the cost of the Indian banks and a decline in the rate of inefficiency reduction.

**Das, Nag and Ray (2005)** examined the output-oriented technical efficiency, cost efficiency, revenue maximization efficiency and profit efficiency of Indian (public, private and foreign) banks for the period 1997-2003. They considered borrowed funds (deposits and other borrowings), number of employees, fixed assets and equity as input for their study. They included in their study only those banks which had at least three branches during the entire study period. The results obtained by Das, Nag and Ray showed that the Indian banks were still not much differentiated in terms of input or output-oriented technical efficiency or cost efficiency. However, they differ sharply in respect of revenue and profit efficiencies.

**Camanho A.S. and R.G. Dyron (2005)** developed a framework for performance appraisal of a bank branch network. Data envelopment Analysis (DEA) model was used to identify both input and output inefficiency from a cost minimization approach. Production and value added approaches were developed jointly to give a comprehensive picture of bank branch efficiency. In their study 144 branches were taken from same bank to measure efficiency of branch network.

In the production approach number of branch and account manager, number of administrative and commercial staff, number of tellers and operation cost : (excluded staff cost) were taken as inputs while total value of deposits, total value of loans , total
value of off balance sheet business and No. of general service transactions were taken as outputs. In the value added approach inputs were Non- interest costs, interest cost from deposits & interest cost from loans while outputs were total value of deposits, total value of off balance sheet business.

The study found that branches could reduce their total cost to 70% of the current value by making adjustment in input and output without reducing total revenue of each branch. Input allocative and output mix efficiency were 86% and 82% respectively which suggested that by exploring tradeoff between interest and non-interest, efficiency can improve.

The operational costs could be reduced, on average, 69% of the current value by using their resource efficiently. The study showed that average scale efficiency of branches were 88% and efficient scale factor for branches with IRS was 1.34 and for branches with DRS is 0.70. They also found that out of 144 branches, 88 are IRS, 41 are CRS and remaining 15 are DRS.

Chatterjee and Sinha (2006) estimated cost efficiency of Indian Commercial banks using the Data Envelopment Analysis taking loan as the output indicator. Number of bank branches and borrowed capital were taken as two inputs. The results were for 1996-97, 1998-99, 2000-01 and 2002-03 respectively. The results of the cost minimizing DEA showed that mean cost efficiency of the sample commercial banks declined in 2002-03 significantly i.e. the banks have diverged from the best practice cost frontier. Further private sector commercial bank exhibited higher mean cost efficiency than public sector commercial banks. The public sector commercial banks lagged behind the private sector commercial bank both in respect of technical efficiency and allocative efficiency. The result may be the outcome of lending aversion behaviour by the public sector commercial banks.

Santha Vaithilingam, M. A. Nair and Milthi Samudram (2006) explored the impact of key factor such as infrastructure, intellectual capital, institutions, integrity, interaction and innovation (6Is) on the soundness of bank in developed, developing and under developed countries. The empirical analysis showed that well develop institutions, good integrity
systems (governance) and high innovative capacity contribute positively to the soundness of banking sector. The empirical analysis also showed that the developments of the 6Is and the soundness of the banking sector in developing and under developed countries were significantly lower than that in developed countries. From the empirical analysis, to advocate information, key policies and strategies to enhance the soundness in the banking sector to the developing and the less developed countries so as to ‘catch up’ with the developed nations.

R.K Uppal and Rimpi Kaur (2007) examined the banking sector reforms policy, crucial issues and agenda for the future. On the basis of certain parameters like productivity, profitability and NPA’s management, paper concluded that foreign banks and new private sector banks were much better in performance as compared to our nationalized banks in the post-banking sector reforms period. The paper ends with the future agenda for the Indian banking Industry, particularly for public sector bank to make them efficient and strong, to compete with the global banks.

Vanniarajan T. and C. Samvel Joseph (2007) classified the commercial banks into Nationalized Banks, State Bank of India Groups, Private Sector Banks, New Private sector Banks and Foreign Banks. The Dupont Control Chart was applied to analyze the financial performance of five group of banks. The multiple regression analysis was administered to analyze the impact of net profit margin and capital turnover ratio on the return on net worth in all five sector banks. Study concluded that the foreign sector banks were performing better than any banks since it concentrated on both net profit margin and capital turnover. This impact analysis emphasised more on capital turnover than the net profit margin in the banking industry. If the banks are highly efficient to utilize funds with a reasonable net profit margin they can maximize then financial performance.

Debaprosanna Nandy (2007) measured the efficiency of Indian Public Sector Banks during 2005-06 using a variety of efficiency measures computed by the non-parametric method of Data Envelopment Analysis (DEA). In this paper, he analyzed the case on the basis of four specific inputs and four specific output only. Out of 28 public sector banks operating in India during the year 2005-06 only 17 banks are 100 percent efficient. Bank of India is the most efficient bank with 89.01 percent efficient score.
Muhammad (2008) made an attempt to analyze the relative efficiency of a group of commercial banks operating in Nigeria over a 5 year period with the help of DEA and Malmquist productivity index. In his study, intermediation approach was used taking net fixed assets and total deposits as input variables, while total loan and advances, other earning assets and operating income were used as output variables both constant return to scale and variable return scale were used to calculate efficiency using Efficiency Measurement System (EMS) software. The study found that average efficiency of all banks over the 5 year showed a constant improvement. The result also showed that the private bank’s performance is superior to the state owned banks.

Sinha and Chatterjee (2008) compared the technical efficiency of 38 public and private sector banks taking contingent liabilities and other incomes as output indicators for the period 2001-02 to 2004-05. For this single stage and malmquist DEA have been used. The result obtained from them showed that the mean technical efficiency scores of public sector banks were considerably lower than the private sector banks. Both under constant and variable return to scale, the overall mean technical efficiency score of observed public sector banks was about 85 percent of observed private sector banks. The total factor productivity growth of 25 observed commercial banks was negative during the study period.

Sinha (2008) integrated the ratio approach adopted by the Reserve Bank of India with the Assurance Region based measure of technical efficiency to find out a composite DEA (Data Envelopment Analysis) based ranking in respect of 28 observed commercial banks for 2002-03 to 2004-05. The result showed that the observed private sector commercial banks had higher mean technical efficiency score compared to the observed public sector commercial banks. Six out of the 28 commercial banks were found to be efficient. A study of technical efficiency scores across ownership group revealed that the observed private sector bank have higher mean technical efficiency scores compared to the public sector banks. Most of the observed commercial banks experienced decreasing returns to scale for the period.
Kumar, S. and Gulati (2008a) measured the relative efficiency of public sector banks (PSBs) during the post reform period from 1992-1993 to 2005-06 using DEA. The study used intermediation approach taking net interest income and non-interest income as output variables while physical capital, labour and loanable funds as outputs variables. The study found that PSBs increase their efficiency after reforms. The study observed highest growth in technical efficiency in United Bank of India followed by Punjab and Sind Bank and Andhra Bank.

Kumar, S. and Gulati (2008b) made an attempt to explore technical efficiency and rank 27 public sector banks in India using DEA. In the present study, interest spread and non interest income were taken as output variables and physical capital, labour and loanable funds were taken as input variables. The main objective of the study was to measure technical efficiency and to rank the public sector banks on the basis of super efficiency scores. To obtain the technical efficiency (TE) the input oriented CCR model was used. The study found that out of 27 PSBs only seven have TE score equal to 1 and remaining 20 banks have TE score less than 1. On the basis of super efficiency scores Andhra Bank was at the top followed by Corporation banks. The study also found SBI group was more efficient than nationalized banks. The repression results showed that off balance sheet activities, staff productivity, market share and size were the main determinants of TE.

Kumar, S. and Gulati (2009) investigated the efficiency of 51 Commercial banks with the help of DEA. In this study, physical capital, labour and loanable funds were taken as inputs and net interest income and non-interest income were taken as outputs. Only 9 banks were found to be efficient and private sector banks were dominate in construction of efficient frontier. ICICI Banks and Yes bank were top ranked according to super efficiency scores. The study found that profitability and exposure to off-balance sheet activities were the most significant factors affecting technical efficiency of the Indian domestic banking Industry.

Hung, N.V. (2009) evaluated the 13 Vietnamese commercial banks using Data Envelopment Analysis (DEA). The study took Interest income and non-interest income as outputs while labour, capital and deposits were taken as inputs. Technical efficiency, cost efficiency, allocative efficiency and scale efficiency were measured to analyses the
relative efficiency of the banks for the period 2001-2003. The study found that average cost efficiency was 60.6 percent and average annual growth of the malmquist index was negative 2.2 percent over the study period.

Wirnkar and Tanko (2010) analyzed the performance of eleven Nigerian commercial banks over a period of nine years (1997-2005) with CAMEL Approach. The DEA Technique was also used taking number of employees, fixed assets & deposits as Inputs and operating Income, deposits and loans were taken as outputs. Efficiency measurement system (EMS) software was used to calculate the efficiency of different banks. The study revealed that the inability of each factors in CAMEL to capture the holistic performance of banks. The best ratio for capital Adequacy was found to be ratio of total shareholder funds to total risk weighted assets. The paper concluded that no one factors in camel suffices to capture the overall performance of a banks.

Asror Nigmonov (2010) examined the efficiency of private, joint stock and foreign banks using input oriented DEA approach. In this study, operating expenses, fixed assets, total deposits were taken as input while total credit-reserve for possible loan losses, total non-interest income, other non-interest income (excluding commission income) were taken as outputs. The study found that the main source of inefficiency was due to the technical efficiency. He also found that there is no significant divergence between the relative performance of private, joint stock and foreign banks.

Wissam Khaddaj (2010) analyzed the relative efficiency of 10 Private Syrian Banks for the year 2006 to 2009, by using Data Envelopment Analysis. He used operating and Intermediation approaches taking interest expenses and non interest expenses as inputs and interest revenue and non interest revenue as outputs. The result were taken with the help of frontier analysis by Banixa Corporation and double cheeked by online DEA Solver of Honenhiem University. The study found that one bank is efficient on its operating level and five banks were efficient on intermediation level, the study also found that average efficiency score for traditional operating model was 83% and for traditional Intermediation Apporach was 98.6%.
Sangmi and Nazir (2010) analyzed the financial performance of Punjab National bank and Jammu and Kashmir bank with the help of CAMEL Approach. Mean and standard deviation was used to evaluate the financial performance of banks from 2001-2005. The study found that average leverage ratio in case of PNB was more comparing to JKB. The business of PNB and JKB have registered a compound growth rate of 14% and 16% respectively. The PNB has registered an average Net interest margin of 0.034 compare to 0.028 generated by JKB. The study also concluded that liquidity position of JKB was better than the PNB. However, the investment to deposit ratio was better in PNB compare to JKB.

Prasad, Ravinder and Reddy (2011) examined the performance of public and private sector banks during the period 2006-10 with the help of CAMEL approach. The study was based on twenty different ratios relating to Capital adequacy, assets quality, management efficiency, earning quality and liquidity. Composite ranks were given to each banks. The study found that Karur Vysa bank stood at top position in terms of Capital adequacy and asset quality. In Front of management efficiency Yes bank was at top most position. In case of earning quality Axis bank was at first position. In terms of liquidity BOB sustained the top position. It was also found that Karur Vysya bank was ranked first followed by Andhra Bank BOB, P&S Bank, City Union bank and Corporation Bank. The largest public sector bank in India SBI availed 36th position and ICICI placed at 24th. In the bottom five, Central bank of India was at the last position, following UCO Bank, Bank of Maharashtra, SBI and Karnataka Bank Ltd.

Mansoury Ali and Mahdi Salehi (2011) analyzed efficiency of 38 branches of Industrial and Mine Bank in Iran using Data Envelopment Analysis (DEA). In this study, input referred to number of personnel, operational and non operational costs whereas output referred to the given facilities and payments, operational and non operational income in the various branches. Input orienting technique was used to compute management efficiency, scale efficiency and technical efficiency. On the basis of average efficiency, type of returning to scale , frequency of each branch as a pattern, all the branches have been ranked and classified to six levels as: superior, excellent and degree from 1 to 4. The result indicated that only five branches are efficient and average scale,
management and technical efficiencies for all the bank branches all over the country as 0.59, 0.839, 0.713 respectively. Industrial and Mine Bank can increase its efficiency up to 30% by including the research strategies and suggestions and attempting to optimize the system.

Dang Thanh (2011) investigated the efficiency of banking system in the world in 2010 using data from 64 Countries. The study applied Data Envelopment Analysis taking ten outputs and one dummy inputs. The study is divided into three parts. In the first part, a frontier was developed with relative efficiency of 64 Countries. In second part, the study examined the determinants affecting that efficiency using Tobit model. In the last stage, weights were calculated for finding final banking effectiveness scores. The study concluded that banking system in advanced economics is still more effective than in developing Countries.

Dwivedi and Charyulu (2011) investigated the efficiency of Indian Banking Industry in the post reform period through Data Envelopment Analysis (DEA). The study analysis the efficiency from 2005 to 2010. In their study loan/advances per unit per annum (Y₁) and non interest income (Y₂) per unit per annum were taken as outputs while no. of branches (X₁), total operating expenses per annum (X₂) and deposits (X₃) were taken as inputs. The DEA model was estimated using DEAP 2.0 Algorithm software developed by Coelli. The study assumed constant return to scale (CRS) to analysis technical efficiency. Nationalised Banks, New private banks and foreign banks showed more efficient than public sector banks, state- owned banks and old private sector banks.

Hoque R. and Israt Rayhan (2012) measured the efficiency of 24 banks by using Data Envelopment Analysis (DEA). In their study, operating profit was considered as output variable and operating income, operating cost, total assets and deposits were considered as input variables. All the efficiency scores of DEA were obtained using DEAP-XP1 software developed by Tim Coelli (1996). The study found that out of 24 banks only three banks were efficient under CRS and 12 banks were efficient under VRS. The study also found that range (maximum-minimum) was biggest for CRS DEA and smallest for VRS DEA.
Ali Said (2012) measured the efficiency of 47 Islamic banks during financial crisis 2006-2009 using Data Envelopment Analysis (DEA). The inputs of model were labour cost, fixed assets and total deposits and output of the model were total loans, liquid assets, and other income. The study contained 21 non Middle Eastern Islamic Banks and 26 Middle Eastern Islamic Banks. An output oriented model was used to measured relative efficiency of banks with the help of DEA excel Solver developed by Zhu. The study found that efficiency of Islamic banks operates in Middle Eastern and Non-Middle Eastern Countries have increased during an economic crisis.

CONCLUSION

In the process of evaluating the performance of SCBs, the earlier studies differ from one another in the selection of banks, selection of inputs and outputs, selection of period and selection of statistical tool and technique. In contrast the present study focuses on the measurement of financial performance and efficiency of individual banks and bank groups and a comparison between public and private sector banks in India. The period of the study start from the year 2006-07 to 2012-13. In the study we have taken an advanced and improved technique to analyse the technical and scale efficiency of banks and bank groups. Thus, it has been possible to identify stronger banks and weak banks and comparatively strong group of banks. Thus, the present study makes a departure from earlier studies in the above stated respects.