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Technical Efficiency of Domestic Commercial Banks: A Case Study of Pakistan

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Abstract
The study applied Data Envelopment Analysis (DEA) to inspect the technical efficiency of Domestic commercial banks in Pakistan for a period of 2006-2008. Two basic models (CCR and BCC) of DEA were used in their input orientation. The results of 16 banks under CCR model showed that 3 banks were efficient in year 2006 and 2008 while 2 banks were efficient in year 2007. Two banks (HMP and MCB) were efficient throughout the study period. Under BCC model, 6 banks achieved 100% efficiency level in 2006, 7 banks in 2007 and 8 banks in 2008 showing improvement in managerial efficiency. Two banks namely HMP and MCB were found efficient under Both CCR and BCC models and were also 100% scale efficient. The results also revealed that technical inefficiency in the banks under study was mainly caused by not operating at optimum scale.
Keywords: Data Envelopment Analysis, Technical Efficiency, Commercial Banks, CCR, BCC, Managerial Efficiency, Scale efficiency

1. Introduction

The financial sector acts as a backbone of the country's economy and improvement in the growth of this sector is considered to be a sign of economic development. It has been empirically proved that growth of financial sector is positively associated to economic growth of a country. So in order to achieve high economic growth, the financial sector of the country has to operate comparably at high efficiency level by reducing the costs of providing financial services. Within the financial sector, Banks play a major role in the development of the economic conditions. It attracts savings and mobilizes the same for enhancing the economic activities in the country. Efficient banking sector provides the base for investments and thereby contribute to creation of employment and business opportunities in the country.

Efficiency can determine the performance of financial sector and can be simplified as ratio of output to input of a business unit. For businesses, it is a matter of concern as to how properly utilize inputs to generate outputs. In today's' competitive environment where the chances of bankruptcy are high, it is indispensible to examine and evaluate the degree of inputs utilized by financial institutions to produce maximum outputs known as technical efficiency. Technical efficiency measures the degree of using various resources in the form of financial, physical or human resources and their distribution It refers to producing more outputs from specific inputs; or, using least amount of inputs to produce a specified output. So a firm may be called as technically efficient if it uses minimum inputs to produce maximum output among all firms in the industry using same the technology and economic environment.

To assess technical efficiency of financial sector, a variety of tools are available to the bank regulators; creditors or investors; etc., and the need for these tools has been increased in the recent past. Financial ratios are mostly used by bank regulators to evaluate efficiency of banks but these ratios have some common limitations. Firstly, these ratios can handle one input- output combination at a time. Secondly, it requires adequate performance standard (benchmark) to compare actual performance against that standard. To eliminate this limitation, the evaluators or regulators need that these ratios be first calculated and then combined for the purpose of comparing these against pre established benchmark. Establishing a benchmark requires a number of ratios to be computed and then be combined in groups. Therefore, it may become difficult to set a benchmark under multiple ratios due to complex and changing business environment. This necessitates the use of some flexible or adjustable benchmark methods for performance evaluation based on financial characteristics where distinction between and within groups may be possible.

Data Envelopment Analysis (DEA) is mostly used and considered to be more suitable method in dealing with limitation of ratios analysis. It has the capacity to use multiple input-output at a time and to identifying the benchmark used for group comparison. This method is applied to compute the efficiency of organization whether it is a financial or non financial sector, profit or nonprofit organization, manufacturing or non-manufacturing, education sector or health sector etc.

1.1 Research Questions

The study was conducted to answer the following questions:

1. What is the efficiency of domestic banks?
2. How it is measured?

3. What are the possible causes or reasons of inefficiency in domestic banks of Pakistan?

1.2 Objectives:

The objectives of this study were;

1. To determine the efficiency of Domestic commercial banks in Pakistan
2. To rank the banks on the basis their efficiency score and
3. To explore the reason or causes of inefficiency.

2. Literature Review

Efficiency in recent times has attracted the attention of many researchers in the field of business in general and financial sector in particular. The banking sector in current scenario plays a significant role in the economic development of a country. It provides a platform for business operations on local, national and international levels. Due to opening of trade, latest information technology, globalization of business activities and technological progress, the needs and preferences of the customers have changed and the way businesses approach the customers have also been customized. The business in order to survive and grow in the changing environment needs to operate comparably at high efficiency level as the customers do not need only cheaper products but also quality products.

The role of banks in the present situation has changed from its basic functions. It has to provide products and services keeping in view the needs as well as preferences of customers at affordable cost. For banks to meet requirements of the customers, it is necessary for them to implement processes or techniques or technologies where they can reduce their costs and thereby increase the profits. The cost reduction is possible only when they will be technically efficient in using their resources to achieve higher productivity by using efficient processes and technologies.

It has been widely acknowledged by the researchers in the field of banking that technical efficiency is a key to success or failure of banks in today's global competition. The various studies on the above cited subject are given below:

Dadashi,I. et.al (2013) analyzed the technical efficiency of banking sector in Iran by using DEA. They computed the efficiency of 11 Iranian banks of 4 years by input oriented CCR and BCC models. The inputs and output of the study were: fixed assets and total deposits as inputs while net income and loans as outputs. The results of the study revealed that two banks (Sanat and Madan) were technically efficient under CCR and BCC models while the remaining banks were technically inefficient. The study also indicated that inefficiency was mainly due to not operating at optimum scale or volume.

Gupta & Garg, (2011) used DEA to measure the efficiency of public and private sector banks in India. The study used 49 banks to measure their competitiveness and for this purpose an intermediation approach was applied for inputs and outputs choice. The results showed that 19 banks were found to be efficient technically and the scale at which they operated during period under study. The inefficient banks had to improve their scale of operations and technology in order to compete globally and locally as the main reason for inefficiency was attributed to scale inefficiency.

Ahmed et al (2009) used Data Envelopment Analysis and Malmquist Productivity Index to examine the dynamics of efficiency in banking together with impact of financial sector reforms. For this purpose, 20 domestic banks of Pakistan were chosen and period under study was from 1990-2005. To estimate efficiency of the banks, the study composed of 3inputs of labor, deposits and capital and 3 outputs of loan advances and investment. The study period was decomposed into pre-reform, 1st reform phase and 2nd reform phase from 1991-1997, 1998-2001 and 2002-2005 respectively. They found from the results of Malmquist productivity index that technological change(Te-Ch) and Total factor productivity(TFP) both decreased by 14.3% and 12.2% in first period of reforms while 2.1% increase in technical efficiency change (Te-Eff) was noticed. The increase of 17.4%, 14.6% and 2.4 % was recorded in the 2nd phase of reforms respectively in TFP,Te-Ch, and Te-Eff. The results sustained the hypothesis that efficiency of Pakistani banking sector improved with financial reforms.

Park and Weber (2006) studied the efficiency and productivity of banking sector of korea and the impact of Financial crisis combined with financial liberalization on the banking sector. The results revealed that industry efficiency affected by financial crisis was offset by the technical progress in the industry where as increase productivity growth was generated by financial liberalization or reforms.

Chen (2004) analyzed efficiency of 44 banks from public and private sector in Taiwan from 1994 to 2000. The study applied DEA to determine the cost, allocative and technical efficiency during a period of financial crisis in Asia. The results showed that efficiency of Taiwanese banks reduced during the Asian financial crisis.

Ataullah et.,al (2004) used DEA to examine the efficiency of Indian and Pakistani banks during 1988 to 1998. By the analysis, they pointed out that overall efficiency of both countries banking sector improved after 1995 to 1996 and also found that improvement in efficiency was due to pure technical and scale efficiency in india while due to scale efficiency in case of Pakistan. They also found that efficiency gap was created by

existence of high non performing loans in the portfolios of two countries banks. The gap in efficiency of large and small banks was filled by implementation of financial liberalization in both countries.

Satye (2003) in the study on the efficiency of commercial banks in India also found that foreign banks were more efficient on average compared to public sector banks. The study used DEA to examine the efficiency of public, private and foreign banks from 1997 to 1998. Two public sector were found to be operating at higher efficiency score on average and rest of the banks operated at lower rate. The study provided recommendation that inefficiency in Indian banks could be removed if they cut their establishment costs and investment in nonperforming assets.

Yildirim (2002) examined the impact of deregulation on the efficiency of commercial banks in Turkey during 1988 to 1999. The efficiency of banks was computed using non parametric approach known as Data envelopment analysis. The study indicated that inefficiency in Turkish commercial banks was mainly due to inefficient management reflected by low pure technical efficiency score as well as due to decreasing return to scale. During the study a positive relationship between size and scale was found. The study revealed that large size banks were more scale inefficient. The analysis also pointed out that efficiency of public sector banks was more than foreign and private banks.

Drake (2001) used DEA to measure efficiency and Malmquist productivity index to measure productivity change in banking industry in the United Kingdom. For purpose of analysis, the study used panel data of 9 banks for year 1984 to 1995. The efficiency results indicated that scale inefficiency was due to decreasing and increasing return to scale in case of large banks and small banks respectively. The analysis also revealed that there was increase in productivity of all banks and a positive technical change was seen in all banks during the study period.(indicating use of new or latest technology or processes)

Vivas (1998) evaluated the cost efficiency of Spanish banks after deregulation using DEA and Thick Frontier. The study took 88 commercial and 55 savings banks from 1985-1991 periods. The results revealed that after deregulation relative cost efficiency of commercial banks reduced and was more associated with technical inefficiency than allocative inefficiency. While in case of savings bank, deregulation had no impact on the cost efficiency.

3. Methodology

The objective of the study was to examine the technical efficiency of domestic banks in Pakistan. In order to determine technical efficiency, different parametric and non parametric methods are used. This study used Data Envelopment analysis, one of non parametric approach widely used for efficiency measurement.

Data Envelopment analysis is considered one of the powerful tool on the basis of certain features. First, multiple input and outputs can be taken at a time to find the efficiency of business unit under study. Secondly, prior functional relationship between the inputs and outputs are not required. Thirdly, this method is unit invariant which means that input and outputs measured in different units can be used. Forth, DEA has the ability to establish the benchmark from the available data and pre established benchmark is not required. The business unit under study may be compared with other units directly against the benchmark established by the DEA.

DEA has two basic models mostly applied in efficiency measurements. These are known as CCR and BCC models and available in two orientations. The efficiency of business unit can be measured from input and output side. The input side is called input oriented model and output side as output oriented model. In its input orientation, DEA calculates efficiency by minimization of inputs to produce given level of output. The efficiency in its output oriented model is found by maximization of outputs at given level of inputs. This study used input oriented models for efficiency measurement.

As these models can handle multiple inputs and outputs, therefore decision as to selection of inputs and outputs becomes crucial. Inappropriate selection of input and output selection may lead to incorrect results and interpretation thereof. Two approaches are often used in banking sector for inputs and outputs selection. One approach uses inputs to produce outputs and is known as production approach where as the second approach known as intermediation approach assumes the banks in the role intermediary which uses inputs to produce outputs and thereby earn the profit. The study used intermediation approach for the purpose of input and output selection.

The two input and two output variables were considered. The inputs variables were Interest and Non interest expenses and two outputs were Interest Income and Non-interest income. The selection of theses inputs and outputs is based on the notion that the study attempts to measure the efficiency of banking sector in terms of its ability to generate revenue by intermediating inputs to generate outputs.

For efficiency measurement, two basic input oriented models of DEA were used known as CCR and BCC. The banks are then ranked as per respective efficiency scores in the light of both models. The efficiency score ranges from 0 to 1 under these models. The bank having a score of 1 or (100%) indicates that it is operating on efficient frontier or optimum capacity and a bank with score of less than shows that it is operating below the best practice or efficient frontier.

The efficiency in CCR model is known as global (overall) technical efficiency under the assumption of constant return to scale. The firm will be called as technically efficient if it has efficiency score of 1 and technically inefficient in case of score less than 1. There may be number of causes for inefficiency. One reason for such inefficiency may be associated with management side of the business known as pure technical efficiency and is measured under BCC model with variable return to scale assumption. Other kind of inefficiency may be due to use of technology known as scale efficiency. Scale efficiency is measured by the ratio of CCR efficiency score to BCC efficiency score.

4. Findings

The objectives of the study were to determine the efficiency of domestic banks; to rank the banks and to find out the reasons of inefficiency. This section is further divided into efficiency analysis under CCR and BCC models and the combined analysis of the same.

4.1 Efficiency Analysis under CCR Model

The table-1, 2 and 3 exhibits efficiency score of 16 private banks computed via input oriented CCR model, with input radial inefficiency and benchmark for the year 2006, 2007 and 2008. The column titled as DMU means Decision making units under study; column titled as Score indicates efficiency score of each DMU, Input Radial inefficiency column displays proportion of inputs not efficiently used by DMU and benchmark column shows DMUs used as a benchmark for DMU under evaluation to compare performance. The efficiency ranges from 0 to 1 which means that a bank with an efficiency of 1 is the most efficient bank while with 0 most inefficient bank. The efficiency score reported in the table 1 were transformed into percentages.

4.1.1 Efficiency Scores of Year 2006

The average efficiency score of 16 banks (Table 1) was witnessed at 74%. Seven banks surpassed this average and 9 banks were observed under the average score. Three banks (HMP, MCB, and Summit bank) among the seven were the most efficient banks having efficiency score of 1 (100%). The most inefficient bank was Samba Bank with the efficiency score of 0.17(17%) and the reference banks (Benchmark) for improvement in efficiency were HMP and MCB with Lambda of (0.172842) and (0.058935) respectively. It shows that Samba bank has to reduce its inputs utilization by 83% in order to achieve the same output.

Soneri bank was the 2nd in rank with respect to efficiency that achieved the efficiency level of 99% and HMP (lambda=0.759501) was the benchmark for efficiency improvement. Two banks AKL and my bank achieved efficiency of 81% and 82%, four banks BAF, BAH; KASB and UBL were evidenced to have efficiency score of 72% each in the year under study. Three banks HBL (64%), NIB (61%), and silk bank (63%) have efficiency score in the range of more than 60% but less than 65%. Js bank was remained at level of 46%.

Among the three efficient banks (HMP, MCB and Summit) in this year, HMP is the most efficient as it was used 14 times as a benchmark followed by MCB used 13 times as benchmark and summit 1 time only.

Table 1: Efficiency scores of Year 2006

DMU	Score	Input Radial Inefficiency	Benchmark
ABL	74%	26%	HMP , MCB
AKL	81%	19%	HMP , MCB
BAF	72%	28%	HMP , MCB
BAH	72%	28%	HMP , MCB
HMP	100%	0%	HMP
HBL	64%	36%	HMP , MCB
JS	46%	54%	HMP , MCB
KASB	72%	28%	HMP , MCB
MYB	82%	18%	HMP , MCB
MCB	100%	0%	MCB
NIB	61%	39%	HMP , MCB
Samba	17%	83%	HMP , MCB
Silk	63%	37%	HMP , MCB
Soneri	99%	1%	HMP
Summit	100%	0%	Summit
UBL	74%	26%	HMP , MCB
Average	74%		

4.1.2 Efficiency Scores of year 2007

The table 2 exhibits the efficiency score for the year 2007. The three banks (HMP, MCB and Summit) with efficiency score of 1(100%) and declared as efficient under CCR. the average efficiency score observed at 72%.

MYB, Soneri and AKL stayed above the average score and remainder of banks were operating at less than average. The low efficiency score of 35% was experienced by Samba Bank. The MCB is declared as highly efficient among the efficient banks on the basis of number of times it was used as a benchmark or standard for the inefficient banks.

Table 2: Efficiency Scores of Year 2007

DMU	Score	Input Radial Inefficiency	Benchmark)
HMP(6)	100%	0	HMP
MCB(14)	100%	0	MCB
Summit(3)	100%	0	Summit
MYB	95%	0.054809	HMP ; MCB
SONERI	85%	0.151979	MCB
AKL	84%	0.164987	HMP ; MCB
HBL	66%	0.335491	MCB
SILK	63%	0.366148	MCB
UBL	63%	0.367136	MCB; Summit
BAF	62%	0.375917	HMP ; MCB
NIB	61%	0.390006	MCB
KASB	60%	0.396495	HMP ; MCB
BAH	59%	0.40991	HMP ; MCB
ABL	58%	0.423742	MCB
JS bank	55%	0.445263	MCB; Summit
Samba	35%	0.650648	MCB
Average	72%		

4.1.3 Efficiency Scores of Year 2008

The table 3 shows the efficiency scores for the year 2008. THE average score was 70%.Two banks HMP and MCB witnessed 100% efficiency followed by UBL (92), MYB (89%), Soneri (82%), HBL (80%), and JS bank (72%). The remaining banks had efficiency scores of less than average score 70% with least efficient bank being NIB (44%). MCB was mostly used as a benchmark for inefficient DMUs and hence is ranked on top among the efficient DMUs.

Table 3: Efficiency score for year2008

DMU	Score	Input Radial Inefficiency	Benchmark
HMP	100%	0	HMP
MCB	100%	0	MCB
UBL	92%	0.078021	MCB
MYB	90%	0.101009	HMP ; MCB
Soneri	83%	0.173348	HMP ; MCB
HBL	81%	0.19159	MCB
JS Bank	72%	0.276653	HMP ; MCB
ABL	71%	0.287513	HMP ; MCB
BAH	69%	0.305907	HMP ; MCB
Summit	66%	0.339687	HMP ; MCB
AKL	65%	0.352537	HMP ; MCB
BAF	65%	0.354704	HMP ; MCB
KASB	56%	0.439001	HMP ; MCB
Silk	49%	0.511536	HMP ; MCB
Samba	47%	0.526243	MCB
NIB	45%	0.552354	MCB
Average	72%		

4.2 EFFICIENCY ANLAYSIS UNDER BCC MODEL FROM 2006 TO 2008

To examine the efficiency of private sector banks under variable return to scale (proportionate increase in inputs does not increase outputs in the same proportion), BCC model was applied. This model is useful in discovering the potential of managerial skills of the DMU in using their inputs and outputs. The efficiency scores under this model from year 2006 to 2008 have been provided in the tables 4, 5, and 6.

4.2.1 Pure Technical Efficiency Score of Year 2006

From the table 4, it was found that 6 banks reached the efficient frontier indicated by efficiency score of 1(100%). These banks were HMP, HBL, JS Bank, MCB, summit and UBL. The average efficiency score in year 2006 was 82%. Seven banks were witnessed operating below average. Among the efficient banks, HMP was used greater number of times as a benchmark followed by MCB and JS bank therefore HMP was assigned rank 1 MCB as at Rank 2 and JS Bank at rank 3.

Table 4: Pure Technical Efficiency Scores Of Year 2006

DMU	Score	Input Inefficiency	Benchmark(Lambda)	Times as a benchmark for another DMU
ABL	0.753352	0.246648	HMP, MCB	0
AKL	0.866747	0.133253	HMP, MCB	0
BAF	0.890175	0.109825	HMP, MCB	0
BAH	0.719373	0.280627	HMP, MCB	0
HMP	1	0	HMP	10
HBL	1	0	HBL	0
JS Bank	1	0	JS Bank	7
KASB	0.721578	0.278422	HMP, JS Bank, MCB	0
MYB	0.816698	0.183302	HMP, JS Bank, MCB	0
MCB	1	0	MCB	9
NIB	0.60712	0.39288	HMP, JS Bank, MCB	0
Samba	0.167941	0.832059	HMP, JS Bank, MCB	0
Silk	0.630066	0.369934	HMP, JS Bank, MCB	0
Soneri	0.988954	0.011046	HMP, JS Bank, MCB	0
Summit	1	0	Summit	0
UBL	1	0	UBL	0
Average	**0.822625**			

4.2.2 Pure Technical Efficiency Score of Year 2007

The table displays the technical efficiency score under BCC model of the year 2007. The average managerial efficiency score was 81%. It can be seen from the table that 8 banks were operated below the average in terms of managerial efficiency while the remaining banks were above the average. The banks with 100% efficiency score were 6 and among these banks MCB was used 8 times as benchmark for the banks in the study. It can be concluded that Muslim commercial bank (MCB) was the top performing bank in year 2007 followed by MYB, Summit, Soneri HMP and UBL respectively.

Table 5: Pure Technical Efficiency Scores of Year 2007

DMU	Score	Input Inefficiency	Benchmark(Lambda)	Times as a benchmark for another DMU
ABL	0.589039	0.410961	MYB, MCB ,Soneri	0
AKL	0.835496	0.164504	HMP,MCB, Summit	0
BAF	0.679596	0.320404	MCB, UBL	0
BAH	0.603787	0.396213	MYB, MCB, Summit	0
HMP	1	0	HMP	1
HBL	1	0	HBL	0
JS Bank	0.632101	0.367899	MYB, MCB, Summit	0
KASB	0.639818	0.360182	MYB, MCB, Summit	0
MYB	1	0	MYB	7
MCB	1	0	MCB	8
NIB	0.705772	0.294228	MYB, MCB, Soneri	0
Samba	0.518063	0.481937	MYB, MCB, Summit	0
Silk	0.791601	0.208399	MYB, Soneri	0
Soneri	1	0	Soneri	3
Summit	1	0	Summit	5
UBL	1	0	UBL	1
Average	**0.812205**			

4.2.3 PURE TECHNICAL EFFICIENCY SCORE FOR YEAR 2008

Pure technical or managerial Efficiency scores of year 2008 were computed using BCC model and provided in the table. The average score was 83.7% showing improvement compared to 81% of year 2007. 8 banks achieved optimum efficiency score of 1 (100% efficiency level) and formed the best practice or efficient frontier. The

remaining 8 banks operated below this frontier out of which 1 bank (Soneri bank) operated at above and 7 banks remained below the average efficiency score. The most efficient bank was MCB and was ranked as top bank because it was used 8 times as a benchmark for other banks in the study period.

Table 6: Pure Technical Efficiency Scores of Year 2008

DMU	Score	Input Inefficiency	Benchmark(Lambda)	Times as a benchmark for another DMU
ABL	0.714083	0.285917	HMP, MCB	0
AKL	0.66358	0.33642	HMP, MYB, MCB	0
BAF	0.648028	0.351972	HMP, MCB	0
BAH	0.72246	0.27754	HMP, MYB, MCB	0
HMP	1	0	HMP	5
HBL	1	0	HBL	0
JS Bank	1	0	JS Bank	1
KASB	0.668204	0.331796	MYB, MCB, Summit	0
MYB	1	0	MYB	5
MCB	1	0	MCB	8
NIB	0.469957	0.530043	JS bank; MCB	0
Samba	1	0	Samba	0
Silk	0.601735	0.398265	MYB, MCB, Summit	0
Soneri	0.904359	0.095641	HMP, MYB, MCB	0
Summit	1	0	Summit	2
UBL	1	0	UBL	0
Average	**0.837025**			

4.3 Summary of Technical, Pure Technical and Scale Efficiencies

The table 4.7, 4.8, and 4.9 summarizes the Efficiency scores of CCR and BCC models with the ratio of CCR technical efficiency to BCC efficiency classified as Scale efficiency for a period from 2006 to 2008 respectively. The evaluation criterion for banks to be efficient is quoted as "The Decision making Unit (bank in the study) is said to be CCR efficient if and only if it is efficient under BCC model." It means that banks efficient under CCR model but not efficient under BCC model will be regarded as inefficient. The possible reasons for this may be unfavorable operating environment or inefficient management or sometimes both.

4.3.1 Technical, Pure Technical and Scale Efficiencies in Year 2006

The average Global Technical efficiency (CCR-Efficiency) Pure Technical Efficiency (BCC-Efficiency) and Scale Efficiency (Ratio of CCR-Efficiency to BCC-efficiency) scores were 0.7347, 0.8226 and 0.9095 respectively in year 2006. It means that overall inefficiency in domestic banks was due to managerial incapability in utilizing the resources and could be removed by reducing the input resources by 26.5% on average to obtain the given level of outputs. The pure technical inefficiency dominated the scale inefficiency which implies that there is a room for improvement in Managerial capabilities.

It is clearly evident from table 4.7 that three banks (Summit, MCB and HMP) were efficient under CCR and BCC model and scale efficient as well indicating that they are operating at the Most Productive Scale size. From the summarized results in table 4.7, it can be observed that 3 banks (HBL, JS Bank and UBL) were found efficient under bcc model and inefficient under CCR model. This means that overall inefficiency in these banks could be due to the scale of operations or in other ways optimum utilization of available technology. The inefficiency of these banks can be alleviated by decreasing the current scale sizes of HBL and UBL while increasing Js banks scale of operations. The remaining 10 banks were inefficient under CCR and BCC models. Three bank banks out of these 10 banks were on decreasing and 7 banks on increasing return to scale in order to reach the scale at which efficient banks are operating in 2006.

Table 7: Summary Of technical, Pure Technical and scale Efficiency Scores of Year 2006

DMU	Technical Efficiency Score(CCR)	Pure Technical Efficiency Score(BCC)	Scale Efficiency Score (CCR to BCC ratio)	RTS
ABL	0.737673	0.753352	0.979188	Decreasing
AKL	0.808298	0.866747	0.932565	Decreasing
BAF	0.715883	0.890175	0.804204	Decreasing
BAH	0.719299	0.719373	0.999897	Increasing
HMP	1	1	1	Constant
HBL	0.644188	1	0.644188	Decreasing
JS-B	0.462563	1	0.462563	Increasing
KASB	0.720798	0.721578	0.998919	Increasing
MYB	0.81543	0.816698	0.998447	Increasing
MCB	1	1	1	Constant
NIB	0.606843	0.60712	0.999545	Increasing
Samba	0.167133	0.167941	0.995194	Increasing
Silk	0.62985	0.630066	0.999657	Increasing
Soneri	0.988809	0.988954	0.999854	Increasing
Summit	1	1	1	Constant
UBL	0.738427	1	0.738427	Decreasing
Average	0.7347	0.822625	0.909541	

4.3.2 Technical, Pure Technical and Scale Efficiencies in Year 2007

The table 4.8: shows technical, pure technical and scale efficiencies of banks with an average score of 0.7167, 0.8122 and 0.8827 respectively during the year 2007. It can be observed that average efficiency score deteriorated slightly compared to year 2006 and to improve the efficiency, there is a need to cut the expenses by approximately 28%. This inefficiency may be caused by management incapability or Scale of operation or may be caused by both. To look at the managerial efficiency, BCC model was applied to see efficiency performance of banks under study.

The banks (HMP, MCB and Summit bank), which were fully efficient under CRS and VRS assumptions in year 2006, were also observed to be fully efficient in the year 2007. It was also observed that 4 banks were BCC efficient while CRS inefficient. The remaining banks were observed inefficient in both CCR and BCC models. Approximately 19 % of inefficiency found in the banks under study was attributed to local or managerial inefficiency while 12 % inefficiency was associated with the scale of operations.

Further analysis also revealed that 10 banks were on Increasing, 3 decreasing and 3 on constant return to scale. For banks under study, it is imperative to improve the management and operating capacities of these banking firms. . The most inefficient bank in 2007 under BCC and CCR model was Samba bank which has to reduce its input expenses by about 66% and increase the scale size by approximately 33%.

Table 8: Summary Of Technical, Pure Technical and scale Efficiency Scores of Year 2007

DMU	Technical Efficiency Score(CCR)	Pure Technical Efficiency Score(BCC)	Scale Efficiency Score (CCR to BCC ratio)	RTS
ABL	0.57626	0.58904	0.9783	Increasing
AKL	0.83501	0.8355	0.99942	Increasing
BAF	0.62408	0.6796	0.91832	Decreasing
BAH	0.59009	0.60379	0.97731	Increasing
HMP	1	1	1	Constant
HBL	0.66451	1	0.66451	Decreasing
JS-B	0.55474	0.6321	0.87761	Increasing
KASB	0.60351	0.63982	0.94325	Increasing
MYB	0.94519	1	0.94519	Increasing
MCB	1	1	1	Constant
NIB	0.60999	0.70577	0.86429	Increasing
Samba	0.34935	0.51806	0.67434	Increasing
Silk	0.63385	0.7916	0.80072	Increasing
Soneri	0.84802	1	0.84802	Increasing
Summit	1	1	1	Constant
UBL	0.63286	1	0.63286	Decreasing
Average	0.716717	0.812205	0.88276	

4.3.3 Technical, Pure Technical and Scale Efficiencies in Year 2008

From table 4.9, it was observed that two banks (HMP and MCB) were efficient under both CCR and BCC models in year 2008. Six banks were efficient under VRS but inefficient under CRS, four banks with decreasing,

ten banks increasing and 2 banks constant return to scale respectively. The most inefficient bank was again samba bank.

The average technical, PTE and scale efficiencies were 0.7193, 0.8370 and 0.8709 respectively. The Pure technical inefficiency (managerial) dominated the scale inefficiency in 2008. The inefficient banks under study have to improve its managerial and scale inefficiency by approximately 16.5% and 13 % on average respectively. The majority of the banks in year 2008 were found inefficient due to its managerial inefficiency.

Table 9: Summary Of technical, Pure Technical and scale Efficiency Scores of Year 2008

DMU	Technical Efficiency Score(CCR)	Pure Technical Efficiency Score(BCC)	Scale Efficiency Score (CCR to BCC ratio)	RTS
ABL	0.71249	0.71408	0.99777	Decreasing
AKL	0.64746	0.66358	0.97571	Increasing
BAF	0.6453	0.64803	0.99579	Decreasing
BAH	0.69409	0.72246	0.96074	Increasing
HMP	1	1	1	Constant
HBL	0.80841	1	0.80841	Decreasing
JS-B	0.72335	1	0.72335	Increasing
KASB	0.561	0.6682	0.83956	Increasing
MYB	0.89899	1	0.89899	Increasing
MCB	1	1	1	Constant
NIB	0.44765	0.46996	0.95253	Increasing
Samba	0.47376	1	0.47376	Increasing
Silk	0.48846	0.60174	0.81176	Increasing
Soneri	0.82665	0.90436	0.91408	Increasing
Summit	0.66031	1	0.66031	Increasing
UBL	0.92198	1	0.92198	Decreasing
Average	0.719369	0.837025	0.87092	

5. Conclusion

The study was designed to examine the efficiency of domestic commercial banks from 2006 to 2008. To find out the efficiencies, input oriented CCR and BCC models of DEA were used. The results showed that average technical efficiency in year 2006, 2007 and 2008 were 73.4%, 71.6% and 71.9%. To find out the possible causes of inefficiency in the banking sector, Managerial efficiency and scale efficiencies were computed and the results showed that the main cause for technical inefficiency was management and scale inefficiency. However, Managerial inefficiency contributed more than scale inefficiency. The results also indicated that MCB and HMP were the only two banks which achieved 100% efficiency under CCR and BCC models in all years followed by Summit bank which was efficient in all years except year 2008. The inefficiency of the domestic banks in Pakistan could be removed if the banks utilize their managerial abilities at optimum capacity and operate at most productive or economic size in order to avail economies of scale.

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