



Comparing the Efficiency of Islamic Banks of Pakistan and Malaysia: by using the Dea Approach

Amara Javed, Naeem Ullah and Qaiser Ali Malik
Department of Business and Economics, FURC, PAKISTAN

Available online at: www.isca.in, www.isca.me

Received 23rd January 2014, revised 15th March 2014, accepted 18th June 2014

Abstract

The purpose of this paper is to do compare the efficiency of Islamic banks of Pakistan and Malaysia. Data Envelopment Analysis (DEA) model is used to determine the technical and cost efficiency of Pakistani Islamic banks and Malaysian Islamic banks. After analysing the data of 20 Islamic banks, it is concluded that Cost efficiency of Pakistani Islamic banks is better than Malaysian Islamic banks. Whereas, according to the technical efficiency Malaysian Islamic banks are working better than Pakistani Islamic banks. So, Pakistani Islamic banks can acquire improvement in the resource utilization process and can reach the level of efficient banks. Malaysian Islamic banks should improve their cost efficiency to produce optimum outputs.

Keywords: Islamic banks, Pakistan, Malaysia, cost efficiency, technical efficiency.

Introduction

It is an established fact that banks are the dominant suppliers of external finance, which is playing a vital role in channelling the capital from savings to the investment¹. Intermediate saving is not only a vital role which is performed by the banks, but relatively to verify the quality of borrowers and increasing their profitability to enhance the productivity, and they also monetize their liabilities²⁻⁶. So, efficiency of the banks, that is virtual capability to exploit resources and generate more output efficiently, is a perfect gauge as it seeks to measure quality of bank and also its functions in economy⁷.

According to the Nassar and Muhammad⁸, Islamic banking is established on the values of Islamic law (Shari'ah) and which should be showed by the Islamic economies. Sharing of profit and loss and exclusion of payment and collection of interest are two foundations of Islamic banking.

In last few centuries, many financial organizations have practiced a versatile, advanced and economical and modest environment at a broader scale. Islamic banking concept is the most developed part, which has extremely captured the interest of Islamic and present-day economists⁹.

Many researches showed that there are 396 Islamic banks in 53 countries and aggregate deposits which all these banks are handling is US\$ 442 billion⁸.

According to the J. Mester¹⁰, while applying efficient techniques to certain industries judgments also has to be used. In banking sector many issues arise when applying the techniques, and these issues arise because of efficiency estimation. The main problem in banking is to how to measure inputs and outputs.

“Production” and “Intermediation” approaches are widely used. The production approach focused on operating cost of banks. The banks inputs are labour and physical capital; whereas outputs are bank's accounts etc. Intermediation approach deliberates production process of borrowing and lending of all funds as financial intermediation. Therefore, main stressed on entire cost, which includes interest expense and operating expense. In this approach, Inputs are labour, deposits etc, whereas outputs can be measured by the dollar volume which includes all sorts of loans. Many researchers deliberated that after an increment in output anyone output should be decreased or one input be increased and vice versa¹¹.

The aim of the paper is to do comparing the efficiency of the Islamic banks of Pakistan and Malaysia. To find out which country is more efficient than other. DEA model is applying for the analysis of banks to determine the technical efficiency and cost efficiency. Data of five years (2008-2012) will be scrutinized of 20 Islamic banks from Pakistan and Malaysia.

Literature review: The role of banking sector in the economy of any country is fundamental and banks performance has been renowned since past¹² and they should maintain their stability^{13,14}. Measuring the efficiency of banks is a tool which is used by banks to measure the performance of banks¹⁵. There are many ways to measure efficiency but commonly used is profit maximization strategy; how to maximize output from minimum input and efficiency therefore is measured by minimization of cost. Researchers have used different strategies to analyse that how banks increase their efficiencies. According to Kumar and Gulati¹⁶ variables used to find the efficiency are staff productivity, size and market share. Noulas¹⁷ scrutinized that state controlled banks are less efficient than private banks.

Cost of production can be minimised due to high competition and hence it stimulates efficiency¹⁸. Hamim et al.¹⁹ studies on efficiency of banks revealed that increased competition in the market might force them to perform capably, and this instrument would also be used to analyse the bank's success. It also emphasises to produce the highly valued product, in which they can excel and make more profits therefore only if they provide efficient services. Several studies such as, Vassiloglou and Giokas²⁰ conducted on DEA Model which is used to measure the technical and cost efficiency of banks. Randhawa and Lim²¹ used DEA model to scrutinize the banks' technical efficiency. Their conclusion exhibited banks with large size have a higher technical efficiency than the small sized banks. Chun and Lim²² evaluated that profit efficiently is less than cost efficiency.

Jackosn and Fethi²³ concluded that profitable and large banks operate at high levels of technical efficiency. Yong Tan and Christos²⁴ found ownership doesn't play any significant role in boosting the efficiency of banking sector. Vigender et al²⁵ concluded that efficiency can be increased through micro financing.

High competition in the banking sector attributes towards lower profitability (ROE and ROE) of competing banks. Samad²⁶ discussed that production efficiency, profit earned by the BIMB and the rate by which BIMB uses the funds found its rate is lesser than other conventional banks. Cost-effectiveness indexes showed profit received by BIMB is lower than other banks.

Bashir²⁷ recognized the factors of Islamic banking performance as profits and suggested these profits could be generated from overheads and short term customer findings. He further claims that in Islamic bank deposits are considered as common and preferred shares; capitals which are held by the banks disseminate which have the impact that might be negative and results in reducing some of the amounts reverse. According to Gaganis, Liadaki, Doumpos, and Zopounidis²⁸ return on assets, logarithm of personnel, loans to deposit ratio and logarithm of income per capita have significant positive impact on banks efficiency.

Shaista and Umadevi²⁹ concluded that profitability of conventional banks are higher than the Malaysian Islamic banks. The determinants were ROA, banks' size, board size, operational efficiency, Quality of asset and profitability. Ratio of cost to total income is used for the estimation of operational efficiency³⁰ and which is also used to find the bank's management ability while monitoring the operating expenses³¹. Banks becomes less risky if the operational ratios are smaller and there is positive growth in the profitability²⁹. Other researchers such as Tanna et al.³² by means of these determinants found that operational efficiency have a negative relationship with the profitability.

Bashir²⁷, Barth at al.³³ and Vong and Hoi³⁴ used the ratio of total

asset in the place of operating expenses and the result shows that higher value results in increased profitability. Alkassim³¹ study showed how much bank profitable according to their loans, to find this he uses operational ratios.

Ahmed and Hassan³⁵ scrutinized that performing well than Islamic banks because of higher operational ratios. Wasiuzzaman and Tarmizi³⁶ revealed that net interest margin and performance of banks has a positive relationship. Kumar et al³⁷ exhibited that performance of private banks are better than the public banks of India.

There are many studies which showed that efficiency of banks can be measured by two different approaches. But one non-parametric approach which is widely used to measure the efficiency is Data Envelopment Analysis (DEA); the other being parametric Stochastic Frontier Analysis (SFA)³⁸⁻⁴⁰. DEA is a decision approach which is extensively utilized for evaluating the performance of the private as well as public sector⁴¹. Charnes et al.⁴² firstly described DEA as the measure of efficiency by using mathematical planning model (CCR model) for frontier based. These studies conducted in different countries such as Hadian and Hosseini⁴³ examined that commercial banks are less efficient than specialised banks. Hasan Z⁴⁴ using DEA approach showed that state-owned banks are less efficient than private banks. Chakrabarti and Chawla⁴⁵ conducted their research on Indian banks to analyse the relative efficiency by using the DEA model. The two models used to stipulate the input-output vector were "Value" and "Quantity" approach. Their outcomes show that according to the "Value" approach, overseas banks are considerably much proficient than other bank groups.

And according to the "Quantity" approach, performances of private Indian banks are good as compared to the foreign banks.

Ramanathan¹² conducted his research in countries of GCC to evaluate the bank's performance. MPI is used to find the pattern of efficiency which could be changes over the period of 2000-2004. Their results revealed that four banks of GCC countries have an improvement in the productivity through the specified period. And there is reduction in productivity in Qatar's banks.

Methodology

This research work is focused on Quantitative method. Five years data has been selected for the research i.e. 2008-2012. Data has been taken from the annual balance sheet and income statement of all the banks. Those firms have been chosen in the sample whose information was readily available for the sample period. Sample size of the research is 20 Islamic banks in which 6 banks are Pakistani and rest of the 14 banks are Malaysian.

To measure the efficiency of any bank, two methodologies were commonly used which are Parametric approach and non-parametric approach. Both approaches are different from each

other because both have a different ways to manage the error and the suppositions done through the shapes of efficient. Both methodologies have their own strengths and flaws. Parametric approach consists of SFA and TFA. Another approach is non-parametric which includes disposal hull analysis (DHA) and DEA. DEA model is applied to evaluate the efficiency of Pakistani and Malaysian Islamic banks. DEA model is widely used as an instrument for assessing and enhance the performance of service operation. This model is used for the analysis of multi-factor productivity, which is used to evaluate the efficiencies of decision making unit (DMU) and score of efficiency evaluated by numerous input factors and output factors. Many researchers⁴⁶⁻⁴⁸ conducted their research in many countries to evaluate the efficiency of banks by using the DEA model.

For the technical efficiency, two inputs and one output uses in this study. The first input is Total deposits, which includes all saving deposits, deposits from customers and from other banks. Second input is total overhead expenses, which includes personnel expense and other operating expenses. Output consists of total earning assets, which includes financing, investment securities, dealing securities and placements with other banks. To evaluate the cost efficiency, two inputs and one output is used. Prices of two inputs are mandatory. Inputs are total deposits and total equity. Pakistan's currency is Rupees whereas Malaysian's currency is Ringgit. To compare the technical and cost efficiency of the Islamic banks of Pakistan and Malaysia, currency would be converted into the standard currency dollar which would be easy to evaluate the results.

Empirical findings: In Empirical findings, DEA approach is used to compare the technical and cost efficiency of Pakistani Islamic banks and Malaysian Islamic banks, and efficiency scores are acquired from 20 banks for the period 2008-2012. DEA analysis model is specifically used for the research in which DEAP Version 2.1 is used which was refined by Coelli et al.⁴⁹

Estimate level of TE and TC: TE method shows that how much banks could reduce their inputs, by using the required outputs. TC method shows that in making a best practice bank, how much bank's cost is used. To evaluate the cost efficiency, prices are also required. Prices of input variables are also required to evaluate the cost efficiency.

Results and Discussion

Year-wise technical efficiency: Data was taken from the balance sheet and income statement of the Pakistani and Malaysian Islamic banks. Following Tables contains different terms such as Mean, Standard Error, Median, Standard Deviation, Sample Variance, Maximum, Minimum and Count, all these terms denoted by X, S.E, Med, S.E, S.V, Min, Max and C. All tables below show the descriptive analysis of Islamic banks of Pakistan and Malaysia.

Table-1 shows that in 2008, Malaysian Islamic banks are more efficient than Pakistani Islamic banks because mean of Malaysian banks is 0.44 with a standard error 0.08, whereas Pakistani banks have 0.27 with standard error 0.021. The mean inefficient score of 27 per cent stated for Pakistani Islamic banks, if they are producing efficiently than its mean that they could produce the same output with only 73 per cent of inputs. Same in the case of Malaysia they used 56 per cent input by producing the outputs. According to the technical efficiency, Pakistani Islamic banks (mean 0.31) which means that they are not managing its inputs properly whereas, Malaysian Islamic banks (mean 0.63) are more efficient than Pakistani banks but they are also not managing its inputs well.

The scale economies specify that banks in the both countries are characterized by economies of scale. In Pakistani and Malaysian Islamic banks, the strongest economies of scale of Pakistani banks (mean 0.88). The economies of scale estimate of mean 0.88 means that these banks can double their output by increasing their cost. Malaysia (mean 0.78) can also extend their Islamic banking sector but they should give more concentration, how to increase the efficiency and where to open the new branches.

Table-2 shows that in 2009, Malaysian Islamic banks are more efficient than Pakistani Islamic banks because mean of Malaysian banks is 0.598, whereas Pakistani banks have 0.167. The mean inefficient score of 16.7 per cent stated for Pakistani Islamic banks, if they are producing efficiently than its mean that they could produce the same output with only 83.3 per cent of inputs. Same as, Malaysian Islamic Banks could produce the same output with 41 per cent of inputs. According to the VRSTE, Pakistani Islamic banks (mean 0.18) which means that they are not managing its inputs properly whereas, Malaysian Islamic banks (mean 0.70) are more efficient than Pakistani banks.

The scale economies specify that banks in the both countries are characterized by economies of scale. In Pakistani and Malaysian Islamic banks, the strongest economies of scale of Pakistani banks (mean 0.92). Whereas, Malaysian banks (mean 0.877) are efficient but its economies of scale are less than Pakistani banks.

Table-3 shows that in 2010, Malaysian Islamic banks are more efficient than Pakistani Islamic banks because mean of Malaysian banks is 0.467, whereas Pakistani banks have 0.090. The mean inefficient score of 9 per cent stated for Pakistani Islamic banks, if they are producing efficiently than its mean that they could produce the same output with only 91 per cent of inputs. Same as, Malaysian Islamic Banks could produce the same output with 54 per cent of inputs. Technical efficiency shows that, Pakistani Islamic banks (mean 0.098) which means that they are not managing its inputs at all whereas; Malaysian Islamic banks (mean 0.55) are more efficient than Pakistani banks. Malaysian banks efficiency is declining with a great value, it shows these banks are not managing its inputs properly

and should pay attention towards it. In 2010, Pakistan is still inefficient, whereas in 2008 its technical efficiency is much better. The scale economies specify that banks in the both countries are considered by economies of scale. In Pakistani and Malaysian Islamic banks, the strongest economies of scale of

Pakistani Islamic banks (mean 0.90). The economies of scale estimate of mean 0.90 means that these banks can double their output by increasing their cost by only 90 per cent. Malaysian Islamic banks (mean 0.88) should focus on their economies of scale.

Table-1
Technical efficiency of 2008

Pakistani Banks 2008			Malaysian banks 2008			
	CRSTE	VRSTE	Scale	CRSTE	VRSTE	SCALE
X	.274	.311666667	.8835	.446428571	.633857143	.781571
S.E	.021896727	.028305084	.020223336	.084022153	.091268343	.085556
Med	.2705	.294	.9105	.3295	.5305	.9775
S.D	.053635809	.069333013	.049536855	.314382108	.341494871	.320122
S.V	.0028768	.004807067	.0024539	.09883611	.116618747	.102478
Min	.217	.237	.81	.076	.216	.076
Max	.367	.441	.92	1	1	1
C	6	6	6	14	14	14

Table-2
Technical efficiency of 2009

Pakistani banks 2009			Malaysian banks 2009			
	CRSTE	VRSTE	SCALE	CRSTE	VRSTE	SCALE
X	.1675	.1805	.9275	.598357143	.707714286	.877286
S.E	.011960351	.012685293	.021198663	.058702323	.064919428	.054359
Med	.1625	.1785	.9135	.601	.6735	.952
S.D	.029296757	.031072496	.051925909	.21964398	.242906259	.203392
S.V	.0008583	.0009655	.0026963	.048243478	.059003451	.041368
Min	.136	.142	.88	.275	.377	.275
Max	.202	.226	.989	1	1	1
C	6	6	6	14	14	14

Table-3
Technical efficiency of 2010

Pakistani banks 2010			Malaysian banks 2010			
	CRSTE	VRSTE	SCALE	CRSTE	VRSTE	SCALE
X	.0905	.098333333	.9065	.467714286	.551285714	.889786
S.E	.014910287	.013906034	.052295156	.066601771	.073185406	.05449
Med	.089	.093	.954	.4095	.455	.944
S.D	.036522596	.034062687	.128096448	.249201009	.273834714	.203884
S.V	.0013339	.001160267	.0164087	.062101143	.074985451	.041569
Min	.044	.064	.646	.187	.271	.187
Max	.13	.138	.971	1	1	1
C	6	6	6	14	14	14

Table-4
Technical efficiency of 2011

Pakistani banks 2011			Malaysian banks 2011			
	CRSTE	VRSTE	SCALE	CRSTE	VRSTE	SCALE
X	.137666667	.765166667	.179833333	.545928571	.863571429	.615286
S.E	.014952517	.069456181	.011637344	.07417002	.043487994	.079096
Med	.1355	.726	.1805	.5105	.927	.593
S.D	.036626038	.170132203	.028505555	.277518804	.162717175	.295951
S.V	.001341467	.028944967	.000812567	.077016687	.026476879	.087587
Min	.09	.564	.138	0	.496	.001
Max	.179	.985	.221	1	1	1
C	6	6	6	14	14	14

This table shows that in 2011, Malaysian Islamic banks are more efficient than Pakistani Islamic banks because mean of Malaysian banks is 0.54, whereas Pakistani banks have 0.13. The mean inefficient score of 13 per cent stated for Pakistani Islamic banks, if they are producing efficiently than its mean that they could produce the same output with only 87 per cent of inputs. Same as, Malaysian Islamic Banks could produce the same output with 46 per cent of inputs. According to the technical efficiency, Pakistani Islamic banks (mean 0.76) which means that Pakistani banks are trying to operate efficiently. From last 3 years efficiency of Pakistani banks are declining but in 2011 its efficiency is boosting. Malaysian Islamic banks (mean 0.86) showing that still these banks are more efficient than Pakistani banks.

Scale economies show that, the strongest economies of scale of Malaysian banks (mean 0.61). The economies of scale estimate of mean 0.61 means that these banks can double their output by increasing their cost. Pakistan (mean 0.17) with this efficiency score, it should try to improve the efficiency of their existing banks. They should more curious to create more branches because their branching network is not well.

Table-5 shows that in 2012, Malaysian banks mean is 0.65, whereas Pakistani banks have 0.23. The mean inefficient score of 23 per cent stated for Pakistani Islamic banks, if they are producing efficiently than its mean that they could produce the same output with only 77 per cent of inputs. Same as, Malaysian Islamic Banks could produce the same output with

35 per cent of inputs. According to the technical efficiency, Pakistani Islamic banks (mean 0.89) which shows that Pakistani Islamic banks are using its inputs very efficiently to produce its outputs, but it still lacking in some places. Malaysian Islamic banks (mean 0.86) showing that it is operating efficiently but Pakistani banks are more efficient.

Scale economies show that, the strongest economies of scale of Malaysian banks (mean 0.75). The economies of scale estimate of mean 0.75 means that these banks can double their output by increasing their cost. Pakistan (mean 0.26) with this efficiency score Pakistan tries to improve the efficiency of their existing banks. They should extend their Islamic banking sector but they should give more concentration on how to the efficiency and where to open new branches.

Year-wise cost efficiency: All tables below show the descriptive analysis of cost efficiency of Islamic banks of Pakistan and Malaysia.

This table shows that Pakistani Islamic banks measured Cost efficiency which is 0.67 or 67% with a standard error 0.087. In other words these banks have wasted 33% of its cost while producing their outputs. Whereas, Malaysian Islamic bank's cost efficiency is 60% with a standard error 0.084. Pakistani Islamic banks have high cost efficiency than Malaysian Islamic banks. Pakistani and Malaysian Islamic banks should use its input more efficiently to produce maximum output and should do reduction in their cost by 33% and 40% respectively.

Table-5
Technical efficiency of 2012

	Pakistani banks 2012			Malaysian banks 2012		
	CRSTE	VRSTE	SCALE	CRSTE	VRSTE	SCALE
X	.237833333	.889833333	.267333333	.654071429	.865857143	.755286
S.E	.018133609	.033498673	.016912849	.062012801	.064647808	.040984
Med	.2435	.8915	.2855	.6545	.9645	.746
S.D	.044418089	.082054657	.041427849	.232030656	.241889949	.153347
S.V	.001972967	.006732967	.001716267	.053838225	.058510747	.023515
Min	.166	.764	.195	.075	.101	.522
Max	.288	1	.303	1	1	1
C	6	6	6	14	14	14

Table-6
Cost efficiency of 2008

Islamic Banks 2008	X	S.E	Med	S.D	S.V	Min	Max	C
Pakistani	0.677667	0.087322264	0.6555	0.21389499	0.045751067	0.351	1	6
Malaysian	0.607286	0.084115464	0.5745	0.314731248	0.099055758	0.03	1	14

Table-7
Cost efficiency of 2009

Islamic Banks 2009	X	S.E	Med	S.D	S.V	Min	Max	C
Pakistani	0.7355	0.090412296	0.673	0.221463993	0.0490463	0.446	1	6
Malaysian	0.548071	0.077064584	0.4625	0.288349271	0.083145302	0.024	1	14

In 2009, Pakistani Islamic banks have a 73% cost efficiency with standard error 0.09. Whereas, Malaysian Islamic banks have a 54% cost efficiency with a standard error 0.07. Pakistani Islamic banks and Malaysian Islamic banks should reduce their cost by 27% and 46% respectively. These results depict that during the year Pakistani banks performed better than Malaysian banks.

In 2010, cost efficiency of Pakistani Islamic banks is 65% with a standard error 0.081. They should reduce their 35% cost to produce maximum output. Cost efficiency of Malaysian Islamic banks is 38% with a standard error 0.078. They should pay more concentration on their cost. These results again depict that during the year Pakistani banks performed better than Malaysian banks.

Table-9 shows that Pakistani Islamic banks measured Cost efficiency which is 0.80 or 80% with a standard error 0.078. In other words these banks have wasted 20% of its cost while producing their outputs. Whereas, Malaysian Islamic bank's cost efficiency is 60% with a standard error 0.066. Pakistani Islamic banks have higher cost efficiency than Malaysian Islamic banks. Pakistani and Malaysian Islamic banks should use its input more efficiently to produce maximum output and should do reduction in their cost by 20% and 40% respectively.

In 2012, Pakistani Islamic banks have 84% cost efficiency with standard error 0.04. Whereas, Malaysian Islamic banks have 84% cost efficiency with a standard error 0.06. Both Pakistani Islamic banks and Malaysian Islamic banks should reduce their cost by 20%.

All the above results show that during 2008-2012, Pakistani Islamic banks performed better than Malaysian Islamic banks in terms of cost efficiency. So, Malaysian Islamic banks should

improve their cost efficiency to produce a maximum output from minimum inputs.

Conclusion

Various researches had been conducted to measure the technical and cost efficiency of Islamic banks and it exhibit different research. The various analyses have identified significant management practices and these are expected to help the banks to identify areas where they might think that they need to improve their efficiency. To increase in the efficiency, it needs change over time so Islamic banks should ensure synchronization of their assets and liabilities.

After analysing the data of 20 Islamic banks of Pakistan and Malaysia during 2008-2012, we concluded that according to the technical efficiency of Malaysian Islamic banks are working more efficiently than Pakistani Islamic banks. Whereas, according to the Cost efficiency of Pakistani Islamic banks are better than Malaysian Islamic banks. Inefficiency caused by improper resource allocation. Pakistan can improve its efficiency by allocating its proper inputs to generate maximum output. They should manage their reimbursement schedule, risk, precision of information, types of deposits etc. These are all have an effect on cost to the bank. The study suggests that large sized banks are the slightly efficient and small sized banks are the utmost efficient Islamic bank in the years 2008-2012 in both countries. Hence, inefficiency can be determined from the size of the bank. Though, economies of scale can be increased with the passage of time. If the bank size increases above medium sized banks then inefficiency increases and economies of scale becomes weaker. So, large size banks are not optimal. Pakistani Islamic banks are marginally inefficient. Pakistani Islamic banks can acquire improvement in the resource utilization process and can reach the level of efficient banks.

Table-8
Cost efficiency of 2010

Islamic Banks 2010	X	S.E	Med	S.D	S.V	Min	Max	C
Pakistani	0.653667	0.081252145	0.6295	0.199026296	0.039611467	0.426	1	6
Malaysian	0.3895	0.078798237	0.339	0.294836004	0.086928269	0.023	1	14

Table-9
Cost efficiency of 2011

Islamic Banks 2011	X	S.E	Med	S.D	S.V	Min	Max	C
Pakistani	0.8055	0.078578517	0.8685	0.192477271	0.0370475	0.546	1	6
Malaysian	0.603357	0.066257208	0.6035	0.247911773	0.061460247	0.022	1	14

Table-10
Cost efficiency of 2012

Islamic Banks 2012	X	S.E	Med	S.D	S.V	Min	Max	C
Pakistani	0.843667	0.04600628	0.855	0.11269191	0.012699467	0.658	1	6
Malaysian	0.846429	0.068909298	0.927	0.257834984	0.066478879	0.023	1	14

Hence, the analyst must focus to boost their efficiency. Malaysian Islamic banks should improve their cost efficiency to produce optimum outputs. Islamic banking system can generate the scope of economies to enhance the efficiency. It is very important to keep the growing spirit in the progress of Islamic banks. Our results exposed that the technical and cost efficiency of both countries could be improved further.

The limitation of the study is that the research is conducted only on 20 Islamic banks due to time constraint. Another limitation of this study is that data was not easily available throughout the years 2008-2012, for this reason only 20 Islamic banks are opted. It would be recommended that further analysis of Pakistani and Malaysian Islamic banks regarding the efficiency should be done to consider the exposure of risk factor. Exposure of risk factor should be taken into consideration besides productivity efficiency measures, to establish overall banks performance. That bank is not the best bank who is most efficient producer of the loans but that bank is the best who balances the high efficiency with low risk assumptions.

References

1. Demircug-Kunt A. and Levine R, Financial structure and economic growth: Perspectives and lessons, in Demircug-Kunt, A. and Levine, R. (Eds), Financial Structure and Economic Growth: A Cross-country Comparison of Banks, Markets, and Development, *The MIT Press*, 3-14 (2001)
2. Fama E, What's different about banks?, *Journal of Monetary Economics*, **15**, 29-39 (1985)
3. Minsky H, Stabilizing an Unstable Economy, *Yale University Press, New Haven, CT*, (1986)
4. Stiglitz J.E. and Weiss A, Banks as social accountants and screening device for the allocation of credit, *NBER working paper*, 2710, (1988)
5. Moore B, Horizontalist and Verticalists: the Macroeconomics of Credit Money, *Cambridge University Press, Cambridge*, (1988)
6. Lucchetti R., Papi L. and Zazzaro A., Banks' inefficiency and economic growth: a micromacro approach, *Scottish Journal of Political Economy*, **48(4)**, 400-24 (2001)
7. Hasan I., Wang H. and Zhou M., Do better institutions improve bank efficiency?, Evidence from a transitional economy, *Managerial Finance*, **35(2)**, 107-127 (2009)
8. Saif Al Nasser S.A. and Muhammed D.D., Introduction to history of Islamic banking in Malaysia, *Humanomics* , **29(2)**, 80-87 (2013)
9. Sufian F., Trends in the efficiency of Singapore's commercial banking groups:A non-stochastic frontier DEA window analysis approach, *International Journal of Productivity and Performance Management*, **56(2)**, 99-136 (2007)
10. Mester L.J., Applying Efficiency Measurement Techniques to Central Banks, *The Wharton Financial Institutions Center*, 1-37 (2003)
11. Koopmans T.C., Efficient Allocation of Resources, *Econometrica*, XIX, **10**, 455-465 (1951)
12. Ramanathan R., Performance of banks in countries of the Gulf Cooperation Council, *International Journal of Productivity and Performance Management*, **56(2)**, 137-154 (2007)
13. Masoud B., Iman D., Zahra B. and Samira Z., A Study of Risk Management in Iranian Banks, *Research Journal of Recent Sciences* , **2(7)**, 1-7 (2013)
14. Mishra Aswini Kumar G., Sri Harsha, Shivi Anand and Neil Rajesh Dhruva, Analyzing Soundness in Indian Banking: A CAMEL Approach, *Research Journal of Recent Sciences*, **1(3)**, 9-14 (2012)
15. Kumbhakar S.C. and Lovell C.A.K., Stochastic Frontier Analysis, *Cambridge University Press, Cambridge*, (2003)
16. Kumar S. and Gulati R., Measuring efficiency, effectiveness and performance of Indian public sector banks, *International Journal of Productivity and Performance Management*, **59(1)**, 51-74 (2010)
17. Noulas A.G., Deregulation and operating efficiency: The case of the Greek banks, *Managerial Finance*, **27(8)**, 35-47 (2001)
18. Nickell S.J., Competition and corporate performance, *Journal of Political Economy*, **104(4)**, 724-46 (1996)
19. Mokhtar H.S., Abdullah N. and Alhabshi S.M., Efficiency and competition of Islamic banking in Malaysia, *Humanomics* , **24(1)**, 28-48 (2008)
20. Vassiloglou M. and Giokas D., A study of the relative efficiency of bank branches: an application of data envelopment analysis, *Journal of Operational Research Society*, **41**, 591-7 (1990)
21. Randhawa D.S. and Lim G.H., Competition, liberalization and efficiency: Evidence from a two stage banking models on banks in Hong Kong and Singapore, *Managerial Finance*, **31(1)**, 52-77 (2005)
22. Chu S.F. and Lim G., Share performance and profit efficiency of banks in an oligopolistic market: Evidence from Singapore, *Journal of Multinational Financial Management*, **8(2-3)**, 155-68 (1998)
23. Jackson P.M., Fethi M.D. and Inal G., Efficiency and productivity growth in Turkish commercial banking sector: A non-parametric approach, paper presented at the European Symposium on Data Envelopment Analysis: *Recent Developments and Applications*, *Wernigerode*, (1998)
24. Tan Y. and Floros C., Stock market volatility and bank

- performance in China, *Studies in Economics and Finance*, **29(23)**, 211-228 (2012)
25. Vijender A., Rachna A. and Parul K., Micro Finance and Risk Management for Poor in India, *Research Journal of Recent Sciences*, **1(2)**, 104-107 (2012)
26. Samad A., Comparative efficiency of the Islamic bank vis-a-vis traditional banks in Malaysia, *Journal of Economics and Management*, **7(1)**, 1-25 (1999)
27. Bashir A.H.M., Assessing the performance of Islamic banks: some evidence from the Middle East, in American Economic Association Annual Meeting, New Orleans, LA, (2001)
28. Gaganis C., Liadaki A., Doumpos M. and Zopounidis, C., Estimating and analyzing the efficiency and productivity of bank branches: Evidence from Greece, *Managerial Finance*, **35(2)**, 202-218 (2009)
29. Wasiuzzaman S. and Gunasegavan U.N., Comparative study of the performance of Islamic and conventional banks: The case of Malaysia, *Humanomics*, **29(1)**, 43-60 (2013)
30. Srairi S.A., Cost and profit efficiency of conventional and Islamic banks in GCC countries, *Journal of Productivity Analysis*, **34(1)**, 45-62 (2008)
31. Alkassim F.A., The profitability of Islamic and conventional banking in the GCC countries: A comparative study, *Journal of Review of Islamic Economics*, **13(1)**, 5-30 (2005)
32. Tanna S., Kosmidou K. and Pasiouras F., Determinants of profitability of domestic UK commercial banks: Panel evidence from the period of 1995-2002, paper presented at the 37th Annual Money Macro and Finance (MMF) Research Group Conference, Rethymno, Greece, (2005)
33. Barth J.R., Nolle D.E., Phumiwasana T. and Yago G., A cross-country analysis of the bank supervisory framework and bank performances, *Financial Markets and Institution and Instruments*, **12(2)**, 67-120 (2003)
34. Vong P.I.A. and Hoi S.C., Determinants of bank profitability in Macao, *Macau Monetary Research Bulletin*, **12**, 93-113 (2009)
35. Ahmad A.U.F. and Hassan M.K., Regulation and performance of Islamic banking in Bangladesh, *Thunderbird International Business Review*, **49(2)**, 251-77 (2007)
36. Wasiuzzaman S. and Tarmizi H.A., Profitability of Islamic banks in Malaysia: An empirical analysis, *Journal of Islamic Economics, Banking and Finance*, **53**, 68 (2010)
37. Kumar M.A., Harsha G.S., Anand S. and Dhruva N.R., Analyzing Soundness in Indian Banking: A CAMEL Approach, *Research Journal of Management Sciences*, **1(3)**, 9-14 (2013)
38. Wezel T., Bank efficiency and amid foreign entry: Evidence from the Central American region, *IMF Working Papers*, 1-33 (2010)
39. Fiordelesi F. and Molyneux P., Total factor productivity and shareholder returns in banking, *OMEGA: The International Journal of Banking and Finance*, **38(5)**, 241-53 (2010)
40. Mishra A.K., Gadhia J.N., Prasad Kar B., Patra B. and Anand S., Are Private Sector Banks More Sound and Efficient than Public Sector Banks?, Assessments Based on Camel and Data Envelopment Analysis Approaches, *Research Journal of Recent Sciences*, **2(4)**, 28-35 (2013)
41. Sueyoshi T., Stochastic DEA for restore strategy: An application to a Japanese petroleum company, *The International Journal of Management Science*, **21(4)**, 385-98 (2000)
42. Charnes A., Cooper W. and Rhodes E., Measuring the efficiency of decision making units, *European Journal of Operational Research*, **2**, 429-44 (1978)
43. Hadian E. and Hosseini A.A., Measuring the efficiency of the Iranian banking system using DEA approach, *Quarterly Iranian Economic Researches*, **20**, 1-25 (2004)
44. Hasanzadeh A., Efficiency and its determinants in the Iranian banking system, *Bi-Quarterly Journal of Economic Essays*, **4(7)**, 75-98 (2007)
45. Chakrabarti R. and Chawla G., Banking efficiency in India since the reforms, *Money and Finance*, **9(2)**, 31-47 (2005)
46. Mostafa M., Benchmarking top Arab banks' efficiency through efficient frontier analysis, *Industrial Management and Data*, **107(6)**, 802-823 (2007)
47. Giokas D., Bank branches operating efficiency: A comparative application of DEA and loglinear model, *Omega-International Journal of Management Science*, **19**, 549-57 (1991)
48. Bdour J.I. and Al-khoury A.F., Predicting change in bank efficiency in Jordan: A data envelopment analysis, *Journal of Accounting and Organizational Change*, **4(2)**, 162-181 (2008)
49. Coelli T., A guide to DEAP Version 2.1: a data envelopment analysis (computer) program, *CEPA Working Paper 96/08*, Centre for Efficiency and Productivity Analysis, University of New England, Armidale, (1996)