



Munich Personal RePEc Archive

# **Evaluation of Islamic banking performance: On the current use of econometric models**

Hasan, Zubair

Faculty of Economics and Management Sciences, International  
Islamic University, Malaysia, (IIUM)

2005

Online at <https://mpra.ub.uni-muenchen.de/7272/>  
MPRA Paper No. 7272, posted 20 Feb 2008 05:47 UTC

# Evaluation of Islamic Banking Performance: On the Current Use of Econometric Models

Zubair Hassan\*

*This paper provides an appraisal of some of the researches conducted in recent years for evaluating the efficiency of Islamic banks. It is restricted to studies using parametric (SFA) and non-parametric (DEA) models. It finds that these models leave much to be desired and the conclusions they arrive at are of suspect validity for variety of reasons. On a more important side, the criteria-cost or profit-they invariably use for measuring efficiency albeit valid miss the essence of what Islamic banking aims to achieve. These banks must of course pay their way more than that they have to meet certain social objectives and priorities. Their fulfillment of social responsibilities even at the expense of reduced profits has to be the main justification for their existence.*

**Key words: Islamic banking, Efficiency criteria, SFA, DEA, Social priorities**

## 1. INTRODUCTION

There has been a fast expansion of banking institutions – conventional and Islamic – over the decades. But so has also been the proliferation of financial crises and banks' non-performance. The phenomenon prompted investigations into various aspects of financial services including the determinants of bank performance and the criteria for its evaluation. Thus, recent years have witnessed a flood of writings on the subject in mainstream economics. Islamic economists and policy makers largely followed the footmarks of their secular forerunners.

The main argument of this paper is that Islamic scholars are in a measure attempting to fix round pegs in square holes. One must see Islamic banking as an on-going process in a social milieu characterized with mass poverty and gross inequalities in the distribution of wealth, income, and opportunities. The mainstream transactional approach to the organization or performance evaluation of Islamic financial institutions is rather misplaced. But one cannot turn the tide all at once. This work, therefore, proceeds on the assumption that the criteria and models used in Islamic literature on the subject are acceptable in so far as they go. Our first task is to provide an appraisal of the main writings in the area, especially the way the models have been handled and the results they yield.

---

\*Department of Economics, Faculty of Economics and Management Sciences, International Islamic University of Malaysia, Jalan Gombak 53100 Kuala Lumpur, E-mail: [zubair@iiu.edu.my](mailto:zubair@iiu.edu.my), [zubhas@hotmail.com](mailto:zubhas@hotmail.com), webpage: [www.staff.iiu.edu.my/zubair](http://www.staff.iiu.edu.my/zubair)

Most of the writings have employed mathematical models: parametric or non-parametric<sup>1</sup>. They have used several criteria but cost and profit considerations dominate the scene. Of the determinants of efficiency so measured Islamic scholars have generally picked up for use from the mainstream writings the scale of operations, market diversification, and productivity growth<sup>2</sup>. Again, time series data are seldom used in their works; though panel modeling is not uncommon. The models presented do not always spell out their theoretical underpinnings or explain policy significance of their findings. In sum, they leave much to be desired on their own terms with rare exceptions

The paper is divided into five sections including the introduction. Section 2 discusses in a broad way the sort of criteria and models used for evaluating the performance of banks. In Section 3 we provide an appraisal of some recent contributions made to the subject in Islamic economics. Section 4 argues that Islamic banking must be viewed as a phenomenon meant for integrating with the dynamics of the reformist movement in Muslim societies. The process of such integration – not the transactional view – must determine both the structure and performance evaluation criteria of Islamic financial institutions including banks. Finally, Section 5 contains some concluding comments.

## **2. CRITERIA AND MODELS**

All models employed for evaluating the performance of a firm including banks invariably seek to construct an appropriate benchmark or frontier for the purpose. The distance of the firm from the frontier measures the extent of its inefficiency. The frontier indicating maximum attainable efficiency is set to have unit value in each case, and estimation is made of what are called the ‘scores’ for individual firms under study. The closer is the score of a firm to one higher it sits relative to others on the efficiency ladder. But opposite is the case the farther away is its score from the frontier.

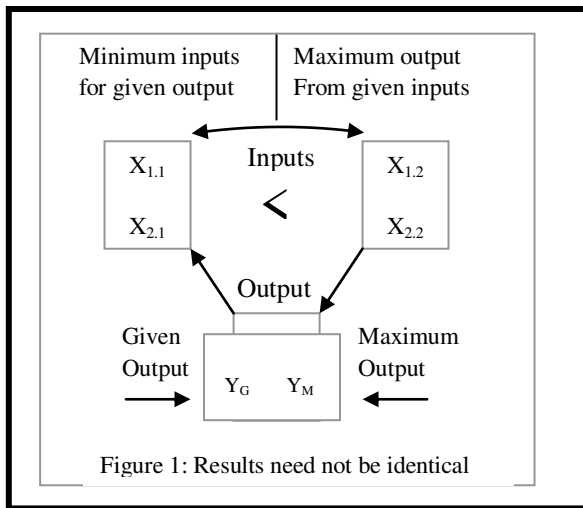
---

<sup>1</sup> One notable exception using ratio analysis is Munawar Iqbal (2001). Detailed comments on his paper are available in Hasan (2005). Suffice here to say that his reliance on conclusions arrived at on the ratios without providing the data they are calculated from is untenable: ratios and absolute values they rest on need not always move in the same direction. Also, ratios fail to capture the long-run business dynamics; they lump together many aspects of performance relating to operations, marketing, and finance suppressing vital details. Comparing ratios and means concerning profit, liquidity, and loans for Islamic and conventional banks, Samad (2004) arrives at similar inconclusive results for Bahrain.

<sup>2</sup> Other variables used for the purpose include the location of the firms, taxation levels, public expenditure, economic stability, investment patterns, stock price variations, foreign capital flows, export performance, market share changes, political climate environmental factors and so on. Since the technique has infinite applications all influences operating on efficiency can rarely be imagined or listed.

In mainstream economics the primary objective of business firms is the maximization of profit for their owners. Criteria for efficient performance are invariably geared to this norm. In principle, the norm is possible to achieve in two ways. First, a firm can aim at producing maximum output with *given inputs*. This is called economic or cost efficiency. Alternatively, the firm may attempt to obtain a *given output* using minimum inputs. This we term as allocative efficiency. In the first case, we use an input or cost (C) frontier while in the second a production or output (Y) frontier is employed for measuring efficiency. The two approaches may not yield identical results Figure 1 juxtaposes the two approaches to further clarify the position.

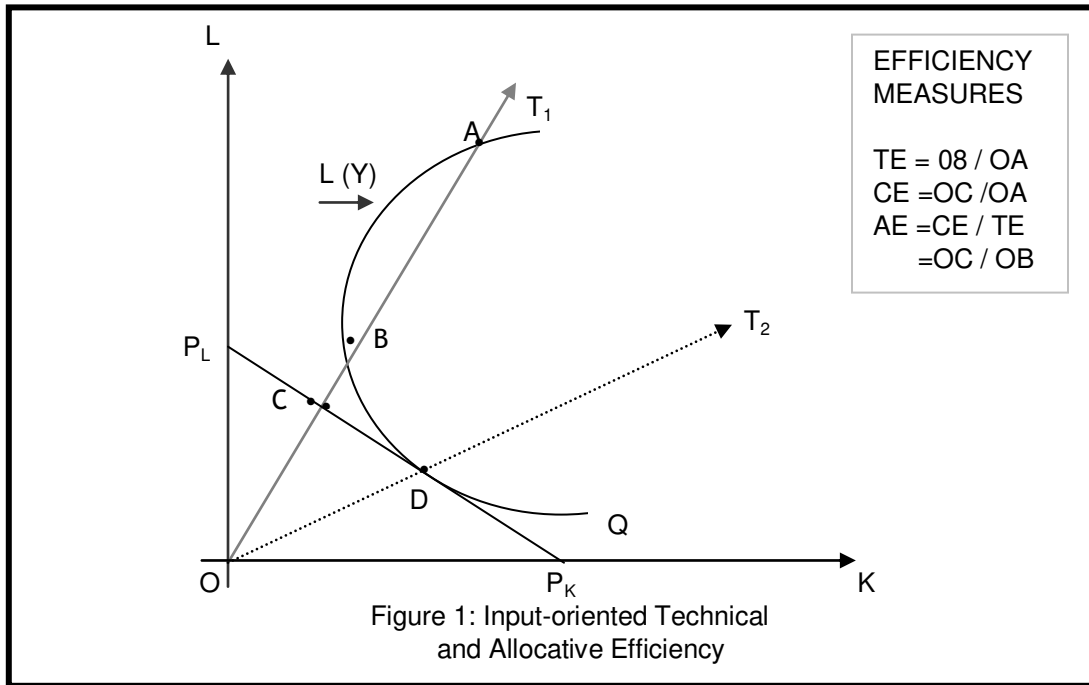
Figure 1: Results need not be identical



Also, the equations for estimating numerical values of efficiency scores, and policy implications of the results need not be the same in the two approaches.

Cost efficiency consists of two elements. First is the purely physical or technical element that refers to the ability of a firm to produce as much output as the given input use would permit. Thus, the technical element focuses on optimal use of given resources; it has an output maximization orientation. The second is the price element requiring the firm to produce a given output with minimum input expense. The approach insists on efficient resource allocation. Allocation here refers to selecting the least expensive combination of the given inputs to produce technically efficient output.

The first element is defined as the maximum possible reduction in the input use that would allow continual production of the *same* output as before. Such input use level is put equal to unity and specifies the technical efficiency frontier because no further input reduction is feasible. Thus, a firm having a score equal to one is technically efficient, but one with a lower score is inefficient. Figure 2 illustrates the basic concepts. Here the firm is producing a given output Q using an input combination defined by point A in time  $T_1$ . The same amount of output the firm could have produced by contracting both labor (L) and capital (K) back to point B that lies on the frontier.



The input oriented technical efficiency is defined as  $TE = OB / OA$ . However, it is point D where the marginal rate of technical substitution equals the input price ratio  $P_L / P_K$  that gives the least cost combination of inputs for producing Q. Notice that total cost at C and D is equal, both points lying on the same price line. To achieve the same level of cost, i.e. the expenditure on inputs, would need A to be contracted further to point C. Hence, the overall *cost* efficiency is to be defined as  $OC / OA$ . If we know the ratio of input prices i.e. the slope of the  $P_L P_K$  line, we can have also the allocative efficiency of the firm operating at A defined as  $AE = OC / OB$ . Now, if we take the product of efficient quantity and input price ratios, we can get a measure of overall cost / economic efficiency (OE). The terms EE, OE and CE are interchangeably used in the literature. Thus,

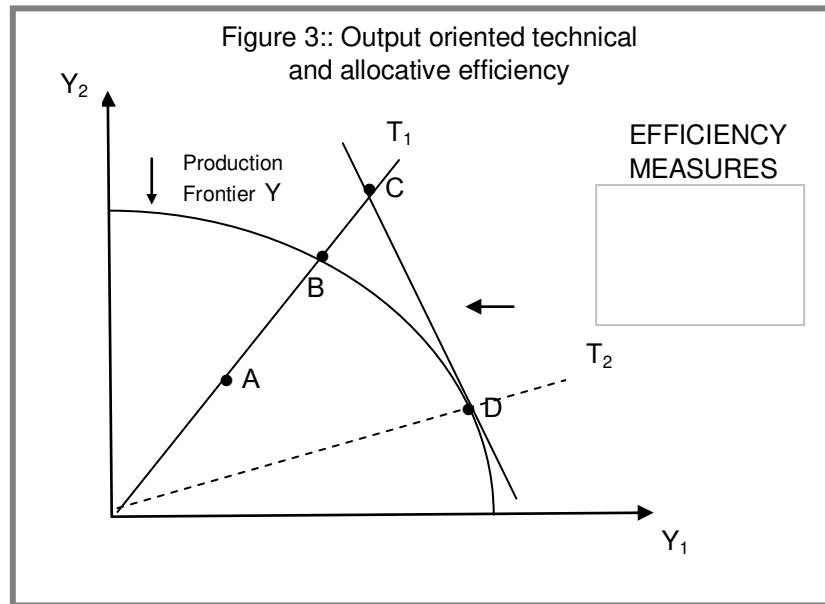
$EE = OE = (TE) \cdot (AE) = (OB / OA) (OC / OB)$  that reduces to  $OC / OA = CE$  (2.1)  
 As (a)  $CE = OC / OA$  is less than one, (b) the gap  $[1 - (OC / OA)]$  measures the overall cost inefficiency (CIE) of the firm<sup>3</sup>. The gap can vanish if technological improvement over time ( $T_2$ ) leads the firm to produce at point D, input prices remaining unchanged.

The above explanation of the conceptual framework for efficiency measurement is provided in terms of cost criterion. Even though it implies profit maximization, a number of studies target profit directly as the focus of their attention. Both cost or profit

<sup>3</sup> These definitions would put CE and CIE in a logical relationship:  $CE + CIE = 1$ , However, in the literature CIE has come to be conceived as a ratio of CE i.e. (c)  $CIE = (1 - CE) / CE$ . Alternatively, we may state the relationship as:  $CE = 1 / (1 + CIE)$ . In some cases, the use of (b) may help avoid inconsistencies the insistence on using (c) may create.

criteria are used to study the impact on them of a host of identifiable factors, referred to earlier, via the efficiency route.

Compare the above output oriented approach to the efficiency measurements with the optimal input use approach for constructing production frontier to explaining the various efficiency notions. Figure 3 helps such comparison. Mark that point A depicting a departure from efficiency was above the cost frontier Q in Figure 2 but here it is below the production frontier implying that more could have been produced with the same cost



at B. The price line passing through C and D implies that more could have been produced in time  $T_1$  as at D in time  $T_2$  but for the current inferior technology. Thus, here  $OA / OD$  measures RE, the revenue efficiency.

There are two basic models that are widely used as tools in efficiency studies with all sorts of variants in the field of applied research. There are econometric models. They are parametric and rely on sophisticated regression analyses. Since probability estimation lies at their heart to erect the efficiency frontiers and obtain firms' scores they constitute the stochastic frontier approach or the SFA to efficiency evaluation. The majority of these studies were confined to the US financial sector. There the large number of banks has traditionally facilitated econometric modeling (Avkiran 1999). The other method uses the non-parametric linear programming or the data envelopment analysis, in short DEA, for the purpose.

Using the SFA for estimating cost efficiency requires the specification of a functional form. The translog cost frontier is often considered appropriate for studying efficiency issues of the banking firms. It is a very general and flexible function form and encompasses also some other approaches like the Cobb-Douglas.

SFA looks at the question of efficiency in terms of cost minimization for a given output rather than maximization of output from given inputs.

SFA models vary according to the type of data used for the study i.e. cross sectional or panel. Studies on efficiency of Islamic banks we shall be evaluating use cross sectional input oriented data i.e. they seek resource conserving cost minimization given the output to be produced. Early cost oriented efficiency studies typically included more than one output and jointly estimated the function with the associated input share equations derived using the Shephard's Lemma<sup>4</sup>. But the derivation of these equations implies that the firms are using their long-run efficient input mix: the firms are assumed allocatively efficient. This is possible because many firms, in fact, produce a single output, and others can aggregate their multiple outputs into a single output index (Kebede 2001, 13).

In a simple single output and multiple inputs case, we estimate the frontier using the functional relationships:

$$C_{it} = f(y_{it}, w_{kt}) + \varepsilon_{it} \quad \text{where } \varepsilon_{it} = v_i + u_i \quad (4.1)$$

In (4.1)  $C_{it}$  is the total cost of firms in a period  $t$ ,  $y_{jt}$  and  $w_{kt}$  are vectors of output and input prices respectively  $f(y_{it}; w_{kt})$  provides the cost frontier. The random disturbance term  $\varepsilon_{it}$  allows the function to vary stochastically. It has two components: the  $v_{it}$ 's are independently and identically distributed (iid) elements; they are truly uncorrelated with the regression. In contrast, the  $u_{it}$ 's are non-negative variations associated with the technical inefficiency of firm  $i$ . Thus, the error term  $\varepsilon$  is not symmetric as  $u_{it} \leq 0$ <sup>5</sup>.

Estimating the firm-specific inefficiency is the ultimate objective of the model. This requires the extraction of separate estimates for  $v_i$  and  $u_i$  from the values of  $\varepsilon_i$  for each firm. For this we need distributional assumptions on the two error components additional to those underpinning the OLS, and also a different estimation technique to obtain a consistent estimator of the intercept and the TE for each firm. The required distributional assumptions are:  $v_i$ 's are normally distributed,  $u_i$ 's follow non-negative half-normal. Both  $v_i$  and  $u_i$  are distributed independently of each other and regression<sup>6</sup>. Avoiding mathematical intricacies that replete the literature, suffice to pointed out that cost efficiency of a firm is defined as  $[\exp(-u_i)]$ . But as  $u_i$  cannot really be observed, it is estimated by using the conditional  $E[\exp(-u_i | \varepsilon_i)]$  as the best predictor of  $u_{it}$  at time  $t$ . Curtiss (2000, 11) provides the relevant estimation equations for  $E[\exp(-u_i | \varepsilon_i)]$ .

---

<sup>4</sup> See, for example, Saaid et al (2003, 131, and 134) who use the technique to extract share equations for capital and deposits but it is unclear why did they drop the one for labor prior to estimation (n.11, 139).

<sup>5</sup> If  $u_i$  is equal to zero in fact or by assumption, SFA is reduced to central tendency analysis.

<sup>6</sup> Kebede 2001, pp. 15-17 illustrates the argument with the aid of appropriate normal distribution curves.

Thus, in an SFA output oriented approach where the objective is to minimize cost for given output  $\exp(-u_i)$  has to be minimized not maximized. Jemric and Vujcic (2002, 5-7) clarify the point in their work. The easier way to find the maximum or minimum value of  $\exp(-u_i)$  is to use the maximization likelihood method (MLM) which is automated in several computer programs. The general problem is often solved by the minimization of  $[-\log(L)]$  where  $L$  is the likelihood function<sup>7</sup>.

It may be mentioned that in an output oriented approach i.e. where the objective is to maximize production,  $\exp(-u_i)$  is maximized for the given inputs, but for measuring cost efficiency it has to be *minimized*. Jemric and Vujcic (2002, 5-7) make the point explicit.

The relative merits and limitations of SFA and DEA approaches have often been discussed in the literature. Put briefly, one disadvantage of the econometric SFA models is that they impose a function form and distribution assumptions on the data prior to estimation<sup>8</sup>. In contrast, DEA does not require any assumptions about the function form, and is, therefore, less open to misspecification. Also, DEA being non-parametric does not take into account random errors. As such, there is no problem of assuming subsequently an underlying distribution form for the error term. However, for this very ability to avoid statistical noise, the efficiency estimates the approach provides could well be biased, if the production process is largely characterized with stochastic elements.

The SFA and DEA techniques are mostly used in two stages. First, each seeks to estimate efficiency or inefficiency scores relevant to the objectives of the study. As stated earlier, these scores can be used to rank the firms on the efficiency scale to indicate their relative performance. In the second stage, attempt is made to search for the nature and extent of causal relationship between inefficiency estimates and other relevant variables such as size of the firms, their location, taxation, public expenditure, stability, investment, profits, stock prices, and so on. Use is made of logarithmic conversion of data to straighten the selected production function. The application could focus on individual entities e.g. firms or farms or their aggregation. The frontier approach is a tool that can be used in *any* field of inquiry where variables yield to measurement.

---

<sup>7</sup> For details of the method see Bock (1998) pp. 1-5. Information on relevant software is available in Herrero and Pascoe (2002)

<sup>8</sup> Usually the condition of linear homogeneity and symmetry is imposed on the data prior to estimation exercise implying constant returns to scale.



## **2. SOME RECENT STUDIES**

Muslim scholars consider the same conventional criteria appropriate for measuring the performance of Islamic banks and often find them more efficient than their mainstream counterparts. They have usually employed either SFA or DEA for the purpose: Our appraisal includes the works of Majid et al (2003), Saaid et al (2003), Hassan and Hussein (2003), and the article of Darrat et al (2002) who use the DEA for their work. These are seminal works; and deserve credit for introducing Islamic economics to some new methods of analysis that made their appearance rather late even in mainstream applied economics. We may begin with a few general remarks though they need not apply to the works under review uniformly.

A common feature of these writings, as alluded to earlier, is the insufficiency of background information they provide about the nature of the economy, and the state of its monetary and fiscal policies affecting the financial sector. Even discussion on the structure, growth and place of Islamic banking in the overall financial setup of a country often leaves much to be desired. Their conclusions too require special attention for they apparently seem to defy both popular perception and experience.

Another difficulty with these exercises is that they do not provide clear explanations on the sources, nature, limitations and editing of data used. The definitions and contents, at times even the number of outputs and inputs chosen for the study remain unclear. Furthermore, appropriate, and unambiguous explanations of methods used are lacking. Reasons supporting the conclusions arrived at are at times missing, their policy implications are seldom adequately clarified.

### ***Majid et al***

Majid et al (2003) measure the cost efficiency of 34 commercial banks in Malaysia paneling the data for the period 1993-2000 with a view to comparing the relative performance of two bank sets – Islamic and mainstream<sup>9</sup>. On the basis of their results, the authors claim that “the efficiency of Islamic banks is not statistically different from the conventional banks”. Also, they find “no evidence to suggest that bank efficiency is a function of ownership status i.e. public or private, foreign or local” (p.1). These conclusions are quite interesting and invite closer attention.

The authors employ the familiar translog cost frontier function for ascertaining the efficiency scores for the selected banks, individually as well as for different bank groupings. Their model specification and its details are mostly in order. Still, a few things raise some queries. To begin with, the study covers a fairly long period – 1993 to 2000 -- but the results have no time dimension: obviously the authors have used panel modeling for their work. Since the total number of banks they cover (34) is quite large, one wonders if the post-crisis data with greater homogeneity and handling ease would not have served the purpose better.

---

<sup>9</sup> For detailed comments on this work see Hasan 2003

Or the data could have been used for a dynamic study of inefficiency i.e. changes in it over time as in Hassan and Hussein (2003)

Again, only two Islamic banks appear in the sample and the results do not highlight their comparison with mainstream banks as promised. This makes the title of the paper a bit misleading. Also, what about the Islamic windows operating in the mainstream banks? How have the authors dealt with the impact of this phenomenon on the efficiency of banking in the country, Islamic or otherwise? This is a difficult question, yet those measuring efficiency of banks in Malaysia can hardly afford to bypass it<sup>10</sup>. One is expected to at least discuss it as a limitation of the study.

The data set for 34 banks – 24 local and 10 foreign --for the paper is created using the banks' annual reports and the ABM Bankers Directory to fill gaps in information on the number of employees in some cases. The banks have been categorized as local and foreign, Islamic and conventional, private and public, and as large and small (p.10) to study the impact, if any, of ownership forms, interest-free financing, and scale on bank efficiency in the country. Of course the categories overlap. Had the authors provided the edited data file as an appendix to their work as for example in Bisha (2004) one could appreciate their contribution better and future researchers might have benefited from it.

Also, the paper does not reveal the component details of the outputs or inputs selected for modeling. One finds a general sort of discussion on the issue on page 9 of the paper. It is hinted that total cost (C) includes all labor and capital expenses plus interest. In the case of Islamic banks interest is replaced with income distributed to the depositors. What has been included in labor expense or how is capital expense estimated is not clear. The authors refer to a paper of Al-Habshi (1999) for details. The paper is not readily available. In any case, it does not contain the needed explanations. Preferably, the explanation of this crucial point in the paper should have been full and complete. The authors mention three outputs: loans, advances, and financing, but provide little details on their nature or content or inter-bank differences. Financing in particular is a dubious category unless clearly explained. The corresponding input prices include (i) staff expenses per employee, (ii) expenses on land, building and equipment per Ringgit of assets, and (iii) expenses on interest or income distributed per Ringgit of deposits.

-----  
<sup>10</sup> It is a difficult question because the mainstream banks do not maintain separate full cost statements for the Islamic windows e.g. their share in the overheads is not available to researchers. May be, it is because of this missing component of significance or its underestimation that authors arrived at the elating conclusions that they did. For example, in (i) for averaging expenses of labor, all employees cannot be treated at the same footing; the proportion of officials to clerks is not the same in all banks. In foreign banks it is found generally loaded in favor of the officials as opposed to clerks.. Also, foreign banks earn a significantly larger share of their revenue from non-interest sources, through activities like derivatives trading, consumer credit, and merchant banking. Such matters are not given weight in the condensed data the work uses. Likewise, in (ii) historical and current costs differences between items and banks may have considerably distorted the aggregation.

Here also the paper has no explanatory discussion. Finally, in their use of the translog cost frontier model Majid et al did not explain, crucial though it was, the way they used the maximum likelihood method MLM for obtaining  $E[\exp(-u_i|\varepsilon_i)]$ <sup>11</sup>.

***Saaïd et al***

Their paper deals with the performance of banks in Sudan. The country is claimed to have the distinction of initiating a total transformation of its financial system to observe Islamic injunctions in the conducting of business after the year 1989. This has put, as the authors say, the spot light on the performance of Islamic banks in Sudan, and lends significance to the present effort. The study employs the SFA cost frontier approach decomposing the error term  $\varepsilon$  into random noise and possible inefficiency. The model specifications are almost flawless<sup>12</sup>.

The paper finds that the Islamic banks in Sudan have low efficiency – both technical and allocative: they were not optimizing their input usage. Furthermore, the authors claim that inefficiency is more in resource allocation than in their technical use. Based on these broad findings, the study ventures a few policy prescriptions for improving the performance of Islamic banks in Sudan.

The effort of the authors is laudable in so far as it goes. The difficulty is that it does

not go far enough, nor always stays on course. It could have been prefaced with the details, even if brief, of the evolution, expansion, transformation and ownership or scale structures of Islamic banks in Sudan. Is it that no foreign banks operate in the country or interest-based financing is at zero level there? The input-output numbers, let alone their composition details, are unclear. The section on data and variable specifications for the most part talks of what the mainstream writings on the subject contain; what the study is based on is scantily mentioned. The section is overloaded with methodological explanations though even these are not devoid of gaps. For example, the authors “define  $\hat{\zeta}_i = \max \bar{\varepsilon}_i - \bar{\varepsilon}_i$  where the maximum is introduced in order to provide positive values of  $\hat{\zeta}_i$ ” (p.130). The statement needs elaboration to clarify why is the function maximized and not minimized? For, apparently maximization is required, as explained earlier, when efficiency measurement is not input but output oriented.

-----  
<sup>11</sup> The authors present in Table 2 of their work some regression coefficient. How they used MLM for their determination is not explained.

<sup>12</sup> The symmetry and linear homogeneity conditions could have better been separately stated in n. 8 p. 139 for clarity. Some of the parameters in Table 2, p.134 do not seem to satisfy the specified conditions.

Shortfall of the estimated efficiency scores from one - the frontier - is not exceptional; it is common. The central elements of frontier analysis, to reiterate, consist of (i) the ranking of firms on the efficiency scale to compare their relative performance, and (ii) to test the hypotheses that claim a causal relationship between efficiency and its perceived determinants. The work of Saaid et al is distinct from others under review in that it falls in neither of the categories. Therefore, it is uncertain what significance one can attach to their conclusion: “The study as a whole shows 78 percent overall efficiency (OE), meaning that 28 percent<sup>13</sup> of the Sudanese Islamic banks’ total cost was inefficiently used compared to (if) the banks were on the frontier (p. 137)”. But the Sudanese Islamic banks could still be found more efficient in comparison with those in other countries. Again, the claim that technical component is the main source of overall inefficiency seems to conflict with the suggestion that public policy forced the banks to divert more of finance to the less productive agricultural sector of the economy (p. 137)<sup>14</sup>. If that were true, *allocative* component, not the technical, should have been the main culprit in lowering the overall efficiency scores which the results show it is not. Thus, question marks may be put on the reliability of the model results and the policy prescriptions that are based on them.

Finally, Saaid et al refer to the two alternative methods for estimating the overall cost efficiency of banks: (i) by averaging of the  $\zeta$ , or (ii) by the deviation of the cost ratio of a bank from the stochastic frontier. However, (ii) provides a measure of inefficiency (1- OE), not of OE. Thus the statement is inconsistent with their equation (4):  $OE = C / C^* = e^{-bt}$ . (p.130)<sup>15</sup> Also, the authors do not clarify if the results the two alternative methods would yield be the same. Nor do they say what methods they have used to obtain their own results. Thus, much faux pas characterizes their treatment of the issues. However, despite the blemishes Saaid et al have produced a neat work that we believe would help open the doors for further research in an important area of Islamic banking.

---

<sup>13</sup> It may be indicated that the SFA does not *directly* provide the allocative efficiency estimates  $AE_i$ ; the same are estimated through division of the CE (=  $OE_i$ ) by the corresponding  $TE_i$ . As such, the authors could have well kept the inefficiency scores shown in their Table 4 p.135 as (1 – CE); alternatively, they could have clarified that discrepancy arises due to the relationship between efficiency CE and inefficiency CIE. (See n. 5 above).

<sup>14</sup> The authors could have easily tested the validity of their claim regarding the adverse efficiency effect of forced diversion of finance to agriculture using a fixed effects model.

<sup>15</sup> The equation could be valid for an output oriented formulation where  $C^* > C$ . But in the cost-oriented approach as Saaid et al have taken, we find  $OE = C^* / C$  (See Kebede p.13). For, as  $C > C^*$ , OE remains  $\leq 1$ . Compare the authors’ formulation with that in our Figures 2 and 3.

Close on the heels of the above work appeared one more study of Hassan and Hussein (2004) on the performance of Islamic banks in Sudan. Like Saaid et al they too employ a panel data modeling but attempt to cover a host of topics in a short space. The authors estimate efficiency measures based on costs, resource allocation, technical variants, profit and scale. Interestingly, they employ both SFA and DEA techniques to obtain their results even though their distinctive roles in the work have not been made explicit. The paper has the merit of providing adequate and revealing facts in tables concerning the banks in Sudan but its explanation of variable definitions and the process of their estimation in the text is rather sketchy.

The authors have done well in using Malmquist Index to measure productivity changes (Table 10). The index has many useful features. One is that it decomposes results into a “technical efficiency change” and “technological change” components. Under the assumption of constant returns to scale, the first component can be broken into a ‘pure’ technical change index, a scale efficiency change index, and a congestion change index (Fare et al 2003). However, one must warn that the index is in jeopardy even at the theoretical plane (Douglas et al 1982). For example, circularity is a desirable property of a productivity index. It is seldom satisfied in the available bilateral indices including the Malmquist. Hassan and Hussein need not detain us here any longer. Suffice to say that they present to the reader an assortment of ideas to choose from according to his taste.

#### ***Darrat et al***

This work focuses on assessing the cost and technical efficiency of eight of the nine banks in Kuwait -- all owned fully by the locals -- in view of the increasingly competitive environment in the financing industry the world over but especially in the developing countries. The study covers a period of four years from 1994 to 1997. It does not resort to data paneling and produces results for each of the year separately. It uses the non-parametric DEA (variable returns)<sup>16</sup> model that has the advantage, among others, of allowing the *direct* calculation of allocative efficiency. Malmquist measure of bank efficiency supplements the use of the DEA.

Generally speaking, the product of the input output numbers in a DEA application should optimally be less than the sample size for effectively discriminating among the banks. The authors, therefore, employ three inputs – labor, capital, and deposits its calculation is made explicit. Unlike many other writings, In Table 1 of the paper the authors present the complete data file. The analysis they presents is both static and dynamic: – and two outputs – loans and investments. The analysis incorporates also the unit prices of inputs to measure cost efficiency. The contents of each item and method of the paper provides efficiency scores of individual banks for each year of study and also measures the impact of technical change over time.

---

<sup>16</sup> The authors impose on their model the restriction  $\sum \lambda_i = 1$

The main conclusions derived from the exercise are:

1. The most striking conclusion from the ranking Table 2 is that the smallest bank in Kuwait is consistently the most efficient of all banks in the country.
2. Going through their Table 3 giving efficiency scores over the estimation period one finds an unmistakable upward trend in the cost efficiency of banks, probably because of decreasing cost of funds.
3. Interestingly, technical efficiency of banks in Kuwait is consistently higher than their allocative efficiency over the estimation period suggesting that the main source of cost inefficiencies, as Saaid et al found for Sudan, is most likely regulatory not managerial in nature: Kuwaiti banks do a better job in utilizing available inputs than in choosing the proper input mix.
4. Scale efficiency is also persistently higher than pure technical efficiency in Kuwaiti banks over the period of study.
5. Finally Kuwaiti banks seem to have improved in terms of all types of efficiency over the period save 1996.

The work of Darrat et al is short but well organized and adequately documented. Their explanations are clear, conclusions fruitful. The various appendices they provide are enlightening, are an integral part of their argument, and above all lend transparency to their work. However, there are limitations as well. For a work presented in 2002, the period of study 1994-1997 looks too far back in the past; their conclusions are at best monumental. Finally, the work lacks an Islamic dimension or should one assume that there are no banks in Kuwait run on interest free basis?

#### 4. EFFICIENCY CRITERIA AND SOCIAL PRIORITIES

It would be naïve to dispute the relevance of cost efficiency for Islamic banks. Nevertheless, we shall argue that the conventional criteria need not be the *sine qua non* for evaluating their performance. In mainstream economics, where in principle the promotion of individual interest is primal for enhancing social well-being, efficiency requirements for firms, including banking, had to remain focused on profit, the reason of their being in business. For Islamic banks too profit adequacy is

a survival constraint<sup>17</sup> But if we look at the bigger picture a more basic question that stares us in the face is: could a business performance appraisal be independent of the broader priorities of a social organism? Past history and current practice both answer in the negative.

Mainstream economics primarily does not look beyond the cost-profit criteria in evaluating the efficiency of a productive unit simply because private enterprise operating through the market is the *raison d'être* of a capitalist society. Islam does accommodate many features of capitalism, and yet it aims at establishing a distinctive social order responding to its imperatives. The requirement demands not only the formal abolition of interest but on a more important side the eradication of the urges that prompt its seeking.

All societal institutions including banks must help in the building of that system and eschew providing the Islamic cover for interest<sup>18</sup>. The social organization in Islam is inspired by its all important notion of *Amanah* that focuses on fulfilling the basic needs of human beings, promotes mutual help and cooperation, makes the seeking of professional skills and enterprise a *Fard Kafaya*—the societal sufficiency obligation -- and insists on observing justice in all facets of human existence, especially in the distribution of wealth and incomes.

The performance of Islamic banks must primarily be judged with reference to the extent they help in building up this sort of society. Once they cross and can stay above the breakeven points, profit efficiency can be, in a measure, traded off for promoting the stated Islamic norms. We need not judge the Islamic banks performance entirely on the mainstream criteria or compare them with conventional institutions on the latter's grounds. Social objectives of business in Islam moderate worldly temptations; people are required to overpower the relentless pursuit of profit in business.

-----  
<sup>17</sup> Some studies directly adopt profit as the efficiency criterion. It may be mentioned that profitability "can be characterizes as a performance indicator of single unit and it is calculated without the need for benchmark, whereas efficiency is based on relativity and can only be calculated with respect to a reference point" (Stavarek, 2003). Again, cost or output approach to efficiency measurement implies profit criterion. For example, Table 2 in Fat and Hua (1998) provides both the X-efficiency and profit efficiency scores for each of the six Singaporean banks from 1992-1996. Using the information as panel data we find that PE is a quadratic function of CE with adjusted  $R^2 = 0.82$ , with relevant coefficients significant at 5%.

<sup>18</sup> For details on the point see Hasan (2005 a)

Islamic financial institutions have mostly been designed on the pattern of usual commercial banks in terms of their outlook, objectives, procedures, training and *modus operandi*. They are required, on the other hand, to undertake project financing, long-term risky ventures, and address the social aspirations for economic development. They hardly have the aptitude, environment, or personnel to do what we expect them to do. And this important structural issue is seldom addressed in the literature. Rather, one often comes across explanation, even justification, for the overwhelming use of deferred contracts in Islamic banking: risk aversion is commonly mentioned, and of late profit rates, and dividend policies are also being exclusively used as efficiency criteria for Islamic banks. In fact, the two are listed among the reasons for Islamic banks concentrating on short or medium term finance. But for this, the main blame lies in our opinion on the organizational design these banks were initially conceived to adopt.

Opening Islamic *windows* in western styled commercial banks represents an apparent mismatch between the provision of capabilities to them, and what they are expected to achieve. Mainstream commercial banks cannot be barred from entering the field for valid reasons but we had suggested on an earlier occasion that they may better be asked to establish *exclusive* branches with pre-stated objectives (Hasan 2005a). It is indeed gratifying to note that Bank Negara Malaysia is now on that course. Though the country's banking law is yet to be suitably amended<sup>19</sup>. The Central Bank is now granting permission for Islamic financing only if commercial banks open separate branches or subsidiaries for the purpose. The process is already well on course.

Islamic banking in the true sense of the term can rarely meet vital *Shari'ah* objectives of raising a strong and prosperous Muslim *ummah* (Trust) unless there is a complete break from tradition with reference to goals, sources, and uses of funds, and operation methods. Planning authorities of a country, better its central bank, must prepare a blue print for the purpose, including a regulatory mechanism. Once the development is redirected along appropriate lines, one can hope that profit and loss sharing (PLS) schemes and deferred contracts will appropriately supplement one another in a balanced growth and efficient performance of the Islamic system.

Finally, Islamic finance though important is only a street under construction in a much bigger Islamic road map. Its ultimate shape, carrying capacity, and usefulness would depend on what happens to the bigger picture. Crucial for success in the matter are social conditioning and political will; everything else would then follow suit

---

<sup>19</sup> The Banking Law of the country was amended in 1992 for allowing mainstream commercial banks to open Islamic windows or counters. Indonesia does not allow this facility.



## 5. CONCLUDING REMARKS

This paper has examined some of the important writings in the area on measuring the efficiency of Islamic banks with a twofold objective. First, we aimed at highlighting the current criteria and measures being used for the purpose. A related goal here was to examine if the applications were in order. Second, and on a more important side, we wanted to judge the efficacy of the current efficiency measures in the context of the social objectives and priorities of an Islamic order and the role banks are expected to play for their achievement. There is disillusionment, but there are some rays of hope as well.

To begin with, it is gratifying to note that Islamic economists have been quick to realize the importance of performance assessment in the fast expanding sector of interest free finance and showed readiness to introduce in Islamic economics the recent techniques available for the purpose; it is a valuable addition to the literature. However, their efforts are wanting on two fronts. First, even if one need not dispute the efficacy of looking at the cost-profit equation for efficiency appraisal of the Islamic banks, the application of the methods itself has left much to be desired. The use of financial ratios that we have not discussed in this paper is a relatively older and easier technique of analysis. But one must recognize the pitfalls along the way: averages, ratios and percentages without providing the bases for their calculation or without assigning weights where needed, especially if the data were highly heterogeneous, may take us, as indicated earlier (n.1), to misleading conclusions

The parametric models are to be handled with care. The writings on the subject in Islamic banking generally lacked conceptual clarity and background information provided was not always adequate. There were serious explanatory gaps, and a mixing up of the parametric and non-parametric methods remained inexplicable. In sum, the blemishes resulted in half-baked models and, at times, lead to conflicting results. The conclusions arrived at were mostly confirmatory, not unexpected or revealing.

Let it be understood that econometric models are not readily understood by the common man, the managers of Islamic banks, Shari'ah advisors, or policy makers -- the groups that are interested in understanding Islamic banking. Who then are our addressees? Sometimes one digs a whole mountain of data only to find a known rat! Most often these models do not follow the theory: they attempt to lead or mislead it. Finally, their conclusions are valid only over the range of the data used; they are often time-specific. Remix the data i.e. change definitions, variables, or the timeframe and the results are most likely to change. They provide *average* values of coefficients, but the mean as we know need not coincide even with a single observation sometimes. These models are to be used but with discretion.

To reiterate, the lament is that the mainstream criteria, methods, and procedures were applied to the neglect of the objectives of establishing the Islamic banks and their social responsibilities. These banks are to be structurally enabled to fulfill their societal obligations Shortfalls from econometric cost or profit efficiency frontiers do not mitigate the bliss of social transformation ushered in by the *grameen* banks in Bangladesh, for

example. To me, the writings such as of Ausaf Ahmad (2003) are more fruitful and efficacious than all the models whose complexities I have discussed above.

Greater transparency in transactions, encouragement for participatory financing, opening up of more specialized banks and customer services, increasing indulgence in long run finance, promotion of cooperative organizations are some of the suggestions to revamp, and reorganize Islamic finance. Things *are* moving in that direction even as the pace is slow.

## REFERENCES

- Ahmad, Ausaf (2003): Islamic Banking in the Informal Sector: Interest-free Solutions in Non-Muslim Societies, *Review of Islamic Economics*, Number 14, The Islamic Foundation UK, pp.67-92
- Berger, A. N, Humphery, D.B. (1997): Efficiency of Financial Institutions: International survey and direction for future research, *European Journal of Operations Research (Special Issue)*. <http://papers.ssm/paper.taf>
- Bock, R. K(2003): Maximum Likelihood Method, <http://rkbhome.cern.ch/rkb/ANI65.html>
- Curtiss, Jarmila (2000): Technical Efficiency and Competitiveness of the Czech Agricultural Sector in Late Transition – The Case of Crop Production, *In proceedings KATO Symposium*, Berlin, Germany.
- Caves, D. W & Christensen, Laurits R & Diewert W.E (1982) *The Economic Theory of Index Numbers and the Measurements of Input, Output, and Productivity*, *Econometrica*, Econometric Society, vol.50(6) pp. 1393 – 1414, November.
- Elhiraika, Adam, B. (1998): Macroeconomic Instability, Financial Repression and Islamic Banking in Sudan. *IIUM Journal of Economics and Management*, Vol.6, No. 2, pp.61-86
- Darrat, Ali F, Topuz, C, and Yousef, T (2002): Assessing Cost and Technical Efficiency of Banks in Kuwait, *In proceedings of the ERF's Annual Conference*, Cario.pp.1-22
- Fan, S (1999): Technical Change, Technical and Allocative Efficiency in Chinese Agriculture: The case of Rice Production inJiangsu, *Environment and Production Technology Division (EPTD) Discussion Paper No. 39*, International Food Policy Research Institute, Washington, D.C. pp.1-23
- Farell, M. J. (1957): The Measurement of Productive efficiency. *Journal of the Royal Statistical Society A*, 120 (III) 253-281.
- Fat, C.S and Hua, L. G (1998): Share Performance and Profit Efficiency of Banks in an Oligopolistic Market: Evidence from Singapore, *Faculty of Business Administration Working Paper*, National University of Singapore
- Ferrier, G.D, and Lovell, C.A.K.(1990): Measuring Cost Efficiency in Banking: Econometric and Linear Programming Evidence, *Journal of Econometrics*, 49 pp. 229-45.

Fries, S and Taci, Anita (2004): Cost Efficiency of Banks in Transition: Evidence from 289 banks in 15 Post-communist Countries, *Working paper series Social Science Research Network ( S-S-R-N) Electronic Library*, pp. 1-34

Hasan, Zubair (2003): Comments on Majid et al, Efficiency of Banks in Malaysia. *In proceedings of the fifth International Conference on Islamic Economics and Finance*, Vol. II, pp. 417-23, Bahrain

Hasan, Zubair (2005a): Islamic Banking at the Crossroads: Theory Versus Practice, in Iqbal, M and Wilson. R (Ed) *Islamic Wealth Creation*, Edinburgh University Press, UK pp.11-25

Hasan, Zubair (2005): Measuring the Efficiency of Islamic Banks: Criteria, Methods, and Social Priorities, *Review of Islamic Economics*, No. 18 Islamic Foundation UK

Hassan M. Kabir and Hussein, Khaled A (2003): Static and Dynamic Efficiency of the Sudanese Banking System, *Review of Islamic Economics*, Number 4, Islamic Foundation UK pp. 1-47

Herrero, I. Pascoe, S.: (2002) Estimation of technical efficiency: a review of some of the stochastic frontier and DEA software, *Economics*, (Virtual Edition) Vol. 15, No.1

Isik, I. and Hassan, M.K. (2000): The Effect of the 1994 Economic Crisis on the Productivity and Efficiency of Turkish Banks, *School of Management, New Jersey, Institute of Technology*, working paper.

Jemric, I and Vujcic, B (2002): Efficiency of Banks in Croatia: A SEA Approach, *Working paper 7*, Croatian National Bank

Iqbal, M: (2001): Islamic and Conventional Banking in the 1990s: A Comparative Study. In *Islamic Banking and Finance in Munawar Iqbal (Ed) Islamic Banking and Finance: Current Developments in Theory and Practice*, *Islamic Foundation*, Leicester, UK pp. 359-390

Kebede, T. A. (2001): Farm Household Technical Efficiency: A Stochastic Frontier Analysis. *A Master's Thesis*, Department of Economics and Social Sciences, University of Norway.

Leong, W. H, and Coelli, T (2002): Measuring the Technical Efficiency of Banks in Singapore for the Period 1993 to 1999: An Application and Extension of the Bauer (1997) Technique, *Working paper series in Economics No. 2002-10*, University of New England.

Lovell, C. A. K and Tatje, E. G. (1997): The Sources of Productivity Change in Spanish Banking *European Journal of Operational Research*, 98, pp. 364-380.

Majid, M. A, Nor, N. G. M, and Said, F. F (2003): Efficiency of Banks in Malaysia. *In proceedings of the fifth International Conference on Islamic Economics and Finance*, Vol. II, pp. 405-6, Bahrain

Saaid, E. Rosly, S. A, Ibrahim, M. H, and Abdullah, N (2003): The X-Efficiency of the Sudanese Islamic Banks, *IJUM Journal of Economics and Management* Vol. 11, No. 2, pp.1- 20.

Salama, Abdin A. (2002): Comments on Iqbal, M: Islamic and Conventional Banking in the 1990s: A Comparative Study. In *Islamic Banking and Finance* Editor Munawar Iqbal, *Islamic Foundation*, Leicester, UK pp. 391-393

Samad, Abdus (2004): Performance of Interest-Free Islamic Banks vis-à-vis Interest-based Conventional Banks of Bahrain, *IJUM Journal of Economics and Management* Vol. 12, No. 2 (See comments on the article by Zubair Hasan in the forthcoming issue of the same Journal Vol. 13, No.2).

Sathye, Milind (2001): Efficiency of banks in a developing economy: the case of India. *In proceedings Examining ten years of economic reforms in India* ANU Canberra, Australia, pp.1-24

Shanmugam, K. R, and Das, A (2004): Efficiency of Indian commercial banks during the reform period, *Applied Financial Economics*, vol.14, no. 9 pp. 681-86 (6).

Stavarek, Daniel (2003): Essential Methods of Banks' Efficiency Measuring, *in "Comparison of Banking Sector Development in the world and in the Czech Republic in the 1990s*, Silesian University.