COMPARING THE EFFICIENCY OF ISLAMIC VERSUS CONVENTIONAL BANKING: A CASE STUDY OF PAKISTAN

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FORWARDING SHEET

The thesis entitled "COMPARING THE EFFICIENCY OF ISLAMIC VERSUS CONVENTIONAL BANKING: A CASE STUDY OF PAKISTAN" submitted by <u>Mr. Idrees Ali Shah</u> in partial fulfillment of M.S degree in Management Sciences with specialization in Finance, has been completed under my guidance and supervision. I am satisfied with the quality of student's research work and allow him to submit this thesis for further process as per IIU rules & regulations.

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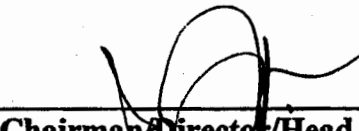
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IN THE NAME OF
ALLAH, THE MOST MERCIFUL AND BENEFICIENT

Dedication

"To my father Mian Gul Badshah, my mother and to my teachers, for their unconditional love, prayers, and support to make my dreams come true."

ABSTRACT

The purpose of this thesis is to compare the efficiency of Islamic banks and conventional banks under various assumptions. These assumptions are technical efficiency under CRS, technical efficiency under VRS, Allocative efficiency under CRS, Allocative efficiency under VRS, Cost efficiency under CRS, Cost efficiency under VRS, Income efficiency under CRS and Income efficiency under VRS. It also aims to investigate the economies of scales for both banking streams. Further we investigate effect of banks specific factors on efficiency like size of banks, total liabilities of banks, total profit of banks, total markup revenue, total non markup revenue, total markup expenses and total non markup expenses. This thesis further aims to compare the efficiency of conventional banks with Islamic banks on the basis of ownership. The data for this study are taken from banking statistics of Pakistan for the year 2001 to 2008. For the measurement of efficiency for commercial banks, Data Envelopement analysis (DEA) is used. For the effect of banks specific factors on efficiency Tobit regression model is used. The finding suggest that overall Conventional banks are efficient than Islamic banks accept technical efficiency under constant return to scale. This is due to because conventional banks had a very old history as compare to Islamic banks. On basis of ownership overall foreign conventional banks were more efficient than Islamic and local conventional banks. On the other hand overall banks specific factors had no strong significant relationship with efficiency scores. This study is different from other studies in respect that it compares the efficiency of Islamic banks with conventional banks with these variables and under various assumptions.

Key words: Efficiency, Islamic banks, Conventional banks, Pakistan, Data Envelopement analysis.

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DECLARATION

I hereby declare that this thesis, neither as a whole nor as a part thereof, has been copied out from any source. It is further declared that I have prepared this thesis entirely on the basis of my personal effort made under the sincere guidenance of my supervisor.

No portion of the work, presented in this thesis, has been submitted in support of any application for any degree or qualification of this or any other university or institute of learning.

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DMU... Decision making unit

PPRU CRS.................   Possible percentage of reduction in inputs to obtain
                                 Efficient point under constant return to scale

PPRU VRS.......................   Possible percentage of reduction in inputs to obtain
                                        Efficient point under Variable return to scale

PPRPOOLO.......................   Possible percentage of reduction in inputs to
                                        To produce outputs on cost efficient point

PIOOEP...................................   Possible increase in output with same level of
                                                  Expenditure

CHAPTER 1
INTRODUCTION

1. Introduction

Efficiency of commercial banks is one of core issues for the economists all over the world due to its strong association with economic growth of the country (Zaidi, 2005). Economic growth would be achieved by utilizing the existing resources of the banks in appropriate and in efficient way (Saeed, 2005). Efficiency of commercial banks has an importance for evaluation of its performance. Banking efficiency provides signal for the economic development of a country (Sathye, 2005). Efficiency of commercial banks is actually the relationship of different combinations of outputs and inputs of the banks to achieve optimum level. The optimum level can be achieved under the objective of inputs minimization, while producing the same level of outputs and outputs maximization with same level of inputs.

Efficiency of commercial banks is a comparative term that the efficiency of commercial bank for particular year may be compared with another year (Coelli et al., 1998). Commercial bank's efficiency provides signal to different stake holders, like depositors, investors, creditors and government. Its measurement provides help to depositors in their decision making about their savings. From investor point of view the efficiency evaluation of banks have also importance. The results of (Nguyen and Swanson, 2007) shows that portfolio composed from inefficient firms significantly underperforms than the portfolio composed of efficient firms. While for government its measurement is necessary so as to take remedial measures of anything that goes wrong in the economy.

Commercial banks have very significant role for governments and private sector because it is the main financial sector that contributes in economic stability of a country (Chansarn, 2008). For government the efficiency is necessary because banks provide base for macroeconomic stability (Ngalande, 2003). Further government implements their financial policies like monetary policy etc. through banks (Hartman, 2004). Commercial banks also provide loans to governments for the economic development of the country. It also helps in

the industrialization of the country by providing loans to the businessmen and private sector. Agriculture sector is one of major sector in Pakistan's economy and key contributor to the GDP (Ahmad and Gill, 2007b). Commercial banks is an important source for Agricultural credit in Pakistan (Ahmad and Gill, 2007b)

Actually banks provide links from surplus unit to deficit unit of the economy. In the last fifty years financial sectors and especially banking sector have been expanded a lot in both developed and underdeveloped countries (Hassan, 2004). Efficiency of the banks and different controversial issues, like competition and economies of scales are linked together. Competition between different banks and banking systems forces these banks to operate efficiently. Lacking of different banking systems and relatively small number of banks, in economy, might encourage monopoly by restricting their output or colluding between different banks. Efficiency of the banks normally depends on different banking systems and number of banks in the market, along with their ability to achieve economies of scales (Qayyum & Khan, 2006). Different banking systems force banks to operate efficiently.

In Pakistan there are two massive banking systems; Islamic Banking and Conventional Banking. In 2008 there were six full-fledged Islamic banks (SBP, 2008).

According to conventional banking theories the banks make profit between the spreads of interests. Banks collect deposits at low interest rate and lend it at a high interest rate the difference between the two interest rates is their profit based on competitive edge of banks (Santos, 2000; Hassan et al., 2009).

Conventional banks have very long history in Pakistan it is operating since independence of Pakistan. While on the other hand Islamic banks are based on Quran and Sunah, which strictly forbid Ribah (Roy, 1991; Ariff, 2006). Islamic banks normally perform the same functions like conventional banks, but Islamic banks do not receive and pay any interest.

Islamic banks are based on profit and loss sharing principal and based on profit sharing agreement between the provider of the funds and the borrower of the funds, but do not receive and lend profit in advance. Islamic banks take fee, commission in transactions but do not accept or give any predetermined interest. Profit is distributed normally on the basis of risk (Hassan et al., 2009).

There are different schools of thoughts about the profit sharing in Islamic perspective. According to Imam Ahmad Bin Hanble the profit will be shared between two parties on the basis of their respective investments. In contrast, according to Imam Malik Bin Anas there is no restriction in profit distribution between two parties; it is solely on their mutual consent, but all schools of thoughts are agreed on one point that the loss should be distributed between the parties on the basis of their respective investments. Today Islamic banking in many countries of the world, especially in Pakistan, is pursuing teaching of on Imam Malik Bin Anas. The concept of efficiency in Islamic perspective is also recognized. The concept of Maqasid is that every Muslim will increase the efficiency, reduce the cost and protect property, wealth of another party (Kamruddin et al., 2008)

Islamic banking is operating in many countries of the world. Initially it was established to fulfill the Muslim's need of halal income. But now a day it is spreading even in non Muslim world Islamic banking is considered as fast growing banking system (Sufian & Noor, 2009). The first bank was established in 1963 in Egypt. And now the total number of Islamic financial institutions all over the world is round about 300 and total assets of Islamic banks, all over the world are about $250 billion (Sufian & Noor., 2009).

Efficiency of banks might result in high profits, good customer service or use for risk diversion (Berger et al., 1993a. b). Efficiency of banks might be affected by different factors like size, interest expense, total profits etc (Hassan et al., 2009).

According to Coelli et al (1998) suggested that efficiency of different banking systems should be compare. As in Pakistan the conventional banking has long history as compared to Islamic banking, so conventional banking has more advantages, like high spread of interest and good will etc over the Islamic banks. In Pakistan the conventional banks, on the basis of ownership structure, are categorized as local conventional banks and foreign conventional banks.

Various researchers like (Hassan and Bashir, 2003; Sarker, 1999; Bashir, 1999; Samad and Hassan, 1999; Yudistira, 2003; Hussein, 2004) suggested that Islamic banks are more efficient than conventional banks but none of them tested it empirically. So the aim of this paper is to solve empirically this controversial issue and compare the efficiency between Islamic banks and conventional banks in Pakistani context. To show more insight and deep information, the efficiency of Islamic banks has been compared with conventional local banks and foreign conventional banks and determined the impact of various micro economic factors, like size of banks, total liabilities, interest expenses, noninterest expenses, interest markup revenue, non interest markup revenue, total profit and on qualitative side ownership structure on the efficiency of banks.

1.1   Objective of Study

Commercial banks have very strong impact on the economy of any country, so the evaluation of its efficiency is necessary. As in Pakistan there are two broad banking systems; Islamic banks and conventional banks so there is a need to compare their efficiencies under various assumptions, viz which banking system is more efficient and further compared the efficiency of Islamic banks with local conventional banks and foreign conventional banks. These assumptions are technical efficiency under CRS, Technical efficiency under VRS, Cost

efficiency under CRS, Cost efficiency under VRS, Income efficiency under CRS, Income efficiency under VRS. Further we determined bank specific factor that effect the efficiency of the banks.

1.2   Significance of the study

As both banking streams have importance in the economy of a country, so the efficiency evaluation of both streams has an importance at micro and macro level. At micro level this study provides information to the bankers, that under which specification their bank is inefficient so that they take the remedial measures. Further, it provides the information to other stake holders that which banking system is efficient. At macro level this study will provide help to the government in decision making regarding banking sector. Islamic banking particularly in Pakistan is growing interest for academia this study provides the information to academia that which banking system is efficient. Further it provides information to both practitioners and academia that which banking type; either Islamic banks, foreign conventional banks or local banks are efficient. This study will fill the gap in literature because little evidence is available in the prior literature about the comparison of Islamic and Conventional banks. So this study will contribute to the literature.

1.3   Organization of thesis

Chapter 1 contains the Introduction, in chapter 2 we described in detail the work done by scholars and practitioners in the past. 3rd chapter contains data, methodology and variables used. In Chapter 4 the main empirical results and findings shows the efficiency comparison of Islamic and Conventional banks. Chapter 5 contains conclusion and future research. And in the last section references are presented.

CHAPTER 2
LITERATURE REVIEW

2 Literature review

The competitive environment in the financial service industry and hasty changes in financial service industry makes it very imperative to determine the efficiency of financial service industry (Berger et al., 1993). In economic development of a country the banks play a very imperative role. There are different opinions about the word bank origination. The most common opinion is that the Word Bank originated from the word bench because in early ages the Jews did their business transactions on benches. Due to direct impact of banks over the economy if any deterioration occurs in the performance of banks this will ultimately disturb the whole economy of the country (Cornett & Tehranian, 2004). So it is very vital to assess that banks are operating efficiently or not. Economists all over the world give very importance to banking efficiency and consider it a very significant economic issue (Chansarn, 2008).

Financial service industry is playing very imperative role in today dynamic environment and banks take a very important part in the financial intermediation (Akhtar, 2002). The various studies that are done for the evolution of efficiency in the financial service industries and especially in banking sector are different with respect to the methodology, variables and sample size (Ahmad & Gill, 2007). Various economists empirically examined deep and positive association between financial growth and economic development in their studies, like (levine et al., 1999; Khan & Senhandji, 2000).

There has been general literature in the banking sector that examined the efficiency of conventional commercial banks in the developed countries especially U.S and European banking sector, over recent years. The work, especially on empirical side, Islamic banking has not been much investigated (Sufian, 2006). Islam is a complete way of life and it has proper financial system to humanity. Islamic banking is one of most important parts of

Islamic financial system and it is based on shiria compliance. Its sources are Quran and Sunah. Islamic banking is based on Islamic principles, so it completely discourages and forbids riba (interest) because it exploits the poor community of society. Islamic banks are based on equity base relationship instead of loan base relationship between provider of fund and borrower of fund. Equity base relationship is encouraged by Islamic banking between equity provider and entrepreneur (Roy, 1991)

2.1   Production & Intermediation Approach

There are two widely accepted concepts used in banking literature about the functions of banks; production approach and intermediation approach (Sealey and Lindley, 1977). In production approach banks are considered as firms that use factors of production i-e (land, labor and capital) to produce a deposits and loans account. Outputs are measured by the number of accounts and numbers of transactions done in each type of product mean, in terms of physical accounts, deposits are taken as output under this approach (Colwell & Davis, 1992; Rizvi, 2001). This approach is used in various studies like (Swank, 1997; Bikker, 1999; Resti, 1997). While on the other hand intermediation approach treated bank as intermedatory of financial services rather than producer of loans and deposits, which takes funds from surplus unit and provides it to deficit unit of the economy. Deposits are taken as input under this approach (Colwell & Davis, 1992; Rizvi, 2001; Akhtar, 2001). The value of inputs and outputs are taken in term of monetary values. The production approach is appropriate when the purpose is to evaluate the performance of bank branches, while intermediation approach is better when the purpose is to evaluate the performance of overall banks (Passiouras, 2006; Berger and Humprey, 1997). So in this study we will use intermediation approach because we will compare two different banking systems.

Various researchers like King & Levine (1993) investigated empirically the relationship between the financial development and economic growth using the samples of 80 countries for the period from 1960 to 1989 and found that the financial development has strong positive significant relationship, not only with the current economic growth but also with financial development that determines the future economic growth.

2.2   Efficiency Concepts

Measuring the efficiency of banks production efficiency and X-efficiency are two main concepts that are widely used (Kamruddin et al., 2008) X- efficiency can also be termed overall efficiency. In contrast some researcher named cost efficiency to overall efficiency, like (Ariff & Can, 2008). X- Efficiency means that "cost of producing observed output if both technical and allocative efficiencies are assumed relative to observed cost". Further, technical and allocative efficiencies are the two components of production efficiency (Kamruddin et al., 2008). Production efficiency concept is mainly based on the cob and Douglas (1928) in which there is input output relationship. Cobb-Douglas model was later extended by Berger and Humpry (1997) to the financial service sector and banking sector for efficiency evaluation. In contrast various researchers like (Ariff & Can, 2008; Tahir et al., 2009) took the allocative and technical efficiency as a part of cost efficiency.

The banking industry is an imperative part of the financial system in any country. Hence, the evaluation of its efficiency is significantly important (Sathye, 2005). In particular, cost efficiency is very imperative for evaluation of banks efficiency. Cost efficiency refers that how much a particular DMU minimizes its cost for producing the same level of output under same conditions that are produced by best practices firm in the sample and analyze that how much its cost is close with respect of best practice firm (Ariff & Can, 2008). In this regard

cost efficiency provides estimation to the banks that what will be minimum cost for producing the same amount of outputs (Hassan et al., 2009).

Income efficiency shows how particular firms obtain their financial and non financial revenues while utilizing the same level of financial and non financial expenditure. It is actually the earning side of the banks (Ahmad & Gill, 2007b). In the same way Passorious (2006) took the revenue side of the banks for the income efficiency and found how much a particular bank increases its revenue while utilizing the same level of financial and non financial expenses. Atuallah et al (2004) found technical and scale efficiency of Pakistan and Indian commercial banks under two models; loan base model and income base model.

The profit efficiency takes into account the effects of the choice of a certain vector of production both on costs and on revenues (Maudos et al., 1999). Commercial banks profit efficiency is to obtain desired level of profit with given level of input called profit by input side, while on the other side banks obtain the desired level of profit with minimum use of output is called profit by output side (Ahmad & Ahmad, 2007).

The technical and allocative efficiencies are the two parts of cost efficiency. Technical efficiency means the ability of firm (bank in this case) to produce more output with a given level of input, this is called technical efficiency by output side. By technical efficiency input side means to produce the same level of output with less input (Farrell, 1957). More technically, if a firm produces one unit of output with the same level of input or it can produce the same level of output by marginally decreasing in input can be called technically efficient firm. Allocative efficiency measures the best optimal level to which input is used at best proportion (Farrell, 1957; Coelli, 1996). This concept is explained through following diagram.

Figure 1 Technical & Allocative efficiency input oriented
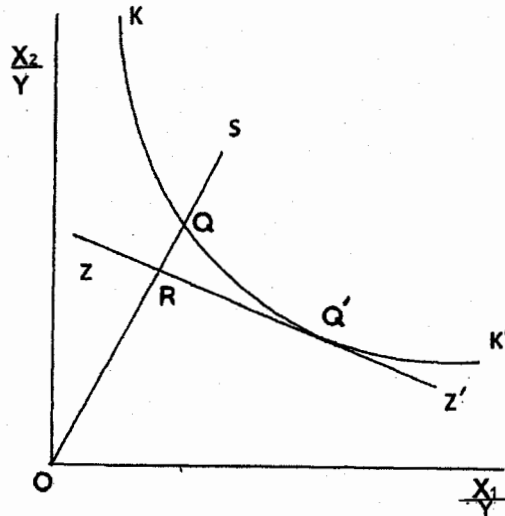
Farrell (1957) gave the idea of modern efficiency. He purposed two types of efficiencies; technical efficiency and allocative efficiency and considered that as a part of cost efficiency. Suppose under CRS a firm produces one output (Y) by utilizing two inputs (X1 & X2). Figure 1 deal with the measurement of technical efficiency. Point S represents inputs used by particular firm or bank in this study to produce output. The isoquant line KK$'$ represents different combinations of inputs to produce same level of output, known as technical efficiency. The distance QS represents technical inefficiency, which means that percentage amount of inputs could be reduced while producing the same level of output. It is represented in ratio form as **QS/OS**. So technical efficiency in ratio is equal to one minus **QS/OS**

$$Technical\ Effeciency = \frac{OQ}{OS}$$

Its values lie between 0 and 1. The value one shows that particular firm or bank in this case is fully efficient and the value less than one show the level of inefficiency. So in this figure point Q shows the most technical efficient point because it lies on isoquant curve.

Line ZZ' represents isocost line in the figure. It shows the allocative efficiency to which best optimal proportion level inputs are used. The allocative efficiency in ratio for the bank that operates at point S

$$Allocative\ Effeciency = \frac{OR}{OQ}$$

Allocative efficiency represented in the figure is point Q' because at this point isocost line is tangent to isoquant curve.

Economic efficiency or cost efficiency is achieved by the bank if it is simultaneously technical and allocative efficient, this is represented in ratio form as follows

$$Cost\ Effeciency = \frac{OR}{OS}$$

$$Cost\ effeciency\ = (OQ/OS)*(OR/OQ) = OR/OS$$

In terms of cost reduction the distance RS is also interpreted. This type of input oriented explanation is done by various researchers on the bases of Farrell (1957) paper like (Coelli., 1996; Ahmad & Gill, 2007a; Bankers et al, 1984; AL- Delaimi & AL-Ani, 2006; Wheelock & Wilson, 1995; Banker & Maindiratta, 1988).

2.3   Islamic Banking

The financial sector efficiency emphasizes that for fostering productivity, there has to be efficient allocations of financial resources. Even there is considerable development in Islamic banks but still there is very limited empirical literature available on Islamic banks (Sufian, 2007). Typically most of the studies that have been done on the Islamic banking are concerned towards the theoretical issues of the Islamic banking and empirically works are limited and especially rigorous statistical estimation (El-Gamal and Inanoglu, 2004). Several studies that have been keen to measure the performance of Islamic banks have commonly investigated the association between profitability and banking characteristics using financial ratios like (Samad, 1999; Bashir, 1999; Hassan and Bashir, 2003).

Bashir (1999) and Bashir (2001) executed regression analysis between Islamic banks profitability and its basic determinants by employing bank level data. Samad and Hassan (1999) found the performance of Malaysian banks from 1984 to 1997 through financial ratios. The results proposed that in broad sense sluggish growth in loans under profit sharing was mainly due to management's lack of knowledge

Sarker (1999) used a Banking Efficiency Model to investigate Islamic Banks efficiency in Bangladesh. He argued that, Islamic banks could stay alive still within a conventional banking design in which profit and loss modes of financing were less dominated. He further claimed that due to difference in Islamic banking system and conventional banking system, Islamic banks have different products and different risk characteristic, so different rules and regulation should be implemented over Islamic banks.

The other group of researchers that conducted their studies on the efficiency of Islamic banking sector by considering the frontier approach instead of financial ratios like (Yudistira, 2003; Brown and Skully, 2005; Hassan, 2005; Muhammad et al., 2007; Badar et al., 2007a).

Batchelor & Wadud (2004) found the efficiency of Islamic banks in Malaysia by applying DEA model and using technical and scale efficiency; their result revealed that full- fledged Islamic banks are generally inefficient due to scale inefficiency not due to pure technical inefficiency.

Yudistira (2003) used 18 Islamic banks sample and found scale and technical efficiency by using DEA model. His results revealed that the Islamic banks perform slightly inefficient during 1998-9. In the same way the (Sufian., 2006) found the technical efficiency of Malaysian Islamic banks. He divided the technical efficiency into pure technical efficiency and scale efficiency and found that overall technical inefficiency was due to scale inefficiency, means he found the technical efficiency under VRS assumption.

2.4   Why Data Envelopement Analysis?

Using accounting ratios is good indicator for measuring the performance of banks. OAR (operating asset ratios) is used for efficiency measurement. The advantage of OAR is that it provides the comparison related to interest, that is applied on deposits, but it loses its advantage and effectiveness when a DMU's operates in different environmental structures and practices like different capital structures and accounting practices (Ikhaid, 2000). Further financial ratios deal for short term performances of the company and that's why it misleads the analysts (Oberholver & Westuizen, 2004). The method using by State Bank of Pakistan is CAMELS approach i-e (capital adequacy ratio, asset quality, management soundness, earning and profitability, sensitivity to market risk) (SBP, 2003).

According to Iqbal & Molynux (2005) the frontier approach is better measurement technique than traditional financial ratios, because it is based on econometric and linear programming technique that eliminates the exogenous market forces that influence the standard performance of the bank. It also removes any difference regarding their input and output

prices. This shows a very clear picture and accurate estimates about the standard performance of firms and managers. Therefore banking literature is dominated by frontier analysis, it also captures the various exogenous effects.

In general, the utilization of frontier efficiency techniques provide a comprehensive overview regarding to significant improvements and can aware institutions to new business practices. Despite of that Simple ratios capture the imperative insights that are valuable for comparison. But their scope may be limited because it analyzes the key variable on one dimension and the relationship between the key variables is also ignored by using simple ratio technique (Iqbal & Molyneux, 2005). Further, simple financial ratio is based on bench marking, that single ratio is compared with the bench mark ratio and there is also problem in proper selection of bench mark (Yeh, 1996).

Thus, there is a need for comprehensive multiple inputs and multiple outputs framework that set criteria for banks to evaluate their efficiency in the light of having bench mark information. This will provide help in the decision process for managers that how there bank are managed and if there are any deviations so that they can take a corrective action (Iqbal and Molyneux, 2005).

For measurement the efficiency of banks various models and techniques are available. . Among these available models and techniques the parametric and non parametric models are frequently used. Parametric model takes the residual value and also a need to develop in functional form. While non parametric model has minimum constrain on its structure form. DEA has an advantage over regression analysis because single regression analysis captures the average performance of banks and also effected by high values. In contrast the DEA analyzes the efficiency of various DMU's on yearly bases and constructing a separate frontier on the yearly basis. It might be possible that the bank efficiency varies over the years that a

particular DMU in this case the bank may be efficient in one year while inefficient in other year (Sufian, 2006).

The DEA has superiority over SFA because DEA model has less restriction while there is no need to develop a functional form. It has also superiority to compute the relationship of multiple outputs and multiple inputs in a very easy way. The technology efficiency analysis provides insight to companies and enterprises that which input is not properly and efficiently utilized. Which facilitates the enterprises to take corrective actions for improving efficiency of particular decision unit besides technology efficiency the DEA model enable various (DMU's) to evaluate the allocative, technical and overall efficiency of particular DMU that provides a concrete picture about the efficiency level of particular DMU (Chen-Guo et al., 2007).

Despite these benefits, DEA model has some limitations. The DEA models are use to find the efficiency of differed banks but it does not arranging the efficient banks in order that whose value is one. Further DEA model has an assumption of non negativity of inputs while in the real case negative inputs are possible. When the banks is in deficit the profit will be in negative form but the DEA don't consider it (Chen-GUO et al., 2007).

2.5   Literature on Conventional Banks

A majority of efficiency studies on financial institution have been done in USA. Berger and Humprey (1997) investigated 130 different studies that applied frontier analysis that are conducted in different 20 countries. They reported that majority studies concluded that overall USA banking industry is inefficient although small banks are more efficient than large banks, these results are supported in the following studies (Ferrier & Lovell, 1990; Elyasiani & Mehdian, 1995; Noulas, 1997, and Daniels & Tirtiroglu., 1998). Too large and profitable banks are even technically inefficient in USA (Miller & Noulas, 1996). These

results are supported in various other studies conducted in other countries like (Jemric & Vujcic, 2002) conducted study in coardian banks that small banks are on average more efficient than large banks under constant return to scale. But the large banks are on average efficient under variable return to scale. In contrast (Hassan, 2003; Browen & Skully, 2003) investigated that larger banks and profitable banks have high efficiency. Constant returns to scale (CRS) means that the proportionate increase in inputs would result in proportionate increase in outputs. While variable return to scale (VRS) means it is not necessary that output would be increased in proportionate percentage. Further, under VRS banks are operating either on increasing return to scale (IRS) or decreasing return to scale (DRS). IRS means proportionate increase inputs will result higher proportionate increase in outputs. On the other hand DRS means proportionate increase in inputs will result in less proportionate increase in outputs (Sufian & Noor, 2009). If a firm has at IRS, it would achieve cost efficiency or income efficiency either through acquisition or elimination scale inefficiency. Banks that are operating at DRS should be conscious when increasing their operations (Sufian & Noor, 2009; Evanoff and Israelvich, 1991)

There are several studies related to the efficiency of banks by applying DEA methodology across the countries Berger et al. (1993) they compare the efficiency of Norway, Sweden and Finland. Pastor et al (1997) compared the efficiency of 11 OCED countries and 8 developed countries. Sathye (2003) compared the Indian banks with world banks and found that mean efficiency of Indian banks is less than that of world banks mean efficiency. All these studies using cross country data DEA construct a common frontier on the basis of these data.

Allen & Rai (1996) used parametric analysis for cross comparison of countries. Most of the researchers find the technical efficiency of the conventional banks like (Havrylchyk, 2006; Pasioras et al., 2007; Isik & Hassan, 2002; Jackson & Fethi, 2000; Aly et al., 1990).

Isik & Hassan (2002) used data from 1988 to 1996 and examined cost, technical, allocative and scale efficiency on the basis of ownership for Turkish banks by applying DEA approach, using labor, capital and loanable funds as inputs. While long term loan, short term loan risk adjusted off balance sheet items and other earning asset used as outputs. Their study revealed that local banks performed less efficiently from state owned and foreign banks. In the same way studies were conducted on cost efficiency like (Haung & Wang, 2002; Weill, 2004). Some efforts have also been made in different countries to find cost and profit efficiency of banks. Most of these studies are conducted on the US banking industry (Clark and Siems, 2002; Färe et al., 2004; Rogers, 1998). Other studies that examined the cost and profit efficiency of Turkish and Spanish banking industry by applying the same DEA test these studies are like (Isik & Hassan, 2002; Maudos & Pastor, 2003). In the same way the study is also conducted in China and this study revealed that profit efficiency levels are less than cost efficiency levels which means that the cause of inefficiency in Chinese banking industry is due to profit inefficiency and not from cost inefficiency (Ariff & Can, 2008).

There are also other factors that affect the efficiency of banks; these are the micro economic factors that have impact on the efficiency of banks that is normally in the control of banks. These factors affect differently on different size banks and different financial institutions (Drake et al., 2006). There are studies that found the affect of bank specific factors on the efficiency of both Islamic and conventional banks.

Hassan et al (2009) investigated the affect of size and age on both Islamic and conventional banks and found that age and size of banks have no significant effect on the efficiency score of both banking streams. In contrast Sufian & Noor (2009) found that size, capitalization and profitability have significantly impact on the efficiency score. These results are consistent with the study of (Hassan, 2004; Ahmad & Gill, 2007a; Ahmad & Gill, 2007b and Sathye, 2001).

In developing country like Pakistan the cost of any specific bank that deviates from its best practice frontier is due to exogenous variables and endogenous variables. The exogenous variables that are normally uncontrollable are random shocks, accounting practices etc. On the other hand endogenous variables are misallocations of inputs, administrative mismanagement. Cost saving is to be achieved through corrective action about the administrative management and allocation of inputs (SBP, 2006).

Ariff & Can (2008) investigated the relationship between ownership, size and efficiency of banks. Their study revealed that state owned banks are less cost and profit efficient than private and foreign banks. Further, medium sized banks are normally more efficient than large and small sized banks. This study is relevant with the study of (Akmal & Saleem, 2008).

2.6   Islamic Banks VS Conventional Banks

The other groups of researchers that try to compare the efficiency of Islamic banks and Conventional banks but some of them just compare the performance of both banking system like (Hassan, 1999; Iqbal, 2001; Bader et al., 2007b). The researchers that compared the efficiency of Islamic banks and conventional banks by utilizing frontier approach, instead of using financial ratios, are (Hassan et al., 2009; Hussain, 2004; Al-Jarrah & Molyneux, 2003; Bader et al., 2007c; Shamsher et al., 2007).

Hassan et al (2009) compared the efficiency of Islamic banks and conventional banks by using DEA model and found there was no significant difference between overall efficiency scores of both streams. Further, they found that Islamic banks and conventional banks had same efficiency score. While Islamic banks had better income efficiency as compared to the conventional banks, but conventional banks were profit efficient as compare to conventional banks.

Shamsher et al (2007) compared Islamic banks and conventional banks using SFA model. There finding revealed that both banking streams have cost inefficiencies but Islamic banks have somehow cost efficient as compare to conventional banks. He also found that age has no significant on the efficiency of both streams.

CHAPTER 3
METHODOLOGY
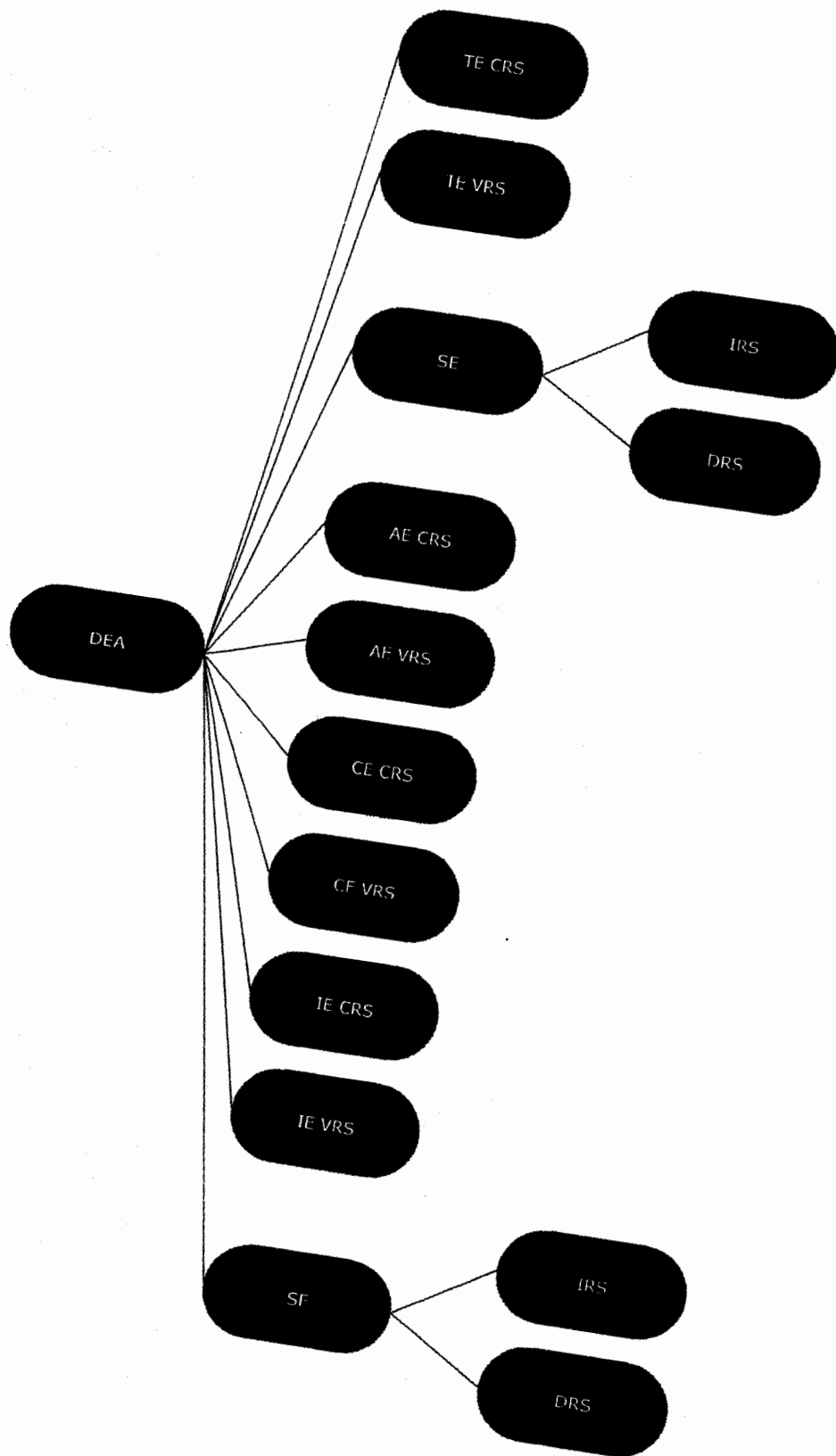
3 Methodology

The data was taken from annual balance sheets, published by State Bank of Pakistan from period 2001 to 2008. The data comprised of unbalanced panel data of 35, 33, 33, 34, 32, 35, 35, and 34 banks from year 2001 to 2008 respectively.

For measuring the efficiency of financial and non financial sectors various, methods are available to measure the efficiency of financial and non financial sectors, especially commercial banks, but unfortunately the researchers do not agree on one specific method. The available methods for measuring the efficiency of commercial banks are classified in three ways financial ratios, parametric test and non parametric test. In this study we used DEA that is non parametric test

3.1 Data Envelopement Analysis (DEA)

DEA is a linear programming model used for evaluating the efficiency of particular Decision making units (DMU's) in this case the banks regarding to construct frontier develop by DEA over the data. It was first developed by Charnes, Cooper and Rhodes (1978) on the sample of nonprofit organization and later it was extended to the banking sector by Sherman and Gold (1985). The assumption of Charnes et al (1978) in their original paper was constant return to scale and their model was input oriented. Banker, Charnes, cooper (1984) proposed a variable to scale model. The former is suitable in the case where all DMU's are operating on optimal scale, which means that banks have obtained the economies of scale. But normally DMU's in this case the banks are not normally operating on optimal scale due to imperfect market, constrain regarding generating finances, government policies (Casu & Molyneux, 2003). In Pakistan, particularly the macro economic factors, like ups and downs in economy of the country, political destabilization, suddenly changing policies are some of constrains that make hurdles for the banks to achieve economies of scale. For Pakistani banks it is

necessary to evaluate their efficiency both under constant return to scale and variable return to scale. Charnes et al (1978) multiple outputs and multiple inputs idea are based on Farrell (1957) in which he analyzed single output and single input of firm. DEA treated input orientation and output orientation of a particular decision making unit.

On the foundation of coelli (1996), under input oriented model, suppose there are N DMU's producing L outputs by utilizing P inputs. Suppose x_i and y_i are representing the vectors of i-th bank. For this X is the input matrix for P*N and Y is output matrix for L*N. DEA measures the maximum ratio observed weighted of outputs to observed weighted inputs subject to constraint. The ratios of all other banks are less or equal to 1 representing DEA in ratio form. It is actually the ratio of output and input $\omega y_i / \upsilon X_i$ in the equation ω and υ

is the output and input weights. But for the optimal weights we used the linear programming technique i-e.

$$\max_{\omega,\upsilon} \left(\omega y_i / \upsilon X_i \right)$$

$$\text{st} \quad \omega y_j / \upsilon X_j \leq 1, \, j = 1,2,3,\ldots\ldots,N \qquad (1)$$

$$\omega, \upsilon \geq 0$$

This equation is used for the purpose to find the value of output and input weights of particular i-th DMU. This means to maximize the efficiency of particular DMU under certain constraint that the value of efficiency for particular DMU is not greater than 1 and the weights must greater or equal to 0. Despite its, strength it has a limitation that it gives infinite solution for the problem. To solve this problem Coelli et al (1998) suggested another restriction that $\upsilon X_i = 1$

$$\max\nolimits_{\acute{u},\upsilon}(\acute{u}\,y_i)$$

st $\qquad\qquad\upsilon X_i = 1$

$$\acute{u}y_j - \upsilon X_j \leq 0,\, j = 1,2,3\ldots\ldots, N \qquad\qquad (2)$$

$$\acute{u},\upsilon \geq 0$$

Where the notation for $\acute{\omega}, \acute{\upsilon}$ is changed to $\acute{u}$ and υ respectively and shows transformation.

This is named as multiplier form of linear programming as suggested by coelli et al (1998).

Coelli (1996) suggested the duality in linear programming based on Farrell (1957). The duality form for this problem is as follows.

$$\min\nolimits_{\theta,\lambda}\theta,$$

st $\qquad -y_i + Y\lambda \geq 0$

$$\theta x_i - X\lambda \geq 0 \qquad\qquad (3)$$

$$\lambda \geq 0$$

Here θ is Scalar while λ is vector for constants. This form had fewer constraints than previous one. Where the value of θ is efficiency score and it is necessary for to satisfy the condition of $\theta \leq 1$. The value of θ indicates score of efficiency for individual banks multiplier form has more hurdles and constraints than this form.

Banker et al (1984) extended the CRS model and proposed the VRS model. This assumption CRS is suitable for the banks at that situation when all banks are operating at optimal point means all banks avail economies of scales. But in the real situation and especially in Pakistani point of view this situation is very difficult Thus firms today, in dynamic world face increasing or decreasing economies of scale. In such situation the

efficiency scores were normally contaminated with scale efficiency (Sufian, 2007). So many

other studies like (Miller & Noulas, 1996; Burki & Niazi, 2006; Akmal & Saleem, 2008;

Pasiouras, 2006; Atuallah et al., 2004; Atuallah & le, 2006)

. VRS is the extended part of CRS Dual model, which is modified and its

mathematical form is as follows.

$$\min_{\theta, \lambda} \theta,$$

$$\text{st} \quad -y_i + Y\lambda \geq 0$$

$$\theta x_i - X\lambda \geq 0 \qquad (4)$$

$$\acute{N}\lambda = 1$$

$$\lambda \geq 0$$

$\acute{N}$ shows the categorization of matrix having ones. It represents in the form of N*1 VRS

tight the envelope more than CRS. This new constrain ensures that inefficient firms is only

benchmarked with the firm of similar size.

Further we are interested in scale efficiency. If TE under CRS is equal to TE under

VRS than it means that there is no scale inefficiency and overall technical inefficiency is due

to pure technical inefficiency. So

$$Scale\ effeciency = \frac{TE\ under\ CRS}{TE\ under\ VRS}$$

If the value of scale efficiency is one it means that overall technical inefficiency is due

pure technical inefficiency. Further we want to find that either banks are operating at IRS or

DRS, for this Coelli (1996) proposed mathematical form.

$$\min_{\theta, \lambda} \theta,$$

$$\text{st} \quad -y_i + Y\lambda \geq 0$$

$$\theta x_i - X\lambda \geq 0$$

$$\acute{N}\lambda \leq 1$$

$$\lambda \geq 0$$

If the value of TE under CRS and TE VRS are equal it means that bank is operating at constant return to scale. If both values are not same then compare the value from VRS with a value $\acute{N}\lambda$ TE if both are unequal then banks are operating at IRS and if both are equal than bank are operating at DRS (Fare et al., 1985b)

3.2 Anticipated Design

According to our literature various models of efficiency are measured by different researchers in their studies, (Ataullah et al, 2004) found technical efficiency under loan based approach and income based approach. In the same way Pasioras (2006) found the technical and scale efficiency of Greek commercial banks under five different models.

Here we measured the efficiency of Islamic and conventional banks in Pakistan under three different models.

Model-1, Conventional and Islamic banks are considered as a decision making units that want to minimize their inputs to obtain the same level of outputs. In this specification both Islamic and conventional banks are considered to perform intermediator function to mobilize funds from surplus units to deficit units, that is from depositor to lender or investor

MODEL-2, under this model both conventional and Islamic banks act as cost minimizer an objective to minimize their cost for obtaining specified amount of output.

Model – 3, in this model both conventional and Islamic banking has a purpose to achieve more output with given level expenditure.

3.2.1 Tobit Model

Tobit model is developed by (Tobin, 1958) which is appropriate when the dependent variable is in proportion or in percentage form. This model is appropriate when the value is between the two limits e.g 0 and 1. That's why it is appropriate model for determinants of efficiency because the value of efficiency lies between 0 and 1.

3.2.2   Model-1

Technical Efficiency and its Determinants

As technical efficiency have two types; technical efficiency by input side and technical efficiency by output side. Input side technical efficiency is defined as that banks obtain same outputs by marginal decreasing its inputs. In same context output oriented technical efficiency is that banks have marginal increasing their outputs with same amount of inputs. This type of efficiency was found by various researchers like (Batchelor & wadud., 2004 ; Yudistra, 2003; Brown & Skully, 2005 ; Sufian, 2006 ; Pasioras, 2006; Burki & Niazi, 2006; Burki & Niazi, 2003).

This specification technical efficiency is calculated under both constant return to scale and variable return to scale. In this study we take investment and advances plus loans as output. Total loan as output is used by (Hassan et al., 2009; Sufian, 2006; Yudishtra, 2003; Ayadi et al., 1998; Sathye, 2000) loans and advances are taken as output by Sathye (2001). Investment are taken as output by researchers in their studies like (Haung & Wang, 2002) while loan plus advances and investment are taken as output by (Akhtar, 2002). While the inputs for this study is number of employees, operating fixed asset and deposits plus borrowing from other financial institutions.

Pasiouras (2006) used fixed assets, customer deposits plus short term funding and number of employees as inputs. In the same way Ahmad &Gill (2007a); Ahmad & Ahmad (2007) used number of employees, operating fixed asset, bills payable and borrowing from financial institutions as input for this specification.

To determine the effect of various factors on the efficiency score various quantitative and qualitative variables are taken for this study. Quantitative factors are the size of banks for which the natural log of total assets are taken , total liabilities , total markup revenue that bank earned , total non markup revenue that banks earned, total markup expenses and total non markup expenses incurred by the banks. The qualitative variable is the ownership structure of the bank. For this Tobit regression model are used.

$$Y_{it} = \beta_0 + \beta_1 \ln TA_{it} + \beta_2\, TL_{it} + \beta_3\, TMR_{it} + \beta_4 TNMR_{it} + \beta_5 TME_{it} + \beta_6 TNME_{it} + \beta_7\, D\, Foreign_{it} + \beta_8 D\, local_{it} + \mu_{it}$$ (4.1)

Y_{it} = Technical efficiency obtained by i-th bank in time t

TA_{it} = Total Assets of i-th bank in time t

TL_{it} = Total liabilities of i-th bank in time t

TMR_{it} = Total markup Revenue of i-th bank in time t.

$TNMR_{it}$ = Total Non markup revenue of i-th bank in time t.

TME_{it} = Total markup expenses that i-th bank incurred in time t.

$TNME_{it}$ = Total non markup expenses that i-th bank incurred in time

D $Foreign_{it}$ = 1 if i-th bank in time has foreign ownership otherwise 0.

D local$_{it}$ = 1 if i-th bank in time t has local ownership otherwise 0.

Whereas Betas are slope or parameters in the Tobit regression model.

For technical efficiency input oriented under VRS and micro economic factors is obtained by replacing the technical efficiency score under CRS by VRS score in model 4.1.

In the same way we obtain determinants of scale efficiency once again replacing the dependent variable by scale efficiency score under input oriented.

3.2.3 Model-2

Cost Efficiency and its Determinants

Technical efficiency is define as to obtain the same output with marginal decrease in its inputs while allocative efficiency is that banks utilize their inputs in optimal proportion . Cost or sometimes called economic efficiency is that the banks are both technically and allocatively efficient. For cost efficiency prices of inputs are used. We measured cost efficiency under constant return to scale and variable return to scale.

For this specification the prices of inputs are used along with inputs. Here the price of employees is obtained by dividing the administration cost incurred by the i-th bank in time t by number of employees that i-th bank have in particular time t

$$Price\ of\ employees = \frac{Administration\ expenses}{Number\ of\ employees}$$

This type of price of employees is found by various researchers like (Sathye, 2000; Ahmad & Gill, 2007a; Akhtar, 2002).

The price of second input that is operating fixed asset is obtained by dividing non markup interest expenses incurred by i-th bank in time t by total value of operating fixed asset of i-th bank in time t.

$$Price\ of\ operating\ fixed\ asset = \frac{Non\ markup\ interest\ Expenses}{Operating\ fixed\ Asset}$$

This type of price of operating fixed asset is found by (Isik & Hassan, 2002)

The price of third variable that is Deposits & Borrowing from another financial institution is obtained by dividing interest expenses incurred by i-th bank in time t by the total value of deposits &borrowing that i-th bank in time t from another financial institution.

$$Price\ of\ Deposits\ \&\ borrowing = \frac{Interest\ expenses}{Value\ of\ Deposits\ \&\ Borrowing}$$

This type of price of Deposits & borrowing from another financial institution is found by researchers like (Isik & Hasan, 2002) found interest expenses divide by value of deposits.

(Akhtar, 2002) found the price of deposits by dividing interest expenses by value of deposits.

To determine the effect of different endogenous and exogenous variables on cost efficiency and allocative efficiency under CRS and VRS are considered both quantitative and qualitative variables are considered. Quantitative variables in this specification are total profit, size of the firm, total liabilities and on qualitative side is the ownership structure. For this Tobit regression model are used.

$Y_{it} = \beta_0 + \beta_1 \ln TA_{it} + \beta_2 TL_{it} + \beta_3\ total\ profit_{it} + \beta_6 TNME_{it} + \beta_7 D\ Foreign_{it} + \beta_8 D\ local_{it}$

$+ \mu_{it}$ (4.2)

Y_{it} = Cost efficiency obtained by i-th bank in time t

TA_{it} = Total Assets of i-th bank in time t

TL_{it} = Total liabilities of i-th bank in time t

$TProfit_{it}$ = Total Profit of i-th bank in time t.

$D\ Foreign_{it}$ = 1 if i-th bank in time has foreign ownership otherwise 0.

$D\ local_{it}$ = 1 if i-th bank in time t has local ownership otherwise 0.

Where, Betas are slope or parameters in the Tobit regression model.

This model is modified for income efficiency under VRS and for scale efficiency.

3.2.4   Model-3

Income Efficiency and its Determinants

Under this specification, income efficiency is measured under both CRS and VRS. Basically income efficiency is that a particular DMU obtains more income or revenue by utilizing the same level of expenses. This type of efficiency is measured by (Pasiouras, 2006; Atuallah & le, 2006; Atuallah et al, 2004).

The inputs and outputs for this specification is that only those variables are considered that measure the earning side of commercial banks, like interest and noninterest revenues while the inputs are interest and non interest expenses (Ahmad & Gill, 2007; Jaffry et al., 2005).

Tobit regression is used to determine the impact of different variables on income efficiency score under CRS and VRS. For this equation 4.2 is modified. Cost efficiency score is replaced by income efficiency score.

CHAPTER 4

RESULT AND DISCUSSION

4   Results and Discussion

4.1   Model-1 Technical Efficiency

Under this specification technical efficiency of Pakistani commercial Banks under CRS & VRS is investigated for years 2001 to 2008. Yearly basis efficiency is investigated by using that year's inputs and outputs of the commercial banks.

For 2001 total banks taken were 36, out of which one was Islamic Bank, 14 were foreign banks and 21 were local banks. For year 2002 number of banks for estimating frontier were 34 out of which two were full fledged Islamic banks, 11 were foreign conventional banks and 21 were local conventional banks. In the year 2003 total 34 banks were taken 2 were Islamic, 10 were foreign and 22 were local banks.   In 2004 total 35 banks out of which 2 were Islamic, 10 were foreign and 23 were local banks. In 2005 total 33 banks were taken, 2 were Islamic, 8 were foreign conventional banks, and 23 were local conventional banks. In 2006 total 34 banks were taken, out of which 4 banks were Islamic, 5 banks were conventional foreign banks while 25 banks were conventional local banks. In 2007 total 34 banks were taken out of which 6 were full fledged Islamic banks, 4 were conventional foreign banks and 24 were local conventional banks. In 2008 the arrangement of banks were same as 2007.

Under CRS, VRS and Scale efficiency score is shown in table 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8.

4.1.1 Technical Efficiency Under CRS

For the year 2001 table 1.1 depicts that seven banks were efficient under CRS input oriented. Out of which one was local bank and six were foreign banks. Similarly the summary of efficient banks from year 2002 to 2008 is as follows.

➢ For year 2002 table 1.2 depicts that five banks were fully efficient and all of them were foreign banks under CRS.

➢ For year 2003, eight banks under CRS were efficient (one Islamic, five foreign, two local).

➢ For year 2004, nine banks were efficient (four local & five foreign).

➢ For year 2005, eight banks were efficient (three foreign and five local)

➢ For year 2006, ten banks were efficient (five foreign and five local)

➢ For year 2007, eight banks were efficient (one Islamic, three foreign and four local)

➢ For year 2008, six banks were efficient (two foreign and four local).

For year 2001 the most technical inefficient bank under CRS was, My bank Ltd with calculated technical efficiency of .304. This bank could have achieved the efficient point on frontier if it had reduced its inputs achieving same level of outputs by 69.6%. In 2002 My bank Ltd was inefficient bank with calculated score of .305 and diverged from efficient point by 69.5%. While Meezan Bank Ltd was inefficient bank among Islamic banks with calculated efficiency score of .735 and diverged from efficient point by 26.5%. In 2003 My bank Ltd was once again inefficient bank under CRS with calculated efficiency score of .27. This bank could have achieved the efficient point if it had reduced its current utilized inputs by 73%. While Al Baraka Islamic Bank B.S.C. (E.C) was inefficient bank among Islamic banks with calculated efficiency score of .63 and diverged from efficient point by 37%. In 2004 My bank Ltd was inefficient among all banks with

Bank B.S.C. (E.C) was inefficient Islamic bank with calculated efficiency score of .784

and was diverge from efficient point by 21.6%. In 2006 Crescent Commercial Bank Ltd

and Samba Bank Limited were inefficient banks with technical efficiency scores of .441.

They both were diverging from efficient point by 55.9%. Bank Islami Pakistan Ltd was

inefficient Islamic bank among Islamic banks sample with calculated technical efficiency

of .447 and was far from efficient point by 55.3%. In 2007 Bank Alfalah Ltd was

inefficient bank with calculated efficiency score of .665 and if this bank was capable to

reduce its current utilized inputs by 33.5% it would be able to attained the efficient score

for this year. While Dubai Islamic Bank Pakistan Ltd was inefficient bank among Islamic

banks sample with calculated efficiency score of .703 and was far from efficient point by

29.7%. In 2008 Dawood Islamic Bank Ltd was inefficient among all banks in sample with

calculated score of .681 and deviated from efficient point by 31.9%. Further we

graphically represented the percentage of efficient banks of both streams Islamic banks

and Conventional banks. The percentage of efficient banks is presented at Y axis and

number of years are presented at X axis.

Figure 2.1 Line graph of Technical Efficiency under CRS
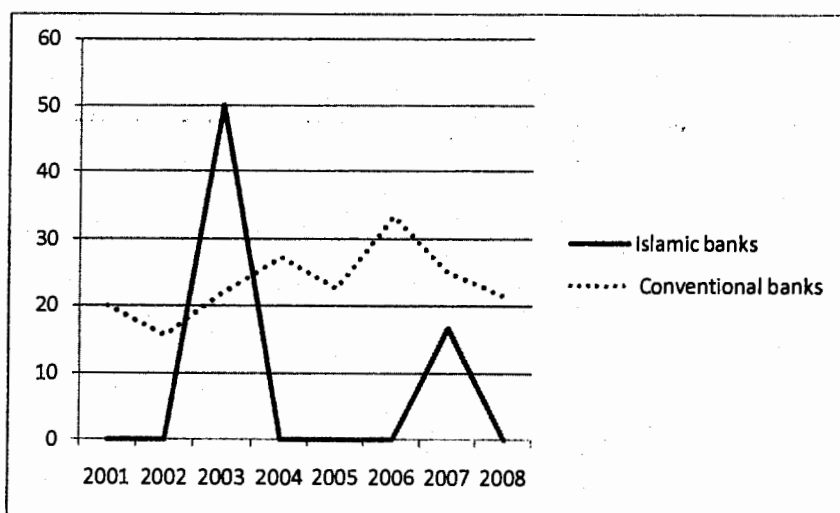
Figure 2.1 depicts that percentage of efficient Islamic banks are less than conventional banks, except in year 2003. The percentage of efficient conventional banks is somehow consistent because the conventional banks have a very long history.

4.1.2 Technical Efficiency under VRS

For the year 2001 table 1.1 depicts that seventeen banks were efficient under VRS input oriented. Out of which seven were local banks and ten were foreign banks. Similarly the summary of efficient banks from year 2002 to 2008 is as follows.

➤ For year 2002 table 1.2 depicts that Sixteen banks were fully efficient (eight local, eight foreign) under VRS.

➤ For year 2003, Sixteen banks under VRS were efficient (one Islamic, seven foreign, eight local).

➤ For year 2004, nineteen banks were efficient (twelve local & seven foreign).

➤ For year 2005, seventeen banks were efficient (seven foreign and ten local)

➤ For year 2006, fifteen banks were efficient (two Islamic, three foreign and ten local)

➤ For year 2007, seventeen banks were efficient (two Islamic, three foreign and twelve local)

➤ For year 2008, fourteen banks were efficient (one Islamic, two foreign and eleven

point by 69%. While Meezan Bank Ltd was inefficient bank among Islamic banks with calculated efficiency score of .746 and diverged from efficient point by 25.4%. In 2003, My bank Ltd was once again inefficient bank under CRS with calculated efficiency score of .27 same under CRS result. This bank could have achieved the efficient point if it had reduced its current utilized inputs by 73%. While Al Baraka Islamic Bank B.S.C. (E.C) was inefficient bank among Islamic banks sample with calculated efficiency score of .664 and diverged from efficient point by 33.6%. In 2004 My bank Ltd was inefficient among all banks with calculated efficiency of .347 and deviated from efficient point by 65.3%. This result was also same as under CRS result. Among Islamic Banks, Meezan Bank Ltd was inefficient bank with estimated efficiency score of .724 and deviated from efficient point by 27.6%. In 2005 Crescent Commercial Bank Ltd and Samba Bank Limited were inefficient banks with estimated efficiency scores of .462 and were far from efficient point by 53.8%. Among Islamic banks samples, Meezan Bank Ltd which replaced Albaraka bank which was inefficient under CRS for this year was inefficient Islamic bank with calculated efficiency score of .818 and diverged from efficient point by 18.2%. In 2006 Crescent Commercial Bank Ltd and Samba Bank Limited were inefficient banks with technical efficiency scores of .449. They both were diverged from efficient point by 51%. Dubai Islamic Bank Pakistan Ltd which replaced Bank Islami Pakistan Ltd which was inefficient bank among Islamic banks, under CRS but under VRS it was fully efficient. So under VRS Dubai Islamic Bank Pakistan Ltd was inefficient Islamic bank among Islamic Banks sample, for 2006 with calculated

bank among convention banks with calculated efficiency score of .835 and was far from efficient point by 16.5%. In 2008 Dubai Islamic bank which replaced the Dawood Islamic Bank Ltd which was inefficient among all banks in sample under CRS. So for year 2008 Dubai Islamic bank was most inefficient bank under VRS assumption with calculated score of .732 and deviated from efficient point by 26.8%.

Further we are representing the percentage of efficient banks of both banking streams under VRS assumption from years 2001 to 2008. The percentage of efficient banks are presented at Y axis while number of years are presented at X axis.

Figure 2.2 Line graph of Technical Efficiency under VRS
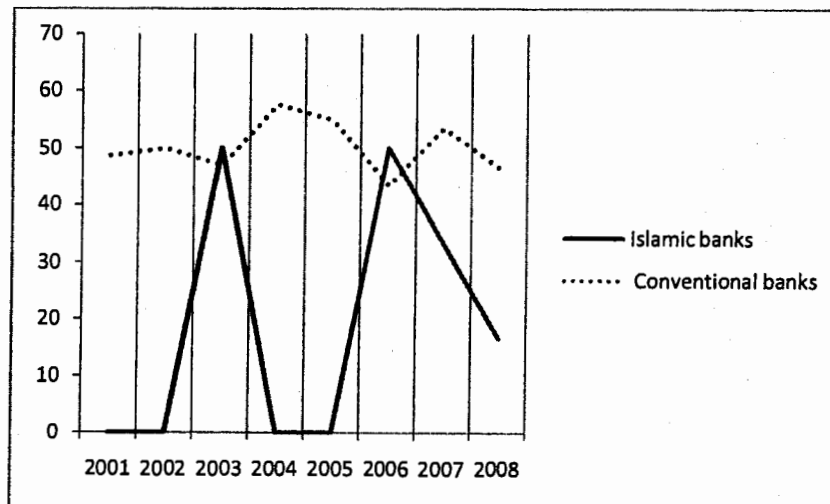
4.2   Model-2 Cost efficiency

Cost efficiency for each year is estimated by using separate cost frontier for each year. The prices of inputs are used for this estimation for each individual bank.

4.2.1   Cost Efficiency Under CRS

Cost efficiency under CRS is estimated for the years 2001 to 2008 and the results are presented in tables 2.1 to 2.8 respectively. For the year 2001, four banks were efficient and they were all foreign banks. My bank Ltd in this year carried the lowest score of .202 and if it had reduced its cost of inputs by 75.6% it would have attained the efficient point on frontier. Similarly

> ➤ For year 2002 four banks were efficient and they all were foreign conventional banks.

> ➤ For year 2003 one bank was efficient and that was foreign bank.

> ➤ For year 2004 six banks were fully efficient and among them one was local and five were foreign conventional banks.

> ➤ For year 2005 five banks were efficient that were two local and three foreign conventional banks.

> ➤ For year 2006 four banks were efficient that were three local and one was foreign conventional bank.

The most inefficient bank for 2002 was My bank Ltd with calculated efficiency score of .208. This means that if My bank Ltd had properly utilized its cost of inputs and was able to reduce its cost by 79.2% that could have enabled it to attain efficient point for year 2002. The allocative efficiency of this bank was .682 and technical efficiency was .305 which indicates that technical inefficiency was main contributor as compared to allocative inefficiency for overall cost inefficiency. Meezan bank Ltd was the inefficient bank among Islamic banks with calculated score of .55 and it could have attained efficient point on frontier if it had reduced its cost by 45%. The allocative efficiency of this bank was .748 and technical efficiency was .734 which depicts that both allocative inefficiency and technical inefficiency were main causes of overall inefficiency. The most inefficient bank for 2003 was My bank with calculated score of .096 indicating that it had underutilized its cost by 90.4%. The allocative efficiency of .356 and technical efficiency was .274, for this bank indicated that both technical and allocative inefficiencies were main contributors of overall cost inefficiency in 2003. Similarly in 2003, Al Baraka Islamic Bank B.S.C. (E.C) was inefficient Islamic bank among Islamic banks sample, with efficiency score of .229. This bank underutilized its cost by 77.1%. The allocative efficiency score for this bank was .364 and technical efficiency was .63 which indicates that allocative inefficiency was main contributor than from technical inefficiency for overall cost inefficiency but overall both inefficiencies were causes of overall inefficiency. Once again, in 2004, the most inefficient bank was My bank Ltd. With estimated efficiency score of .223. It was unable to reduce its cost of inputs

The allocative efficiency score of .734 and technical efficiency of .719 indicates that overall cost inefficiency was due to both technical and allocative inefficiency; In 2005 My bank Ltd was once again the most inefficient bank among all the banks in the sample with Meezan bank standing as inefficient bank among Islamic banks. However, the scores were better as compared to 2004.In 2006. The results slightly changed as four Islamic banks were inefficient. These banks were Dubai Islamic Bank Pakistan Ltd, Meezan Bank Ltd, Bank Islami Pakistan Ltd and Al Baraka Islamic Bank B.S.C. (E.C). Al Baraka Islamic Bank B.S.C. (E.C) was the most inefficient bank in this year with calculated score of .2. If this bank had reduced its inputs cost by 80%, it could have attained the efficient point on the efficient frontier. The technical efficiency was .992 and allocative efficiency was .202 for this bank, which indicated that overall cost inefficiency was mainly due to allocative inefficiency. Among conventional banks, Crescent Commercial Bank Ltd was inefficient bank with estimated score of .367, deviated from efficient point by 63.3%. The allocative efficiency of .831 and technical efficiency was .441 for Crescent bank Ltd indicates that cost inefficiency was mainly due to technical inefficiency. However it was better than most Islamic banks as all of the above mentioned Islamic banks performed inefficiently under CRS. Year 2007 saw the entry of two new Islamic banks, namely Dawood Islamic Bank Ltd and Emirates Global Islamic Bank Ltd. In whole sample of 2007, Dubai Islamic Bank Pakistan Ltd appeared as the most inefficient bank with calculated efficiency score of .213.indicating a deviation of 78.7% from efficient point. The allocative efficiency score was .303 and technical efficiency .703,

most inefficient banks in whole sample and Dubai Islamic Bank Pakistan Ltd with estimated efficiency score of .342 appeared as the most inefficient bank in the sample. It indicated a deviation of 65.8% from the efficient point. The allocative efficiency of .498 and technical efficiency .687 buttressed the fact that cost inefficiency was due to both allocative and technical inefficiency.

Further to present the percentage of cost efficient banks of both streams under CRS we used graphical representation. From the graphic 2.3 we infer that no Islamic bank had achieved efficient point on the cost frontier. Further the percentage of efficient banks on conventional side was also at low level. This means that Pakistani banks had not achieved efficient point on the frontier. Islamic banks cost inefficiency was due to allocative inefficiency means Islamic banks had not properly used their input mix.

Figure 2.3 Line graph of Cost Efficiency under CRS
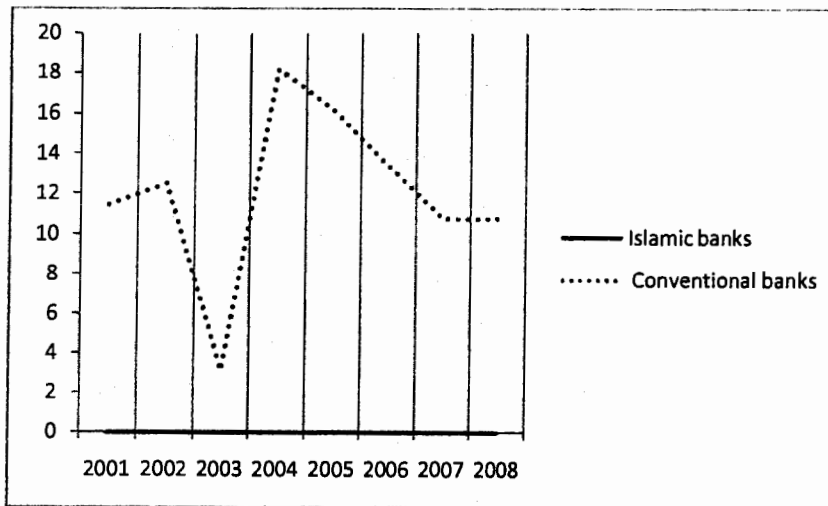
4.2.2 Cost efficiency under VRS

The results of cost efficiency under VRS are presented in table 2.1 to 2.8. In 2001 twelve banks were fully efficient out of which four were local conventional banks and eight were foreign conventional banks. Similarly

➢ In 2002 twelve banks were efficient out of which five banks were local conventional banks and seven banks were foreign conventional banks.

➢ In 2003 eight banks were efficient out of which four were local conventional banks and four were foreign owned conventional banks.

➢ In 2004 fourteen banks were fully efficient out of which nine banks were locally owned conventional banks and five banks foreign owned conventional banks.

➢ In 2005 nine banks were fully efficient out of which seven banks were locally owned conventional banks and two were foreign owned conventional banks.

➢ In 2006 nine banks were fully efficient out of which seven banks were local conventional banks, one was Islamic bank and two were foreign conventional banks.

➢ In 2007 seven were fully efficient out of which five were local conventional banks and two were foreign conventional banks.

➢ In 2008 five banks were fully efficient out of which four were local conventional

inefficiency as compared to allocative inefficiency contributed more to cost inefficiency. In 2002 My bank Ltd was once again most inefficient bank with calculated score .219 and deviated from efficient point by 78.1%. The allocative efficiency of this bank was .705 and technical efficiency was .31 indicating that overall cost inefficiency was mainly due to technical inefficiency. Al Baraka Islamic Bank B.S.C. (E.C) was inefficient bank among Islamic banks, with calculated score of .746 indicating that it deviated from efficient point by 25.4%. The allocative efficiency score of .937 and technical efficiency score .796 of this bank indicated that overall cost inefficiency was mainly from technical inefficiencies. In 2003 My bank Ltd was once again inefficient bank with calculated score of .116. This bank deviated from efficient point by 88.4%. The allocative efficiency score of .431 and technical efficiency score of .27 indicated that both technical and allocative inefficiencies were main causes of overall inefficiency of My bank Ltd. In Islamic banks, Al Baraka Islamic Bank B.S.C. (E.C) was inefficient score with estimated efficiency score .304 and was dived from efficient point by 69.6%. The allocative efficiency of .459 and technical efficiency score of .664 depicted that both technical and allocative inefficiencies were contributors of overall cost inefficiency but allocative inefficiency contributed more than technical inefficiency to overall cost inefficiency. In 2004 My bank Ltd was once again inefficient bank. Meezan Bank Ltd was inefficient bank among Islamic banks with calculated efficiency score of .528. This bank could have reduced its cost of inputs by 47.2%. It would have been able to attained the efficient point. The allocative efficiency score of .73 and technical efficiency score of .724

inefficiency instead of technical inefficiency. While Al Baraka Islamic Bank B.S.C. (E.C) was most inefficient bank with calculated inefficiency score of .308 and was far from efficient point by 69.2%. The calculated allocative efficiency of .308 and technical efficiency score of 1 indicates that overall cost inefficiency was solely due to allocative inefficiency. On conventional side the Crescent Commercial Bank Ltd was inefficient bank with calculated efficiency score of .449 and allocative efficiency score was .917 and technical efficiency score was .49. The results were different from Islamic banks in this year because technical inefficiency was the main contributor of overall inefficiency instead of allocative inefficiency. In 2007, the three Islamic banks (Dubai Islamic Bank Pakistan Ltd, Meezan Bank Ltd, Al Baraka Islamic Bank B.S.C. (E.C)) were again the most inefficient banks and allocative inefficiency was main contributor of this overall inefficiency. On conventional side the Crescent Commercial Bank Ltd was inefficient bank but it was better than all three Islamic banks as their inefficiency was due to technical inefficiency instead of allocative inefficiency. In 2008 Barclay Bank Plc was inefficient bank on conventional side with second last position in inefficient banks in 2008 with estimated efficiency score .43 and was far from efficient point by 59.6%. The allocative efficiency score of .43 and technical efficiency score of 1 indicated that allocative inefficiency score was sole contributor in overall cost inefficiency. Dubai Islamic Bank Pakistan Ltd was inefficient bank in whole sample of 2008 with calculated efficiency score .404. The allocative efficiency score .553 and technical efficiency score of .734 indicate that both allocative and technical inefficiencies

Figure 2.4 Line graph of Cost Efficiency under VRS
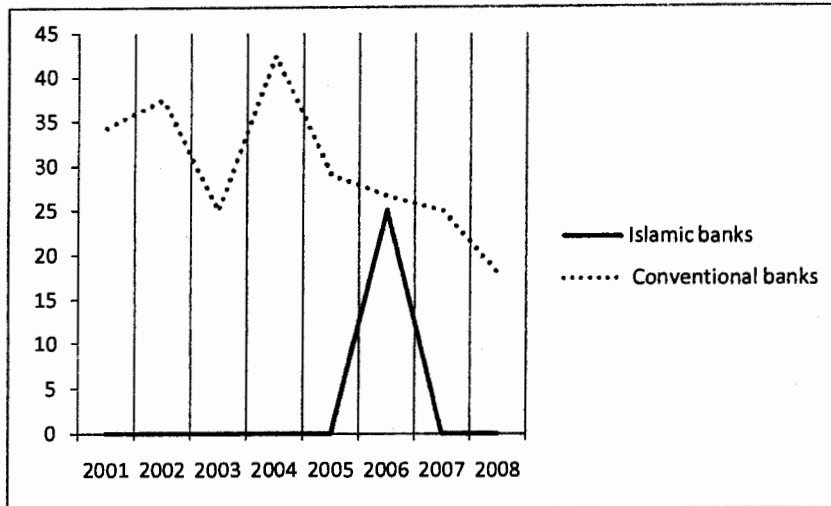
The result had little bit changed under VRS assumption as compared to CRS assumption. Under this assumption Islamic banks had better position in 2006. This means that these banks that were inefficient under CRS and efficient under VRS had a problem of scale inefficiency.

4.3   Model-3 Income Efficiency

Income efficiency of each individual bank is calculated under this specification both under CRS and VRS assumption. The revenue side of the banks is used for this specification. Interest and noninterest revenues are taken as output, while interest and non interest expenses are taken as input for this study.

4.3.1 Income Efficiency under CRS

inputs of financial and non financial expenses, it was able to attain the efficient point similarly.

- ➢ In 2002 five banks were efficient that were three local two foreign conventional banks.

- ➢ In 2003 five banks were efficient that were three local and two foreign conventional banks.

- ➢ In 2004 four banks were efficient that were two local and two foreign conventional banks.

- ➢ In 2005 seven banks were efficient that were five local and two foreign conventional banks.

- ➢ In 2006 seven banks were efficient that were four local, one Islamic, two foreign conventional banks.

- ➢ In 2006 five banks were efficient that were two local, one Islamic and two foreign conventional banks

- ➢ In 2007 six banks were efficient that were four local and two foreign conventional banks were the most efficient banks from the year 2002 to 2008.

Dubai Islamic Bank Pakistan Ltd was efficient Islamic bank in 2006; Emirates Global

Global French Bank was most inefficient bank. If this bank was capable to increase its financial and non financial revenue by 79.3% with same level of inputs, It could have been able to attain the efficient point on frontier. Meezan Bank Ltd was inefficient bank among Islamic banks with estimated score of .478 and diverged from efficient point by 52.2%. In 2004 Crescent Commercial Bank Ltd and Samba Bank Limited were inefficient banks with estimated score of .313 and diverged from efficient point by 68.7%. Among Islamic banks, Al Baraka Islamic Bank B.S.C. (E.C) was inefficient with calculated score of .427 and differed from efficient point by 57.3%. In 2005 Crescent Commercial Bank Ltd and Samba Bank Limited were inefficient banks with calculated score of .296 and deviated from efficient point by 70.4%. In Islamic banks sample, Meezan Bank Ltd was inefficient bank with calculated efficiency score of .676 and was far from efficient point by 32.4%. In 2006 Crescent Commercial Bank Ltd and Samba Bank Limited were inefficient banks with calculated efficiency scores of .167 and diverged from efficient point by 83.3%. Bank Islami Pakistan Ltd was inefficient bank among Islamic banks sample, with calculated efficiency score of .633 and was far from efficient point by 36.7%. In 2007 Atlas Bank Ltd was inefficient bank with calculated efficiency score of .269 and differed from efficient point by 73.2%. Dubai Islamic Bank Pakistan Ltd was inefficient bank among Islamic banks sample, with calculated efficiency score of .504 and diverged from efficient point by 49.6%. In 2008 The Bank of Punjab was inefficient bank with calculated efficiency score of .318 and this efficiency could have been converted in to efficiency if this bank was proficient to increase

Further graphical representation of percentage of efficient banks is given as follow. The percentage of efficient banks are shown at Y axis and number of years are shown at X axis.

Figure 2.5 Line graph of Income Efficiency under CRS
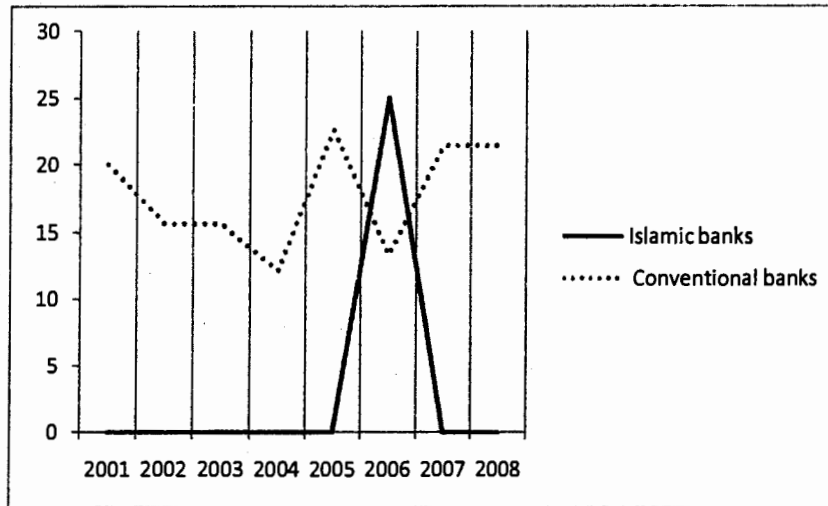
From the graph we infer that percentage of efficient banks belonging to both banking streams were low under CRS assumption. In comparison number of efficient banks from conventional banks were high than Islamic banks. This is because many conventional banks had very high operations and high goodwill in the eye of customers. Conventional banks have opportunities to make high income spreads as compared to Islamic banks. Further, the conventional banks comprised of local conventional banks and foreign conventional banks. Foreign conventional banks have high goodwill in the eyes of customers.

4.3.2   Income efficiency under VRS

Income efficiency under VRS is calculated from year 2001 to 2008 and their results are presented under VRS column in table 3.1 to 3.8 respectively. In 2001 fourteen banks were efficient in which ten were local owned banks, one was Islamic bank that is Al Baraka Islamic Bank B.S.C. (E.C) and three were foreign owned banks, in this year Doha Bank Ltd

was the most inefficient bank with calculated efficiency score .288 which was below from efficiency score by 71.2.

> For year 2002 twelve banks were efficient eight were local and four were foreign banks

> For year 2003 seven banks were efficient five were local and two were foreign banks,

> For year 2004 nine banks were efficient five were local and four were foreign conventional banks.

> For year 2005 fourteen banks were efficient eleven were local, one was Islamic and two were foreign banks

> For year 2006 ten banks were efficient seven were local, one was Islamic and two were local banks

> For year 2007 nine banks were efficient five wee local, two were Islamic and two were foreign banks,

> For year 2008 ten banks were efficient eight were local and two were foreign banks were the efficient banks from 2002 to 2008.

In 2001 Doha Bank Ltd was the most inefficient bank with calculated efficiency score of .288. This bank deviated from efficient point by 71.2%. In 2002 KASB Bank Ltd was most inefficient bank with calculated efficiency score of .555, this was far from efficient point by 44.4%. While Al Baraka Islamic Bank B.S.C. (E.C) was inefficient bank among Islamic banks for the year 2002, with calculated efficiency score of .864 and diverged from efficient point by 13.6%. In 2003 Credit Agricole Indosuez The Global French Bank was the most inefficient bank under VRS with calculated efficiency score of .228 and diverged from efficient point by 77.2%. Meezan Bank Ltd was inefficient bank among Islamic banks sample for the year 2003, with calculated score of .49 and was diverged from efficient point by 51%. In 2004 Crescent Commercial Bank Ltd and

Samba Bank Limited were most inefficient banks with calculated efficiency scores of .319 and was differed from efficient point by 68.1%. Al Baraka Islamic Bank B.S.C. (E.C) was inefficient bank among Islamic banks sample for same year with calculated efficiency score of 53.6%. In 2005 Crescent Commercial Bank Ltd was inefficient bank with calculated efficiency scores of .333 diverged from efficient point by 66.7%. While Meezan Bank Ltd was inefficient bank among Islamic banks sample, with calculated efficiency score .685 and far from efficient point by 30.5%. In 2006 Crescent Commercial Bank Ltd and Samba Bank Limited were most inefficient banks with calculated efficiency scores of .167 and far from efficient point by 83.3%. While Bank Islami Pakistan Ltd with calculated efficiency score of .634 was inefficient bank among Islamic banks and far from efficient point by 36.6%. In 2007 Atlas Bank Ltd was inefficient bank with calculated score of.27 and was far from efficient point 73%. While Dubai Islamic Bank Pakistan Ltd with calculated efficiency score .513 was away from efficient point by 48.7%. In last 2008 Atlas Bank Ltd was most inefficient bank with calculated efficiency score of .355 and was below from efficient point by 64.5%. Al Baraka Islamic Bank B.S.C. (E.C) was inefficient bank among Islamic banks sample, with calculated efficiency score of .512% and diverged from efficient point by 48.8%.

Table 2.6 Line graph of Income efficiency under VRS
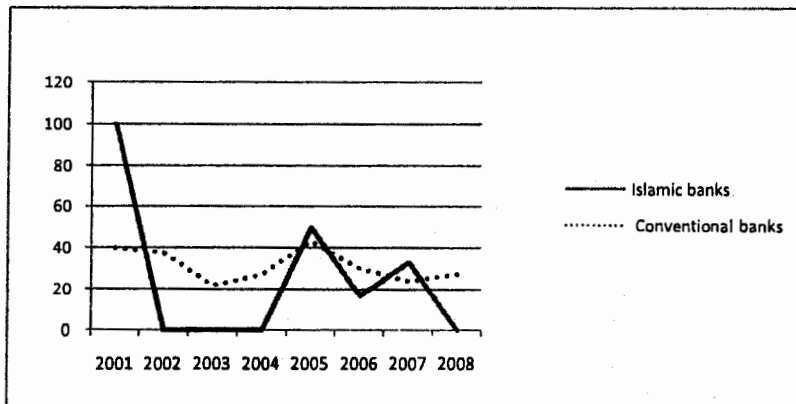
Descriptive Statistics

Table4:   *Comparison Between Conventional & Islamic Banks*

Conventional Banks Under CRS

	TE		AE		CE		IE	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	0.759	0.200	0.755	0.179	0.579	0.229	0.729	0.216

Islamic Banks Under CRS

	TE		AE		CE		IE	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	0.808	0.136	0.593	0.217	0.475	0.187	0.691	0.173

Conventional Banks Under VRS

TE		SE		AE		CE		IE		SE	
Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
0.884	0.170	0.863	0.160	0.853	0.161	0.762	0.225	0.788	0.220	0.929	0.114

Islamic Banks Under VRS

TE		SE		AE		CE		IE		SE	
Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
0.874	0.110	0.928	0.120	0.665	0.204	0.584	0.201	0.740	0.197	0.944	0.093

Note: TE, SE, AE, CE, CRS and VRS means Technical efficiency, Scale efficiency, Allocative efficiency, Cost efficiency, constant return to scale and Variable return to scale

Table 5: Comparing the efficiency between Islamic, Local and Foreign conventional bank under VRS

Local Conventional Banks

	TE		SE		AE		CE		IE		SE	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2001	0.803	0.214	0.804	0.178	0.828	0.124	0.673	0.230	0.921	0.116	0.981	0.021
2002	0.824	0.199	0.656	0.179	0.903	0.140	0.758	0.247	0.883	0.126	0.925	0.053
2003	0.786	0.229	0.799	0.195	0.694	0.253	0.570	0.312	0.764	0.193	0.923	0.110
2004	0.875	0.198	0.802	0.190	0.895	0.121	0.791	0.225	0.660	0.222	0.936	0.116
2005	0.863	0.176	0.899	0.140	0.911	0.079	0.793	0.201	0.858	0.179	0.909	0.163
2006	0.871	0.159	0.898	0.113	0.886	0.103	0.771	0.163	0.776	0.240	0.914	0.165
2007	0.945	0.065	0.889	0.094	0.807	0.137	0.765	0.153	0.765	0.237	0.901	0.136
2008	0.953	0.055	0.922	0.063	0.792	0.143	0.759	0.161	0.765	0.224	0.895	0.127
OAVG	0.867	0.176	0.837	0.167	0.839	0.157	.737	0.222	0.797	0.210	0.922	0.123

Islamic Banks

	TE		SE		AE		CE		IE		SE	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2001	0.875	0.000	0.939	0.000	0.917	0.000	0.802	0.000	1.000	0.000	0.995	0.000
2002	0.771	0.035	0.988	0.004	0.850	0.124	0.658	0.125	0.924	0.084	0.873	0.132
2003	0.832	0.238	0.975	0.035	0.498	0.055	0.421	0.165	0.745	0.361	0.988	0.018
2004	0.791	0.095	0.996	0.004	0.785	0.077	0.624	0.136	0.484	0.028	0.960	0.055
2005	0.841	0.033	0.944	0.051	0.813	0.056	0.685	0.073	0.848	0.216	0.939	0.047
2006	0.945	0.101	0.811	0.254	0.528	0.321	0.503	0.332	0.829	0.154	0.996	0.007
2007	0.898	0.121	0.957	0.060	0.648	0.230	0.598	0.253	0.751	0.210	0.961	0.061
2008	0.892	0.101	0.914	0.095	0.640	0.107	0.574	0.135	0.683	0.180	0.900	0.159
OAVG	0.874	0.109	0.928	0.119	0.665	0.203	0.584	0.201	0.740	0.197	0.944	0.092

Foreign Conventional Banks

	TE		SE		AE		CE		IE		SE	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2001	0.948	0.091	0.928	0.104	0.969	0.056	0.920	0.114	0.850	0.186	0.934	0.113
2002	0.945	0.115	0.913	0.109	0.933	0.092	0.889	0.170	0.816	0.170	0.938	0.070
2003	0.922	0.128	0.882	0.187	0.751	0.257	0.700	0.287	0.622	0.247	0.954	0.053
2004	0.882	0.208	0.971	0.054	0.901	0.134	0.800	0.244	0.675	0.298	0.943	0.087
2005	0.933	0.190	0.956	0.082	0.950	0.091	0.893	0.219	0.801	0.236	0.952	0.078
2006	0.857	0.224	0.980	0.044	0.902	0.132	0.780	0.265	0.707	0.341	0.978	0.050
2007	0.973	0.054	0.990	0.021	0.819	0.223	0.799	0.236	0.749	0.315	0.964	0.068
2008	0.979	0.036	0.907	0.121	0.751	0.239	0.735	0.239	0.884	0.141	0.978	0.044
OAVG	0.928	0.142	0.934	0.109	0.890	0.164	.830	0.128	0.762	0.243	0.949	0.078

Table 6: Comparing efficiency between Islamic, Foreign and Local Conventional Banks under CRS

	TE		AE		CE		IE	
Local conventional banks								
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2001	0.628	0.179	0.763	0.097	0.477	0.142	0.903	0.113
2002	0.52	0.144	0.769	0.09	0.4	0.119	0.817	0.129
2003	0.607	0.199	0.464	0.129	0.274	0.092	0.697	0.172
2004	0.687	0.201	0.841	0.101	0.586	0.214	0.605	0.181
2005	0.769	0.183	0.832	0.096	0.649	0.203	0.775	0.207
2006	0.78	0.156	0.833	0.137	0.649	0.181	0.695	0.234
2007	0.841	0.109	0.724	0.151	0.608	0.161	0.68	0.221
2008	0.879	0.075	0.686	0.138	0.604	0.152	0.676	0.207
OAVG	0.719	0.194	0.740	0.165	0.536	0.203	0.729	0.205
Islamic Banks								
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2001	0.822	0	0.91	0	0.747	0	0.995	0
2002	0.762	0.037	0.838	0.127	0.641	0.128	0.801	0.049
2003	0.815	0.262	0.432	0.096	0.365	0.192	0.739	0.369
2004	0.788	0.098	0.782	0.067	0.62	0.129	0.465	0.053
2005	0.793	0.013	0.838	0.094	0.664	0.064	0.791	0.163
2006	0.766	0.262	0.437	0.214	0.293	0.066	0.825	0.153
2007	0.856	0.103	0.517	0.243	0.449	0.235	0.717	0.183
2008	0.814	0.124	0.551	0.104	0.449	0.118	0.592	0.048
OAVG	0.808	0.135	0.593	0.216	0.475	0.187	0.691	0.173
Foreign Conventional Banks								
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2001	0.879	0.135	0.912	0.077	0.806	0.164	0.808	0.204
2002	0.864	0.158	0.917	0.094	0.8	0.201	0.766	0.176
2003	0.816	0.224	0.496	0.198	0.41	0.229	0.6	0.257
2004	0.857	0.211	0.824	0.185	0.71	0.264	0.63	0.273
2005	0.889	0.192	0.833	0.177	0.753	0.266	0.769	0.247
2006	0.847	0.244	0.811	0.136	0.69	0.253	0.692	0.345
2007	0.964	0.073	0.743	0.222	0.722	0.244	0.727	0.328
2008	0.888	0.133	0.696	0.266	0.615	0.271	0.866	0.156
OAVG	0.868	0.174	0.795	0.207	0.698	0.253	0.727	0.245

Note: CRS, TE, AE, CE and IE means Constant return to scale, Technical efficiency, Allocative efficiency, Cost efficiency

And Income efficiency respectively. SD means standard deviation. OVAG means overall average efficiency

4.4 Descriptive Statistics

In this part we will discuss about the descriptive statistics of efficiency scores and make a comparison between Islamic banks and conventional banks. Further, we will compare the results between Islamic banks, local conventional banks and foreign conventional banks.

4.4.1 Technical Efficiency Under CRS

Table 4 shows average efficiency score of Islamic banks, conventional local banks and conventional foreign banks under CRS, VRS and Scale assumptions. Islamic banks over all technical efficiency score under CRS were 0.808. While overall conventional banks efficiency under CRS was 0.759. We divide conventional banks on the basis of ownership in local banks and foreign banks. Table 6 shows that Local banks technical efficiency score under CRS was 0.719. Foreign banks technical efficiency score under CRS was 0.868. These results depicts that Islamic banks were technically more efficient than conventional banks. The result of conventional banks by parts shows that foreign banks were more efficient than local conventional banks. Our finding is same to (Akmal & Saleem, 2008; Burki & Niazi, 2003). On the other hand Islamic banks were more efficient than conventional local banks but were less efficient than conventional foreign banks.

The table 6 further indicates that under CRS assumption Islamic banks are more efficient than local conventional banks but less efficient than foreign conventional banks in years 2001, 2002, 2004, 2005 and 2007. In 2003 the result was little bit changed Islamic

4.4.2   Technical Efficiency Under VRS

Table 4 further indicates that Mean efficiency score of Islamic banks, under VRS assumption was less efficient with efficiency score 0.874 than from conventional banks efficiency score at 0.883. Table 5 indicates mean efficiency score under VRS on the basis of ownership. Result of table 5 show that foreign banks were more efficient with calculated mean efficiency score of 0.928 than conventional local banks with estimated efficiency score of 0.867 same to (Burki & Niazi, 2003) and from Islamic banks . Islamic banks were technically more efficient under VRS than conventional local banks. Local conventional banks is huge in operations and in large size so it efficiency increased under VRS.

Yearly results under VRS assumption, in table 5 indicate that Islamic banks were more efficient than local conventional banks but were less efficient than foreign conventional banks in years 2001, 2002 and 2003. Local conventional banks were more efficient than Islamic banks but were less efficient than foreign conventional banks in years 2005, 2007 and 2008 respectively. But in 2004 local conventional banks were more efficient than both Islamic banks and foreign conventional banks. On the other hand in 2006 Islamic banks were more efficient than both local and foreign conventional banks.

4.4.3   Scale Efficiency

Under scale efficiency specification, Islamic banks were more efficient with efficiency score of 0.928 than conventional banks scale efficiency score of 0.863. Table 5

inefficiency and not on scale inefficiency. The local conventional banks, inefficiency were mainly due to both technical and scale inefficiency but scale inefficiency contributed more.

Yearly results under scale specification Islamic banks were more efficient than both foreign and local conventional banks in the years indicate that 2001, 2002, 2003 and 2004 respectively. In 2005 and 2007 Islamic banks were more efficient than local conventional banks but less efficient than foreign conventional banks. The result was changed in 2006 because Islamic banks were less efficient than both local and foreign conventional banks. In 2008 Islamic banks were more efficient than foreign conventional banks but less efficient than local conventional banks.

4.4.4 Allocative efficiency under CRS

Table 4 also shows the allocative efficiency of both banking streams under CRS assumption. The Islamic banks were less allocative efficient with calculated efficiency score of 0.593 than conventional banks allocative efficiency score of 0.755. This means that Islamic banks were less efficient than conventional banks in allocation of their input choices. This was the main reason that Islamic banks were less cost efficient than conventional banks because Islamic banks were efficient than conventional banks in technical efficiency. To take further Information from table 6 we discovered that foreign conventional banks were more allocative efficient with calculated efficiency score of 0.795 than local conventional banks with score of 0.740, while local conventional banks were more allocative efficient than

banks had same efficiency scores under CRS. This means that difference in their cost efficiency in this particular year was due to technical inefficiency. In 2001 Islamic banks and foreign conventional banks had approximately same efficiency but both were more efficient than local conventional banks. In 2002 Islamic banks were more efficient than local conventional banks but were less efficient than foreign conventional banks.

4.4.5 Allocative Efficiency under VRS

Table 4 shows the allocative efficiency under VRS assumption. Where Islamic banks were less allocative efficient with calculated efficiency score of 0.665 than conventional banks with calculated efficiency score of 0.853, so allocative efficiency was the major cause of Islamic banks cost inefficiency in comparison with conventional banks. Table 5 also shows the efficiency score of local conventional banks, Islamic banks and foreign conventional banks. Foreign conventional banks were more allocative efficient with calculated efficiency score of 0.890 than local conventional banks allocative efficiency score of 0.839 and both were more allocative efficient than Islamic banks.

To investigate yearly information table 5 further shows that local conventional banks were more allocative efficient than Islamic banks but were less allocative efficient than foreign conventional banks in years 2001 to 2007. In 2008 local conventional banks were more allocative efficient than foreign conventional banks and both were less allocative efficient than Islamic banks under VRS assumption.

on average, were less efficient in comparison to conventional banks, which means that Islamic banks less efficiently utilized its cost of inputs in comparison to conventional banks. This result is opposite with the study of (Hassan et al., 2009; Muhammad et al., 2007). The conventional banks on the basis of ownership, like local conventional banks and foreign conventional banks in table 6, show that Islamic banks were less cost efficient than both, local conventional banks and foreign conventional banks. On the other side local conventional banks with calculated efficiency score of 0.536 were less efficient than foreign conventional banks with calculated efficiency score of 0.698 this result is same as that of (Burki & Niazi, 2003). So these results show that all types of banks were low cost efficiency, which means that they had not properly utilized its cost of inputs.

Table 6 further shows yearly efficiency scores of all banks and result explain that Islamic banks were more efficient than local conventional banks and less cost efficient than foreign conventional banks for the year 2001 to 2005. On the other hand local conventional banks efficiency scores were more than Islamic banks but less from conventional foreign banks from years 2006 to 2008.

4.6.7 Cost efficiency VRS assumption

Under this assumption result depicts from table 4 shows that Islamic banks were less cost efficient with average efficiency score of 0.584, than conventional banks with mean efficiency score of 0.761, whereas Islamic banks were less cost efficient than both local and

were less efficient than foreign conventional banks in 2001. Similarly local conventional banks were more efficient than Islamic banks but were less efficient than foreign conventional banks from year 2002 to 2007. In 2008 foreign conventional banks were more efficient than Islamic banks but were less efficient than local conventional banks.

4.4.8 Income Efficiency under CRS

Table 4 also shows income efficiency under CRS assumption. Here Islamic banks with average calculated efficiency score of 0.691 were less efficient than overall conventional average efficiency score of 0.728. This means that Islamic banks had not achieved high financial and non financial revenue with existing level of financial and non financial expenditures. This result is also opposite to (Hassan et al., 2009). From table 6 it can been seen that foreign and local conventional banks had same efficiency scores of .792 and they were both having high efficiency scores as compare to Islamic banks.

Table 6 further reveal yearly results of all banks and shows that Islamic bank were more efficient than both local and foreign conventional banks, but local conventional banks were more efficient than foreign convention banks in the years 2001, 2002, 2005 respectively. In 2002 Islamic banks were more efficient than foreign conventional banks but were less efficient than local conventional banks. In 2004 local conventional banks were more efficient than Islamic banks but less efficient than foreign conventional banks. In 2006 both conventional banks had same efficiency and both were less efficient than Islamic banks. In

4.4.9 Income Efficiency under VRS Assumption

Under VRS specification the table 4 indicates that Islamic banks with mean efficiency score of 0.740 were less efficient than conventional banks with average efficiency score of 0.788. Further, on the basis of ownership foreign conventional banks were more efficient than Islamic banks but were efficient than local conventional banks.

Table 5 shows the yearly data on the basis of its results. Islamic banks were more efficient than both, foreign and local conventional banks in years 2001, 2002 and 2006 respectively. In 2004 Islamic banks were less efficient than both types of conventional banks, while Islamic banks were more efficient than conventional foreign banks but were efficient than Islamic banks in years 2005 and 2007 respectively. In 2008 local conventional banks were more efficient than Islamic banks but less efficient than foreign conventional banks.

4.4.10   Income Efficiency under Scale Assumption

Under Scale efficiency specification the Islamic banks had obtained higher efficiency with mean efficiency score of 0.944 than conventional banks mean efficiency score of 0.929. While separating conventional banks on the basis of ownership structure the results revealed that Islamic banks were more efficient than local conventional banks but were less efficient than foreign conventional banks. Thus we infer that Islamic banks income inefficiency as compared to that of conventional banks was due to pure technical income inefficiency.

Table 5 reveals the yearly descriptive statistics of all banks on the basis of results. It shows that Islamic banks were more efficient than conventional local and foreign banks in years the 2003, 2004 and 2006 respectively. In 2001 Islamic banks were more efficient than foreign conventional banks but were less efficient than local conventional banks, Whereas in 2002 Islamic banks were less efficient than both types of conventional banks. Islamic banks

were more efficient than local conventional banks but less efficient than foreign conventional

banks in years 2005, 2007 and 2008 respectively.

Table 7: Economies of Scales Between Islamic Banks VS Conventional Banks

Conventional Banks TE				Islamic Banks TE			
IRS	CRS	DRS	No. of Banks	IRS	CRS	DRS	No. of Banks
41	61	205	249	14	2	9	25
16.46%	24.49%	82.32%		56%	8%	36%	
Conventional Banks IE				Islamic Banks IE			
IRS	CRS	DRS	No. of Banks	IRS	CRS	DRS	No. of Banks
78	60	108	246	14	7	4	25
31.45%	24.19%	43.54%		56%	28%	16%	

4.5   Returns to Scales under Loan Base Approach Specification- 1

As mentioned in literature that if all banks are not operating on optimal level then for that

banker et al (1988) proposed VRS (Variable return to scale) model beside of CRS. CRS

(Constant return to scale) means that proportionate increase in inputs will result in

proportionate increase in outputs, while VRS means increase in inputs will results in

disproportionate increase in outputs. If banks operate at VRS it may be operate at IRS or

DRS. IRS (Increasing return to scale) means that proportionate increase in inputs will results

higher proportionate increase in outputs, while DRS (Decreasing return to scale) means

proportionate decrease in inputs will result in less proportionate increase in outputs.

Table 7 shows the economies of scales on the basis of banks types. The result reveal that

41 Conventional banks out of 249 banks were on increasing return to scale, which was almost

16.46% of the sample. On the other side 14 Islamic banks out of 25 Islamic banks were on

increasing return to scale, which was 56% of the Islamic banks sample. This means that most

Islamic banks were on IRS as compared to conventional banks. This result also shows that

these banks have an advantage to increase their size because they operate at downside slope

of frontier.

Table 7 further shows that lot of conventional banks operated at decreasing return to scale. As conventional banks are large in operations so they banks normally operated at CRS or IRS, similar with the study of (McAllister and McManus, 1993). A many as 205 conventional banks, out of 249, were at DRS which was 82.32% of the whole sample. On the other hand 9 Islamic banks out of 25 were at DRS, which is almost 36% of whole sample. These banks have not appropriate to increase their operations because output would increase at less proportion than input would increase. At CRS, 62 conventional banks operated which was 24.49% of the sample. On the other hand only 2 banks were operated at CRS which was 8% of sample.

Table 8 gives further information showing the economies of scale by ownership status of conventional banks and Islamic banks. The results reveal that 21 banks out of 138 were at IRS, which was 11.41% of the sample, while 19 conventional foreign banks out of 67 foreign conventional banks were at IRS, which was 28.35% of sample. At CRS, 25 local conventional banks were operated which was 13.58% of sample. On the other side 36 foreign conventional banks operated at CRS which was 53.73% of the sample. Majority of local conventional banks were at DRS because they had large operations as compared to foreign conventional banks. So 138 conventional local banks which was 75% of the sample operated at DRS, while 12 foreign conventional banks, which were 17.91% of the sample were at DRS. These results are consistent with the study of (McAllister and McManus, 1993; Noulas et al., 1990; Sufian & Noor, 2009). As McAllister and McManus (1993) suggested that larger banks were operating at DRS, while small banks were operating at IRS or CRS. So it is better for majority of Islamic banks and for foreign conventional banks to increase their operations, because they would increase their outputs more than their inputs. This means that those Islamic banks and foreign conventional banks that have been operating at increasing return to scale would achieve economies of scales by increasing their operations through acquisitions

etc. On the other hand larger banks that have been operating at DRS would be very conscious. While increasing their operations because proportionate increase in their input would be result a lower proportionate increase in their outputs.

Table 8: Economies of Scales Under Loan Base Approach on the Basis of Banks types

	Conventional locals banks				Islamic banks				Conventional foreign banks			
	IRS	CRS	DRS	No of banks	IRS	CRS	DRS	No of banks	IRS	CRS	DRS	No of banks
2001	3 / 37.50%	0 / 0%	17 / 80.90%	20	1 / 12.50%	0 / 0%	0 / 0%	1	4 / 50%	7 / 100%	4 / 19.04%	15
2002	2 / 25%	0 / 0%	20 / 90.90%	22	2 / 25%	0 / 0%	0 / 0%	2	4 / 50%	5 / 100%	2 / 9.09%	11
2003	3 / 33.30%	2 / 25%	17 / 100%	22	1 / 11.12%	1 / 12.50%	0 / 0%	2	5 / 55.56%	5 / 62.50%	0 / 0%	10
2004	0 / 0%	5 / 50%	18 / 81.80%	23	0 / 0%	0 / 0%	2 / 9.09%	2	3 / 100%	5 / 50%	2 / 9.09%	10
2005	6 / 66.67%	5 / 50%	12 / 85.71%	23	1 / 11.12%	0 / 0%	1 / 7.14%	2	2 / 22.23%	5 / 50%	1 / 7.14%	8
2006	2 / 33.33%	5 / 55.55%	19 / 95%	26	3 / 50%	0 / 0%	1 / 5%	4	1 / 16.67%	4 / 44.44%	0 / 0%	5
2007	2 / 33.33%	4 / 50%	18 / 90%	24	4 / 66.66%	1 / 12.50%	1 / 5%	6	0 / 0%	3 / 37.50%	1 / 5%	4
2008	3 / 60%	4 / 66.66%	17 / 73.91%	24	2 / 40%	0 / 0%	4 / 17.39%	6	0 / 0%	2 / 33.33%	2 / 8.69%	4
All banks	21 / 11.41%	25 / 13.58%	138 / 75%	184	14 / 56%	2 / 8%	9 / 36%	25	19 / 28.35%	36 / 53.73%	12 / 17.91%	67

Table 9: Economies of Scales Under Income Base Approach on the Basis of Bank types

	Conventional local banks				Islamic banks				Conventional foreign banks			
	IRS	CRS	DRS	No of banks	IRS	CRS	DRS	No of banks	IRS	CRS	DRS	No of banks
2001	5	7	9	21	1	0	0	1	7	1	6	14
2001	38.46%	87.50%	60%		7.69%	0%	0%		53.84%	12.50%	40%	
2002	0	3	18	21	0	0	2	2	1	2	8	11
2002	0%	60%	64.28%		0%	0%	7.14%		100%	40%	28.57%	
2003	7	3	12	22	1	0	1	2	3	2	5	10
2003	63.63%	60%	66.66%		9.09%	0%	5.55%		27.27%	40%	27.77%	
2004	12	3	8	23	2	0	0	2	6	3	1	10
2004	60%	50%	88.88%		10%	0%	0%		30%	50%	11.11%	
2005	12	5	6	23	2	0	0	2	2	2	3	7
2005	75%	71.42%	66.66%		12.50%	0%	0%		12.50%	28.57%	33.33%	
2006	3	12	8	23	1	2	1	4	0	4	1	5
2006	75%	66.66%	80%		25%	11.11%	10%		0%	22.22%	10%	
2007	10	2	12	24	5	1	0	6	0	2	2	4
2007	66.66%	40%	85.71%		33.33%	20%	0%		0%	40%	14.28%	
2008	10	6	8	24	2	4	0	6	0	3	1	4
2008	83.33%	66.66%	61,5%		16.66%	30.76%	0%		0%	33.33%	7.69%	
All banks	59	41	81	181	14	7	4	25	19	19	27	65
	32.59%	22.65%	44.75%		56%	28%	16%		29.23%	29.23%	4153%	

4.6 Returns to Scales under Income Base Approach Specification 2

Under income base model, table 7 shows that conventional banks were better economies of scales as compared to loan base approach. Under this approach 78 conventional banks out of 246 had operated at increasing return to scale which was 31.45% of conventional banks sample. On the other hand 14 Islamic banks which were 56% of sample had operated at IRS. These banks increase their financial operations because they can achieve a high proportionate increase in financial and non financial revenues in relation to proportionate increase in financial and non financial expenses. At CRS, 60 conventional banks had operated that was 24.19% of the sample, while 7 Islamic banks, that is 28% of sample had operated at CRS. Conventional banks were better under this model because lesser banks were operating at DRS as compared to loan base approach. At DRS, 108 conventional banks had operated that was 43.54% of the sample. On the other hand 4 Islamic banks that was 16% of the sample had operated on DRS. This means that these banks have to take care regarding increasing their financial and non financial expenses because these banks would not achieve high proportion of revenue as compared to proportionate increase in financial expenses.

Table 9 shows economies of scales on the basis of conventional banks ownership. The results that 59 conventional local banks out of 181, which is 32.59% of sample were at IRS, On the other hand 19 foreign conventional banks out of 65 banks which were 29.23% of sample were at IRS. At CRS, 41 local conventional banks which were 22.65% of sample had operated, while 19 banks which is 29.23% of sample operated at CRS. As many as 81 local conventional banks that is 44.75% of sample had operated at DRS. On the other side 27 foreign conventional banks which were 41.53 operated at DRS. These results are quite different economies of scales under loan base model, which means local conventional banks were better positioned to expand their financial and non financial expenses as compared to loan base approach.

4.7   Determinants of Different Factors

Table 10.1: Determinants of Technical efficiency

Dependent Variables	TE CRS	t-value	P-value	TE VRS	t-value	P-value	SE	t-value	P-value
TME	0.0000185	2.54	0.012	-5.39E-06	-0.55	0.582	0.0000185	3.58	0.000
TL	-1.58E-06	-3.83	0.000	7.26E-07	1.20	0.233	-1.82E-06	-6.20	0.000
lnTA	0.0266536	1.65	0.1	-0.0196977	-0.84	0.404	0.0047747	0.41	0.681
TMR	5.76E-06	1.08	0.282	0.0000139	1.82	0.069	3.67E-06	0.97	0.332
TNMR	0.000012	0.62	0.536	0.0000201	0.690	0.490	0.0000128	0.94	0.35
TNME	-0.0000102	-0.84	0.403	-0.0000187	-1.01	0.312	-6.41E-06	-0.74	0.46
Tprofit	0.0000183	1.81	0.071	-2.96E-06	-0.21	0.832	0.0000212	2.97	0.003
Ownership	0.1965581	5.49	0.000	0.1954263	4.4	0.000	0.0810616	3.16	0.002
Constant	0.4903758	3.02	0.003	1.031722	4.44	0.000	0.872692	7.46	0.000
log liklehood	-30.942372			-82.277371			49.689254		
Nobservation	274			274			274		

4.7.1   Technical Efficiency Under CRS and its Determinants

Table 10.1 depicts that total liabilities, interest expense, total profit and ownership had significant impact on technical efficiency score under CRS at 95% confidence interval. Total liabilities, ownership and interest expense had significant relationship with efficiency score. Total liabilities had negative significant relationship with technical efficiency. This result is in line with (Ahmad & Gill, 2007a,b). Total asset and total profit had insignificant relationship with technical efficiency score, this result is in line with (Sathye, 2001; Hassan, 2005). Interest expenses had significant positive relationship with technical efficiency under CRS; this result is in line with (Staub et al., 2009). On qualitative side, Ownership had positive significant relationship with technical efficiency score and this result is in line with the study of (Isik & Hassan, 2002; Burki & Niazi, 2006). While the other variables that are total non markup expenses, total markup revenue and total non markup revenue had insignificant relationship with technical efficiency score under CRS and this result is in line with (Ahmad & Gill, 2007a).

4.7.2 Technical Efficiency under VRS and its Determinants

To determine the effect of different variables on technical efficiency score under VRS, table 10.1 depicts that total markup revenue had positive significant relationship with technical efficiency score under VRS. Size of the banks had insignificant and negative relationship with technical efficiency score, this result is in line with (Darrat et al., 2002).

4.7.3 Scale Efficiency and its Determinants

Table 10.1 also shows the determinants of scale efficiency. The result depicts that interest expense, total liabilities, total profit and ownership had significant relationship with scale efficiency at 95% confidence interval. Total profit had positive and significant relationship with scale efficiency. This result is in line with the previous studies conducted by (Sufian, 2007; Hassan, 2005; Sufian et al., 2007; Darat et al., 2002). Total asset had insignificant relationship with scale efficiency score (Sufian et al., 2007; Darat et al., 2002). Total liabilities had negative and significant relationship with scale efficiency this is in line with (Miller and Noulas., 1996). The directions of expenses were related with the study of (Atuallah et al., 2004). On the qualitative side, ownership had significant and positive relationship with scale efficiency; this study is in line with (Burki & Niaz, 2006; Isik & Hassan, 2002b).

Table 10.2: Determinants of cost efficiency

Dependent variable	CE CRS	t- value	p-value	CE VRS	t-value	p- value
TL	-8.93E-07	-2.02	0.045	1.93E-06	3.27	0.001
ln TA	0.512613	3.05	0.002	-0.0028414	-0.14	0.893
TMR	3.68E-06	0.93	0.355	-0.00000547	-1.08	0.279
TNMR	-6.15E-06	0.0000171	-0.36	-0.0000217	-1	0.317
Tprofit	0.0000158	2.08	0.038	0.0000028	0.3	0.763
Ownership	0.2147376	2.08	0.038	0.2315541	5.29	0.000
Constant	3.18506E-02	0.19	0.851	0.6628667	3.15	0.002
log liklehood	-26.9741			-83.0006560		
Nobservation	274			274		

4.7.4 Cost Efficiency under CRS and its Determinants

Table 10.2 shows the determinants of cost efficiency under CRS assumption. The results show that size of banks had significant and positive relationship with cost efficiency score, this result is in line with (Pasioras, 2007). Total profit had significant and positive relationship with cost efficiency score and this result is in line with (Ariff & Can, 2008). Total non markup revenue had insignificant and positive relationship with cost efficiency score under CRS, this result is also in line with (Ariff & Can, 2008) used a ratio of non interest income to total income. Total liabilities had significant negative effect cost efficiency score under CRS. On the other hand ownership had significant positive effect on efficiency score, which result is also in line with (Ariff & Can, 2008; staub et al., 2009).

4.7.5 Cost Efficiency under VRS and its Determinants

Table 10.2 further reveals the results regarding cost efficiency under VRS. These results depict that size of the bank had insignificant relationship with cost efficiency under VRS and the study is in line with (Sufian et al., 2007). Total profit had insignificant and positive relationship with cost efficiency under VRS; this result is in line with (Ahmad & Gill, 2007). In contrast, according to Pasiouras et al (2007) total profit had positive and

significant impact on cost efficiency score under VRS. Total asset, total interest income and total non income interest income had insignificant impact on cost efficiency score under VRS, and this is in line with (Ahmad & Gill, 2007). Total liabilities had significant and negative relationship with cost efficiency under VRS. On qualitative side ownership had significant and positive relationship with cost efficiency under VRS this result is in line with (Burki & Niazi, 2003, 2006; Hauner, 2004).

Table 10.3: Determinants of Income efficiency

Dependent variable	IE CRS	t-value	p-value	IE VRS	t-value	p-value	SE	t-value	p-value
TL	-5.45E-07	-2.19	0.029	7.49E-07	2.36	0.019	-8.46E-07	-7.05	0.000
ln TA	0.025428	1.42	0.157	-0.0239392	-1.11	0.267	0.0271446	3.11	0.002
Tprofit	0.0000266	3,33	0.001	0.0000243	2.26	0.025	0.000036	3.58	0.000
Ownership	0.0332275	0.88	0.379	0.0194275	0.45	0.653	0.0092247	0.5	0.618
Constant	0.4869648	2.7	0.007	0.9980365	4.63	0.000	0.720645	8.19	0.000
log liklehood	-48.70948			-91.051023					
No.Obs.	273			273					

4.7.6 Income Efficiency Under CRS and its Determinants

Table 10.3 depicts that total liabilities had negative and significant impact at 5% on income efficiency under CRS. Total profit had significant relationship with income efficiency and the relationship was positive between income efficiency and total profit. Size of the banks and ownership had insignificant relationship with income efficiency score under CRS.

4.7.7 Income Efficiency under VRS and its Determinants

Table 10.3 further reveals the determinants of income efficiency under VRS. Result reveals that total liabilities had significant negative relationship with income efficiency under VRS, this result is in line with (Ahmad & Gill, 2007a), while Total profit had significant and

Table 10.2: Determinants of cost efficiency

Dependent variable	CE CRS	t- value	p-value	CE VRS	t-value	p- value
TL	-8.93E-07	-2.02	0.045	1.93E-06	3.27	0.001
ln TA	0.512613	3.05	0.002	-0.0028414	-0.14	0.893
TMR	3.68E-06	0.93	0.355	-0.00000547	-1.08	0.279
TNMR	-6.15E-06	0.0000171	-0.36	-0.0000217	-1	0.317
Tprofit	0.0000158	2.08	0.038	0.0000028	0.3	0.763
Ownership	0.2147376	2.08	0.038	0.2315541	5.29	0.000
Constant	3.18506E-02	0.19	0.851	0.6628667	3.15	0.002
log liklehood	-26.9741			-83.0006560		
Nobservation	274			274		

4.7.4 Cost Efficiency under CRS and its Determinants

Table 10.2 shows the determinants of cost efficiency under CRS assumption. The results show that size of banks had significant and positive relationship with cost efficiency score, this result is in line with (Pasioras, 2007). Total profit had significant and positive relationship with cost efficiency score and this result is in line with (Ariff & Can, 2008). Total non markup revenue had insignificant and positive relationship with cost efficiency score under CRS, this result is also in line with (Ariff & Can, 2008) used a ratio of non interest income to total income. Total liabilities had significant negative effect cost efficiency score under CRS. On the other hand ownership had significant positive effect on efficiency score, which result is also in line with (Ariff & Can, 2008; staub et al., 2009).

4.7.5 Cost Efficiency under VRS and its Determinants

Table 10.2 further reveals the results regarding cost efficiency under VRS. These results depict that size of the bank had insignificant relationship with cost efficiency under VRS and the study is in line with (Sufian et al., 2007). Total profit had insignificant and positive relationship with cost efficiency under VRS; this result is in line with (Ahmad & Gill, 2007). In contrast, according to Pasiouras et al (2007) total profit had positive and

significant impact on cost efficiency score under VRS. Total asset, total interest income and total non income interest income had insignificant impact on cost efficiency score under VRS, and this is in line with (Ahmad & Gill, 2007). Total liabilities had significant and negative relationship with cost efficiency under VRS. On qualitative side ownership had significant and positive relationship with cost efficiency under VRS this result is in line with (Burki & Niazi, 2003, 2006; Hauner, 2004).

Table 10.3: Determinants of Income efficiency

Dependent variable	IE CRS	t-value	p-value	IE VRS	t-value	p-value	SE	t-value	p-value
TL	-5.45E-07	-2.19	0.029	7.49E-07	2.36	0.019	-8.46E-07	-7.05	0.000
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Ownership	0.0332275	0.88	0.379	0.0194275	0.45	0.653	0.0092247	0.5	0.618
Constant	0.4869648	2.7	0.007	0.9980365	4.63	0.000	0.720645	8.19	0.000
log liklehood	-48.70948			-91.051023					
No.Obs.	273			273					

4.7.6 Income Efficiency Under CRS and its Determinants

Table 10.3 depicts that total liabilities had negative and significant impact at 5% on income efficiency under CRS. Total profit had significant relationship with income efficiency and the relationship was positive between income efficiency and total profit. Size of the banks and ownership had insignificant relationship with income efficiency score under CRS.

4.7.7 Income Efficiency under VRS and its Determinants

Table 10.3 further reveals the determinants of income efficiency under VRS. Result reveals that total liabilities had significant negative relationship with income efficiency under VRS, this result is in line with (Ahmad & Gill, 2007a), while Total profit had significant and

positive relationship with income efficiency, under VRS; this result is in line with (Atuallah & lee, 2006; Pasiouras, 2006; Ahmad & Gill, 2007). Size of the bank had insignificant and negative relationship with income efficiency under VRS. This result is against (Atuallah & le, 2006; Pasiouras, 2006) their study established significant and positive relationship between size of banks and income efficiency under VRS. On the qualitative side ownership had insignificant relationship with income efficiency score under VRS. This result is in line with (Ahmad & Gill, 2007).

4.7.8 Scale Efficiency and its Determinants

Table 10.3 further reveals the relationship between different variables and scale efficiency score under income base approach. The result indicates that size of the banks had significant and positive relationship with scale efficiency score. This result was consistent with previous studies like (Atuallah & le, 2006; Pasiioras, 2006). Similarly total profit had significant and positive relationship with scale efficiency, this result is in line with (Atuallah &le, 2006; Pasioras, 2006). Total liabilities had significant and negative relationship with scale efficiency. On the qualitative side ownership had insignificant relationship with scale efficiency under income specification.

4.7.9 Discussion of Results

From the result and discussion we infer that both banking streams were not producing the optimum level of output with minimum cost. But in comparison with Islamic banks the conventional banks had somehow produced the better level of output with minimum cost. Islamic banks inefficiency was due to allocative inefficiency which means that banking stream had not utilized its inputs mix in appropriate way. On the other side conventional banks inefficiency was due to both allocative and technical inefficiencies. This indicates that conventional banks had not used minimum inputs while producing the same level of output.

Under loan base approach Islamic banks had somehow better economies of scales, and more Islamic banks as compared to conventional banks are in position to eliminate their efficiencies by increasing their operations.

Further on the revenue side the conventional banks were obtaining more revenue with same level of expenses as compared to Islamic banks. Under this approach both banking streams had somehow economies of scales. More Islamic banks as compared to conventional banks are in position to eliminate income inefficiency by increasing their operations.

4.7.10 Justification of Study

Overall the Conventional banks were more efficient than Islamic banks because conventional banking is performing their operations from almost more than four decades. Conventional banks have huge capital and high spread of interest. One of the limitations of Islamic banks is short market operations and lack of awareness in general public, In spite of the fact that Islamic Banking is still in its early ages of operations in Pakistan.

CHAPTER 5
CONCLUTION

5.1 Conclusion of the Study

Pakistan is a transition economy and banks play a very important role in the economic development. Pakistan has two massive banking systems; Islamic banking and conventional banking. In this study we compared efficiency of Islamic banks and conventional banks from year 2001 to 2008 using DEA model under three specifications i-e (Technical efficiency, cost efficiency and income efficiency). We also compared efficiency of Islamic banks and conventional banks on the basis of ownership structure i-e foreign conventional banks and local conventional banks. We examined the efficiency of three specifications under CRS and VRS assumptions. Under VRS we compared Islamic banks and conventional banks on the basis of ownership structure and that they performed on IRS or DRS.

The empirical results recommend that under CRS the Islamic banks were technically more efficient than its conventional counterparts. Further on the basis of ownership structure results suggest that Islamic banks were less efficient than foreign conventional banks but were more efficient than local conventional banks. Under VRS assumption the results show that Islamic banks and conventional banks have almost same technical efficiency score. The result also suggest that Islamic banks were efficient than local conventional banks but were less efficient than foreign conventional banks. Islamic banks were more scale efficient than conventional banks which means that conventional banks technical inefficiency was due to scale inefficiency.

The empirical result also indicates cost efficiency under CRS and VRS. Under CRS Islamic banks were less cost efficient than conventional banks. The result further suggests that local conventional banks were less cost efficient than foreign conventional banks and both were more efficient than Islamic banks. Accordingly, Islamic banks were less allocative efficient than conventional banks and this was the main cause of Islamic banks overall

inefficiency, because Islamic banks were technically more efficient than conventional banks under CRS. Under VRS assumption Islamic banks were less cost efficient than conventional banks. Further local conventional banks were less cost efficient than foreign conventional, banks but more efficient than local conventional banks. Islamic banks were less allocative efficient than conventional banks under VRS and this was main cause of Islamic banks overall inefficiency as compared conventional banks.

The empirical results further show Income efficiency under CRS and VRS. The result indicate that Islamic banks were less income efficient than conventional banks under CRS. Moreover, local and foreign conventional banks had same efficiency scores and both were more efficient than Islamic banks. This means that Islamic banks obtained less financial and non financial revenue by using same level of financial and non financial expenses as compared to conventional banks. Under VRS, Islamic banks were less income efficient than conventional banks but Islamic banks were more efficient than conventional banks. This means Islamic banks income inefficiency was due to income efficiency of VRS or pure technical inefficiency.

Further we examined the economies of scales and compare the Islamic banks and conventional banks. The result suggests that 56% of Islamic banks were at IRS as compared to 16.46% of conventional banks under specification 1. Thus means that large number of Islamic banks has a chance to increase their operations to eliminate scale inefficiency as compare to conventional banks. It is also established that 82.32% conventional banks were at DRS as compared to 36% Islamic banks. Thus majority of conventional banks should be conscious while increasing their operations

The empirical result further suggests that 56% Islamic banks were at IRS as compared to 31.45% conventional banks. Thus Islamic banks have better chance as compared to

conventional banks to increase their operations in respect of financial and non financial matters. On the other hand 43.54% conventional banks were at DRS as compared to Islamic banks which were 16% at DRS. This show that more conventional banks were at IRS under income base approach as compare to loan base approach.

In the second stage we regressed bank specific factors to bank efficiency score, under three basic specifications and under two basic assumptions. Our findings reveal that interest expenses, total profit and ownership had positive significant relationship while total liabilities had significant negative relationship with technical efficiency score under CRS, with scale efficiency score and cost efficiency score under CRS. The other factors like non markup revenue, non markup expenses and size of bank had insignificant relationship with technical efficiency and scale efficiency score. Only interest expenses, non markup expenses are excluded from cost efficiency regression because these variables are used for its efficiency model. On the other hand only total markup revenue had significant relationship with technical efficiency score under VRS. The all bank specific factors are insignificant in relationship with cost efficiency score under VRS.

The result further suggests that total liabilities had significant relationship with income efficiency score under CRS, VRS and scale efficiency. Total profit had significant relationship with income efficiency score under CRS, VRS and scale efficiency, while size and ownership had insignificant relationship with income efficiency scores under CRS, VRS and scale efficiency.

5.2 Limitation of Study

This study has some limitations that a lot merger and acquisition occurred in banking sector but this study did not give any idea regarding merger and acquisition. In this study we studied the impact of aggregate level variables e.g Asset but specific type of assets like (Cash

with other banks, demand deposits, consumer deposits etc) were not studied. Technology progress is one of important part in the progress of banks but this study did not give any idea about it. Further, this study also did not give any idea about the macro economic factors like GDP, Political condition, Regulations on banks etc.

5.3 Future research

Future research could compare conventional and Islamic bank efficiencies across countries, for example, Malysia, Sudan, Iran should establish the impact of different regions (owing to different levels of economic, financial and market micro-structure development in each region) on the level of different efficiencies in both banking streams. Also, further insights could be ascertained on the level of Technical, Cost and income efficiency of both banking streams using the SFA also called econometric frontier approach, as in Koetter (2005). Incorporate variables like age, GDP, consumer satisfaction, political structure etc to see their effect on the efficiency of banks.

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Technical and Scale efficiency for year 2001: Table 1.1

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Alied bank	0.463	0.805	0.576	drs	24	8	53.7	19.5
Askari bank	0.657	0.993	0.662	drs	17	2	34.3	0.7
Bank Alfalah Ltd	0.531	0.817	0.651	drs	21	7	46.9	18.3
Bank Alhabib Ltd	0.468	0.471	0.993	drs	25	18	53.2	52.9
Faysal bank Ltd	0.953	1	0.953	drs	2	1	4.7	0
First women bank	0.858	0.922	0.931	drs	5	4	14.2	7.8
Habib bank Ltd	0.438	1	0.438	drs	26	1	56.2	0
KSB bank Ltd	0.411	0.431	0.954	irs	27	19	58.9	56.9
MCB	0.613	1	0.613	drs	18	1	38.7	0
MY Bank Ltd	0.304	0.38	0.8	irs	28	20	69.6	62
NBP	0.517	1	0.517	drs	22	1	48.3	0
SPCB	0.542	0.563	0.962	irs	20	16	45.8	43.7
Soneri bank Ltd	0.687	0.717	0.958	drs	15	15	31.3	28.3
The bank of Kyber	0.868	1	0.868	drs	4	1	13.2	0
The bank of Punjab	0.718	0.78	0.92	drs	12	11	28.2	22
Union bank Ltd	0.487	0.51	0.956	drs	23	17	51.3	49
United bank Ltd	0.539	0.935	0.576	drs	19	3	46.1	6.5
Metropolitan bank Ltd	0.817	1	0.817	drs	7	1	18.3	0
PICIC bank Ltd	0.772	0.781	0.989	drs	10	9	22.8	21.9
PRiME bank Ltd	0.677	0.763	0.887	drs	16	13	32.3	23.7
MBP	0.868	1	0.868	irs	4	1	13.2	0
Albaraka bank	0.822	0.875	0.939	irs	6	6	17.8	12.5
CITI bank N.A	0.874	1	0.874	drs	3	1	12.6	0
Deutsche bank Ltd	0.778	0.878	0.886	irs	9	5	22.2	12.2
Rupali bank Ltd	1	1	1	-	1	1	0	0
TOKOYO	0.706	0.755	0.936	irs	14	14	29.4	24.5

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Standard charterd grindlay	0.81	0.865	0.937	drs	8	7	19	13.5
HSBC	1	1	1	-	1	1	0	0
ABN Amro NV	1	1	1	-	1	1	0	0
American express bank	0.715	0.769	0.93	drs	13	12	28.5	23.1
Bank of Ceylon	1	1	1	-	1	1	0	0
Doha bank Ltd	1	1	1	-	1	1	0	0
Emirates bank	0.767	1	0.767	drs	11	1	23.3	0
Oman international bank	0.658	1	0.658	irs	8	1	34.2	0
CAIGFP	1	1	1	-	1	1	0	0
Habib bank AG Zurich	1	1	1	-	1	1	0	0

Note: MCB, NBP, HSBC, CAIGFP , MBP stands for Muslim commercial bank, National bank of pakistan, Honkong and shanghi corporation, Credit Agricolo Indosuez : The global French bank and Mashreeq bank Pakistan. PPRU possible % of reduction in inputs

Technical & Scale efficiency for 2002 table 1.2

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Alied bank	0.386	0.66	0.585	drs	23	16	61.4	34
Askari Bank	0.507	1	0.507	drs	20	1	49.3	0
Bank Alfalah Ltd	0.459	0.948	0.484	drs	20	3	54.1	5.2
Bank Alhabib Ltd	0.529	0.956	0.553	drs	17	2	47.1	4.4
Faysal bank Ltd	0.698	0.762	0.916	drs	12	10	30.2	23.8
First women bank	0.573	1	0.573	drs	14	1	42.7	0
Habib bank Ltd	0.342	1	0.342	drs	23	1	65.8	0
KSB bank Ltd	0.306	0.572	0.534	drs	24	21	69.4	42.8
MCB	0.497	1	0.497	drs	19	1	50.3	0
MY Bank Ltd	0.305	0.31	0.983	irs	25	22	69.5	69
NBP	0.386	1	0.386	drs	22	1	61.4	0

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
SPCB	0.431	0.583	0.739	drs	22	20	56.9	41.7
Soneri bank Ltd	0.507	0.738	0.686	drs	18	14	49.3	26.2
The bank of Kyber	0.709	0.85	0.835	drs	11	7	29.1	15
The bank of Punjab	0.52	0.632	0.822	drs	19	19	48	36.8
Union bank Ltd	0.535	0.702	0.762	drs	16	15	46.5	29.8
United bank Ltd	0.449	1	0.449	drs	21	1	55.1	0
Metropolitan bank Ltd	0.755	1	0.755	drs	6	1	24.5	0
PICIC bank Ltd	0.729	0.939	0.776	drs	9	5	27.1	6.1
Prime bank Ltd	0.528	0.657	0.803	drs	18	17	47.2	34.3
MBP	0.779	1	0.779	irs	5	1	22.1	0
Meezan bank Ltd	0.735	0.746	0.985	drs	8	11	26.5	25.4
Albaraka bank	0.788	0.796	0.99	irs	4	8	21.2	20.4
Habib bank AG Zurich	1	1	1	-	1	1	0	0
CITI bank N.A	0.882	1	0.882	drs	3	1	11.8	0
Deutsche bank AG	0.9	0.944	0.953	irs	2	4	10	5.6
Rupali bank Ltd	0.751	1	0.751	irs	7	1	24.9	0
Tokoyo	0.564	0.655	0.86	irs	15	18	43.6	34.5
HSBC	1	1	1	-	1	1	0	0
ABN Amro N.V	1	1	1	-	1	1	0	0
American Express	0.718	0.792	0.906	drs	10	9	28.2	20.8
Bank of Ceylon	1	1	1	-	1	1	0	0
Oman international	0.69	1	0.69	irs	13	1	31	0
CAIGFP	1	1	1	-	1	1	0	0

Note: TOKOYO stands for The bank of Tokoyo Mitsubushi Ltd. American Express stands for American express bank Ltd. Emirates bank stand for Emirates bank international PJSC. SPCB stands for Saudi-Pak Commercial Pakistan Ltd. Albaraka bank stand for Al Baraka Islamic Bank B.S.C. (E.C). Oman international stands for Oman International Bank S.A.O.G. DRS stand for decreasing return to scale. Irs stand for increasing return to scale. – stand for constant return to scale.. TE means technical efficiency. CRS constant return to scale. SE scale effeciency

Table 1.3:   *Technical & Scale efficiency for 2003*

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Alied bank	0.478	0.711	0.672	drs	23	8	52.2	28.9
Askari Bank	0.511	0.931	0.549	drs	19	3	48.9	6.9
Bank of Alfalah	0.483	0.994	0.486	drs	22	2	51.7	0.6
Bank of Alhabib Ltd	0.587	0.697	0.842	drs	12	11	41.3	30.3
Faysal bank Ltd	0.603	0.635	0.95	drs	11	14	39.7	36.5
First women bank	0.873	1	0.873	drs	4	1	12.7	0
Habib bank Ltd	0.455	1	0.455	drs	24	1	54.5	0
KSB bank Ltd	0.507	0.535	0.948	drs	20	16	49.3	46.5
MCB	0.693	1	0.693	drs	6	1	30.7	0
MY Bank Ltd	0.27	0.27	0.997	irs	27	19	73	73
NBP	0.564	1	0.564	drs	16	1	43.6	0
SPCB	0.484	0.485	0.998	irs	21	17	51.6	51.5
Soneri bank Ltd	0.611	0.64	0.955	drs	10	13	38.9	36
The bank of Kyber	1	1	1	-	1	1	0	0
The bank of Punjab	0.629	0.76	0.828	drs	9	7	37.1	24
Union bank Ltd	0.527	0.868	0.606	drs	17	4	47.3	13.2
United bank Ltd	0.512	1	0.512	drs	18	1	48.8	0
Metropolitan bank Ltd	0.924	1	0.924	drs	2	1	7.6	0
PICIC bank Ltd	1	1	1	-	1	1	0	0
Prime bank Ltd	0.577	0.6	0.962	drs	15	15	42.3	40
NIB bank Ltd	0.766	0.768	0.997	drs	5	6	23.4	23.2
MBP	0.301	0.397	0.758	irs	26	18	69.9	60.3
Meezan bank Ltd	1	1	1	-	1	1	0	0

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Albaraka bank	0.63	0.664	0.95	irs	8	12	37	33.6
Habib bank AG Zurich	1	1	1	-	1	1	0	0
CITI bank N.V	1	1	1	-	1	1	0	0
Deusche bank AG	0.58	0.806	0.72	irs	13	5	42	19.4
Rupali bank Ltd	1	1	1	-	3	1	0	0
TOKOYO	0.886	1	0.886	irs	1	1	11.4	0
HSBC	1	1	1	-	1	1	0	0
ABN Amro NV	1	1	1	-	1	1	0	0
American Express	0.685	0.703	0.975	irs	7	10	31.5	29.7
Oman international	0.43	1	0.43	irs	25	1	57	0
CAIGFB	0.578	0.711	0.813	irs	14	9	42.2	28.9

Table 1.4: Technical and scale efficiency for year 2004

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Alied bank	0.628	1	0.628	drs	13	1	37.2	0
Askari Bank	0.532	1	0.532	drs	22	1	46.8	0
Bank Alfalah Ltd	0.54	0.985	0.548	drs	21	2	46	1.5
Bank of Alhabib Ltd	0.649	0.818	0.793	drs	12	8	35.1	18.2
Faysal bank Ltd	0.841	1	0.841	drs	5	1	15.9	0
First women bank	0.818	1	0.818	drs	7	1	18.2	0
Habib bank Ltd	0.457	1	0.457	drs	23	1	54.3	0
KSB bank Ltd	0.587	0.612	0.958	drs	19	13	41.3	38.8
MCB	0.453	0.963	0.471	drs	24	3	54.7	3.7
MY Bank Ltd	0.347	0.347	0.999	-	27	20	65.3	65.3
NBP	0.614	1	0.614	drs	15	1	38.6	0

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
SPCB	0.622	0.657	0.946	drs	14	11	37.8	34.3
Soneri bank Ltd	0.766	0.931	0.823	drs	9	4	23.4	6.9
The bank of Kyber	1	1	1	-	1	1	0	0
The bank of Punjab	0.743	0.906	0.82	drs	10	5	25.7	9.4
Union bank Ltd	0.612	0.851	0.719	drs	17	7	38.8	14.9
United bank Ltd	0.613	1	0.613	drs	16	1	38.7	0
Metropolitan bank Ltd	0.947	1	0.947	drs	3	1	5.3	0
PICIC bank Ltd	1	1	1	-	1	1	0	0
Prime bank Ltd	0.609	0.628	0.97	drs	18	12	39.1	37.2
Atlas bank Ltd	1	1	1	-	1	1	0	0
NIB bank Ltd	1	1	1	-	1	1	0	0
Samba bank Ltd	0.419	0.438	0.958	drs	25	15	58.1	56.2
Meezan bank Ltd	0.719	0.724	0.993	drs	11	10	28.1	27.6
Albaraka bank	0.857	0.858	0.999	drs	4	6	14.3	14.2
Habib bank AG Zurich	1	1	1	-	1	1	0	0
Cresent commercial bank	0.419	0.438	0.958	drs	26	19	58.1	56.2
CITY bank N.V	1	1	1	-	1	1	0	0
Deutshe bank AG	0.786	0.791	0.993	irs	8	9	21.4	20.9
Rupali bank Ltd	1	1	1	-	1	1	0	0
Tokoyo	0.827	1	0.827	irs	6	1	17.3	0
HSBC	1	1	1	-	1	1	0	0
ABN Amro NV	1	1	1	-	1	1	0	0
American Express	0.563	0.591	0.952	drs	20	14	43.7	40.9
Oman international	0.975	1	0.975	irs	2	1	2.5	0

Table 1.5: Technical and scale efficiency for year 2005

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Alied bank	0.558	0.833	0.67	drs	20	6	44.2	16.7
Askari Bank	0.676	0.876	0.771	drs	15	3	32.4	12.4
Bank Alfalah Ltd	0.698	0.932	0.749	drs	14	2	30.2	6.8
Bank Alhabib Ltd	0.746	0.747	0.998	drs	12	1	25.4	25.3
Faysal bank Ltd	1	1	1	-	1	11	0	0
First women bank	1	1	1	-	1	1	0	0
Habib bank Ltd	0.658	1	0.658	drs	17	1	34.2	0
KSB bank Ltd	0.556	0.564	0.986	irs	21	13	44.4	43.6
MCB	0.587	0.999	0.587	drs	19	1	41.3	0.1
MY Bank Ltd	0.47	0.476	0.987	irs	22	14	53	52.4
NBP	0.786	1	0.786	drs	10	1	21.4	0
SPCB	0.824	0.826	0.998	irs	7	8	17.6	17.4
Soneri bank Ltd	0.83	0.83	0.999	irs	6	7	17	17
The bank of Kyber	1	1	1	-	1	1	0	0
The bank of Punjab	0.672	0.824	0.816	drs	16	9	32.8	17.6
Union bank Ltd	0.973	1	0.973	drs	3	1	2.7	0
United bank Ltd	0.73	1	0.73	drs	13	1	27	0
Metropolitan bank	1	1	1	-	1	1	0	0
PICIC bank Ltd	1	1	1	-	1	1	0	0
Prime bank Ltd	0.627	0.629	0.997	irs	18	12	37.3	37.1
Atlas bank Ltd	0.987	1	0.987	irs	2	1	1.3	0
NIB bank Ltd	0.854	0.854	0.999	drs	5	5	14.6	14.6
Samba bank Ltd	0.458	0.462	0.993	drs	23	15	54.2	53.8
Meezan bank Ltd	0.802	0.818	0.98	drs	8	10	19.8	18.2
Albaraka bank	0.784	0.864	0.908	irs	11	4	21.6	13.6
Habib bank AG Zurich	1	1	1	-	1	1	0	0

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Cresent commercial bank	0.458	0.462	0.993	drs	24	16	54.2	53.8
CITY bank N.V	1	1	1	-	1	1	0	0
Deutshe bank Ltd	0.862	1	0.862	irs	4	1	13.8	0
Rupali bank Ltd	1	1	1	-	1	1	0	0
HSBC	1	1	1	-	1	1	0	0
ABN Amro NV	1	1	1	-	1	1	0	0
American Express	0.79	1	0.79	irs	9	1	21	0

Table 1.6: Technical and scale efficiency for year 2006

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Alied bank	0.65	0.84	0.775	drs	19	8	35	16
Askari Bank	0.685	0.801	0.856	drs	17	10	31.5	19.9
Bank Alfalah Ltd	0.642	0.82	0.783	drs	20	9	35.8	18
Bank Alhabib Ltd	0.765	0.799	0.958	drs	9	11	23.5	20.1
Faysa bank Ltdl	0.964	1	0.964	drs	4	1	3.6	0
First women bank	0.858	1	0.858	irs	6	1	14.2	0
Habib bank Ltd	0.712	1	0.712	drs	15	1	28.8	0
KSB bank Ltd	0.574	0.582	0.986	drs	24	18	42.6	41.8
MCB	0.612	0.966	0.634	drs	21	4	38.8	3.4
MY Bank Ltd	0.729	0.732	0.995	drs	13	16	27.1	26.8
NBP	0.71	1	0.71	drs	16	1	29	0
SPCB	0.741	0.793	0.935	drs	11	14	25.9	20.7
Soneri bank Ltd	0.737	0.75	0.982	drs	12	15	26.3	25
The bank of Kyber	1	1	1	-	1	1	0	0
The bank of Punjab	0.812	0.969	0.838	drs	7	3	18.8	3.1
United bank Ltd	0.761	1	0.761	drs	10	1	23.9	0

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
ARif Habib Rupali bank Ltd	1	1	1	-	1	1	0	0
Atlas bank Ltd	1	1	1	-	1	1	0	0
JS bank Ltd	1	1	1	-	1	1	0	0
NIB bank Ltd	0.886	0.892	0.993	drs	4	6	11.4	10.8
Samba bank Ltd	0.441	0.49	0.901	irs	26	19	55.9	51
Standard chartered bank	0.723	0.848	0.852	drs	14	7	27.7	15.2
PICIC bank Ltd	0.878	0.905	0.97	drs	5	5	12.2	9.5
Prime bank Ltd	0.608	0.609	0.998	drs	23	17	39.2	39.1
Habib metropolitan bank	1	1	1	-	1	1	0	0
Meezan bank Ltd	0.967	0.987	0.98	drs	3	2	3.3	1.3
Bank Islami Pakistan Ltd	0.447	1	0.447	irs	25	1	55.3	0
Dubai Islami bank Pakistan	0.656	0.794	0.825	irs	18	12	34.4	20.6
Albarka bank	0.992	1	0.992	irs	2	1	0.8	0
Crecent commercial bank	0.441	0.49	0.901	irs	27	20	55.9	51
CITY bank N.V	0.793	0.794	1	-	8	13	20.7	20.6
Deutsche bank Ltd	1	1	1	-	1	1	0	0
HSBC	1	1	1	-	1	1	0	0
ABN Amro NV	1	1	1	-	1	1	0	0

Note: PPRU CRS means possible percentage of reduction in inputs to obtain the same level of output under constant return to scale.

Table 1.7: Technical and scale efficiency for year 2007

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Alied bank	0.763	0.943	0.81	drs	19	5	23.7	5.7
Askari Bank	0.782	0.896	0.873	drs	15	6	21.8	10.4
Bank Alfalah Ltd	0.665	0.885	0.752	drs	26	8	33.5	11.5
Bank Alhabib Ltd	0.702	0.867	0.809	drs	25	12	29.8	13.3
Faysal bank Ltd	0.979	1	0.979	drs	2	1	2.1	0
First women bank	0.975	1	0.975	irs	3	1	2.5	0
Habib bank Ltd	0.787	1	0.787	drs	14	1	21.3	0
KSB bank Ltd	0.824	0.854	0.965	drs	12	15	17.6	14.6
MCB	0.719	1	0.719	drs	23	1	28.1	0
MY Bank Ltd	1	1	1	-	1	1	0	0
NBP	0.772	1	0.772	drs	18	1	22.8	0
SPCB	0.779	0.855	0.911	drs	16	14	22.1	14.5
Soneri bank Ltd	0.737	0.835	0.882	drs	22	16	26.3	16.5
The bank ofKyber	0.955	1	0.955	irs	4	1	4.5	0
The bank of Punjab	0.841	1	0.841	drs	10	1	15.9	0
United bank Ltd	0.74	1	0.74	drs	21	1	26	0
Habib metropolitan bank	1	1	1	-	1	1	0	0
ABN Amro (Pakistan) Ltd	0.788	0.868	0.909	drs	14	11	21.2	13.2
Arif Habib Rupali bank	1	1	1	-	1	1	0	0
Atlas bank Ltd	0.846	0.856	0.989	drs	8	13	15.4	14.4
JS bank Ltd	0.922	0.95	0.971	drs	5	4	7.8	5
NIB bank Ltd	0.757	0.881	0.859	drs	20	9	24.3	11.9
Samba bank Ltd	1	1	1	-	1	1	0	0

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Standard chartered bank	0.84	0.996	0.843	drs	11	2	16	0.4
Meezan bank Ltd	0.866	0.879	0.986	drs	7	10	13.4	12.1
Bank Islami Pakistan Ltd	0.798	0.815	0.979	irs	13	17	20.2	18.5
Dubai Islamic bank Pakistan	0.703	0.706	0.995	irs	24	18	29.7	29.4
Dawood Islamic bank Ltd	0.843	1	0.843	irs	9	1	15.7	0
Emirates Global Islamic	1	1	1	-	1	1	0	0
Albaraka bank	0.925	0.986	0.938	irs	6	3	7.5	1.4
CRESENT commercial bank	1	1	1	-	1	1	0	0
CITY bank N.V	0.855	0.892	0.958	drs	7	7	14.5	10.8
HSBC	1	1	1	-	1	1	0	0

Table 1.8: Technical and scale efficiency for year 2008

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Alied bank	0.843	0.956	0.883	drs	14	4	15.7	4.4
Askari Bank	0.784	0.892	0.878	drs	21	14	21.6	10.8
Bank Alfalah Ltd	0.774	0.851	0.909	drs	23	17	22.6	14.9
Bank Alhabib Ltd	0.887	0.925	0.959	drs	7	10	11.3	7.5
Faysal bank Ltd	0.954	1	0.954	drs	3	1	4.6	0
First women bank	0.946	1	0.946	irs	4	1	5.4	0
Habib bank Ltd	0.841	1	0.841	drs	16	1	15.9	0
KSB bank Ltd	0.865	0.941	0.919	drs	11	7	13.5	5.9
MCB	0.886	1	0.886	drs	8	1	11.4	0
MY Bank Ltd	0.931	0.938	0.993	irs	5	8	6.9	6.2

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
NBP	0.835	1	0.835	drs	18	1	16.5	0
SPCB	0.783	0.816	0.96	drs	22	18	21.7	18.4
Soneri bank Ltd	0.819	0.88	0.93	drs	19	16	18.1	12
The bank of Kyber	1	1	1	-	1	1	0	0
The bank of Punjab	0.75	0.983	0.763	drs	25	1	25	1.7
United bank Ltd	0.841	1	0.841	drs	17	1	15.9	0
ABN Amro (Pakistan) Ltd	0.861	0.963	0.893	drs	12	3	13.9	3.7
Habib metropolitan bank	1	1	1	-	1	1	0	0
Atlas bank Ltd	0.843	0.905	0.931	drs	15	13	15.7	9.5
Arif Habib Rupali bank	1	1	1	-	1	1	0	0
JS bank Ltd	0.871	0.89	0.979	irs	10	15	12.9	11
NIB bank Ltd	0.893	0.952	0.938	drs	6	5	10.7	4.8
Samba bank Ltd	1	1	1	-	1	1	0	0
Standard chartered bank	0.883	1	0.883	drs	9	1	11.7	0
Meezan bank Ltd	0.848	0.923	0.919	drs	13	12	15.2	7.7
Bank Islami Pakistan Ltd	0.758	0.808	0.938	irs	24	19	24.2	19.2
Dubai Islamic bank Pakistan	0.687	0.732	0.939	drs	27	20	31.3	26.8
Dawood Islamic bank Ltd	0.681	0.936	0.728	irs	28	9	31.9	6.4
Emirates Global Islamic	0.95	0.951	0.999	drs	3	6	5	4.9
Albaraka bank	0.958	1	0.958	drs	2	1	4.2	0
CITY bank Ltd	0.815	0.925	0.882	drs	20	11	18.5	7.5
Deutsche bank Ltd	1	1	1	-	1	1	0	0
HSBC	0.737	0.99	0.745	drs	26	2	26.3	1
Barclay bank Ltd	1	1	1	-	1	1	0	0

Note: TE, SE, CRS, VRS means Technical efficiency, Scale efficiency, Constant return to scale and Variable return to scale. PPRU CRS means Possible percentage of reduction under CRS, PPRU VRS means possible percentage of reduction under VRS. Drs means decreasing return to scale. "-"means Constant return to scale. Irs means increasing return to scale.

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Standard chartered bank	0.84	0.996	0.843	drs	11	2	16	0.4
Meezan bank Ltd	0.866	0.879	0.986	drs	7	10	13.4	12.1
Bank Islami Pakistan Ltd	0.798	0.815	0.979	irs	13	17	20.2	18.5
Dubai Islamic bank Pakistan	0.703	0.706	0.995	irs	24	18	29.7	29.4
Dawood Islamic bank Ltd	0.843	1	0.843	irs	9	1	15.7	0
Emirates Global Islamic	1	1	1	-	1	1	0	0
Albaraka bank	0.925	0.986	0.938	irs	6	3	7.5	1.4
CRESENT commercial bank	1	1	1	-	1	1	0	0
CITY bank N.V	0.855	0.892	0.958	drs	7	7	14.5	10.8
HSBC	1	1	1	-	1	1	0	0

Table 1.8: Technical and scale efficiency for year 2008

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
Alied bank	0.843	0.956	0.883	drs	14	4	15.7	4.4
Askari Bank	0.784	0.892	0.878	drs	21	14	21.6	10.8
Bank Alfalah Ltd	0.774	0.851	0.909	drs	23	17	22.6	14.9
Bank Alhabib Ltd	0.887	0.925	0.959	drs	7	10	11.3	7.5
Faysal bank Ltd	0.954	1	0.954	drs	3	1	4.6	0
First women bank	0.946	1	0.946	irs	4	1	5.4	0
Habib bank Ltd	0.841	1	0.841	drs	16	1	15.9	0
KSB bank Ltd	0.865	0.941	0.919	drs	11	7	13.5	5.9
MCB	0.886	1	0.886	drs	8	1	11.4	0
MY Bank Ltd	0.931	0.938	0.993	irs	5	8	6.9	6.2

Names Of banks	TE CRS	TE VRS	S.E	Return to scale	Rank CRS	Rank VRS	PPRU CRS	PPRU VRS
NBP	0.835	1	0.835	drs	18	1	16.5	0
SPCB	0.783	0.816	0.96	drs	22	18	21.7	18.4
Soneri bank Ltd	0.819	0.88	0.93	drs	19	16	18.1	12
The bank of Kyber	1	1	1	-	1	1	0	0
The bank of Punjab	0.75	0.983	0.763	drs	25	1	25	1.7
United bank Ltd	0.841	1	0.841	drs	17	1	15.9	0
ABN Amro (Pakistan) Ltd	0.861	0.963	0.893	drs	12	3	13.9	3.7
Habib metropolitan bank	1	1	1	-	1	1	0	0
Atlas bank Ltd	0.843	0.905	0.931	drs	15	13	15.7	9.5
Arif Habib Rupali bank	1	1	1	-	1	1	0	0
JS bank Ltd	0.871	0.89	0.979	irs	10	15	12.9	11
NIB bank Ltd	0.893	0.952	0.938	drs	6	5	10.7	4.8
Samba bank Ltd	1	1	1	-	1	1	0	0
Standard chartered bank	0.883	1	0.883	drs	9	1	11.7	0
Meezan bank Ltd	0.848	0.923	0.919	drs	13	12	15.2	7.7
Bank Islami Pakistan Ltd	0.758	0.808	0.938	irs	24	19	24.2	19.2
Dubai Islamic bank Pakistan	0.687	0.732	0.939	drs	27	20	31.3	26.8
Dawood Islamic bank Ltd	0.681	0.936	0.728	irs	28	9	31.9	6.4
Emirates Global Islamic	0.95	0.951	0.999	drs	3	6	5	4.9
Albaraka bank	0.958	1	0.958	drs	2	1	4.2	0
CITY bank Ltd	0.815	0.925	0.882	drs	20	11	18.5	7.5
Deutsche bank Ltd	1	1	1	-	1	1	0	0
HSBC	0.737	0.99	0.745	drs	26	2	26.3	1
Barclay bank Ltd	1	1	1	-	1	1	0	0

Note: TE, SE, CRS, VRS means Technical efficiency, Scale efficiency, Constant return to scale and Variable return to scale. PPRU CRS means Possible percentage of reduction under CRS, PPRU VRS means possible percentage of reduction under VRS. Drs means decreasing return to scale. "-"means Constant return to scale. Irs means increasing return to scale.

Cost & Allocative Efficiency under CRS and VRS For Year 2001 Table 2.1

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Alied bank	0.743	0.345	29	65.5	0.846	0.681	13	31.9
Askari Commercial Bank LTD	0.792	0.521	19	47.9	0.73	0.725	11	27.5
Bank Alfalah LTD	0.892	0.474	21	52.6	0.817	0.667	15	33.3
Bank Alhabib LTD	0.784	0.367	28	63.3	0.784	0.369	23	63.1
Faysal bank LTD	0.621	0.591	16	40.9	0.595	0.595	18	40.5
First women bank	0.766	0.657	13	34.3	0.805	0.742	9	25.8
Habib Bank LTD	0.715	0.313	31	68.7	1	1	1	0
KASB Bank LTD	0.807	0.332	30	66.8	0.809	0.349	24	65.1
MCB	0.731	0.448	23	55.2	1	1	1	0
MY Bank LTD	0.666	0.202	32	79.8	0.643	0.244	25	75.6
NBP	0.775	0.401	25	59.9	1	1	1	0
SPCB	0.874	0.474	21	52.6	0.843	0.475	21	52.5
Soneri Bank LTD	0.756	0.519	20	48.1	0.795	0.57	19	43
The Bank of Kyber	0.882	0.766	5	23.4	1	1	1	0
The bank of Punjab	0.635	0.456	22	54.4	0.723	0.564	20	43.6
Union Bank LTD	0.812	0.396	26	60.4	0.793	0.404	22	59.6
United Bank LTD	0.707	0.381	27	61.9	0.9	0.841	7	15.9
Metropolitan Bank Ltd	0.848	0.693	10	30.7	0.94	0.94	2	6
PICIC Bank Ltd	0.872	0.673	12	32.7	0.87	0.679	14	32.1
Prime Bank Ltd	0.83	0.562	17	43.8	0.896	0.683	12	31.7
MBP	0.512	0.445	24	55.5	0.603	0.603	17	39.7
Albaraka bank	0.91	0.747	6	25.3	0.917	0.802	8	19.8

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
CITI Bank N.A	0.801	0.7	9	30	1	1	1	0
Deutsche Bank AG Ltd	0.933	0.727	7	27.3	0.974	0.856	4	14.4
Rupali Bank Ltd	0.889	0.889	3	11.1	1	1	1	0
TOKOYO	0.772	0.545	18	45.5	0.847	0.639	16	36.1
HSBC	1	1	1	0	1	1	1	0
Standard Chartered Grindlays	0.83	0.672	14	32.8	0.981	0.848	5	15.2
ABN Amro N.V	1	1		0	1	1	1	0
American Express	0.945	0.676	11	32.4	0.999	0.768	9	23.2
Bank of Ceylon	1	1	1	0	1	1	1	0
Doha Bank Ltd	0.933	0.933	2	6.7	1	1	1	0
Emirates Bank	0.925	0.709	8	29.1	1	1	1	0
Oman International	0.902	0.593	15	40.7	0.915	0.915	3	8.5
CAIGFB	0.844	0.844	4	15.6	0.848	0.848	6	15.2
Habib Bank AG Zurich	1	1	1	0	1	1	1	0

Note: AE, CE, CRS, VRS means Allocative efficiency, Cost efficiency, Constant return to scale and Variable return to scale. , PPRPOLO means possible percentage of reduction to produce obtain level of output on cots efficient point . Drs means decreasing return to scale. "-"means Constant return to scale. Irs means increasing return to scale. MCB, NBP, HSBC, CAIGFP , MBP stands for Muslim commercial bank, National bank of pakistan, Honkong and shanghi corporation, Credit Agricolo Indosuez : The global French bank and Mashreeq bank Pakistan. TOKOYO stands for The bank of Tokoyo Mitsubushi Ltd. American Express stands for American express bank Ltd. Emirates bank stand for Emirates bank international PJSC. SPCB stands for Saudi-Pak Commercial Pakistan Ltd. Albaraka bank stand for Al Baraka Islamic Bank B.S.C. (E.C). Oman international stands for Oman International Bank S.A.O.G

Cost & Allocative Efficiency under CRS and VRS For Year 2002 Table 2.2

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Alied bank	0.623	0.241	30	75.9	0.928	0.613	16	38.7
Askari Commercial Bank Ltd	0.722	0.366	24	63.4	1	1	1	0
Bank Alfalah Ltd	0.792	0.363	25	63.7	0.991	0.939	4	6.1
Bank Alhabib Ltd	0.789	0.417	19	58.3	0.971	0.929	5	7.1
Faysal bank Ltd	0.656	0.458	16	54.2	0.603	0.459	21	54.1
First women bank	0.713	0.408	20	59.2	1	1	1	0
HABIB Bank LTD	0.861	0.295	29	70.5	1	1	1	0
KASB Bank LTD	0.706	0.216	31	78.4	0.756	0.433	22	56.7
Muslim commercial bank LTD	0.785	0.39	21	61	1	1	1	0
MY Bank LTD	0.682	0.208	32	79.2	0.705	0.219	24	78.1
National Bank of Pakistan	0.904	0.349	27	65.1	1	1	1	0
Saudi-Pak Commercial Bank Ltd	0.77	0.332	28	66.8	0.935	0.545	19	45.5
SONERI Bank LTD	0.769	0.39	22	61	0.974	0.719	11	28.1
The Bank of KYBER	0.884	0.627	10	37.3	0.964	0.819	7	18.1
The bank of PUNJAB	0.683	0.355	26	64.5	0.638	0.403	23	59.7
UNION Bank LTD	0.882	0.471	14	52.9	0.959	0.674	13	32.6
UNITED Bank LTD	0.819	0.368	23	63.2	0.997	0.997	2	0.3
Metropolitan Bank Ltd	0.867	0.654	9	34.6	1	1	1	0
PICIC Bank Ltd	0.792	0.578	11	42.2	0.97	0.911	6	8.9
Prime Bank Ltd	0.858	0.453	18	54.7	0.938	0.616	15	38.4
Mashreeq Bank of Pakistan Ltd	0.594	0.463	15	53.7	0.636	0.636	14	36.4
Meezan Bank Ltd	0.748	0.55	13	45	0.762	0.569	18	43.1
Al Baraka Islamic Bank B.S.C(E.C)	0.928	0.731	4	26.9	0.937	0.746	10	25.4
Habib Bank AG Zurich	1	1	1	0	1	1	1	0
CITI Bank N.A	0.852	0.751	3	24.9	1	1	1	0
Deutsche Bank AG	0.782	0.704	5	29.6	0.858	0.81	9	19

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
RUPALI Bank Ltd	0.77	0.578	12	42.2	1	1	1	0
The Bank of Tokyo-Mitsubishi Ltd	0.809	0.456	17	54.4	0.757	0.496	20	50.4
HSBC	1	1	1	0	1	1	1	0
ABN AMRO N.V	1	1	1	0	1	1	1	0
American Express Bank Ltd	0.943	0.677	6	32.3	0.866	0.686	12	31.4
Bank of Ceylon	1	1	1	0	1	1	1	0
Oman International Bank S.A.O.G	0.956	0.66	7	34	0.813	0.813	8	18.7
CAIGFB	0.97	0.97	2	3	0.974	0.974	3	2.6

Note: AE, CE, CRS, VRS means Allocative efficiency, Cost efficiency, Constant return to scale and Variable return to scale. , PPRPOLO means possible percentage of reduction to produce obtain level of output on cots efficient point . Drs means decreasing return to scale. "-"means Constant return to scale. Irs means increasing return to scale

Cost & Allocative Efficiency under CRS and VRS For Year 2003Table 2.3

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Alied bank	0.387	0.185	28	81.5	0.672	0.478	12	52.2
Askari Commercial Bank LTD	0.517	0.264	21	73.6	0.933	0.869	4	13.1
Bank Alfalah LTD	0.596	0.288	17	71.2	0.935	0.929	2	7.1
Bank Alhabib LTD	0.413	0.242	25	75.8	0.755	0.526	10	47.4
Faysal bank LTD	0.535	0.322	13	67.8	0.703	0.446	15	55.4
FIRST WOMEN Bank LTD	0.372	0.325	12	67.5	0.339	0.339	19	66.1
HABIB Bank LTD	0.568	0.258	18	74.2	1	1	1	0
KASB Bank LTD	0.348	0.176	30	82.4	0.383	0.205	25	79.5
Muslim commercial bank LTD	0.535	0.371	9	62.9	1	1	1	0
MY Bank LTD	0.356	0.096	33	90.4	0.431	0.116	27	88.4
National Bank of Pakistan	0.533	0.301	15	69.9	1	1	1	0
Saudi-Pak Commercial Bank Ltd	0.486	0.235	26	76.5	0.485	0.235	24	76.5
SONERI Bank LTD	0.477	0.291	16	70.9	0.595	0.381	16	61.9
The Bank of KYBER	0.461	0.461	5	53.9	0.47	0.47	14	53
The bank of PUNJAB	0.23	0.145	32	85.5	0.226	0.172	26	82.8
UNION Bank LTD	0.485	0.255	24	74.5	0.898	0.78	5	22
UNITED Bank LTD	0.354	0.181	29	81.9	0.896	0.896	3	10.4
Metropolitan Bank Ltd	0.367	0.339	11	66.1	0.721	0.721	7	27.9
PICIC Bank Ltd	0.487	0.487	4	51.3	1	1	1	0
Prime Bank Ltd	0.481	0.278	19	72.2	0.484	0.29	22	71
NIB Bank Ltd.	0.346	0.265	20	73.5	0.438	0.337	20	66.3
Mashreeq Bank of Pakistan Ltd	0.874	0.263	22	73.7	0.903	0.358	18	64.2
Meezan Bank Ltd	0.5	0.5	3	50	0.537	0.537	9	46.3
Al Baraka Islamic Bank B.S.C(E.C)	0.364	0.229	27	77.1	0.459	0.304	21	69.6
Habib Bank AG Zurich	0.287	0.287	18	71.3	0.288	0.288	23	71.2
CITI Bank N.A	0.51	0.51	2	49	1	1	1	0

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Deutsche Bank AG	0.616	0.357	10	64.3	0.783	0.631	8	36.9
RUPALI Bank Ltd	0.419	0.419	6	58.1	1	1	1	0
The Bank of Tokyo-Mitsubishi Ltd	0.452	0.401	7	59.9	0.746	0.746	6	25.4
HSBC	0.39	0.39	8	61	0.472	0.472	13	52.8
ABN AMRO N.V	1	1	1	0	1	1	1	0
American Express Bank Ltd	0.45	0.308	14	69.2	0.522	0.367	17	63.3
Oman International Bank S.A.O.G	0.352	0.152	31	84.8	1	1	1	0
CAIGFB	0.482	0.278	19	72.2	0.703	0.5	11	50

Note: AE, CE, CRS, VRS means Allocative efficiency, Cost efficiency, Constant return to scale and Variable return to scale. , PPRPOLO means possible percentage of reduction to produce obtain level of output on cots efficient point . Drs means decreasing return to scale. "-"means Constant return to scale. Irs means increasing return to scale

Cost & Allocative Efficiency under CRS and VRS For Year 2004 Table 2.4

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Alied bank	0.878	0.551	11	44.9	1	1	1	0
Askari Commercial Bank LTD	0.96	0.511	17	48.9	0.849	0.849	5	15.1
Bank Alfalah LTD	0.908	0.49	13	51	0.875	0.862	4	13.8
Bank Alhabib LTD	0.845	0.548	13	45.2	0.892	0.729	9	27.1
Faysal bank LTD	0.88	0.74	5	26	1	1	1	0
FIRST WOMEN Bank LTD	0.719	0.588	9	41.2	0.694	0.694	11	30.6
HABIB Bank LTD	0.788	0.36	28	64	1	1	1	0
KASB Bank LTD	0.792	0.465	22	53.5	0.77	0.471	18	52.9
Muslim commercial bank LTD	0.784	0.355	29	64.5	0.769	0.74	8	26
MY Bank LTD	0.643	0.223	30	77.7	0.65	0.225	22	77.5
National Bank of Pakistan	0.818	0.502	18	49.8	1	1	1	0
Saudi-Pak Commercial Bank Ltd	0.796	0.495	19	50.5	0.997	0.655	13	34.5
SONERI Bank LTD	0.883	0.677	8	32.3	0.959	0.892	2	10.8
The Bank of KYBER	1	1	1	0	1	1	1	0
The bank of PUNJAB	0.653	0.485	21	51.5	0.659	0.598	14	40.2
UNION Bank LTD	0.882	0.539	14	46.1	0.875	0.744	7	25.6
UNITED Bank LTD	0.705	0.432	25	56.8	1	1	1	0
Metropolitan Bank Ltd	0.963	0.912	3	8.8	1	1	1	0
PICIC Bank Ltd	0.934	0.934	2	6.6	1	1	1	0
Prime Bank Ltd	0.878	0.535	15	46.5	0.851	0.535	16	46.5
Atlas Bank Ltd.	1	1	1	0	1	1	1	0
NIB Bank Ltd.	0.777	0.777	4	22.3	0.781	0.781	6	21.9
Samba Bank Limited	0.863	0.362	26	63.8	0.966	0.423	20	57.7
Meezan Bank Ltd	0.734	0.528	16	47.2	0.73	0.528	17	47.2
Al Baraka Islamic Bank B.S.C(E.C)	0.829	0.711	6	28.9	0.839	0.72	10	28
Habib Bank AG Zurich	0.551	0.551	12	44.9	0.657	0.657	12	34.3

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Crescent Commercial Bank Ltd.	0.863	0.362	27	63.8	0.966	0.423	21	57.7
CITI Bank N.A	1	1	1	0	1	1	1	0
Deutsche Bank AG	0.586	0.46	23	54	0.709	0.561	15	43.9
RUPALI Bank Ltd	1	1	1	0	1	1	1	0
The Bank of Tokyo-Mitsubishi Ltd	0.84	0.695	7	30.5	0.889	0.889	3	11.1
HSBC	1	1	1	0	1	1	1	0
ABN AMRO N.V	1	1	1	0	1	1	1	0
American Express Bank Ltd	0.802	0.451	24	54.9	0.792	0.468	19	53.2
Oman International Bank S.A.O.G	0.596	0.58	10	42	1	1	1	0

Note: AE, CE, CRS, VRS means Allocative efficiency, Cost efficiency, Constant return to scale and Variable return to scale. , PPRPOLO means possible percentage of reduction to produce obtain level of output on cots efficient point . Drs means decreasing return to scale. "-"means Constant return to scale. Irs means increasing return to scale

Cost & Allocative Efficiency under CRS and VRS for Year 2005 Table 2.5

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Alied bank	0.66	0.368	26	63.2	0.783	0.652	16	34.8
Askari Commercial Bank LTD	0.911	0.615	15	38.5	0.906	0.794	17	20.6
Bank Alfalah LTD	0.85	0.593	17	40.7	0.916	0.853	6	14.7
Bank Alhabib LTD	0.849	0.633	13	36.7	0.91	0.68	15	32
Faysal bank LTD	0.905	0.905	3	9.5	1	1	1	0
FIRST WOMEN Bank LTD	1	1	1	0	1	1	1	0
HABIB Bank LTD	0.726	0.478	23	52.2	1	1	1	0
KASB Bank LTD	0.9	0.5	22	50	0.919	0.518	19	48.2
Muslim commercial bank LTD	0.649	0.381	25	61.9	0.749	0.748	11	25.2
MY Bank LTD	0.743	0.349	29	65.1	0.767	0.365	22	63.5
National Bank of Pakistan	0.757	0.595	16	40.5	1	1	1	0
Saudi-Pak Commercial Bank Ltd	0.824	0.679	11	32.1	0.828	0.684	14	31.6
SONERI Bank LTD	0.806	0.668	12	33.2	0.837	0.695	13	30.5
The Bank of KYBER	0.924	0.924	2	7.6	0.93	0.93	4	7
The bank of PUNJAB	0.881	0.592	18	40.8	0.928	0.764	9	23.6
UNION Bank LTD	0.792	0.77	7	23	1	1	1	0
UNITED Bank LTD	0.732	0.535	8	46.5	1	1	1	0
Metropolitan Bank Ltd	1	1	1	0	1	1	1	0
PICIC Bank Ltd	0.895	0.895	4	10.5	0.932	0.932	3	6.8
Prime Bank Ltd	0.905	0.568		43.2	0.904	0.569	18	43.1
Atlas Bank Ltd.	0.793	0.782	6	21.8	0.923	0.923		7.7
NIB Bank Ltd.	0.876	0.748	20	25.2	0.881	0.753	5	24.7
Samba Bank Limited	0.767	0.352	27	64.8	0.839	0.387	20	61.3
Meezan Bank Ltd	0.771	0.618	14	38.2	0.773	0.633	17	36.7
Al Baraka Islamic Bank B.S.C(E.C)	0.904	0.709	10	29.1	0.852	0.736	12	26.4

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Habib Bank AG Zurich	1	1	1	0	1	1	1	0
Crescent Commercial Bank Ltd.	0.767	0.352	28	64.8	0.839	0.387	21	61.3
CITI Bank N.A	0.769	0.769	8	23.1	0.772	0.772	8	22.8
Deutsche Bank AG	0.493	0.425	24	57.5	1	1	1	0
RUPALI Bank Ltd	0.889	0.889	5	11.1	1	1	1	0
HSBC	1	1	1	0	1	1	1	0
ABN AMRO N.V	1	1	1	0	1	1	1	0
American Express Bank Ltd	0.746	0.589	19	41.1	0.986	0.986	2	1.4

Note: AE, CE, CRS, VRS means Allocative efficiency, Cost efficiency, Constant return to scale and Variable return to scale. , PPRPOLO means possible percentage of reduction to produce obtain level of output on cots efficient point . Drs means decreasing return to scale. "-"means Constant return to scale. Irs means increasing return to scale

Cost & Allocative Efficiency under CRS and VRS For Year 2006 Table 2.6

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Alied bank	0.836	0.544	18	45.6	0.895	0.751	7	24.9
Askari Commercial Bank LTD	0.953	0.653	10	34.7	0.936	0.75	8	25
Bank Alfalah LTD	0.833	0.534	20	46.6	0.896	0.735	11	26.5
Bank Alhabib LTD	0.827	0.633	12	36.7	0.809	0.647	17	35.3
Faysal bank LTD	0.979	0.944	2	5.6	0.982	0.982	2	1.8
FIRST WOMEN Bank LTD	0.662	0.568	15	43.2	0.717	0.717	12	28.3
HABIB Bank LTD	0.704	0.501	22	49.9	1	1	1	0
KASB Bank LTD	0.978	0.561	16	43.9	0.975	0.567	20	43.3
Muslim commercial bank LTD	0.783	0.479	23	52.1	0.774	0.747	10	25.3
MY Bank LTD	0.785	0.572	14	42.8	0.782	0.573	19	42.7
National Bank of Pakistan	0.744	0.528	21	47.2	1	1	1	0
Saudi-Pak Commercial Bank Ltd	0.892	0.661	9	33.9	0.844	0.669	15	33.1
SONERI Bank LTD	0.909	0.67	8	33	0.905	0.679	14	32.1
The Bank of KYBER	1	1	1	0	1	1	1	0
The bank of PUNJAB	0.802	0.651	11	34.9	0.772	0.748	9	25.2
UNITED Bank LTD	0.722	0.549	17	45.1	1	1	1	0
Arif Habib Rupali Bank Ltd.	0.424	0.424	25	57.6	0.65	0.65	16	35
Atlas Bank Ltd.	0.761	0.761	6	23.9	0.779	0.779	5	22.1
JS Bank Ltd.	1	1	1	0	1	1	1	0
NIB Bank Ltd.	0.879	0.779	4	22.1	0.877	0.782	4	21.8
Samba Bank Limited	0.831	0.367	26	63.3	0.917	0.449	22	55.1
Standard Chartered Bank Pakistan Ltd	0.654	0.473	24	52.7	0.81	0.687	13	31.3
PICIC Commercial Bank Ltd	0.885	0.776	5	22.4	0.86	0.778	6	22.2
Prime Bank Ltd	0.972	0.591	13	40.9	0.975	0.594	18	40.6
Habib Metropolitan Bank Ltd.	1	1	1	0	1	1	1	0
Meezan Bank Ltd	0.326	0.315	29	68.5	0.349	0.344	25	65.6

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Bank Islami Pakistan Ltd.	0.679	0.303	30	69.7	1	1	1	0
Dubai Islamic Bank Pakistan Ltd.	0.542	0.355	28	64.5	0.455	0.361	24	63.9
Al Baraka Islamic Bank B.S.C. (E.C)	0.202	0.2	31	80	0.308	0.308	26	69.2
Crescent Commercial Bank Ltd.	0.831	0.367	27	63.3	0.917	0.449	23	55.1
Citibank N.A	0.677	0.537	19	46.3	0.679	0.539	21	46.1
Deutsche Bank AG	0.68	0.68	7	32	1	1	1	0
HSBC	0.868	0.868	3	13.2	0.912	0.912	3	8.8
ABN AMRO N.V	1	1	1	0	1	1	1	0

Note: AE, CE, CRS, VRS means Allocative efficiency, Cost efficiency, Constant return to scale and Variable return to scale. , PPRPOLO means

possible percentage of reduction to produce obtain level of output on cots efficient point . Drs means decreasing return to scale.   "-"means

Constant return to scale. Irs means increasing return to scale

Cost & Allocative Efficiency under CRS and VRS For Year 2007 Table 2.7

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Alied bank	0.735	0.561	27	43.9	0.863	0.814	5	18.6
Askari Commercial Bank LTD	0.673	0.526	20	47.4	0.793	0.711	12	28.9
Bank Alfalah LTD	0.831	0.553	16	44.7	0.811	0.717	11	28.3
Bank Alhabib LTD	0.786	0.552	17	44.8	0.768	0.666	17	33.4
Faysal bank LTD	0.815	0.798	5	20.2	1	1	1	0
FIRST WOMEN Bank LTD	0.464	0.452	26	54.8	0.665	0.665	18	33.5
HABIB Bank LTD	0.672	0.528	19	47.2	1	1	1	0
KASB Bank LTD	0.746	0.615	8	38.5	0.812	0.693	15	30.7
Muslim commercial bank LTD	0.678	0.488	24	51.2	0.695	0.695	14	30.5
MY Bank LTD	1	1	1	0	1	1	1	0
National Bank of Pakistan	0.737	0.569	14	43.1	1	1	1	0
Saudi-Pak Commercial Bank Ltd	0.88	0.685	6	31.5	0.828	0.708	13	29.2
SONERI Bank LTD	0.908	0.669	7	33.1	0.89	0.743	8	25.7
The Bank of KYBER	0.901	0.86	3	14	0.952	0.952	2	4.8
The bank of PUNJAB	0.722	0.607	9	39.3	0.805	0.805	6	19.5
UNITED Bank LTD	0.626	0.463	25	53.7	0.848	0.848	4	15.2
Habib Metropolitan Bank Ltd.	1	1	1	0	1	1	1	0
ABN AMRO (Pakistan) Limited	0.527	0.416	27	58.4	0.65	0.564	23	43.6
Arif Habib Rupali Bank Ltd.	0.607	0.607	10	39.3	0.617	0.617	21	38.3
Atlas Bank Ltd.	0.642	0.543	18	45.7	0.67	0.574	22	42.6
JS Bank Ltd.	0.639	0.589	12	41.1	0.669	0.636	20	36.4
NIB Bank Ltd.	0.794	0.601	11	39.9	0.764	0.673	16	32.7
Samba Bank Limited	0.525	0.525	21	47.5	0.544	0.544	24	45.6
Standard Chartered Bank Pakistan Ltd	0.47	0.395	28	60.5	0.729	0.726	10	27.4
Meezan Bank Ltd	0.669	0.579	13	42.1	0.842	0.74	9	26
Bank Islami Pakistan Ltd.	0.443	0.354	30	64.6	0.506	0.412	27	58.8

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Dubai Islamic Bank Pakistan Ltd.	0.303	0.213	32	78.7	0.328	0.232	28	76.8
Dawood Islamic Bank Ltd.	0.435	0.366	29	63.4	0.792	0.792	7	20.8
Emirates Global Islamic Bank Ltd.	0.319	0.319	31	68.1	0.517	0.517	26	48.3
Al Baraka Islamic Bank B.S.C. (E.C)	0.934	0.863	2	13.7	0.905	0.893	3	10.7
Crescent Commercial Bank Ltd.	0.525	0.525	22	47.5	0.544	0.544	25	45.6
Citibank N.A	0.595	0.509	23	49.1	0.73	0.652	19	34.8
Deutsche Bank AG	1	1	1	0	1	1	1	0
HSBC	0.852	0.852	4	14.8	1	1	1	0

Note: AE, CE, CRS, VRS means Allocative efficiency, Cost efficiency, Constant return to scale and Variable return to scale. , PPRPOLO means

possible percentage of reduction to produce obtain level of output on cots efficient point . Drs means decreasing return to scale. "-"means

Constant return to scale. Irs means increasing return to scale

Cost & Allocative Efficiency under CRS and VRS for Year 2008 Table 2.8

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Alied bank	0.723	0.609	10	39.1	0.811	0.775	8	22.5
Askari Commercial Bank LTD	0.681	0.533	18	46.7	0.772	0.688	16	31.2
Bank Alfalah LTD	0.703	0.544	17	45.6	0.787	0.67	18	33
Bank Alhabib LTD	0.702	0.623	18	37.7	0.68	0.629	21	37.1
Faysal bank LTD	0.798	0.761	2	23.9	0.897	0.897	3	10.3
FIRST WOMEN Bank LTD	0.515	0.487	24	51.3	0.986	0.986	2	1.4
HABIB Bank LTD	0.736	0.619	9	38.1	1	1	1	0
KASB Bank LTD	0.726	0.628	7	37.2	0.725	0.682	17	31.8
Muslim commercial bank LTD	0.625	0.554	14	44.6	0.755	0.755	11	24.5
MY Bank LTD	0.78	0.727	4	27.3	0.826	0.774	9	22.6
National Bank of Pakistan	0.703	0.587	11	41.3	1	1	1	0
Saudi-Pak Commercial Bank Ltd	0.706	0.553	15	44.7	0.685	0.559	23	44.1
SONERI Bank LTD	0.772	0.632	6	36.8	0.86	0.757	10	24.3
The Bank of KYBER	1	1	1	0	1	1	1	0
The bank of PUNJAB	0.672	0.505	22	49.5	0.739	0.726	12	27.4
UNITED Bank LTD	0.653	0.549	16	45.1	0.832	0.832	5	16.8
ABN AMRO (Pakistan) Limited	0.501	0.431	1	56.9	0.555	0.534	25	46.6
Arif Habib Rupali Bank Ltd.	0.728	0.728	3	27.2	0.776	0.776	7	22.4
Atlas bank Ltd	0.502	0.423	26	57.7	0.556	0.503	27	49.7
Habib Metropolitan Bank Ltd.	1	1	1	0	1	1	1	0
JS Bank Ltd.	0.6	0.523	20	47.7	0.714	0.636	20	36.4
NIB Bank Ltd.	0.636	0.568	13	43.2	0.66	0.629	22	37.1
Samba Bank Limited	0.401	0.401	28	59.9	0.538	0.538	24	46.2
Standard Chartered Bank Pakistan Ltd	0.589	0.52	21	48	0.862	0.862	4	13.8
Meezan Bank Ltd	0.623	0.528	19	47.2	0.71	0.655	19	34.5
Bank Islami Pakistan Ltd.	0.546	0.414	27	58.6	0.639	0.517	26	48.3

Names Of banks	AE CRS	CE CRS	Ranks CRS	PPRPOLO	AE VRS	CE VRS	Ranks VRS	PPRPOLO
Dubai Islamic Bank Pakistan Ltd.	0.498	0.342	32	65.8	0.553	0.404	30	59.6
Dawood Islamic Bank Ltd.	0.584	0.398	29	60.2	0.738	0.691	15	30.9
Emirates Global Islamic Bank Ltd.	0.379	0.36	31	64	0.472	0.449	28	55.1
Al Baraka Islamic Bank B.S.C. (E.C)	0.677	0.649	5	35.1	0.725	0.725	13	27.5
Citibank N.A	0.617	0.503	23	49.7	0.748	0.692	14	30.8
Deutsche Bank AG	1	1	1	0	1	1	11	0
HSBC	0.793	0.584	12	41.6	0.827	0.818	6	18.2
Barclay Bank Plc	0.372	0.372	30	62.8	0.43	0.43	29	57

Note: AE, CE, CRS, VRS means Allocative efficiency, Cost efficiency, Constant return to scale and Variable return to scale. , PPRPOLO means possible percentage of reduction to produce obtain level of output on cots efficient point . Drs means decreasing return to scale. "-"means Constant return to scale. Irs means increasing return to scale

Income and scale efficiency for year 2001 table 3.1

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Alied bank	0.743	0.743	0.999	-	27	21	25.7	25.7
Askari Commercial Bank LTD	0.962	1	0.962	drs	4	1	3.8	0
Bank Alfalah LTD	0.872	0.912	0.956	drs	16	10	12.8	8.8
Bank Alhabib LTD	0.929	0.948	0.98	drs	9	4	7.1	5.2
Faysal bank LTD	0.937	1	0.937	drs	8	1	6.3	0
FIRST WOMEN Bank LTD	1	1	1	-	1	1	0	0
HABIB Bank LTD	0.95	1	0.95	drs	7	1	5	0
KASB Bank LTD	0.768	0.775	0.991	irs	26	18	23.2	22.5
Muslim commercial bank LTD	1	1	1	-	1	1	0	0
MY Bank LTD	0.834	0.85	0.981	irs	20	14	16.6	15
National Bank of Pakistan	0.957	1	0.957	drs	6	1	4.3	0
Saudi-Pak Commercial Bank Ltd	0.544	0.547	0.994	irs	29	22	45.6	45.3
SONERI Bank LTD	1	1	1	-	1	1	0	0
The Bank of KYBER	0.88	0.932	0.945	drs	15	6	12	6.8
The bank of PUNJAB	0.96	0.962	0.998	drs	5	3	4	3.8
UNION Bank LTD	0.884	0.888	0.996	irs	14	12	11.6	11.2
UNITED Bank LTD	1	1	1	-	1	1	0	0
Metropolitan Bank Ltd	1	1	1	-	1	1	0	0
PICIC Bank Ltd	0.92	0.93	0.989	irs	11	7	8	7
Prime Bank Ltd	1	1	1	-	1	1	0	0
Mashreeq Bank of Pakistan Ltd	0.828	0.852	0.971	drs	21	13	17.2	14.8
Al Baraka Islamic Bank B.S.C(E.C)	0.995	1	0.995	irs	2	1	0.5	0
CITI Bank N.A	0.777	0.78	0.996	irs	24	17	22.3	22
Deutsche Bank AG	0.84	0.928	0.905	irs	19	8	16	7.2
RUPALI Bank Ltd	0.841	1	0.841	irs	18	1	15.9	0
The Bank of Tokyo-Mitsubishi Ltd	0.989	1	0.989	drs	3	1	1.1	0

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
HSBC	0.87	0.89	0.978	irs	17	11	13	11
Standard Chartered	0.914	0.925	0.988	drs	13	9	8.6	7.5
ABN AMRO N.V	0.919	0.986	0.932	drs	22	15	8.1	1.4
American Express Bank	0.813	0.825	0.986	irs	12	2	18.7	17.5
Bank of Ceylon	1	1	1	-	1	1	0	0
Doha Bank Ltd	0.166	0.288	0.578	irs	30	23	83.4	71.2
Emirates Bank	0.8	0.801	0.998	drs	23	16	20	19.9
Oman International	0.693	0.752	0.921	irs	28	20	30.7	24.8
CAIGFB	0.769	0.772	0.996	drs	25	19	23.1	22.8
Habib Bank AG Zurich	0.923	0.947	0.974	drs	10	5	7.7	5.3

Note; IE CRS stands for income efficiency under Constant return to scale. IE VRS stands for income efficiency under variable return to scale. PIOOEP CRS stands for Possible increase of output with same level of expenditures under constant return to scale. PIOOEP CRS stands for Possible increase of output with same level of expenditures under variable return to scale. Irs means increasing return to scale. Drs means decreasing return to scale. — means constant return to scale. MCB, NBP, HSBC, CAIGFP , MBP stands for Muslim commercial bank, National bank of pakistan, Honkong and shanghi corporation, Credit Agricolo Indosuez : The global French bank and Mashreeq bank Pakistan

Income and scale efficiency for year 2002 table 3.2

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Alied bank	0.912	1	0.912	-	5	1	8.8	0
Askari Commercial Bank LTD	0.761	0.857	0.888	drs	19	8	23.9	14.3
Bank Alfalah LTD	0.672	0.758	0.887	drs	23	15	32.8	24.2
Bank Alhabib LTD	0.673	0.734	0.916	drs	22	18	32.7	26.6
Faysal bank LTD	0.933	1	0.933	drs	3	1	6.7	0
FIRST WOMEN Bank LTD	0.795	0.848	0.938	-	14	10	20.5	15.2
HABIB Bank LTD	0.867	1	0.867	drs	7	1	13.3	0
KASB Bank LTD	0.55	0.555	0.99	irs	29	23	45	44.5
Muslim commercial bank LTD	1	1	1	-	1	1	0	0
MY Bank LTD	0.702	0.771	0.91	irs	7	1	29.8	22.9
National Bank of Pakistan	0.808	1	0.808	drs	13	1	19.2	0
Saudi-Pak Commercial Bank Ltd	1	1	1	irs	1	1	0	0
SONERI Bank LTD	0.841	0.892	0.943	-	10	5	15.9	10.8
The Bank of KYBER	1	1	1	drs	1	1	0	0
The bank of PUNJAB	0.863	0.887	0.973	drs	9	6	13.7	11.3
UNION Bank LTD	0.659	0.768	0.857	irs	24	14	34.1	23.2
UNITED Bank LTD	0.867	1	0.867	-	8	1	13.3	0
Metropolitan Bank Ltd	0.908	0.967	0.939	-	6	3	9.2	3.3
PICIC Bank Ltd	0.927	0.95	0.976	irs	4	4	7.3	5
Prime Bank Ltd	0.657	0.746	0.881	-	25	15	34.3	25.4
Mashreeq Bank of Pakistan Ltd	0.764	0.819	0.933	drs	18	12	23.6	18.1
Meezan Bank Ltd	0.766	0.984	0.779	irs	17	2	23.4	1.6
Al Baraka Islamic Bank B.S.C(E.C)	0.835	0.864	0.966	irs	11	7	16.5	13.6
Habib Bank AG Zurich	0.999	1	0.999	irs	2	1	0.1	0
CITI Bank N.A	0.773	1	0.773	irs	16	1	22.7	0
Deutsche Bank AG	0.83	0.846	0.982	drs	12	11	17	15.4

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
RUPALI Bank Ltd	1	1	1	irs	1	1	0	0
The Bank of Tokyo-Mitsubishi Ltd	0.717	0.75	0.955	drs	9	6	28.3	25
HSBC	0.646	0.693	0.933	drs	20	16	35.4	30.7
ABN AMRO N.V	0.774	0.853	0.908	irs	15	9	22.6	14.7
American Express Bank Ltd	0.58	0.67	0.865	-	27	20	42	33
Bank of Ceylon	1	1	1	irs	1	1	0	0
Oman International Bank S.A.O.G	0.56	0.57	0.982	drs	28	22	44	43
CAIGFB	0.545	0.594	0.918	irs	30	21	45.5	40.6

Note; IE CRS stands for income efficiency under Constant return to scale. IE VRS stands for income efficiency under variable return to scale. PIOOEP CRS stands for Possible increase of output with same level of expenditures under constant return to scale. PIOOEP CRS stands for Possible increase of output with same level of expenditures under variable return to scale. Irs means increasing return to scale. Drs means decreasing return to scale. – means constant return to scale. MCB, NBP, HSBC, CAIGFP , MBP stands for Muslim commercial bank, National bank of pakistan, Honkong and shanghi corporation, Credit Agricolo Indosuez : The global French bank and Mashreeq bank Pakistan

Income and scale efficiency for year 2003 table 3.3

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Alied bank	0.861	0.911	0.945	drs	3	4	13.9	8.9
Askari Commercial Bank LTD	0.62	0.623	0.995	drs	16	16	38	37.7
Bank Alfalah LTD	0.656	0.772	0.85	drs	14	8	34.4	22.8
Bank Alhabib LTD	0.517	0.519	0.997	irs	21	19	48.3	48.1
Faysal bank LTD	1	1	1	-	1	1	0	0
FIRST WOMEN Bank LTD	0.601	0.61	0.984	drs	17	17	39.9	39
HABIB Bank LTD	0.695	1	0.695	drs	10	1	30.5	0
KASB Bank LTD	0.439	0.463	0.947	drs	25	24	56.1	53.7
Muslim commercial bank LTD	0.683	0.871	0.785	drs	12	5	31.7	12.9
MY Bank LTD	0.812	0.931	0.873	drs	5	3	18.8	6.9
National Bank of Pakistan	0.594	1	0.594	drs	18	1	40.6	0
Saudi-Pak Commercial Bank Ltd	0.741	0.758	0.978	irs	7	9	25.9	24.2
SONERI Bank LTD	0.722	0.73	0.989	irs	8	10	27.8	27
The Bank of KYBER	0.969	0.988	0.98	irs	2	2	3.1	1.2
The bank of PUNJAB	0.688	0.725	0.95	drs	11	11	31.2	27.5
UNION Bank LTD	0.417	0.432	0.967	drs	26	25	58.3	56.8
UNITED Bank LTD	1	1	1	-	1	1	0	0
Metropolitan Bank Ltd	0.852	0.859	0.993	irs	4	6	14.8	14.1
PICIC Bank Ltd	0.707	0.717	0.987	irs	9	12	29.3	28.3
Prime Bank Ltd	0.472	0.478	0.988	drs	24	23	52.8	52.2
NIB Bank Ltd.	0.587	0.666	0.881	irs	19	15	41.3	33.4
Mashreeq Bank of Pakistan Ltd	1	1	1	-	1	1	0	0
Meezan Bank Ltd	0.478	0.49	0.975	drs	23	22	52.2	51
Al Baraka Islamic Bank B.S.C(E.C)	0.56	0.591	0.947	irs	20	18	44	40.9
Habib Bank AG Zurich	0.812	0.824	0.986	irs	6	7	18.8	17.6
CITI Bank N.A	0.674	0.686	0.983	drs	13	13	32.6	31.4
Deutsche Bank AG	1	1	1	-	1	1	0	0

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
RUPALI Bank Ltd	1	1	1	-	1	1	0	0
The Bank of Tokyo-Mitsubishi Ltd	0.396	0.419	0.945	irs	28	26	60.4	58.1
HSBC	0.504	0.508	0.991	drs	22	20	49.6	49.2
ABN AMRO N.V	0.654	0.683	0.958	drs	15	14	34.6	31.7
American Express Bank Ltd	0.381	0.398	0.958	drs	29	27	61.9	60.2
Oman International Bank S.A.O.G	0.415	0.507	0.818	irs	27	21	58.5	49.3
CAIGFB	0.207	0.228	0.905	drs	30	28	79.3	77.2

Note; IE CRS stands for income efficiency under Constant return to scale. IE VRS stands for income efficiency under variable return to scale. PIOOEP CRS stands for Possible increase of output with same level of expenditures under constant return to scale. PIOOEP CRS stands for Possible increase of output with same level of expenditures under variable return to scale. Irs means increasing return to scale. Drs means decreasing return to scale. – means constant return to scale. MCB, NBP, HSBC, CAIGFP stands for Muslim commercial bank, National bank of pakistan, Honkong and shanghi corporation, Credit Agricolo Indosuez : The global French bank

Income and scale efficiency for year 2004 table 3.4

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Alied bank	1	1	1	-	1	1	0	0
Askari Commercial Bank LTD	0.666	0.678	0.983	drs	9	5	33.4	32.2
Bank Alfalah LTD	0.425	0.522	0.814	drs	26	16	57.5	47.8
Bank Alhabib LTD	0.442	0.442	0.999	-	22	20	55.8	55.8
Faysal bank LTD	0.641	0.641	0.999	drs	11	6	35.9	35.9
FIRST WOMEN Bank LTD	0.642	0.652	0.984	irs	13	10	35.8	34.8
HABIB Bank LTD	0.702	1	0.702	drs	6	1	29.8	0
KASB Bank LTD	0.354	0.356	0.995	irs	29	24	64.6	64.4
Muslim commercial bank LTD	0.709	0.882	0.804	drs	5	2	29.1	11.8
MY Bank LTD	0.594	0.6	0.989	irs	16	12	40.6	40
National Bank of Pakistan	0.559	1	0.559	drs	18	1	44.1	0
Saudi-Pak Commercial Bank Ltd	0.692	0.695	0.997	irs	7	3	30.8	30.5
SONERI Bank LTD	0.568	0.569	0.998	irs	17	10	43.2	43.1
The Bank of KYBER	0.675	0.68	0.993	irs	8	4	32.5	32
The bank of PUNJAB	0.613	0.614	0.999	drs	14	11	38.7	38.6
UNION Bank LTD	0.482	0.537	0.897	drs	21	14	51.8	46.3
UNITED Bank LTD	1	1	1	-	1	1	0	0
Metropolitan Bank Ltd	0.641	0.642	0.998	irs	12	7	35.9	35.8
PICIC Bank Ltd	0.532	0.533	0.998	irs	19	15	46.8	46.7
Prime Bank Ltd	0.432	0.433	0.998	irs	24	21	56.8	56.7
Atlas Bank Ltd.	0.845	1	0.845	irs	3	1	15.5	0
NIB Bank Ltd.	0.379	0.381	0.995	irs	27	22	62.1	61.9
Samba Bank Limited	0.313	0.319	0.984	irs	31	26	68.7	68.1
Meezan Bank Ltd	0.502	0.503	0.999	irs	20	17	49.8	49.7
Al Baraka Islamic Bank B.S.C(E.C)	0.427	0.464	0.921	irs	25	18	57.3	53.6
Habib Bank AG Zurich	0.621	0.624	0.996	irs	13	10	37.9	37.6
Crescent Commercial Bank Ltd.	0.313	0.319	0.984	irs	32	27	68.7	68.1

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
CITI Bank N.A	1	1	1	-	1	1	0	0
Deutsche Bank AG	1	1	1	-	1	1	0	0
RUPALI Bank Ltd	0.727	1	0.727	irs	4	1	27.3	0
The Bank of Tokyo-Mitsubishi Ltd	0.914	1	0.914	irs	2	1	8.6	0
HSBC	0.439	0.446	0.985	irs	23	19	56.1	55.4
ABN AMRO N.V	0.369	0.369	0.999	-	28	23	63.1	63.1
American Express Bank Ltd	0.601	0.637	0.944	drs	15	9	39.9	36.3
Oman International Bank S.A.O.G	0.314	0.356	0.88	irs	30	25	68.6	64.4

Note; IE CRS stands for income efficiency under Constant return to scale. IE VRS stands for income efficiency under variable return to scale. PIOOEP CRS stands for Possible increase of output with same level of expenditures under constant return to scale. PIOOEP CRS stands for Possible increase of output with same level of expenditures under variable return to scale. Irs means increasing return to scale. Drs means decreasing return to scale. – means constant return to scale. MCB, NBP, HSBC, CAIGFP stands for Muslim commercial bank, National bank of pakistan, Honkong and shanghi corporation, Credit Agricolo Indosuez : The global French bank

Income and scale efficiency for year 2005 table 3.5

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Alied bank	0.82	0.824	0.995	irs	8	6	18	17.6
Askari Commercial Bank LTD	0.866	0.894	0.969	drs	7	4	13.4	10.6
Bank Alfalah LTD	0.389	1	0.389	drs	24	1	61.1	0
Bank Alhabib LTD	0.804	0.814	0.988	irs	11	8	19.6	18.6
Faysal bank LTD	1	1	1	-	1	1	0	0
FIRST WOMEN Bank LTD	0.802	1	0.802	irs	12	1	19.8	0
HABIB Bank LTD	0.816	1	0.816	drs	9	1	18.4	0
KASB Bank LTD	0.506	0.544	0.929	irs	22	17	49.4	45.6
Muslim commercial bank LTD	1	1	1	-	1	1	0	0
MY Bank LTD	0.658	0.762	0.863	irs	20	12	34.2	23.8
National Bank of Pakistan	0.917	1	0.917	drs	3	1	8.3	0
Saudi-Pak Commercial Bank Ltd	0.762	0.77	0.99	irs	13	9	23.8	23
SONERI Bank LTD	0.998	1	0.998	drs	2	1	0.2	0
The Bank of KYBER	1	1	1	-	1	1	0	0
The bank of PUNJAB	0.688	0.696	0.989	irs	17	13	31.2	30.4
UNION Bank LTD	0.75	0.766	0.979	drs	14	11	25	23.4
UNITED Bank LTD	1	1	1	-	1	1	0	0
Metropolitan Bank Ltd	1	1	1	-	1	1	0	0
PICIC Bank Ltd	0.898	0.905	0.993	irs	6	3	10.2	9.5
Prime Bank Ltd	0.748	0.769	0.974	irs	15	10	25.2	23.1
Atlas Bank Ltd.	0.471	1	0.471	irs	23	1	52.9	0
NIB Bank Ltd.	0.628	0.653	0.962	irs	21	16	37.2	34.7
Samba Bank Limited	0.296	0.333	0.89	irs	25	18	70.4	66.7
Meezan Bank Ltd	0.676	0.695	0.972	irs	18	14	32.4	30.5
Al Baraka Islamic Bank B.S.C(E.C)	0.906	1	0.906	irs	5	1	9.4	0
Habib Bank AG Zurich	0.908	0.915	0.992	drs	4	2	9.2	8.5
Crescent Commercial Bank Ltd.	0.296	0.333	0.89	irs	26	19	70.4	66.7

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
CITI Bank N.A	0.699	0.874	0.799	drs	16	5	30.1	12.6
Deutsche Bank AG	1	1	1	-	1	1	0	0
HSBC	1	1	1	-	1	1	0	0
ABN AMRO N.V	0.808	0.815	0.992	irs	10	7	19.2	18.5
American Express Bank Ltd	0.67	0.673	0.994	drs	19	15	33	32.7

Note; IE CRS stands for income efficiency under Constant return to scale. IE VRS stands for income efficiency under variable return to scale. PIOOEP CRS stands for Possible increase of output with same level of expenditures under constant return to scale. PIOOEP CRS stands for Possible increase of output with same level of expenditures under variable return to scale. Irs means increasing return to scale. Drs means decreasing return to scale. – means constant return to scale. MCB, NBP, HSBC, CAIGFP stands for Muslim commercial bank, National bank of pakistan, Honkong and shanghi corporation, Credit Agricolo Indosuez : The global French bank

Income and scale efficiency for year 2006 table 3.6

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Alied bank	0.738	0.777	0.949	drs	10	11	26.2	22.3
Askari Commercial Bank LTD	0.808	0.869	0.93	drs	7	6	19.2	13.1
Bank Alfalah LTD	0.417	0.99	0.421	drs	24	2	58.3	1
Bank Alhabib LTD	0.719	0.719	1	-	11	12	28.1	28.1
Faysal bank LTD	1	1	1	-	1	1	0	0
FIRST WOMEN Bank LTD	0.633	0.634	0.998	irs	16	16	36.7	36.6
HABIB Bank LTD	0.635	1	0.635	drs	15	1	36.5	0
KASB Bank LTD	0.519	0.519	1	-	22	21	48.1	48.1
Muslim commercial bank LTD	1	1	1	-	1	1	0	0
MY Bank LTD	0.673	0.673	0.999	-	14	14	32.7	32.7
National Bank of Pakistan	0.845	1	0.845	drs	6	1	15.5	0
Saudi-Pak Commercial Bank Ltd	0.63	0.63	1	-	18	18	37	37
SONERI Bank LTD	0.989	0.989	1	-	2	3	1.1	1.1
The Bank of KYBER	0.948	0.949	0.999	irs	3	4	5.2	5.1
The bank of PUNJAB	0.396	0.443	0.896	drs	25	22	60.4	55.7
UNITED Bank LTD	0.679	0.829	0.819	drs	13	9	32.1	17.1
Arif Habib Rupali Bank Ltd.	1	1	1	-	1	1	0	0
Atlas Bank Ltd.	0.285	0.285	0.999	-	26	23	71.5	71.5
JS Bank Ltd.	0.464	1	0.464	irs	23	1	53.6	0
NIB Bank Ltd.	0.607	0.607	1	-	20	20	39.3	39.3
Samba Bank Limited	0.167	0.167	0.999	-	27	24	83.3	83.3
Standard Chartered Bank Pakistan Ltd	0.753	0.835	0.903	drs	9	8	24.7	16.5
PICIC Commercial Bank Ltd	0.847	0.847	1	-	5	7	15.3	15.3
Prime Bank Ltd	0.629	0.629	1	-	19	19	37.1	37.1
Habib Metropolitan Bank Ltd.	1	1	1	-	1	1	0	0
Meezan Bank Ltd	0.796	0.797	0.999	irs	8	10	20.4	20.3
Bank Islami Pakistan Ltd.	0.633	0.634	1	-	17	17	36.7	36.6

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Dubai Islamic Bank Pakistan Ltd.	1	1	1	-	1	1	0	0
Al Baraka Islamic Bank B.S.C. (E.C)	0.872	0.885	0.986	drs	4	5	12.8	11.5
Crescent Commercial Bank Ltd.	0.167	0.167	0.999	-	28	25	83.3	83.3
Citibank N.A	0.594	0.668	0.889	drs	21	15	40.6	33.2
Deutsche Bank AG	1	1	1	-	1	1	0	0
HSBC	1	1	1	-	1	1	0	0
ABN AMRO N.V	0.701	0.701	1	-	1	1	29.9	29.9

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Income and scale efficiency for year 2007 table 3.7

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Alied bank	0.629	0.65	0.967	drs	16	13	37.1	35
Askari Commercial Bank LTD	0.685	0.842	0.813	drs	12	8	31.5	15.8
Bank Alfalah LTD	0.462	0.988	0.468	drs	25	3	53.8	1.2
Bank Alhabib LTD	0.592	0.596	0.994	irs	19	17	40.8	40.4
Faysal bank LTD	0.854	0.926	0.922	drs	6	6	14.6	7.4
FIRST WOMEN Bank LTD	0.957	0.966	0.991	drs	2	4	4.3	3.4
HABIB Bank LTD	0.651	0.998	0.652	drs	14	2	34.9	0.2
KASB Bank LTD	0.519	0.542	0.959	irs	23	19	48.1	45.8
Muslim commercial bank LTD	1	1	1	-	1	1	0	0
MY Bank LTD	0.829	0.888	0.933	irs	8	7	17.1	11.2
National Bank of Pakistan	0.784	1	0.784	drs	10	1	21.6	0
Saudi-Pak Commercial Bank Ltd	0.682	0.697	0.978	irs	13	12	31.8	30.3
SONERI Bank LTD	0.912	0.934	0.977	irs	4	5	8.8	6.6
The Bank of KYBER	0.902	1	0.902	irs	5	1	9.8	0
The bank of PUNJAB	0.342	0.474	0.722	drs	29	22	65.8	52.6
UNITED Bank LTD	0.62	0.83	0.747	drs	17	9	38	17
Habib Metropolitan Bank Ltd.	1	1	1	-	1	1	0	0
ABN AMRO (Pakistan) Limited	0.533	0.538	0.991	drs	22	20	46.7	46.2
Arif Habib Rupali Bank Ltd.	0.809	0.821	0.985	irs	9	10	19.1	17.9
Atlas Bank Ltd.	0.269	0.27	0.998	irs	30	26	73.1	73
JS Bank Ltd.	0.397	0.429	0.924	irs	26	23	60.3	57.1
NIB Bank Ltd.	0.614	0.622	0.989	irs	18	16	38.6	37.8
Samba Bank Limited	0.346	0.348	0.994	drs	27	24	65.4	65.2
Standard Chartered Bank Pakistan Ltd	0.936	1	0.936	drs	3	1	6.4	0
Meezan Bank Ltd	0.838	1	0.838	irs	7	1	16.2	0
Bank Islami Pakistan Ltd.	0.569	0.581	0.978	irs	20	18	43.1	41.9
Dubai Islamic Bank Pakistan Ltd.	0.504	0.513	0.983	irs	24	21	49.6	48.7

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Dawood Islamic Bank Ltd.	0.644	0.65	0.991	irs	15	14	35.6	35
Emirates Global Islamic Bank Ltd.	1	1	1	-	1	1	0	0
Al Baraka Islamic Bank B.S.C. (E.C)	0.744	0.764	0.975	irs	11	11	25.6	23.6
Crescent Commercial Bank Ltd.	0.346	0.348	0.994	drs	28	25	65.4	65.2
Citibank N.A	0.56	0.649	0.863	drs	21	15	44	35.1
Deutsche Bank AG	1	1	1	-	1	1	0	0
HSBC	1	1	1	-	1	1	0	0

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Income and scale efficiency for year 2008 table 3.8

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Alied bank	0.716	0.746	0.96	drs	9	10	28.4	25.4
Askari Commercial Bank LTD	0.647	0.649	0.998	irs	12	14	35.3	35.1
Bank Alfalah LTD	0.479	1	0.479	drs	25	1	52.1	0
Bank Alhabib LTD	0.704	0.715	0.985	irs	10	12	29.6	28.5
Faysal bank LTD	0.809	0.822	0.985	irs	5	6	19.1	17.8
FIRST WOMEN Bank LTD	1	1	1	-	1	1	0	0
HABIB Bank LTD	0.758	1	0.758	drs	6	1	24.2	0
KASB Bank LTD	0.548	0.589	0.93	irs	21	16	45.2	41.1
Muslim commercial bank LTD	1	1	1	-	1	1	0	0
MY Bank LTD	0.811	1	0.811	irs	4	1	18.9	0
National Bank of Pakistan	0.824	1	0.824	drs	3	1	17.6	0
Saudi-Pak Commercial Bank Ltd	0.488	0.525	0.931	irs	23	20	51.2	47.5
SONERI Bank LTD	0.827	0.881	0.938	irs	2	3	17.3	11.9
The Bank of KYBER	0.643	0.791	0.812	irs	13	9	35.7	20.9
The bank of PUNJAB	0.318	0.378	0.841	drs	29	24	68.2	62.2
UNITED Bank LTD	0.642	0.866	0.741	drs	14	5	35.8	13.4
ABN AMRO (Pakistan) Limited	0.626	0.695	0.901	drs	1	1	37.4	30.5
Arif Habib Rupali Bank Ltd.	0.66	0.868	0.761	irs	17	13	34	13.2
Atlas bank Ltd	0.355	0.355	1	-	11	4	64.5	64.5
Habib Metropolitan Bank Ltd.	1	1	1	-	28	25	0	0
JS Bank Ltd.	0.485	0.579	0.839	irs	24	18	51.5	42.1
NIB Bank Ltd.	0.409	0.415	0.986	drs	27	23	59.1	58.5
Samba Bank Limited	0.474	0.474	1	-	26	22	52.6	52.6
Standard Chartered Bank Pakistan Ltd	1	1	1	-	1	1	0	0
Meezan Bank Ltd	0.637	0.985	0.647	irs	15	2	36.3	1.5
Bank Islami Pakistan Ltd.	0.636	0.636	1	-	16	15	36.4	36.4
Dubai Islamic Bank Pakistan Ltd.	0.581	0.581	1	-	19	17	41.9	41.9

Names of Banks	IE CRS	IE VRS	Scale Efficiency	Return to scale	Rank CRS	Rank VRS	PIOOEP CRS	PIOOEP VRS
Dawood Islamic Bank Ltd.	0.571	0.571	1	-	20	19	42.9	42.9
Emirates Global Islamic Bank Ltd.	0.612	0.813	0.753	irs	18	8	38.8	18.7
Al Baraka Islamic Bank B.S.C. (E.C)	0.512	0.512	1	-	22	21	48.8	48.8
Citibank N.A	0.745	0.817	0.912	drs			25.5	18.3
Deutsche Bank AG	1	1	1	-	7	7	0	0
HSBC	1	1	1	-	1	1	0	0
Barclay Bank Plc	0.717	0.717	1	-	8	11	28.3	28.3

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