Efficiency Analysis of Full-fledged Islamic Banks and Standalone Islamic Branches of Conventional Banks in Pakistan: A Comparative Study for the Period of 2007-2012

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Abstract

The main purpose of ihis study is to examine the (relative) efficiency of the full-fledged Islamic banks compared to standalone Islamic banking branches of conventional banks (CBs) operating in Pakistan over the period 2007-2012. The Data Envelopment Analysis (DEA) is employed under CRS and VRS approach, which allows for the decomposition of efficiency into technical, allocative and cost efficiency. The study also measures changes in productivity over the time as a result of technical progress by employing the Malmquist Total Factor Productivity Index. The results explain that the technical efficiency of standalone Islamic banking branches (IBBs) of the CBs is better than that of full-fledged Islamic banks, but allocative and cost efficiency of full-fledged Islamic banks are higher than that of IBBs of conventional banks.

Keywords: Standalone Islamic Banking Branches (IBBs), Data Envelopment Analysis (DEA), Technical Efficiency (TE), Allocative Efficiency (AE), Cost Efficiency (CE), Constant Return to Scale (CRS), Variable Return to Scale (VRS), Total Factor Productivity Index.

1. Introduction

The importance of financial sector for the growth of an economy is obvious and cannot be overemphasized. Economic growth and development is possible if financial sector works efficiently and banks being part of financial sector work actively when they utilize their available resources at optimal level (Shahid *et al.* 2010).

In Pakistan there is dual banking system where conventional banks (CBs) are allowed by the State Bank of Pakistan (SBP) to provide Islamic banking products and services, of course, with standalone branches. The

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concept of dual banking system[3] provides an interesting ground to compare the efficiency of dual banks and full-fledged Islamic banks (FFIBs) in different countries of the world such as Malaysia, Sudan, UAE etc. (Sufian, 2007). This paper is an empirical investigation to examine the efficiency of FFIBs and standalone Islamic banking branches (IBBs) of CBs in Pakistan for the period of 2007-12.

The Islamic banking industry[4] (IBI) in Pakistan had grown from just 6 or 7 branches in 2002 to a cumulative branch network of approximately 1000 branches by Dec, 2012 (SBP), covering all the major cities of the country. One of the key reasons of this impressive advancement in IBI is friendly policies by the SBP. The share of IBI in the banking system in Pakistan was raised to 10 % in 2012 from just 0.5 % in 2003 and it was much higher growth, on an annualized basis, than that of the other Muslim economies (Figure-I presented in Annexure). Now SBP has planned to enhance the market share of IBI up to 15 % of overall banking industry by 2017 in terms of deposits, assets and lending.[5]

Many researchers extensively conducted their studies on efficiency and performance of Islamic and conventional banking systems and made comparative analysis for different countries like Saudi Arabia (Al-Faraj *et al*. 1993), Bangladesh (Sarker, 1999), Turkey (Isik and Hassan, 2002), Bahrain (Hassan et al. 2003), Gulf countries (Al-Jarrah and Molyneux, 2003), Jordan (Isik et al. 2005), Malaysia (Sufian, 2007) and Pakistan (Shahid et al. 2010).

All previous studies, focused on efficiency analysis of conventional banks, can be segregated in three ways: First, the studies considered the core interest based business. Second, the studies considered Islamic windows operations only. Third, the studies evaluated mixed operations of CBs and compared with full-fledged Islamic banks. There is enough literature available on these categories but there are very few studies on comparison between full-fledged Islamic banks and IBBs of CBs, excluding interest base operations of CBs. There is no single study available regarding comparison with respect to efficiency and performance measurement between the full-fledged Islamic banks and IBBs of CBs for Pakistan using Data Envelopment Analysis technique.

[3] To run dual banking means to run Islamic and conventional banking simultaneously by one bank.
[4] Islamic banking industry includes both FFIB and IBBS
[5] SBP Islamic Banking Bulletin March, 2013, P: 9.

Reason behind this unavailability of literature on comparison between full-fledged Islamic banks and IBBs of CBs is that IBBs concept exists just in Pakistan. Islamic windows or mixed banking system are working all over the world but not in Pakistan. SBP has developed a proper guideline for opening standalone branches for Islamic banking according to which all banks are strictly advised to keep separate books of accounts, separate system and control, separate all operations from interest base business of CBs.[6]

The main objectives of this study are to investigate: i) which system: full-fledged Islamic banking or IBBs of CBs is technically efficient? ii) Which system: full-fledged Islamic banking or IBBs of CBs is cost efficient? and iii) Which system: full-fledged Islamic banking or IBBs of CBs has higher allocative efficiency?

Section 1 of the paper has introduced the title, identified research problem, framed objectives and briefly highlighted the Islamic banking growth in Pakistan. Section 2 will review the literature on the efficiency analysis from both the conventional and Islamic perspectives. Section 3 and 4 will present methodology and model specifications used in the study and the data and inputs-outputs explanation, respectively. Empirical findings and conclusion will be presented in section 5 and 6, respectively.

2. Literature Review

Due to the reason behind the unavailability of literature on comparison between full-fledged Islamic banks and IBBs of CBs, we presented the literature review of previous researches on conventional banks' Islamic windows or mixed banking operations regarding our study on comparison between full-fledged Islamic banks and IBBs of CBs. Previous studies on comparison between Islamic banks and CBs on the basis of performance can be segregated into two classes. One class[7] used the financial ratios to evaluate the performance of Islamic and CBs and compared the results. The other class[8] measured the efficiency of banks and used frontier analysis approach and Data Envelopment Analysis (DEA).

Moin and Chen (2008) analyzed the performance of Meezan Bank and five CBs of Pakistan using ratio analysis for the period 2003-07 and described that Islamic banking was a fastest growing market but had

[6] Guidelines for opening of standalone branches for Islamic banking by existing banks, Annexure-III to IBD Circular No. 02 of 2004

[7] Bashir, 1999; Samad, 1999; Hassan and Bashir, 2003; Bader, Ariff, & Shamsher, 2007.

[8] Yudistira, 2004; Weill, 2004; Hassan, 2005; Brown and Skully, 2005; Bos and Kool, 2006; Bader, Ariff, and Taufiq, 2007 and Bader, 2007.

different challenges to face. They observed that Meazan Bank was less profitable (less efficient) and more solvent. In another study, Khattak *et al.* (2008) concluded that Islamic banks in Pakistan were less efficient technically, and costly as compare to CBs during the period of 2004-08. These results were partially confirmed by Moin (2013) who compared the performance of Meezan Bank limited (MBL) with five Pakistani CBs and evaluated the performance of the banks in profitability, liquidity, risk and solvency, and efficiency for the period 2003-2007 using the ratio analysis. He found that MBL was less profitable, more solvent, and also less efficient comparing to the average of the five CBs but it was improving significantly over the time representing convergence with the performance of the CBs.

Samad and Hassan (2000) found that Bank Islam Malaysia Berhad (BIMB) was less profitable, relatively less risky and more solvent as compared to CBs of Malaysia. Samad (2004) compared the performance of interest-free Islamic banks and interest-based conventional commercial banks of Bahrain and found that there was a significant difference in credit risk performance between the two sets of banks but there was not any major difference in profitability and liquidity performances between Islamic banks and CBs. Kader and Asarpota (2007) conducted a study on comparison between Islamic and CBs on the base of efficiency and performance. They used ratio analysis to measure the efficiency and performance and concluded that UAE Islamic banks were relatively more profitable, less liquid, less risky, and more efficient as compared to the CBs of UAE.

Sufian (2007) investigated the efficiency of IBI in Malaysia and found that the foreign Islamic banks were less efficient than domestic Islamic banks, and efficiency of banks in Malaysia increased during 2003-04 as compared to 2002. Sufian et al. (2008) confirmed these results by analyzing the efficiency of thirty seven Islamic banks of sixteen countries of Asia and MENA region and found that technical efficiency (TE) of Islamic banks increased in 2004 but declined again in 2005 and 2006. Overall operations of Islamic banks were running at optimal scale but with inefficient management regarding the use of resources at optimal level. Tahir *et al.* (2011) also confirmed these results by concluding that technical efficiency dominated scale efficiency of IBI in Africa, Central Asia, Europe and Middle East.

For the period 1997-2003, Mukhtar *et al.* (2006) measured TE and cost efficiency (CE) of Malaysian banks and concluded that CBs were stable while, on average, efficiency of IBI grew over the period and Islamic

windows were less efficient than full-fledged Islamic banks. Islamic windows of domestic banks were also found less efficient than that of foreign banks.

Hassan (2005) measured and investigated the productivity, cost, profit and X-efficiency of the Islamic Banking sector during 1993-2001 in twenty one Muslim countries. He concluded that profit efficiency of Islamic banks was 84 % where profit efficiency frontier was 74%, so Islamic banks were more efficient regarding profit, but major source of inefficiency was allocative inefficiency (AE) not technical inefficiency. He also found that both AE and TE are highly correlated. Brown and Skully (2005) found that banking system in Sudan is less efficient than that of Iran, because banking industry was small in size in Sudan as compare to Iran. Due to small size of industry, banks in Sudan were least cost efficient due to their financing to agriculture sector, while Irani banks were cost efficient due to their large size. Hassan and Hussein (2003) evaluated cost and profit efficiencies of seventeen banks of Sudan for period 1992-2000 and found that Islamic banks in Sudan had cost inefficiency due to weak management.

Ahmad *et al.* (2010) examined the efficiency of IBI in Pakistan, Malaysia, Bangladesh and Indonesia for the period of 2001-06 and found that IBI in these four countries was relatively inefficient regarding management as well as controlling the operational cost. It was also found that these countries were also inefficient in employing their resources at full.

Now take a look at performance of Islamic and CBs during financial crises. Shahid, *et al.* (2010) measured and compared the mean efficiencies of five conventional and five Islamic banks of Pakistan for the period of 2005-09 using DEA model and concluded that there is no significant difference in mean efficiencies of Islamic and CBs except for 2008 during financial crises. According to Willison and Yılmaz Islamic banks were insulated from the financial crisis of 2008 (Johnes et al 2012).

According to Yudistira (2004), the efficiency of Islamic banks regarding operation was more than that of CBs during the global financial crises 2007-08. Al-Smadi *et al*. (2013) also confirmed that the Islamic Banking system was more sound and stable compared to conventional banking system even in the global financial crises of 2007-08, while conventional banking sector was stuck on in Malaysia. According to Duski and Abdullah, Islamic banking attracted many non-Muslims customers because of its quality of stability and increased its customer base after financial crises of 2007-08 (Khan *et al*. 2012).

All above studies focused efficiency comparison between IBI and conventional banking industry in specific region or country or period. Though there were also some studies on efficiency comparison between both types of banking in Pakistan, but studies used the sample which was limited to one or two Islamic banks which does not represent the whole IBI and compared with the sample of conventional banking which included Islamic banking as well as interest base banking operations. The present study includes five full-fledged Islamic banks and IBBs of five conventional banks of Pakistan.

3. Methodology and Model Specification

3.1. Efficiency Measurement

Banking efficiency can be measured two ways either by using traditional financial ratio analysis (FRA) or by the distance function approach. In distance function approach, firm's observed production is compared with production frontier. This is the best method for efficiency analysis and technical efficiency is measured by the distance between the two points. This approach leads to frontier estimation methods such as DEA and stochastic frontier analysis (SFA) (Johnes *et al* 2012).

Financial ratios analysis is a popular method and many researchers[9] used it quite extensively to evaluate the bank performance as calculation and interpretation is easy (Hassan and Bashir, 2003). It is easy to compare the performance of a bank with different other banks and with benchmark (Halkos and Salamouris, 2004). But it was also found that the evaluation of the bank performance by financial ratios was improper because banks were large and one ratio cannot sketch a picture of performance of complex organizations (Ho and Zhu, 2004). According to Shahid *et al.* (2010) FRA measures the performance in short run and does not incorporate the management decisions and actions regarding investment that may affect in future. So this study used the distance function approach which is the best method for efficiency analysis.

3.2. Data Envelopment Analysis (DEA)

Charnes *et al*. introduced the term Data Envelopment Analysis (DEA) first time in 1978. The DEA is a linear programming technique that evaluates relative efficiency and performance of organizations where multiple inputs and outputs complicate the efficiency comparison (Hassan, 2006). Literature shows four dominate approaches: the operating approach, the

[9] Samad and Hassan 2000; Patnam, 1983; Meister and Elyasiani, 1988; Spindler, 1991; Samad. 1999.

production approach, the intermediation approach and the revenue approach.

The operating approach which is income based approach considers the banks as business entities having objective to earn maximum revenue by the minimum cost for running the business (Leightner and Lovell, 1998). Under this approach, total revenue is output while inputs are total expenses. This approach considers the perspective of cost/revenue management. The operating approach has been popular for defining inputs and outputs of banks (Jemric and Vujcic, 2002).

The production approach is used to measure the efficiency of bank branches (Berger and Humphrey, 1992). Applying this approach, financial firms are considered as producer of services for customers as customer avail different services through depositing money or borrowing. So under this approach number of accounts and transactions are used to measure output and inputs are physical capital and the number of employees. Many researchers used this approach as Sherman and Gold (1985), Ferrier and Lovell (1990) and Fried *et al*. (1993).

The intermediation approach was used to evaluate the financial performance of banks by Charnes *et al.* (1990), Bhattacharyya *et al*. (1997) and Sathye (2001). Under this approach, financial institutions provide the services of intermediation between investors and borrowers and maintain the proper flow of financial assets from surplus to deficient units (Sufian, 2007).

In DEA the efficiency score of a specific firm is not measured by an absolute form but is relative to the other firms under consideration. DEA determines the efficiency of firm through production possibility frontier. Firm is supposed to be efficient; if it operates on DEA frontier otherwise it would be considered inefficient (Tahir *et al.* 2011).

DEA works under linear programming model by allowing multiple inputs and multiple outputs under constant returns to scale. In order to understand the method, we assume number of firms, where each firm consumes the same "*m*" inputs to produce the same "*s*" outputs. Precisely, firm j uses x_{ij} *(i = 1, 2…., m)* of input *i* to produce y_{rj} *(r = 1, 2, 3……, s)* of output *r* assuming that $x_{ij} > 0$ *and* $y_{rj} > 0$ (Seiford and Thrall, 1990). Each firm being evaluated has to solve the following optimization problem:

$$Max\ h_o = \sum_{r=1}^{s} u_r y_{ro} / \sum_{i=1}^{m} v_r x_{io} \quad (1)$$

Subject to

$$\sum_{r=1}^{s} u_r y_{rj} / \sum_{i=1}^{m} v_r x_{ij} \leq 1, u_r \geq 0, v_i \geq 0$$

Where h_o is the ratio of virtual outputs to virtual inputs, the u_r's and the v_j's are the variables and the y_{ro}'s and the x_{jo}'s are the observed output and input values of the firm to be evaluated. A set of normalizing constraints guarantees that no firm, including the one evaluated, can obtain an efficiency score that exceeds unity. Thus, DEA establishes a standard efficiency score of unity that no firm can go beyond one (Yue, 1991). If the efficiency score (h_o) is one, then $firm_o$ is considered to be DEA efficient fulfilling the necessary condition; otherwise it is DEA inefficient (Ramanathan, 1999). The above mentioned model is non-linear and it can be converted into linear form;

$$Max\ h_o = \sum_{r=1}^{s} u_r y_{ro}$$

Subject to;

$$\sum_{i=1}^{m} v_i x_{ij0} = 100\ (\%)$$

$$\sum_{r=1}^{s} u_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij} \le 0,\ j = 1,.....,n \qquad (2)$$

$-v_i \le -\varepsilon \quad i=1,2,\ldots,m$

$-u_i \le -\varepsilon \quad i=1,2,\ldots,s$

Here the primal problem arises which has an alternate dual problem. Dual problem involves the minimization of the objective function if it is being maximized in the primal problem and vice versa. Now if dual theorem is applied to the above linear problem then it becomes:

$$\text{Min}_{\lambda,0}(\theta)$$

Subject to

$$Y\lambda \ge Y_0$$
$$\theta X_0 - X\lambda \ge 0$$
$$\lambda \ge 0$$

Where λ is the matrix and have order $N \times 1$ containing vector of constants only when θ is scalar. θ indicates the efficiency score of the firm ranging from 0 to 1. The above problem follows the assumption of constant returns to scale only as they consider that all firms are operating under this assumption, but this was not the case. However, extension of DEA was also proposed that accounts for variable returns to scale (Banker *et al*. 1080-82) and the DEA dual model (under CRS) is modified into which constraint of convexity is added:

$$\text{Min}_{\lambda,0}(\theta)$$

Subject to

$$Y\lambda \ge Y_0$$
$$\theta X_0 - X\lambda \ge 0$$
$$K/\lambda = 1$$
$$\lambda \ge 0$$

K symbolizes a matrix having orders n ×1 and as compared to CRS assumption of DEA, it envelopes data more compactly. According to Aly *et al.,* (1990), it is possible to derive a measure of scale efficiency by dividing technical efficiency (T) measured under CRS and pure technical (PT) efficiency calculated under VRS as follows:

$$S = T/PT \quad \text{or} \quad S = CRS/VRS \tag{3}$$

If the value of S is one, the firm is considered to be scale efficient otherwise it would be scale inefficient. If there is scale inefficiency, it means firm is operating at either increasing or decreasing returns to scale.

3.3. Malmquist Index of Profitability Change:

DEA also estimate Total Factor Productivity (TFP) change of the panel data. This Index measures the TFP change between two data points by calculating the ratio of the distances between each data point relative to a common technology. According to Fare et al., specification of Malmquist productivity change is expressed as a geometric mean of two Malmquist indices (Coelli, 1996) as given in the following equation:

$$m_o(y_{t+1}, x_{t+1}, y_t, x_t) = \left[\frac{d_o^t x_{t+1}, y_{t+1}}{d_o^t x_t, y_t} X \frac{d_o^{t+1} x_{t+1}, y_{t+1}}{d_o^{t+1} x_t, y_t} \right]^{1/2}$$

This equation is productivity index which is the geometric mean of a pair of ratios of output distance function. The performance of the data is compared in first ratio from period *t* to *t* +1 relative to production possibilities existing in period t, while second ratio compares the performance of the same data relative to production possibilities existing in period t+1. Here d_o is the distance from the frontier. If its value is greater than one then it will specify positive TFP growth during period *t* to period *t+1*.

4. Data and Inputs-Outputs

4.1. Data

Specifically, this study compares the efficiency of five full-fledged Islamic banks with standalone Islamic banking branches of five CBs in Pakistan for the period of 2007-2012. We left other CBs because unavailability of data on their Islamic banking counterpart. Annual data is compiled from the income statements, balance sheets and the publications that are issued by SBP.

4.2. Inputs-Outputs

The present study focuses intermediation approach based on practical and theoretical considerations to evaluate and compare the efficiency of banks. The study uses deposits (X_1), fixed assets (X_2) and labor (X_3), as inputs while investment portfolio (y_1) and Loans & advances (y_2) are characterized as outputs.

The selection of variables (inputs and outputs) for the DEA model is influenced by different reasons such as previous literature with these variables is available on banking sector with small sample. But this study will take five full-fledged Islamic and five IBBs of CBs for the period of 2007-2012.

Deposits (saving accounts, current accounts and money market accounts) are one of the main inputs of the study and define as all available resources to the banks for carrying out their operations like lending and investments.

Data for the number of employees is not available for these purposes. Salaries are used as a proxy for labor input following Sufian, 2007; Johnes, Izzeldin and Pappas, 2012 and Drake and Hall, 2003. Data on fixed assets of Islamic banks and investment portfolio (IP) is easily available.

Islamic banks do not enter into loan contracts as CBs. So advances of Islamic banks are used as proxy of "loan & advances" (L & A). CBs make profit from the difference between lending and borrowing interest rates. Islamic banks earn profit from the difference between the entrepreneurs and the depositors profit ratios (Johnes *et al* 2012).

Table –I: List of financial institutions and Inputs – outputs used in study

No.	Full-Fledged Islamic Banks	CBs (IBBs Only)	Input	Output
1	Bank Islamic Pakistan Ltd.	Habib Bank Ltd.	Deposit- X_1	IP (y_1)
2	Meezan Bank Ltd.	Bank Al-Habib Ltd.	fixed asset -X_2	L & A (y_2)
3	Dubai Islamic Bank Pak. Ltd.	Bank Al-Falah Ltd	Labour - X_3	
4	Burj Islamic Bank Ltd	Askari Bank Ltd.		
5	Al-Barkah Islamic Bank Ltd.	MCB Bank Ltd.		

5. Empirical Findings

5.1. DEA Efficiency Results

The technical efficiency (TE) determines the scale to which the bank can reduce its input to produce the specified output. The value of TE being '1' show that the industry is efficient and is working on the production possibility frontier (PPF). And the value less than 1 means that the industry is wasting its resources and performing bellow the PPF.

At first, we calculated and examined the efficiencies (TE, CE and AE) of IBBs of CBs and Islamic banks operating in Pakistan applying the DEA method for each year using CRS and VRS models. But efficiency values under VRS were better than values under CRS for Islamic banks. The mean efficiency scores of IBBs and Islamic banks for each year have been calculated under the assumption of CRS and VRS. Now, analysis has been presented in table II and III.

Table II shows the results during the period of study, under VRS assumption it was found that the Islamic banks displayed mean TE of 97.5%, suggesting mean input waste of 2.5%. In other words, the Islamic banks could produce the same amount of outputs by only using 97.5 % of the amount of inputs it currently uses, while mean of TE of CBs was 100 % during the last 6 years. During the period of study, our results suggested that IBBs of CBs were technically stronger (Figure-II presented in Annexure). Islamic banks outperformed the CBs by 9 % and 5 % in mean values of TE and CE respectively during the studied period. Mean of AE of Islamic banks and IBBs was 97.5% and 88.5% respectively and mean of Cost efficiency of Islamic banks and IBBs was 93.5 % and 88.5 % respectively (Table-II).

Table II: Efficiency Summary of Islamic banks and IBBs under VRS

Bank Type	No of banks	Years	Mean		
			TE	**AE**	**CE**
Islamic Banks	5	2007	0.988	0.982	0.971
	5	2008	1.000	0.995	0.995
	5	2009	0.986	0.971	0.958
	5	2010	0.988	0.995	0.983
	5	2011	0.900	0.997	0.898
	5	2012	0.979	0.914	0.894
Overall Mean			**0.973**	**0.975**	**0.949**
IBBs of Conventional banks	5	2007	1.000	0.834	0.834
	5	2008	1.000	0.799	0.799
	5	2009	1.000	0.908	0.908
	5	2010	1.000	0.896	0.896
	5	2011	1.000	0.920	0.920
	5	2012	1.000	0.955	0.955
Overall Mean			**1.000**	**0.885**	**0.885**

Note: **TE**=Technical efficiency, **AE**=allocative efficiency, **CE**=cost efficiency

Table III reports the sample statistics of the various mean efficiency scores of Islamic banks and IBBs of CBs for the years 2007-12 under CRS. For the last six years, mean of TE of Islamic banks is ranging from 88% to 98%, which indicates that Islamic banks were utilizing 98% of their input resources till December 2012 and it is the sign that Islamic banks are growing and showing a good progress in the financial market of Pakistan. But the mean of TE of IBBs was ranging from 100% to 95% which is much higher than that of Islamic banks. However, if we consider the growth ratios, we find that there was marginal decline of 5% in mean of TE in case of IBBs, while mean of TE of Islamic banks grew 10% over the same period. Though during the period, there was a bit decline of 1% in mean of TE of Islamic banks in 2009, but it is ignorable. With overall mean of TE, Islamic banks and IBBs of CBs showed 94.8% and 98.6% respectively.

Now looking at the cost efficiency of the Islamic banks, we come to know that mean of CE of Islamic banks is ranging from 70% to 88%, while mean of CE of IBBs is ranging from 52% to 88% which is not bad in comparison with Islamic banks. But if we consider overall mean of CE, we find that Islamic banks having 83% CE is more cost efficient as compared to conventional banking having 64% CE. Mean of AE of Islamic banks and IBBs are 86.9% and 65.7% respectively under CRS approach. Islamic banks are performing better in AE and CE but need enhancement in their TE.

Table III: Efficiency Summary of Islamic banks and IBBs under CRS

Bank Type	No of banks	Years	Mean		
			TE	AE	CE
Islamic Banks	5	2007	0.886	0.81	0.7
	5	2008	0.983	0.769	0.757
	5	2009	0.977	0.847	0.829
	5	2010	0.988	0.993	0.981
	5	2011	0.883	0.955	0.84
	5	2012	0.975	0.902	0.879
Overall Mean			**0.949**	**0.879**	**0.831**
IBBs of Conventional banks	5	2007	1.000	0.528	0.528
	5	2008	1.000	0.320	0.320
	5	2009	1.000	0.514	0.514
	5	2010	0.978	0.838	0.824
	5	2011	0.996	0.809	0.806
	5	2012	0.945	0.931	0.885
Overall Mean			**0.986**	**0.657**	**0.647**

Note: **TE**=Technical efficiency, **AE**=allocative efficiency, **CE**=cost efficiency

5.2. Malmquist Index of Profitability Change

This index provides a change in TFP for the banks during the specified period. TFP is further decomposed into different components. If the value of the Index (or any of its components) exceeds 1 then it indicates improvements in the efficiency during the period and if the value is less than 1 then it infers reduction in TFP.

Table IV presents the Islamic banks' total productivity change annually for 2007-12. It shows that mean value of TFP is 1.053, which is greater than 1 indicating that banks had growth rate of 5.3% during the 6 years. Growth in TFP is high relative to the growth in efficiency, technical efficiency, pure technical efficiency and scale efficiency which is 2.4%, 2.8%, 1.0% and 1.4% respectively.

Table IV: Malmquist Index summary of Islamic banks

Year	Effch	Techch	Pech	Sech	Tfpch
2	1.407	0.322	1.059	1.329	0.452
3	0.915	3.238	0.912	1.003	2.962
4	1.112	0.921	1.015	1.096	1.025
5	0.945	2.3	1.047	0.902	2.173
6	0.834	0.52	1.025	0.814	0.434
Mean	**1.024**	**1.028**	**1.01**	**1.014**	**1.053**

Note: **Effch**=efficiency change, **Techch**=technical efficiency change, **Pech**=Pure technical efficiency change, **Sech**=Scale efficiency change and **Tfpch**= total factor profitability change

For IBBs of CBs, Table V represents the summary and indicates that there is a drastic decline in total factor profitability by 5.7% over the period. But there is growth in efficiency and scale efficiency by 0.4% and 1.4% respectively. Technical efficiency and pure technical efficiency reduced by 6.1% and 1%. Now turning to comparison, it is evident from the results that Islamic banks total factor profitability increased by 5.3% over the year while TFP of IBBs of CBs decreased by 5.7%.

Table V: Malmquist Index summary of IBBs

Year	Effch	Techch	Pech	Sech	Tfpch
2	0.717	1.8	0.928	0.773	1.29
3	1.619	0.247	1.106	1.463	0.4
4	0.62	2.65	0.871	0.712	1.642
5	1.415	0.659	1.075	1.316	0.932
Mean	**1.004**	**0.939**	**0.99**	**1.014**	**0.943**

Note: Effch=efficiency change, **Techch**=technical efficiency change, **Pech**=Pure technical efficiency change, **Sech**=Scale efficiency change and **Tfpch**= total factor profitability change

6. Conclusion

Looking at the results, we conclude that overall mean of TE (Technical Efficiency) for IBBs of CBs under both VRS & CRS modes is higher than that of full-fledged Islamic Banks. One of the reasons of high TE scores for IBBs of CBs may be that they are in operations for many years and having technically experienced people, as compare to Islamic banks which are still in their early age of operations in Pakistan. But in year wise comparison of efficiency, values for Islamic banks and IBBs of CBs, TE of Islamic banks show a healthy competition with IBBs of CBs.

Findings also suggest that full-fledged Islamic banks have exhibited higher CE and AE values which means that full-fledged Islamic banking is producing services at less cost and also taking into account customer's preferences. This is one of the good signs for economy that Islamic banks are on the horizon of improving their efficiency and are performing better than IBBs of CBs. Malmquist Total Factor Productivity Index also shows positive growth in productivity over time for Islamic banks, while it shows negative growth for IBBs of CBs.

There may be different reasons for relatively better performance of full-fledged Islamic banks. One reason may be that Islamic banks are fully focused on interest free direction that keeps the industry more efficient but CBs are working in both directions interest base and interest free which make their customers confuse and hesitate to continue with them (Latham and Watkins, 2011). Equity based investment is also an important factor of good performance of Islamic banks (Khan *et al*, 2011). After financial crises of 2007-08, Islamic banks attracted the institutions, investors and people because of their sound performance during the crises (Amjad *et al,* 2012). SBP's friendly policies for Islamic banks are also playing vital role in growing Islamic banking industry.

The future recommendation of this paper is that it can be extended to consider other approaches as the production and revenue approach along with the intermediation approach, which has been applied in this paper. It is also suggested that further analysis for investigation of Islamic banks and IBBs efficiency could be undertaken by considering the risk exposure factors.

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Annexure

Figure-I

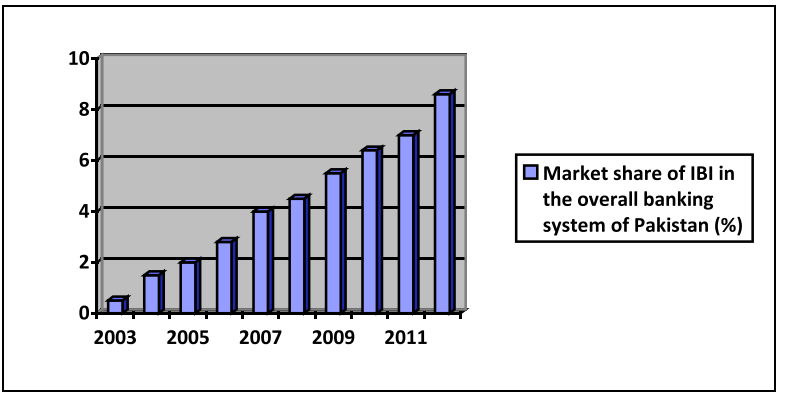
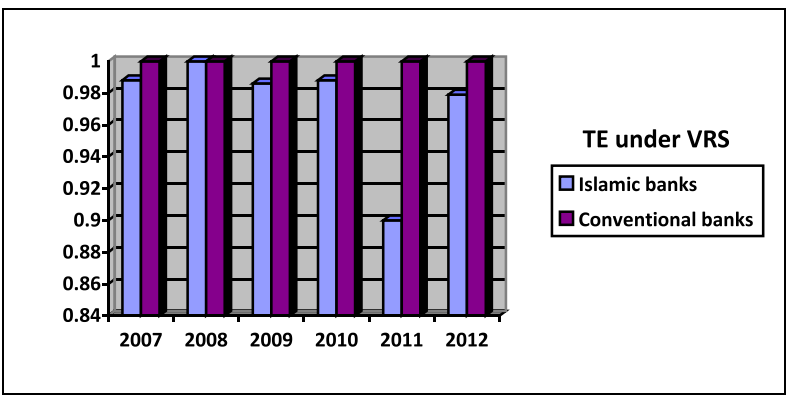


Figure-II



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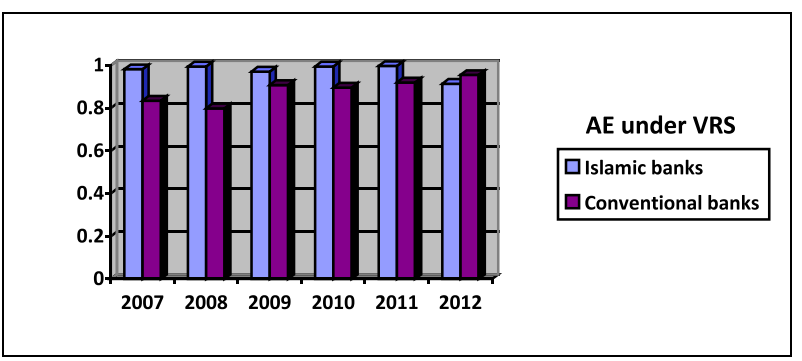


Figure-IV

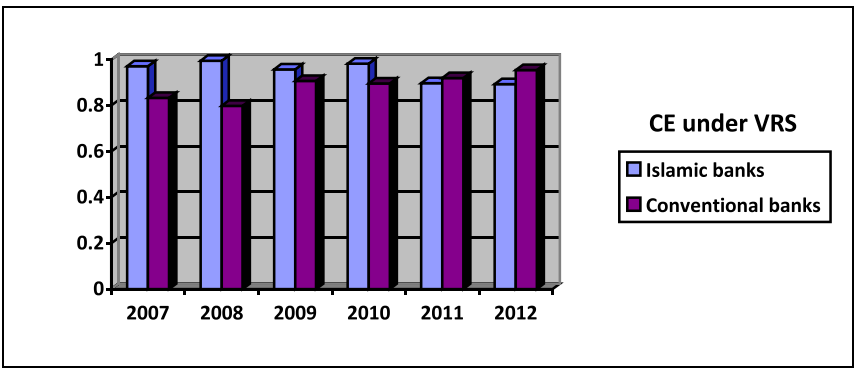


Figure-V

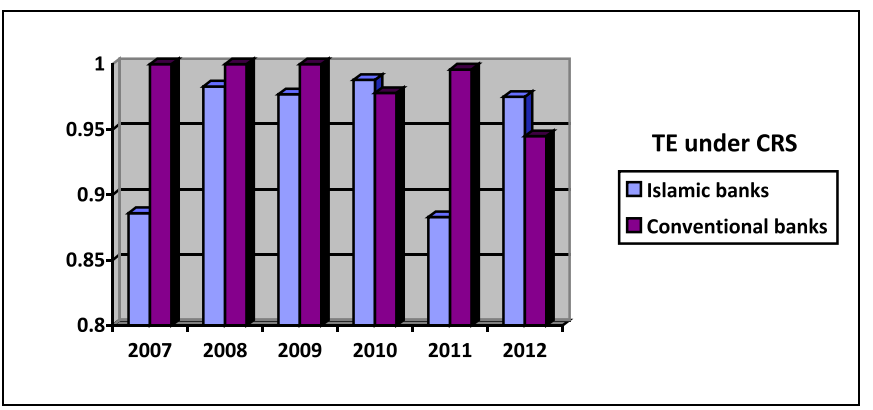


Figure-VI

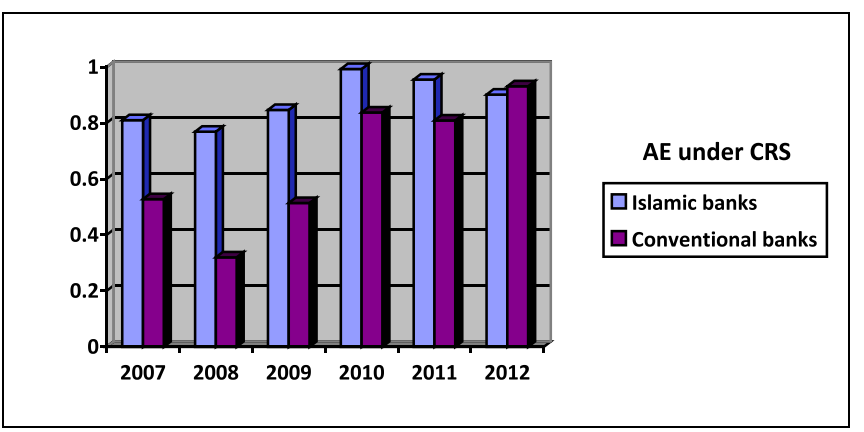
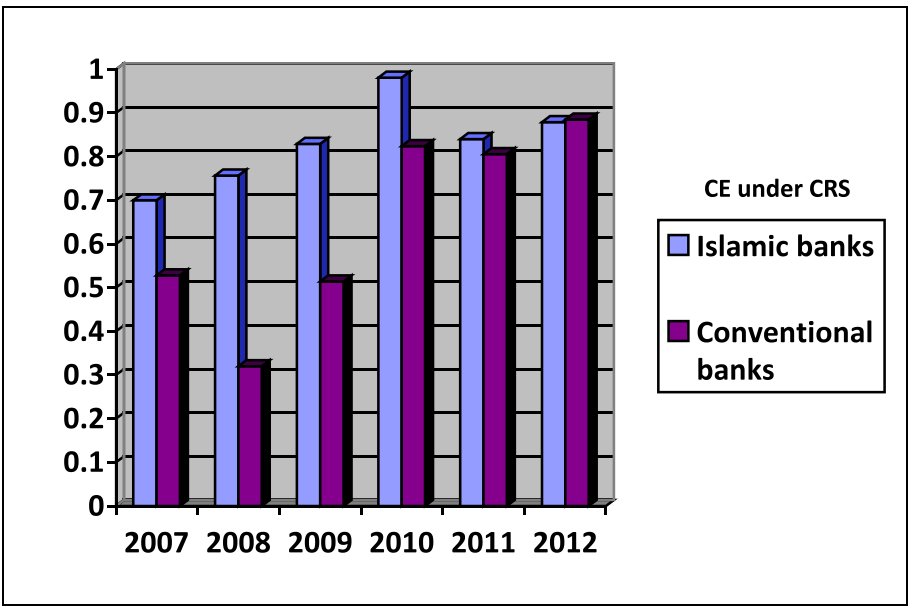


Figure-VII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