COMPARISON OF EFFICIENCY BETWEEN PURE ISLAMIC BANKS AND ISLAMIC BANK WINDOWS AND ROLE OF ISLAMIC BANKING IN AGRICULTURE SECTOR

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This paper is an attempt to compare the efficiency between pure Islamic banks and Islamic bank windows of conventional banks. It also explains the role of Islamic banks in agriculture sector. Data envelopment analysis (DEA) was used to find out the efficiency. The results of this study suggest that overall efficiency of Islamic banking is increasing with the passage of time. The cost, allocative, scale and technical efficiencies of pure Islamic banks are higher than Islamic banking windows of conventional banks; however, income efficiency is higher in the case of Islamic bank windows. In agriculture sector, Islamic banking provides equal opportunities to all farm size groups with its unique products. Especially the small farmers can benefit from the products of to enhance the productivity of their farms.

Keywords: Islamic banks, cost efficiency, technical efficiency, income efficiency, agriculture sector

INTRODUCTION

The growth of an economy has very close relation with the growth of banking industry (Zaidi, 2005). Conventional Banking is interest based which is strongly prohibited in Islam. However, Muslims require a financial system which fulfills their financial needs according to Sharia[1]. Islamic banking is a way to fulfill their financial requirements according to Islamic laws. Keeping this in view, Islamic banking has been introduced in various countries in the recent past as an alternative to conventional banking, yet its growth is rapid. The central questions which arise with the growth of this industry are; whether these banks are performing efficiently? Are pure Islamic banks more efficient than the Islamic banks windows of the conventional banks? These and many other related questions necessitate empirical research on these issues within each individual country framework. Keeping in view these questions, our study attempts to measure the efficiency of pure Islamic banks and Islamic banks windows[2] of the conventional banks operating in Pakistan. Additionally, this study also provides the description of the role of Islamic banking in agricultural sector.

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[1]*The term 'Sharia' refers to the Islamic principles/rules, which are mainly derived from Quran and Sunnah (the life of Prophet Muhammad P.B.U.H)*
[2]*Pure Islamic banks are those which are dealing only with Islamic banking such as Albaraka Islamic Bank, Dawood Islamic Bank, Dubai Islamic Bank, Meezan Bank and BankIslami. Islamic banking windows mean those banks which are dealing with Islamic banking as well as conventional banking system based on interest like Al-Falah Bank, National Bank, Habib Bank and MCB etc.*

Since Islamic banks around the world are in its early stage of operation, there is limited empirical research on the efficiency measurement of these banks. Most of the research done in Pakistan on this issue is either theoretical or preliminary in nature reported by Khattak and Rehman (2010) and Ahmad *et al.* (2010). This is because of the fact that Islamic banking industry is still in its infancy in Pakistan. Although a decade has gone since its inception, yet it cannot be compared with the flourishing, well establish conventional banking in this country. As Rizvi observed, this could precisely be the reason that study on efficiency measurement of conventional banks is well documented as opposed to the case of Islamic banking efficiency (Rizvi, 2001).

The literature on the performance measurement of Islamic banks provides a useful insight and also serves as a motivation of our work. Yudistiria (2004) compared the efficiencies of 18 Islamic and conventional banks in Malaysia by employing Data Envelopment Analysis (DEA). He measured technical, pure technical and scale efficiencies of all these banks and made two conclusions: one, that inefficiencies of these banks is small (10%); however, considerable as compared to conventional banks and two, the variations in the efficiency score of these banks is mainly determined by the 'country specific factors'. Mokhtar *et al.* (2006) measured the efficiency of pure Islamic banks and Islamic banks windows in Malaysia. He used the stochastic frontier approach to measure the technical and cost efficiency. His study revealed that conventional banks efficiency is higher than that of Islamic banks; however, the marginal efficiency of Islamic banks is higher and increasing gradually. This study also concluded that pure Islamic banks

are more efficient than the Islamic bank windows of conventional banks. Sufian (2007) estimated the performance of Islamic banks operating in Malaysia from 2001-2005. He also used DEA approach and concluded that scale inefficiency prevail over pure technical inefficiency in the studied Islamic banks. In addition to this, they asserted that foreign banks are technically more efficient as compared with domestic ones which are sound in terms of scale efficiency. Bader *et al.* (2008) conducted research to find out efficiency of Islamic versus conventional banks. They applied Data Envelopment Analysis (DEA) to measure and compare the cost, revenue and profit efficiencies. The conclusion they made is that there is no significant difference between Islamic versus conventional banks on the basis of overall efficiency. Although, Islamic banks exhibits relatively better efficiency performance as compare to conventional banks, yet differences are not statistically significant. Moreover, all those banks studied prove to be more inefficient in revenue efficiency than the cost and profit efficiency. Shahid *et al.* (2010) compared the efficiency of five Islamic verses five conventional banks in Pakistan. They found the technical, cost and allocative efficiencies of these banks by utilizing DEA. Their results indicated that the Islamic banks compete well with the conventional banks in cost and allocative efficiency. However, the technical efficiency of conventional banks is higher than that of the Islamic banks.

From the preceding review of literature, it emerges that the findings on the efficiency measurement of Islamic banking around the world presents a mixed picture. There is considerable diversity in the literature as to how efficiently the Islamic banks are performing in different parts of the world. This diversity is not only restricted to the overall efficiency score but also among various types of efficiency, e.g. technical, scale, cost, allocative etc. From the dearth of literature on Islamic banks efficiency and the enormous variation in the results of available research, it is thus essential to measure efficiency of Islamic banks and its various determinants in each individual country specific frame work.

Our study is significant in the sense that it is designed to provide the empirical reference from Pakistan on the efficiency measurement of Islamic Banks. On one hand, this study fills up the research gap on this issue in Pakistan, while on the other hand it usefully contributes to the overall available literature on this subject. For the measurement of efficiency, this study focuses exclusively on the Islamic banking industry as a whole which includes the full-fledged Islamic banks and the Islamic windows of the conventional banks operating in Pakistan. This way, it provides the efficiency comparison of the pure Islamic banks with that of those being run by the conventional banks. Our study employs non parametric approach that is Data Envelopment Analysis (DAE). DEA has a quality that it can estimate

efficiency even if the sample size is small. Since, the no of Islamic banks in case of Pakistan is small; DEA is the best suited technique for efficiency analysis of Islamic banking. This technique can also evaluate yearly performance of individual banks, which is helpful to study the individual bank performance from last few years.

This paper has been divided into six sections. First section is introductory. In the second section, methodology is explained along with data and model specification. The empirical results are discussed in the third section and section four discusses the role of Islamic mode of banking in the agriculture sector. The last section concludes the study.

METRIAL AND METHODS

As banking sector has important role in the economy of any country, therefore measuring the efficiency of banking sector can help the government to make effective policies. Efficiency means maximizing the outputs from given resources and minimizing the cost of inputs. Banking efficiency is measured by comparing the input and output at which a bank operates to its optimal level. The methods to calculate efficiency are broadly categorized either as parametric or non-parametric. Parametric methods such as SFA use statistical approach, while the non-parametric methods such as DEA construct linear piece wise frontier. Wadud and White (2000), Thiam *et al.* (2005) and Alene and Zeller (2005) applied both of these approaches and concluded that the results are highly correlated. The choice of adopting these methods is very much arbitrary and depends on the objectives of the study and the type of the data (Wadud and White, 2000).

With particular reference to our study, DEA was applied because it can estimate efficiency even if the sample size is small. Since, the number of Islamic banks in case of Pakistan is small; DEA is best suited technique for efficiency analysis of Islamic banking. It is a linear programming technique which evaluates the relative efficiency of decision making units and also provides the best level of input and output mix. DEA can measure efficiency of multi inputs and outputs at the same time. Wheelock and Wilson (1999), Alam (2001), Jaffry *et al.* (2005), Burki and Niazi (2006) and Pasiouras (2006) also used this method in their studies. As per Coelli *et al.* (2005), following are the additional advantages of using DEA.

1. It is a relative efficiency method.
2. It does not assume any a priori functional relationship between inputs and outputs.
3. It constructs a linear piece wise efficient frontier and then measure efficiency relative to that efficient frontier.
4. It measure efficiency using mathematical programming.

Sufian (2007) explained that this technique can also evaluate annual performance of individual banks. If a bank gets

efficiency score of 1, it has maximum efficiency while 0 score represents minimum efficiency level. Banking efficiency consists of scale and cost efficiency. Scale efficiency is defined as production at optimal level by using optimal level of inputs (Farrell, 1957). Cost efficiency mean production of given level of output in least cost way. Cost efficiency is further divided into allocative efficiency (use of optimal level of input) and technical efficiency (optimal production of output from given resources).

Input-output, data source and model specification: There are 18 banks which are exercising Islamic modes of banking operation in Pakistan. In this study, data of 15 Islamic banks were collected for the period ranging from 2008 to 2010. The data for the rest of the three banks were not available for the investigating time period. Data were collected from financial statements of the banks. In this study, five types of efficiencies including cost, scale, allocative, income and technical efficiencies were estimated under constant returns to scale (CRS) and variable returns to scale (VRS) by applying DEA.

The measurement of efficiency using DEA requires deciding on the input and output. To calculate technical efficiency, we followed Miller and Noulas (1996), Leightner and Lovell (1998) and Attaullah *et al.* (2004) to specify operational fixed assets and deposits as the main inputs to produce advances and investment. In order to calculate the cost and allocative efficiency we specify deposits and number of windows on the input side while advances and investment on the output side. The similar specification is used by Casu and Girardone (2006), Ferrier and Lovell (1990) and Miller and Noulas (1996). Finally, income efficiency is clearly a subtraction of total expenses from total revenue (Ahmad, 2008).

Efficiency	Inputs	Outputs
Technical efficiency	Operating fixed assets Deposits	Advances Investments
Cost & Allocative Efficiency	Deposits Number of Windows	Advances Investment
Income Efficiency	Total Expenses	Total Revenue

Regarding efficiency of pure Islamic banks, mean of efficiency of all pure Islamic banks was taken and same was done to calculate the efficiency of Islamic bank windows operated by conventional banks. The efficiency can be measured by

$$E_k = \sum_{i=1}^{x} wi \ output_{ik} / \sum_{j=1}^{y} wj \ input_{jk},$$

$$\text{for } i=1,\ldots\ldots,x \text{ and } j=1,\ldots\ldots,y. \quad (1.1)$$

Where $output_{ik}$ represents the ith output of kth bank and w_i shows the weight assigned to output. Similarly $input_{jk}$ is

the ith input of jth bank and w_j is weight associated with input. This efficiency ratio E_k is maximized by selecting optimal weights assigned to input and output.

$$\sum_{i=1}^{x} wi \ output_{ik} / \sum_{j=1}^{y} wj \ input_{jk} \leq 1,$$

$$\text{for } k= 1,\ldots\ldots,N \text{ and wi and wj} \geq 0, \quad (1.2)$$

The equation 1.2 shows that efficiency ratios must be either 1 or less than 1. Moreover weights of input and output must be positive. The optimal weights of input and output are determined by converting non-linear function into linear function for k^{th} bank.

RESULTS AND DISCUSSION

Technical efficiency: Technical efficiency under CRS and VRS of pure Islamic banks and Islamic banks windows is presented in Table 1. The table revealed that technical efficiency under CRS of pure Islamic banks was higher as compared to the Islamic banks windows for the study period. The results also show that technical efficiency under CRS of overall Islamic banking industry increased with the passage of time. The technical efficiency scores under VRS of pure Islamic banks were higher as compared to Islamic banks windows. Scale efficiency of pure Islamic banks during the study period was high as compared to Islamic banks windows. Technical efficiency under CRS and VRS and scale efficiency of pure Islamic banks was higher than Islamic bank windows. This may be because of the fact that pure Islamic banks have been in this mode of financing for a relatively longer period of time than the Islamic windows of conventional banks. The findings of this study are in line with the results of Mokhtar *et al.* (2006). Technical and scale efficiencies of Islamic banking industry in Pakistan have been increasing as the time is passing; the same was reported by Shahid *et al.* (2010).

Income efficiency: Income efficiency under CRS and VRS is presented in table 3. The table revealed that income efficiency under CRS of Islamic banks windows was higher than the pure Islamic banks for the study period. Moreover, income efficiency under CRS of Islamic banking industry was increasing with the passage of time. Income efficiency under VRS from 2008 to 2010 of Islamic banks windows was also high than the pure Islamic bank windows. This may be due to the reason that Islamic banks are opening new branches much faster than conventional banks. As these banks have to spend most of their income on opening new branches, their income efficiency score is relatively lower than the Islamic bank windows. Income efficiency under VRS was also increasing with the passage of time. The income efficiency of overall Islamic banks in Pakistan was increasing gradually. The similar results are reported by Sufian (2007).

Table 1. Technical efficiency

Banks type	Technical efficiency under CRS	Technical efficiency under VRS	Scale efficiency	Return to scale
Year 2008				
Pure Islamic Banks	0.713	0.923	0.793	DRS
Islamic Banks Windows	0.691	0.891	0.738	DRS
Year 2009				
Pure Islamic Banks	0.775	0.979	0.810	IRS
Islamic Banks Windows	0.711	0.924	0.789	DRS
Year 2010				
Pure Islamic Banks	0.871	1	0.917	IRS
Islamic Banks Windows	0.803	0.978	0.854	DRS

(IRS= Increasing Returns to Scale, DRS= Decreasing Returns to Scale)

Table 2. Income efficiency

Banks type	Income efficiency under CRS	Income efficiency under VRS	Scale efficiency	Return to scale
Year 2008				
Pure Islamic Banks	0.145	0.536	0.264	DRS
Islamic Banks Windows	0.406	0.582	0.706	DRS
Year 2009				
Pure Islamic Banks	0.192	0.564	0.369	DRS
Islamic Banks Windows	0.474	0.701	0.722	IRS
Year 2010				
Pure Islamic Banks	0.213	0.574	0.410	IRS
Islamic Banks Windows	0.491	0.786	0.756	DRS

Table 3. Allocative and cost efficiency

Bank type	For Year 2008		For Year 2009		For Year 2010	
	Allocative efficiency	Cost efficiency	Allocative efficiency	Cost efficiency	Allocative efficiency	Cost efficiency
	Mean					
Pure Islamic Banks (CRS)	0.387	0.379	0.683	0.627	0.910	0.901
Islamic Banks Windows (CRS)	0.423	0.365	0.493	0.453	0.808	0.791
Pure Islamic Banks(VRS)	0.691	0.688	0.931	0.905	0.991	0.927
Islamic Banks Windows (VRS)	0.546	0.512	0.814	0.807	0.918	0.889

Allocative and cost efficiency: Allocative and cost efficiency of pure Islamic banks and Islamic banks windows are reported in Table 3. Allocative efficiency (CRS) of Islamic banks windows was higher in 2008, but in 2009 and 2010 pure Islamic banks scored higher. It is also shown in the table that allocative efficiency (CRS) of Islamic banks industry was increasing with time. Under VRS pure Islamic banks were more efficient than the Islamic banks windows during the study period. The cost efficiency under CRS and VRS of pure Islamic banks were higher than the Islamic banks windows of conventional banks from 2008 to 2010. These results show that pure Islamic banks were performing better than the Islamic bank windows in case of allocative and cost efficiency. The cost efficiency of overall Islamic banking industry was also increasing overtime.

In summary, results presented in table 1 to 3 suggest two points. One, Islamic banking industry showed significant sign of growth during the study period. Two, in terms of technical, cost, allocative and scale efficiency, pure Islamic banks fare better than Islamic bank windows during the study period. However, in terms of income efficiency, Islamic bank windows performed better during the study period.

The overall growth and efficiency of the Islamic banks in Pakistan suggest that this would acquire a major share of banking industry in the future. Akram *et al.* (2011) also made a similar observation that the Islamic banks have already acquired a major share of banking services during the last 8 years. As discussed earlier, opening up of new branches of Islamic banks might have resulted in lower income efficiency as compared to the Islamic bank windows

of the conventional banks. The result on scale efficiencies can be understood in the light of dynamics of economies of scale and scope. Initially, Economies of Scale increase with increasing number of branches, until reaching an optimum size, after which Diseconomies of Scale may set in. In Finance and Cost Accounting terms, in break-even analysis, the point up to which increased "Liquification of the Fixed Cost Element per Unit (in this case Unit may be Branch)" is achieved or is possible, corresponds with increasing efficiencies due to Economies of Scale. However, after reaching a certain stage, due to excessive size, "Liquification of the Fixed Cost Element per Unit (in this case Branch)" may no longer be possible, thereby suggesting that the optimum level has passed and hence, Diseconomies of Scale may now set in, after having reached a certain number of branches.

Role of Islamic banking in agriculture sector:

Pakistan is an agricultural economy. It contributes 21% in GDP and provides employment to 44% labor force (GoP, 2011). Keeping in view the importance of agriculture sector; SBP has taken initiative to direct the Islamic banks for providing finance to this sector. Islamic banking is product and investment based banking, it can play an important role in agriculture sector. Islamic finance has the ability to cover all the farm size groups with their unique and comprehensive products (Iqbal, 2007). The importance of Islamic finance has compelled all the leading conventional banks to start Islamic banking windows.

Islamic banking provides number of products/instrument (Wilson, 1991), which can deal with every nature of business (Adam and Ahmed, 2005). Islamic finance provides various products especially for agriculture sector. These products can be classified into following three modes as per the guidelines of State Bank of Pakistan.

1. Trade based financing
2. Rental based financing
3. Participatory mode of financing

In Trade based financing, Islamic banks act as traders and provide goods/commodities to the clients on their demand. Murabaha, Musawamah, Salam and Istisna are different ways of financing under this mode. Ijarah operats under Rental based financing. In this mode, commodities are provided on lease. On the other hand, Participatory mode is operated by Musharaka, Diminishing Musharaka, Mudaraba, Musaqat and Muzara'a. In this mode, Islamic bank creates partnership among clients to run a business.

1. Musharaka: It is a mode of financing in which two or more parties/partners join the business on the basis of profit and loss sharing. There are certain rules which partners have to fulfill under this mode. The terms and conditions and duration of business should be in written form before starting a business. Proportion of profit should be predetermined by mutual understanding of all parties. But the amount of profit can never be fixed. The proportion of profit may be greater or less than the proportion of investment. In case of loss, both parties should bear loss according to proportion of their investment (SBP, 2010). Musharaka can play critical role in agriculture sector to enhance the production. This mode of finance can be used for project finance and term finance. In project finance, development of forest, big farms, fruit gardens and other mega projects are included. The term finance is used for development of farm buildings, equipments and machinery etc. Basically this mode of finance is for large and medium framers to develop their farms and run the projects.

2. Diminishing Musharaka: It is basically branch of musharaka. In this mode of finance Islamic bank and farmer purchase joint property/goods, some investment is done by famer and other is done by Islamic bank. As farmer pay installment, the ownership ratio of farmer increases and rent become low. Gradually the farmer acquires full ownership of property/good. The ratio of rent decreases as ownership of bank declines. This mode of finance is usually used for buying new properties, equipments and machinery etc. This is very helpful for small farmer who cannot purchase machinery or equipments. They can opt for diminishing musharaka with bank to purchase required goods. Even in start, farmer can own only few percent of the good while the rest of the amount bank pays. This mode is equally favorable for medium and large farmers.

3. Mudarabah: It is a participatory mode of finance. In this contract one party provide finance/assets called Rab-ul-Maal and other party provides services called Mudarib. Profit sharing ratio can be determined by the mutual understanding of both parties and should be determined at the time of agreement. But the loss in this mode of finance is only borne by Rab-ul-Maal. The time period of agreement and business in which Mudarib invest the finance/assets should be written at the time of agreement (Usmani, 2002). This is very unique mode of finance which can be of great value to small and poor farmers. For agriculture financing bank will be Rab-ul-Maal while farmer will be Mudarib. Bank can provide finance, inputs, lands machinery and equipments to poor farmers who are short of resources.

4. Murabaha: It is non-participatory mode of finance and is commonly used in Islamic finance. Murabaha means sale, and in this mode seller (bank) discloses the price of commodity and also mention the amount of profit. Simply it is a sale on profit. In Pakistan mostly agriculture finance is not used for agriculture purpose. Farmers use this finance for their home consumption or for other needs. To avoid this, Murabaha is good type of finance in which bank provide the required goods instead of finance. In this way, efficient use of agriculture finance can be increased. There are some important rules of Murabaha. Goods which bank offer to sale must exist with the bank. Bank has ownership of those goods. Sale must be instant and absolute (SBP, 2010). Under this mode of finance, Islamic banks can sale raw materials,

equipments, machinery and in some way the working capital to the farmers. Famers can also purchase these things on deferred payments. This term is called Bai Muajjal.

5. Ijarah: It is also a useful method of financing to increase the production especially for small farmers. This mode of finance can be useful to transfer the farming business from old traditional ways to new technological methods of farming. Ijarah mean giving products on lease. The asset under Ijarah should be valuable, non-perishable, non-consumable, identified and quantified (SBP, 2010). In this method banks give required commodities/equipments to the farmers on lease. In this way it provides an opportunity to the small farmers who cannot purchase equipments and machinery. There are some rules of this contract. The time period for which farmer acquire a commodity on lease must be written. The bank will retain the ownership of that commodity. If farmer misuses that commodity, the bank can put penalty on farmer.

6. Salam: Salam is an agreement in which advance payment is given to a person for a good which is delivered at any future date (Usmani, 2002). In this mode Islamic banks contract with farmers that the payment is given to farmers at present, farmers used that payment in production process and will give the production to the bank. It is also very important mode of finance especially country like Pakistan in which mostly famers have small holdings.

7. Istisna: The function of Istisna is same as Salam. It is also a future contract. But works differently than salam. Salam is an arrangement for crop production while Istisna is done on manufacturing and assembling of commodities. The other main difference is that in Salam full advance payment is given to the farmers at the time of contract but in Istisna an order can be placed to produce required quantity of commodity and the payment can be made either at the start of agreement or when commodity is ready (Usmani, 2002).

Islamic banking provides different products than conventional banking. It can play an important role in agriculture sector (Sadr *et al.*, 2006). Islamic finance deals equally to all groups of farmers. It provides machinery, equipments and inputs to those small farmers who cannot purchase these goods either on lease or on interest free installments. It also provides finance for medium and large farmers to develop their farms. Islamic banks can also create partnership in mega projects of agriculture. It will be equally helpful to the Agribusiness firms and industry dealing with the farming community, in a number of ways through above mentioned modes of arrangements. There could be bank-farmer dealing or three way arrangements among farmer, bank and industry.

The informal meetings and discussions with the farming community including all farm categories revealed that they have very little knowledge about the existence of Islamic banking in the country. Their awareness level about the products being offered by Islamic banks is almost negligible.

The rigorous campaign of the part of Stat Bank and Islamic bank is required to introduce Islamic banking in the rural areas particularly among the farming community.

Conclusions: This study attempted to measure the efficiency of Islamic banking in Pakistan from 2008 to 2010 by applying DEA method. In conclusion it can be said that efficiency of Islamic banks in Pakistan had been increasing gradually. However, the income efficiency score of pure Islamic banks was low as compared to technical efficiency. This could be because of the fact that most of these banks were opening new branches which escalated the cost and reduced the overall efficiency of operation. We also found that pure Islamic banks were more efficient as compared to the Islamic windows of conventional banks. On the basis of the findings of this study, it is suggested that the Islamic banks should improve their total asset base, while liabilities should be decreased. Moreover, the decision to open up new branches should be very calculated and considered only if the bank is working efficiently, not just for the sake of expanding the area of operation. It should take place keeping in view the economies of scale and scope. In addition to the efficiency measurement, we also described the role of Islamic banks in the agriculture sector. Islamic banking products provide easy access to farmers for purchasing inputs, machinery and equipment. They provide equal opportunity to all farm size groups for example under SALAM small farmers has the access to interest free loans in advance of farming.

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