Efficiency of islamic and conventional banks in countries with islamic banking

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Efficiency of Islamic and Conventional Banks in Countries with Islamic Banking

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Abstract

Our study aims at analyzing Islamic banks efficiency over the period 2001-2008. We found that they were efficient at 78.9%. The level of efficiency could however vary according to regions. Asia displays the highest score with 84.64%. Indeed, country like Malaysia and Pakistan implemented reforms in order to allow Islamic banks to better cope with the existing financial system. On the contrary countries with Islamic banking system do not necessarily display efficiency scores superior to the average. Further analyses on commercial banks, in the selected countries strengthen the conclusion for a regulatory environment suiting Islamic banking. Besides, the subprime crisis did not impact Islamic banks as evidenced by the dummy variable. Market power and profitability have negative impact on Islamic banks efficiency. Concentration leads to higher costs through slacks and inefficiency. Again other results from robustness checks appear to stress the specificity of Islamic banks, like their first aim for financing rural population.

Keywords: Islamic Finance, Islamic Banks, performance, efficiency, stochastic frontier analysis.

JEL classification: G21, G24, G15.

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Introduction

Islamic banking is booming in Muslim and non-Muslim countries, since it is shariah compliant and is intended to Muslim clients in those countries. Although most of the Islamic banks are within Middle Eastern and Emerging countries, some universal banks based in developed countries have started to satisfy a large demand of Islamic financial products. It is the case in the United Kingdom and the United States.

In the past couple of decades, many developments in the Islamic world took place and favor the development and revival of Islamic finance. The recent unprecedented boost in the oil-related income of many Muslim Arab nations induces in those countries inflows of petrodollars. Then attacks of 11th September 2001 and more recently the subprime crisis encouraged capital flight of Muslims (repatriation) and non-Muslims investors and financiers. The Golf region now captures a large concentration of liquidities. Lastly, in order to attract these liquidities to their financial markets, many occidental countries such as the UK, the USA and recently France encourage their banks offering Islamic banking services (see appendix 1 for more details).

Several studies examined the development of this particular area of finance. In particular, some studies examined the risk that can pose Islamic finance to the international financial system, given the amount of petrodollars that they collect and the context of globalization. Sudararajan and Errico, 2002 discussed how to take into account the specificity of those institutions and their products in the management of financial risks; the same for Čihák and Hesse, 2008. They studied the possible channels through which Islamic finance could impact global financial stability. Lastly, Jobst, 2007 examined legal and economic implications of shariah compliance on the configuration of Islamic securitization transactions.

Other studies assessed Islamic bank efficiency based on financial and management ratio or using parametric or non parametric methods, as done for conventional banks. For the first group of studies, one can cite Abdus-Samad, 1999; Bashir, 1999 and Hassan and Bashir, 2003. Those papers focus most of the time on few banks in a country or a very limited number of countries. The second group of papers were written by Yudistira, 2003; Al-jarrah and Moulyneux, 2003, Hussein, 2004; Hassan, 2005. They studied a limited number of Islamic banks settled in one or several countries. Indeed, data on Islamic banks are scarce limiting such studies as well as comparative studies across countries.

Islamic banking is growing in Middle East as well as in emerging countries. In those countries, financial authorities took reforms either to have a full islamization of their financial system or to allow Islamic banks to better compete with conventional banks. Our concern is therefore to measure Islamic as well as commercial banks efficiency to assess their evolution and determinants. Our study is made up with banks operating in 17 countries in Middle East, Asia and Africa, but also in United Kingdom. This scope of analysis will allow us to compare

Islamic banks efficiency through the differences characterizing those countries. We then make a comparison with a sample of commercial banks in the same countries. We used a stochastic Frontier Approach (SFA) over the period 2001-2008 to estimate a cost-efficiency frontier and derived scores of cost efficiency, while taking into account explanatory variables. Our results show that commercial banks are more efficient than Islamic banks, apart from countries where reforms where undertaken, in order to allow Islamic banks to better cope with the environment. The current paper is structured in the following way: Section (1) analyzes the results of previous studies about the performance and the profitability of these banks in Muslim and non-Muslim countries. Section (2) presents the model and the sample. The results are discussed in Section (3). We conclude in Section (4).

1. Literature review and stylized facts on Islamic banking:

The market share of Islamic banks increases by 15% per annum (Moody's, 2008), this last decade. The emergence and boom of Islamic finance, lead several economist to write on this topic. Many studies discussed in depth about the rationale behind the prohibition of interest (Chapra, 2000), but also the policy implications of eliminating the interest payments (see among others Khan, 1986, Khan and Mirakhor, 1987 and Dar 2003). However, most of the existing literature on Islamic banking unleashes various studies made on the measurement of performance in Islamic banks: they examine the relationship between profitability and banking characteristics.

A first group of studies are interested in the performance of Islamic banks in a specific country, through financial ratios. Those ratios capture (a) profitability, (b) liquidity, (c) risk and solvency and (d) efficiency. For instance, Saleh and Rami (2006) focus on the performance of the first and the second Islamic banks in Jordan: Jordan Islamic Bank for Finance and Investment (JIBFI) and Islamic International Arab Bank (IIAB). They notice that they play a major role in financing ventures in Jordan, particularly short-term investment, and both banks have increased their activities and expanded their investment but, the JIBFI still has higher profitability. They conclude that Islamic banks have high growth in the credit facilities and in profitability. Samad (2004) focused on the post Gulf War period of 1990-2001 in Bahrain, and examined the performance of the interest-free Islamic banks and the interest-based conventional commercial banks. His study shows that there is no major difference between the two sets of banks in terms of profitability and liquidity performances but there is a significant difference in credit performance. Kader and Asarpota (2007) evaluate the performance of the UAE Islamic banks by comparing the Islamic and conventional banks. They examine the balance sheets and income statements of 3 Islamic banks and 5 conventional banks between 2000 and 2004. Their results show that Islamic banks are more profitable, less liquid, less risky and more efficient than conventional ones. They conclude

that the SPL principle (see annex) is the main reason for the rapid growth of Islamic banks and suggest that they should be regulated and controlled in a different way as the two kinds of banks have different characteristics in practice.

Again, Samad and Hassan (2000) performed an intertemporal study in which they compared the performance of the Bank Islamic Malaysia Berhad (BIMB) between two periods of time 1984-1989 and 1990-1997. Then they evaluate the interbank performance by comparing the BIMB's performance with 2 conventional banks (one smaller and another larger than the BIMB) as well as 8 conventional banks. The results show that there is a significant improvement of the BIMB performance between 1984 and 1997 but this improvement is less important than in the conventional banks. Moreover, Islamic banks are less profitable and less risky but more liquid than conventional banks. Moin (2002) compared the performance of Islamic banks relatively to conventional banks in Pakistan. The study makes comparison of Meezan Bank Limited (MBL) which is the oldest Islamic bank in Pakistan and a group of 5 conventional banks for the period of 2003-2007. He adopted an inter-bank analysis of the income statements and the balance sheets of the two groups. The study found that there is no difference in terms of liquidity between the two sets of banks. Besides, the MBL is less profitable, more solvent (less risky), and also less efficient comparing to the average of the conventional banks but it is improving considerably between 2003 and 2007. This is explained by the fact that the latter banks have a dominating position in the financial market with a longer history and experience than the Islamic banks in Pakistan which have started their business few years back. Sarkar (1999) studies the case of Islamic banks in Bangladesh. He finds that Islamic products have different risk characteristics and concludes that prudential regulation should be modified.

Those studies related each to one country and using financial ratios tend to converge towards one conclusion. Islamic banks may be as efficient as conventional ones; however there is a necessity of reforms, regulation and control for each banking system where they operate.

A second group of studies are interested in Islamic banks across several countries. Bashir (1999) and Bashir (2001) examined the balance sheets and the income statements of a sample of 14 Islamic banks in 8 Middle Eastern countries between 1993 and 1998. He analyzed the determinants of Islamic Banks' performance, specifically the relationship between the profitability and the banks' characteristics. He found that the measure of profitability is an increasing function of the capital and loan ratios. Besides, the study highlights the empirical role that adequate capital ratios and loan portfolios play in explaining the performance of Islamic banks. Factors such as non-interest earning assets and customer and short-term financing, etc contribute to the increase of the Islamic banks' profit. Hassan and Bashir (2003)[3], confirm the results of Bashir (2001) in the sense that the performance of Islamic banks is affected not only by the bank's characteristics but also by the financial environment.

[3] They consider a larger sample in 21 countries between 1994 and 2001 and use cross-country bank level data.

Their results indicate that controlling for macroeconomic environment[4], financial market structure, and taxation; the high capital and loan-to-asset ratios improve the banks' performance. The study also provides an interesting but surprising results such as the positive correlation between profitability and overhead; and the negative impact of the size of the banking system on the profitability except net on interest margin.

The third group of studies is interested in using efficiency frontier methods. Yudistira (2003) analyzed the impact of financial crises on the efficiency of 18 Islamic banks over 1997-2000. This study is based on a non-parametric approach Data Envelopment Analysis (DEA). It assesses a technical frontier of efficiency composed of best practice banks. The efficiency score provided indicates how well a bank transform its inputs in an optimal set of outputs. He highlighted the small inefficiency scores of 18 Islamic banks as compared to conventional banks. Sufian (2007) adopted the same approach as Yudistira (2003) to examine the efficiency in domestic and foreign Islamic banks in Malaysia between 2001 and 2004. He provided evidence that these banks improve their efficiency slightly in 2003 and 2004. However, domestic Islamic banks are found marginally more efficient than foreign Islamic banks. Besides Islamic banks profitability is significantly and positively correlated to three different types of efficiency: technical, pure technical and scale efficiencies.

Lastly, Mokhtar, Abdullah and Al-Habsh (2006) used the Stochastic Frontier Approach (SFA) to measure and analyze technical and cost efficiency of Islamic Malaysian banks. Their findings show that, on average, the efficiency of the overall Islamic banking industry (full-fledged Islamic banks and Islamic windows) has increased during the period of study while that of conventional banks remained stable over time. However, the efficiency level of Islamic banks is still lower than that of conventional banks. The study also reveals that full-fledged Islamic banks are more efficient than Islamic windows[5] for local banks, while Islamic window of foreign banks tend to be more efficient than those of domestic banks.

Those studies focus on one or a few countries. Our study will cover a large range of countries in Middle East, Asia, Africa and United Kingdom. Before our empirical assessment, we will analyze some statistics related to commercial Banks as well as Islamic Banks. Stylized facts in those regions show that conventional and Islamic banks tend to have roughly the same evolution in terms of activity (see figure 3). However, a more careful analysis reveals some differences. In Middle East, commercial banks profitability measured by return on Average assets_ ROAA_ (or average Equity) increase slightly (30%) relatively to their level of 2002, then decrease from 2007 with the subprime crisis. Profitability of Islamic banks grows more intensely (around 100%), and seems also to be affected by the subprime crisis. The share of equity to total assets decreases for commercial banks but not for Islamic banks, for which there is rather an increase after 2007 of almost 80%. Net interest margin decreases over the

[4] The Islamic banks seem to have higher profit margins in favorable macroeconomic environment.

[5] It refers to conventional banks that offer Islamic financial services, as part of their activity.

period for commercial banks over the whole period, but only after 2006 for Islamic ones, showing the increase of competitiveness.

We have the same figure for Asia concerning profitability of commercial banks; however Islamic banks profitability is rather increasing after 2007. The decrease of ROAA, leads to less competitiveness. For both type of banks, net interest margin is increasing. The share of equity to total assets is decreasing for commercials banks while it keeps almost the same level over the period for their Islamic counterparts.

African commercials banks profitability increases of 70%, after a fall in 2006. We have the same evolution for net interest margin, that increase of 20%, after a decrease of 10 % from the 202 level. However the share of equity to total assets increases slightly. Data on Islamic banks, when available show an increase of this share (after a fall in 2004) as well as total assets which represent a proxy of their activities.

Lastly, for United Kingdom, profitability of commercial banks increases after a fall in 2005, while it shows a regular growth for Islamic banks. The share of equity to total assets decreases for commercial banks but stays steady for Islamic ones. Besides, net interest margin is decreasing over the period for commercial banks.

Those statistics reveal different evolutions among Islamic and commercial banks. Differences are also noticeable across the regions. They could be explained by the environment, but also reforms undertaken by financial and monetary authorities. As we previously said Islamic banking flourish in those regions. However, their implementation followed different paths, depending on countries. Iran and Sudan chose the full islamization of the banking system through respectively the enactment of the 1983 Usury Free Banking law and the promulgation of the 1992 Banking Law. On the other hand, some Muslim countries have allowed mixed financial system. Sole (2007) pinpoints the importance of respecting gradual steps in the process. Those steps were undertaken by Malaysia whose banking system is successful in attracting capital both from international investors, as well as the local Muslim population. In its concern to provide a favorable environment to Islamic banking, Malaysian authorities followed four stages. (1) In 1963, a small Islamic saving fund was allowed to operate. Then after the enactment of the 1983 Islamic Banking Act, the first Islamic bank (Bank Islam Malaysia Berhard) was granted a full-fledged banking license and started operations. (2) Conventional banks began opening Islamic windows under a pilot program that imposed certain restrictions, such as no commingling of funds. (3) After a certain period of operating Islamic windows, some conventional banks accumulated a sufficient critical mass of Islamic customers to make viable a full conversion of the bank into an Islamic institution. (4) Lastly, the government introduces other Islamic financial institutions and markets.

Besides, financial authorities should play their supervisory and regulatory role as Islamic banking may present the same risks than conventional banks: moral hazard consideration, safeguarding the interests of demand deposits but also systemic considerations. They also hold a decisive developmental role, as they can foster an environment where Islamic banking can offer a suitable response to customers' demands for Islamic products. Indeed a level

playing field should be provided. For example, British Financial Services Authority has a policy of "no obstacles, no special favours", allowing customers of Islamic banks to have the same level of regulatory oversight than those of commercial banks.

Our empirical analysis aims at assessing efficiency of Islamic as well as conventional banks in those countries. Also, we will analyze the determinants of their efficiency basing our reflection on sensitive variables cited in the literature of Islamic banks efficiency.

2. Model specification and Data

2.1 Methods of efficiency measurement

Efficiency is a concept that is close to the economic logic insofar as it involves the optimization of behaviour. It's Farell (1957) who first defines technical efficiency measurement as the deviation from an ideal isoquant. We then have two perspectives. On the one hand, the maximization of outputs produced from a combination of available inputs (output-oriented measure). And on the other hand, the use of minimum quantities of inputs to produce a given quantity of output (input-oriented measure). In both cases the idea of optimization comes from the desire to avoid waste and to be as efficient as possible in achieving the objectives. Measuring the efficiency of banks leads to determine their level of performance in terms of distribution of financial services, based on inputs they use. Methods for efficiency measurement used in the literature, indicate this ability of banks, since they allow calculation of composite indices to take into account this capacity. Islamic banks are different from conventional banks, in that they reject any financial activity involving the interest perception or financial transactions related to unethical activities (weapons, tobacco, alcohol ...). Because the scope of their intermediation activity is redefined and limited, we are led to raise the issue of their efficiency in the distribution of such financial services.

There are two main methods in the literature for efficiency measurement: (1) the non-parametric approach which comes in two ways: Data Envelopment Analysis (DEA) and Free Disposal Hull (DFH) analysis and (2) the parametric approach which has three variants: the Stochastic Frontier Analysis (SFA), the Thick Frontier Approach (TFA) and the Distribution Free Approach (DFA). The first method is a mathematical linear programming, which determines an envelopment surface composed of banks of best practices. The efficiency index is derived by reference to any deviation from the ideal surface. The second method is more accurate than the first one, because it is possible to estimate econometrically the frontier and separate the error term from the inefficiency term. However, it imposes a functional form to the efficiency frontier. This frontier function may be a Cobb-Douglas, a Constant-Elasticity-Substitution or a Translog, depending on the technological form of the firm's production. The

inefficiency term derived from the estimate is subsequently used to calculate the efficiency's score.

2.2 Implementing the stochastic frontier analysis

In the current study, we retain the parametric approach and use more specifically a stochastic frontier analysis (SFA). It has the advantage of being more accurate than the nonparametric approach like DEA. As we explained it before, it allows separating the error term of the inefficiency term. It is therefore less sensitive to measurement errors and outliers[6].

As objective function, we choose a cost function. It allows taking into account the constraints of banks as financial companies, seeking to optimize their financial performance. Thereby minimizing the costs induced by the efficiency frontier, we will take into account this constraint. As functional form, we choose the Translog, as it best suits the multi-products characteristic of banking technology, involving multiple inputs and outputs, cf. Mester (1997), Bauer et al. (1998), Roger (1998) and Isik and Hasan (2002). Regarding the distribution of error and inefficiency term, studies have been made with different assumptions. Meusen and van den Broeck (1977) assume an exponential distribution for the inefficiency term, while Stevenson (1980) and Greene (1990) proposed a gamma distribution. Finally, Cebenoyan, Coopermann, Register and Hudginns (1993) prefer the semi-normal truncated distribution. However, Berger, Hunter and Timme (1993) and Bauer et al. (1998) showed by a detailed literature review that the semi-normal distribution has become the standard assumption. Moreover comparative studies showed that the different assumptions about the distribution of the error term have no impact on the final results. Therefore, we will assume a semi-normal truncated distribution, while the random error follows a normal distribution. We use the maximum likelihood method for the estimate. Panel data allow us to gain in estimation accuracy by increasing the number of data. However, our data are unbalanced as some banks are not observed at certain points in time.

a) Choice of inputs and outputs related to Islamic banks

Estimating efficiency frontier requires the choice of inputs and outputs used and produced by Islamic banks. The literature on banking activities, propose two competing approaches: the production approach and the intermediation approach. In the first one, bank is expected to produce transaction services and information. Products consist of bank accounts opened by

[6] We use SFA instead of TFA or DFA, because the last one although easy to implement, leads to poor information. DFA requires the assumption that cost efficiency is time invariant. Besides, when the time period of the panel is short, the random noise terms may not average 0, and substantial amounts of random noise will appear in the cost inefficiency error component.

the bank to manage loans and deposits. Thus bank output is measured in number of accounts or transactions. In the intermediation approach, banks are supposed to simultaneously offer safe and liquid deposits on the one hand and on the other hand, loans that are riskier and less liquid assets. Under this approach, bank products are expressed in monetary amounts of deposits, loans and other financial assets. Then banking costs relate to operating costs and financial costs. We will use the intermediation approach as it is widely used in the literature. It also assesses bank efficiency as a whole. Besides, the principle of Islamic banking is participation in the company that is using the funds on the basis of SPL principle. Therefore, the intermediation approach emphasizes intermediation function carried out by Islamic banks.

This led us to determine as inputs labour, physical capital and deposits. The prices of those inputs are measured respectively by personnel expenses/total assets (PERSONEXP), other expenses/ total assets (OTHEREXP) and income for deposits/total deposits (INTERESTEXP). For outputs, we have net loans (LOANS), net liquid assets (LA) and total earning assets (SECURITIES). This classification is justified by the fact that Islamic banks engage in other types of profitable activities, since they do not charge interest on loans and deposits (see table 3). Thus, the computed model for the cost frontier function will be as equation 1 that follows:

$$\ln CT_{ijt} = \alpha_0 + \sum_{m}^{n} \alpha_m \ln p_{m,ijt} + \sum_{s}^{t} \beta_s \ln y_{s,ijt} + 1/2 \sum_{m}^{n} \sum_{n}^{m} \alpha_{m,n} \ln p_{m,ijt} \ln p_{n,ijt} + 1/2 \sum_{s}^{t} \sum_{t}^{s} \ln y_{s,ijt} \ln y_{t,ijt} + \sum_{m}^{n} \sum_{s}^{t} \delta_{m,z} \ln p_m \ln y_{s,ijt} + u_{ijt} + v_{ijt} \quad (1)$$

where p_m and p_n are input prices and y_s and y_t are outputs quantities. Because of the specific form of the cost frontier function, we impose constraints on symmetry, $\alpha_{m,n} = \alpha_{n,m}$ and $\beta_{s,t} = \beta_{t,s}$ homogeneity in prices $\Sigma_m \alpha_m = 1$ and adding-up $\Sigma_m \alpha_{m,n} = \Sigma_n \alpha_{n,m} = \Sigma_m \delta_{m,s} = 0$. We also consider homogeneity constraints by normalizing total cost, the labor price and physical capital price by financial capital price.

The composite error term also takes a specific functional form. The random components, v_{ijt} are independently and identically distributed according to standard normal distribution, $N(0;\sigma_v^2)$ while the bank inefficiency components, $u_{ijt} > 0$ are independently but not identically distributed according to a truncated-normal distribution. The Stochastic Frontier Analysis assumes that the inefficiency component of the error term is positive; that is, higher bank inefficiency is associated with higher cost.

The inefficiency of bank i in country j at time t is defined as exp ($\hat{u}_{ijt}$) where $\hat{u}_{ijt}$ is the estimated value of u_{ijt}. However, only the composite error term $\varepsilon_{ijt} = v_{ijt} - u_{ijt}$ can be observed from estimation of the cost function. The best predictor of u_{ijt} is therefore the conditional expectation of u_{ijt} given $\varepsilon_{ijt} = v_{ijt} - u_{ijt}$. To retrieve the inefficiency component from the

composite error for each bank from the cost function estimation, we use the method of Jondrow et al. (1982) to calculate the conditional expectation.

To estimate the stochastic efficiency frontier, measures of bank inefficiency, we use the Frontier econometric program developed by Coelli (1993). A second step regression will consist in regressing the inefficiency scores from the first step method on determinants of efficiency in Islamic banks.

b) Choice of variables that explain cost-efficiency:

The variables influencing efficiency and therefore enabling to explain it, are related to characteristics of the banking firm and its production process, as well as the environment in which banks operate. The size of the bank has often been used in the literature as determinants of efficiency. Allen and Rai (1996) showed that large banks can take advantage on economies of scale by sharing costs in the production process. It is measured by the logarithm of total assets. The same authors and more specifically, authors that have worked on Islamic banks such as Yudistira (2003) take into account regulatory and competitive conditions under which banks operate. Thus a variable used to catch profitability of banks is measured by net income/total assets (ROA) (or net income/equity (ROE)); and for Risk Taking Propensity we used the ratio equity/total assets. Indeed, Islamic banks refrain from charging interests on loans and deposits to devote themselves to the principle of PLS. This redefinition of the banking practices lead to new risks that conventional banks do not incur. Hence, there is a double interest here in our study to assess the impact of their risk taking propensity on efficiency (see table 3).

Another variable that could have an impact on efficiency is the market share. It is measured by the ratio of total deposits of the bank/total deposits in the whole banking system. It can increase costs for the banking system in general because it results in slacks and therefore inefficiency that can not be solved. However, it can have a positive impact on efficiency, if it is the result of consolidation and market selection of the largest and most efficient banks. It appears therefore through lower costs, providing the market is contestable. The GDP per capita is a proxy of the level of development. It influences many factors related to demand and supply of banking services, mainly deposits and loans. Therefore, countries with a higher level of development are supposed to have more developed banking system, with more competitive interest rates and profit margins. Demand density for banking products (measured by deposits per square kilometre), has a negative impact on costs. In countries with high demand density, banks support lower costs in the distribution of banking products. Again, the provision of banking services may be affected by population density. In countries where this variable is low, banking costs are higher and banks are not encouraged to increase their

efficiency. We will test whether those variables are significant or not, according to their relative correlation.

c) Data sources:

We used data from balance sheets and income statements in their standard universal version of Database Bankscope. The values of the variables are expressed in current dollars and have been deflated by the consumer price index of the current year in order to reflect macroeconomic differences among countries. The macroeconomic variables come from International Financial Statistics, from the IMF, available through DataStream. Total deposits in each country for the calculation of market power were converted into dollars using market exchange rate end of period.

3. Empirical Results

Our regression is based on unbalanced panel data of 17 countries from Middle East (Iran, Jordan, Kuwait, United Arab Emirates, Qatar, Bahrain, Lebanon, Saudi Arabia, Yemen), from Asia (Pakistan, Malaysia, Turkey, Brunei), from Africa (Sudan, Egypt, Tunisia), but also from United Kingdom. This later country has a few Islamic banks where Muslims immigrants can have financial services. Including these banks in our sample allow us to see how well they perform relatively to their counterparts in country where Muslims are not the minority. The covered period is 2001-2008, which allows us to analyze the impact of subprime crisis on Islamic banks efficiency; and the total number of observations is 340. Even if the temporal dimension of our panel is short and barely captures temporal effects, we enjoy other benefits of panel regression, ie flexibility in modeling differences between banks. Precisely to reflect the heterogeneity of data, we first led Haussmann test to determine the specification of the panel model (Table 2). The probability of the test being greater than 10% threshold, it does not allow us to discriminate which of the fixed effects model and random effects model is best suited to the data. However, statistical observations allow us to choose the most appropriate model. For all variables in the model, the Within-variance is inferior to the Between-variance (see Table 3). Similarly, the short period of analysis leads us to prefer the random effects model. Our choice is reinforced by the idea that the random effects model allows us to take into account the one sided error term of the inefficiency for each Islamic bank.

We first estimate an efficiency frontier with the 3 inputs formerly presented in Section 2. However, the cost of deposits which is the income paid to depositors for Islamic banks, is not indicated in the financial statements provided by Bankscope for all banks in the sample. Therefore, estimate of the frontier, taking into account these three inputs reduces the number of available data for estimating and the γ coefficient is not significant. This reflects the non-existence of the efficiency frontier. This leads us to estimate the efficiency frontier by considering as inputs “Personnel Expenses” and “Other Expenses”, the latter used to normalize “Total costs” and “Personnel Expenses”, in order to respect homogeneity constraints. Results appear in table 1.

Table 1 hereafter

Figure 1 shows the evolution of Islamic banks efficiency over the period 2001-2008. It is growing, with an average of 78.9%. Differences in efficiency scores emerge among regions: Asia shows the highest one (84.64%). This level reflects the strong performance of Malaysian and Pakistani banks that constitute most of our Asian sub-sample. Malaysia in particular is emerging as one of the most developed centers in Islamic finance, after Iran and Saudi Arabia. Since 1975 the government has reformed the financial system, so that it promotes the development of Islamic banking alongside conventional finance, as indicated above. This was especially possible through the Malaysian Islamic Banking Act of 1983. For the Pakistani case, since 1978, the government has fostered the transformation of the banking system through the constitution of Commission for Transformation of Financial System (CTFS), and the establishments of Islamic Banking Department by the State Bank of Pakistan. Thus the government accompanied and framed this transformation through an appropriate regulatory system.

Figure 1 hereafter.

Besides, Islamic banks operating in Africa displayed an average efficiency score of 81.24%, with 81.16% for Sudan whose banking system is fully Islamic (government legislation). Middle East region has an efficiency score of about 80.39%. Especially, Iran which banking system is essentially Islamic (government legislation) displays an average efficiency of 81.95%. For Saudi Arabia, we have 79.65% as efficiency score. Finally, Islamic banks operating in United Kingdom have an average efficiency score of 73.36%. It is the lowest one, despite efforts made by British authorities to include in its banking regulation, specific rules for Islamic banks to better exercise in the British environment.

The second step of our analysis is to investigate what explain this efficiency across regions and countries. At this purpose we regressed efficiency scores on explanatory variables mentioned above. Scores efficiency evolving between 0 and 1, we use a Tobit model with double truncation. Results are presented in table 5 (regression 1).

Size (logarithm of Total Assets) of the bank is not significant. ROA (Net Income / Total Assets) is a measure of banks profitability impact on efficiency. On a theoretical point of view, the most profitable banks are the most efficient ones. The coefficient of this variable is negative, indicating a negative impact of profitability on efficiency. Allen and Rai, 1996 explained this by the reduction of costs agency due to moral hazard, for small banks with specific activities. This explanation could also be applied to Islamic banks which are specific in their activities and the way they generate profits. Lastly, “Market Power” (Bank Deposits/Total Deposits of the whole banking system) has a negative significant impact too on efficiency. This implies that concentration increases costs for banks through slacks and therefore leads to inefficiency.

We also run robustness tests, to check the stability of our results, table 5 (regressions 2-7). Since 4 banks in our sample are located in United Kingdom, we estimated the efficiency

frontier without them. This regression is displayed in table 5 (*regression 2*). The results are qualitatively the same. A second robustness test consisted in including in the regression explanatory variables related to the macroeconomic environment (following Hassan and Bashir, 2003) in order to control this aspect on the efficiency measurement. Despite, the strong correlation among the explanatory variables as shown by table 4, we run the Tobit model (table 5, regression 3 and 4) including per capita GDP (GDPc), population density (DPOP) (or the percentage of urban population, URBANPOPPERC) and the propensity to take risk (RISKTAKING). Results are qualitatively the same than the regression 1. However, ROA is no more significant even if the sign of the coefficient remains negative. Population density has a negative significant impact on efficiency, while urban population percentage is not significant. GDP per capita has a negative impact on efficiency which is not consistent with the literature. Islamic banks evolving in less developed countries are more efficient, possibly because they were first designed as rural banks. Size has a positive coefficient when significant in regression 4, implying the existence of scale economies. Lastly, RISKTAKING variable is not significant for our sample of Islamic banks.

Again, regressions 5 and 6 in table 5 show qualitatively the same results for the sample without Islamic banks in the UK. The coefficient of URBANPOPPERC is significant with a negative coefficient, meaning that Islamic banks operating in countries with less important urban population tend to be more efficient.

Our last robustness test consisted in checking whether some dummies variables were significant (regression 7). Dummy variable related to Middle East (*D_middle_East*) and to the Islamic banking system as government legislation (*D_islamicbkgsystem*) are not significant. Dummy variable related to the United Kingdom (*D_UK*) has a negative and significant impact on efficiency, meaning that banks operating in United Kingdom are less efficient. This is consistent with the lowest average efficiency score, among regions. Lastly dummy variable related to the subprime crisis (D_subprime) has a positive and significant coefficient. Those years of subprime crisis were conversely to commercial banks, good years for Islamic banks. Indeed their efficiency improved as shown in figure 1. Such a result could corroborate the fact that Islamic banks weren't affected by the crisis, as suggested in the literature.

Table 5 hereafter

To deepen our analysis, we estimate cost frontier efficiency of commercial banks in all countries surveyed, except the countries whose banking system is wholly Islamic. Our first idea was to estimate a common frontier for Islamic and commercial banks. But even if we tried to define the corresponding inputs and outputs between the two types of banks, the estimated border did not exist. Thus, we chose to estimate a cost frontier of 156 commercial banks of comparable size to Islamic banks. The estimated efficiency score is 82.50% on average over the period. It is superior to the average Islamic banks efficiency score previously estimated. It is also growing over the period, as the efficiency of Islamic banks, indicating that both types of banks react quite identically to changes in their environment. The average efficiency over the period is substantially the same across regions. Thus, commercial banks in the Middle East have an efficiency of 82.66%, 82.38% in Africa, 82.34% in Asia and 82.28% in United Kingdom.

Figure 2 hereafter.

Even if efficiency scores of commercial and Islamic banks are not assessed with the same cost frontier, we note nevertheless that, commercial banks are generally more efficient than Islamic banks. Except for the Asian region, where the authorities implemented reforms to enable Islamic banks to adapt to the environment, as we previously underlined. In other regions, it is clear that Islamic banks are struggling to be as effective as commercial banks. Lastly, table 6 shows that the determinants of commercial banks efficiency in these countries are mainly Return on Equity (ROE) which is a proxy for profitability and market power (MARKETPOWER). The latter has a positive coefficient indicating that the most efficient commercial banks push out of the market or acquire (by consolidation) less efficient ones, since they have the lowest costs because of scale economies.

4. Concluding Remarks

Islamic banks have expanded significantly in recent years, because of increasing petrodollars inflows, following the oil shocks. These banks are growing at a rate of 15% per year since the early 2000s. And wherever they settle, the authorities try to implement adequate regulation in order to enable them to integrate the banking system of these countries. It is within this context that our study is inserted, to measure and understand what explains the efficiency of these banks.

At this purpose, we use the method of stochastic frontier in a first step. Then in a second step, we estimate a Tobit model with the efficiency scores derived from the previous estimation and explanatory variables for efficiency that we found consistent to Islamic banks. While size hasn't a significant coefficient, profitability and market power have negative impact on Islamic banks efficiency. Those results corroborate the thesis according to which there is a reduction of costs agency due to moral hazard, and that concentration increases costs for banks through slacks and therefore leads to inefficiency. Our robustness checks tend to support those results. However, in addition some interesting results are to be underlined. Apart from the positive coefficient of GDP (consistent with the literature), the percentage of urban population has a negative impact on efficiency. This finding tends to support the idea that Islamic banks are more efficient and active in countries with a small urban populaition. Dummy for banks operating in UK is consistent with Islamic banks score efficiency of the sub-sample. Dummy related to years of subprime crisis has a positive impact consistent with the literature and the increase of Islamic banks efficiency despite the crisis.

Concerning the level of efficiency it is growing over the period of analysis, with an average of 78.9%. However, there are noticeable differences in efficiency scores among regions. Asia shows the highest one (84.64%), due to overrepresentation of Pakistani and Malaysian banks. Islamic banks operating in Africa displayed an average efficiency score of 81.24%, greater than Middle East (80.39%). Indeed, Islamic banks settled in countries with Islamic banking as legislation do not necessarily displayed the highest level of efficiency. Finally, Islamic banks operating in United Kingdom have the lowest average efficiency score (73.36%).

Further analysis showed that commercial banks in the selected countries tend to be more efficient on average than Islamic ones, despite the separate cost frontiers. This result, corroborate the idea that in countries like Pakistan and Malaysia where reforms were taken to improve the competitiveness of Islamic banks and allow them to better cope with the environment, they have higher scores efficiency. Therefore, more reforms are necessary in other countries to improve Islamic banks efficiency.

Appendix 1: An overview on Islamic Banking

A. Islamic Banking system

More generally Islamic finance can be included in the larger concept of ethical finance. It consists I integrate in extra-financial criteria (ethical, solidarity, environment and governance) in investment decisions and portfolio management. More specifically, Islamic banking has been defined as banking in consonance with the ethos and value system of Islam and governed by the principles laid down by Islamic law called the Shari'ah.

A.1 The banking principles in Islamic Finance

The Shari'ah is "Way to the water". The "way" of Islam in accord with:

The Qur'an and the Sunna[7] and the Hadith[8] (which are the source of Islamic laws), and Ijma'[9], Qiyas[10] and Ijtihad[11] (which are used to provide interpretation), facilitate future development and implementation of the Islamic judicial system (Pervez, 1990).

Islamic banking is expected not only to avoid interest-based transactions, prohibited in the Islamic Shari'ah, but also to avoid unethical practices and participates actively in achieving the goals and objectives of an Islamic economy. Business and investments made must be conducted in a responsible and committed way.

There are four basic principles in the Islamic banking:

1. The sharing of profit and loss (hereafter SPL) principle. When meeting between a capital provider and an entrepreneur, the principle of participation condemns compensation in the form of interest on capital contribution (riba). Indeed, Islamic morality regards as unfair that the provider of capital does not enjoy large profits

[7] It is the second source of Islam faith, refers to Prophet Mahomet's acts and words which are related to his practice of faith. It explains and transmits the Qur'an.

[8] They refer to tradition or stories of the Prophet. In contrast with the Sunna which was practiced, the Hadith are records of what was practiced. They have become a controversy between Islamic groups since there are many interpretations of them.

[9] It is the consensus of the Islamic community, umma. It is through his principle that democracy makes its impact on the conduct of Islamic polity.

[10] It is a deductive analogy by which a jurist applies to a new case a ruling made previously in similar cases.

[11] It is independent judgment provided by scholars of Islamic laws for which clear principles and procedures are stipulated in the Qu'ran and Sunna.

that could be achieved if the contractor receives a fixed fee. And conversely, that the lender can require full remuneration even if the project has led to losses. The sharing of profits and losses binds the provider of capital and the entrepreneur, while providing insurance for the entrepreneur from the pooling of risks that this entails. This also has the advantage in terms of resource allocation and efficiency: the fund provider has interest to know the borrower and interest in this project. Similarly, the fact that the financier will be interested in the result pushes to oversee the work of the contractor and ensures that it has no illegal activity.

2. There are "some" risks (proportional to the efforts) shared by all the partners, whether funds are used in commercial or productive ventures. According to the Islam vision, the risk is necessary to justify a fee but it is prohibited if it is not controllable. The purpose of the contract should exist, be known and assessed at the conclusion of the agreement to protect against the imbalance of the transaction (gharar).

3. All funds should preferably finance socially productive activity. The bank can therefore not engage in alcoholic beverage trade or in the pork meat trade or any other activities explicitly prohibited by the Islamic law.

4. The prohibition of Usury (the collection and payments of interest, commonly called the Riba). Islamic finance deals only with certain aspects of conventional finance. Indeed according to the Shari'ah, the cardinal sin of economic activity is the riba. It is the undue increase of wealth. The collection of remuneration without effort or risk is prohibited. Therefore, no contract between economic agents must disclose directly or indirectly paid or received interest by any of the contractors. A compensation is fair only if it is the counterpart of a real job. Instead, it is possible to calculate the profit of an economic agent on the basis of the rates on the conventional market. Similarly, contracts to receive a variable remuneration or the occurrence of an event are likely to generate a rating imbalance of the transaction, (gharar).

These principles are accompanied by strong constraints that must be taken into account in the commercial and financial arrangements. According to cases, conventional finance will provide tools to meet them. Often, there will be established a specialized engineering to combine several techniques to achieve the goal under the constraints imposed.

Those financial products are designed in order to eliminate in economic transactions Riba as well as many others such as Gharar (risk or uncertainty) and Qimar (speculation). (has been rewritten for a better transition)

A depositor in an Islamic bank can therefore make earnings on his or her deposit in several ways:

- Through return on his capital if it is employed to finance an investment.

- Through profit's sharing if his capital or a share of his capital is employed in a partnership.

- Through rental earnings on an asset that has been partially financed by his capital.

It is clear from the foregoing that there are five basic Islamic financing contracts that are permissible by the Islamic Shari'ah: cost plus (Murabaha)[12], leasing and lease purchase (Ijara and Ijara wa-Iqtina)[13], leasing structured mode (Istinsa)[14], profit sharing (Mudaraba) and equity participation (Musharaka)[15].

A.2 Categories of Islamic banks

There are five categories of operating Islamic banks (Al-Omar et all., 1996):

- The Islamic Development Bank (IDB) which has a main office in Saudi Arabia and three regional offices.[16]

- The banks which operate in countries where the whole banking system is overseen in some way by religious bodies/institutions (like in Pakistan).

- The banks which operate in Muslim countries and which co-exist with interest-based banks (for example in Jordan, Egypt, Malysia).

- The Islamic banks in non-Muslim countries whose monetary authorities do not recognize their Islamic character (like the Al-Baraka International Bank in London and the Islamic Bank in Durban, South Africa).

- The Islamic banks which exist in non-Muslim countries whose monetary authorities do recognize their Islamic character (for instance the Faisal International Bank, FIB based on Copenhagen, Denmark registered under the Danish Banking Supervisory Board).

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[12] The Islamic Bank acquires a tangible asset at the request of its customer. Then, the bank sells the asset to its customer on a deferred sales basis with a markup which corresponds to the profit of the bank.

[13] The Ijara transaction is similar to the conventional leasing transaction. However, in Ijara wa-iqtina the customer (the lesee) has the option of owing the asset at the end of the contract.

[14] It is a leasing mode which is used to finance long term or large scale facilities involving like construction of manufacturer. Bank can either own the manufacturer and charge the customer a fee based on profits or sell it to the customer on a differed basis similarly like in the Murabaha transaction.

[15] The Islamic bank and the customer invest jointly money into the venture. They agree on the sharing of profits and losses.

[16] Currently, the IDB has 55 member countries. All member countries must be also a member of the Organization of the Islamic Conference and must pay their contribution to the capital of the bank and accept terms and conditions decided upon by the IDB Board of Governors. Its purpose is to support the economic development and social progress of member countries and Muslim communities. The IDB participates in equity capital and grants loans for productive projects and enterprises.

Table (1) presents a glance on the presence of Islamic banking in Muslim and non-Muslim countries:

	Islamic Banks (market share, MS)				
No Islamic Banks	Marginal presence	Small MS	Medium MS	High MS	Government legislation
Iraq	Algeria	Malaysia	Bahrain	Kuwait	Iran
Libya	Lebanon	Turkey	Egypt	Qatar	Pakistan
Morocco	Tunisia	Yemen	Jordan		Sudan
Oman			Saudi		
Syria			UAE		

A.3 Aims of the Islamic banking

The first Islamic banks were created to fill a gap in social and economic life of poor population. Their first aim is to support individuals by mobilizing their resources and increasing their awareness of savings. However, the current Islamic banks seem to support the idea that all the other banks (conventional banks) are illicit and have to be replaced by Islamic ones (Henry et al. 2004).

Islamic banks choose the projects which have the highest rate of profit and are the safest and the most socially beneficial. This is why we distinguish two sets of aims in the Islamic banking which are closely related: economic and social aims.

1. Economic aims

- To satisfy the demand and the financial operations of Muslims today in the framework of the principles and percepts of the shari'ah.
- To invest the capital of Muslims into projects which are permissible by the Islamic law to generate licit profits.
- To establish subsidiaries of Islamic banks in Muslim and non-Muslim countries through the implementation of innovative and various activities.
- To capture the savings of hundreds of millions of Muslims who have never deposit their money in banks such as farmers and artisans.

2. Social aims

- To promote and consolidate co operations among Muslims.

- In addition to the economic promoting of Muslim countries, the Islamic Banking promotes also social development through the almsgiving (zakat)[17] and the creation of funds employed in charitable works.

B. Conventional versus Islamic Banks

There are some major differences between the conventional and the Islamic banking. As explained before, in contrast with conventional banks which have no business limitations, Islamic banks can finance only business not against the teachings of Islam.

Finances are given to the customer by a contract of loan (where the bank is the creditor and the customer is the debtor) in conventional banks and by a contract of a deferred sale contract in Islamic banks: first, the bank buys the goods that the customer requires or appoints him or her to do it on its behalf. Later, the bank sells them to the customer. The loan transaction in conventional banks is substituted for a buying and a selling transaction in the Islamic banks. The selling price is equal to the acquisition's cost plus an agreed profit margin. This price is the contracted amount that the customer must repay.

If the conventional banks earn their profit by financing the customers at a fixed interest rate, the return of the Islamic banks is given by the profits of their trading and investment activities: If they face some risks, these risks must be proportional to their efforts when they are studying the custumers' business and buying and selling the commodities required by their clients.

Given finances to the customer through a buying and selling transaction leads Islamic banks to face more risk than the conventional banks. In both, they have to take into account some risks as credit risks and currency fluctuation and liquidity risks, but only Islamic banks share loss as well as profit and they cannot compensate it with any additional charge: if the customer is unable to pay, the Islamic bank can neither ask for higher selling price because of the delayed settlement dues nor charge additional money such as penalities and compounded interest (Al-Omer and Abdul-Haq 1996).

Consequently, they have to examine and to understand the customers' investments very well. From the point of view of depositors, Islamic banks are less risky than the conventional ones (see among others Aggrawal and Yousaf 2000, Hassan and Bashir 2003, Yudistira 2003, Sufian 2007, Moin 2008).

Some non-Islamic banks in Egypt open "Islamic" branches. Ray (1995) reveals that eleven conventional banks are involved in Islamic banking business for different reasons such as competing with the Islamic ones but also to attempt to weaken the strongest ones. One can

[17] Zakat institutionalizes the systematic giving of certain percentage ($\simeq$2.5%) of one's wealth each year to benefit the poor. It does not include charitable gifts given out of individual generosity and is not a replacement for taxes, but is seen as a form of compulsory worship, purification and redistribution. As it necessitates a regular reassessment of net wealth, Zakat is thought to help concentrate the mind in encouraging compliance with Shari'ah in all financial dealings (Alam, 2004).

notice however that, non-Islamic banks contribute therefore to the "Islamization" of the banking system in Egypt.

To end with, it is worth to note that people involved in the Islamic banking business are usually apolitical and some of them deal with both Islamic and conventional banks. In contrast with expectations, the Islamic banking is neither the monopoly of the Islamic movement nor of its founders (Ray, 1995 and Henry et all., 2004).

Appendix 2 / Tables and figures

Table1: Estimate for the cost-efficiency frontier (Islamic banks)

	1		2	
	coefficient	standard-error	coefficient	standard-error
Constant	-0,2025	(0,0484)***	-0,1033	(0, 0195)***
lnLOANS	0,1484	(0, 3019)	0,0000	(0, 0000)***
lnSECURITIES	0,7254	(0,2782)***	0,1620	(0, 0271)***
lnLA	0,6601	(0,2665)**	0,0000	(0, 0000)***
ln PERSONEXP	0,0592	(0, 257)	0,6478	(0, 0363)***
lnLOANS*lnLOANS	0,0498	(0, 0429)	0,0000	(0, 0000)***
lnLOANS*lnSECURITIES	-0,0771	(0, 083)	0,3428	(0, 0378)***
lnLOANS*lnLA	0,036	(0, 0406)	0,0000	(0, 0000)***
lnSECURITIES*lnSECURITIES	0,0705	(0, 056)	0,3811	(0, 0411)***
lnSECURITIES*lnLA	-0,1598	(0,0697)**	0,0000	(0, 0000)***
lnLA*lnLA	0,0344	(0, 0229)	0,0099	(0, 0049)**
lnPERSONEXP*lnPERSONEXP	0,1532	(0,0640)**	0,0000	(0, 0000)
ln PERSONEX*-lnLOANS	-0,0727	(0, 0907)	0,0202	(0, 0064)***
lnPERSONEXP*lnSECURITIES	0,1682	(0,0992)*	0,0000	(0, 0000)
lnPERSONEXP*lnLA	-0,1135	(0,0403)***	-0,0411	(0, 0045)***
Gamma	0,2801	(0,0749)***	0,7939	(0, 1457)***
Log-likelihood ratio	15,22		164,41	
Number of observations	334		886	

*, ** and *** significant at levels 10%, 5% and 1% respectively.

(1) cost-frontier function with Islamic banks.

(2) cost-frontier function with commercial banks of the selected countries.

Table 2: Haussmann test

	coefficients			
	fixed effects	**random effects**	**difference**	**standard error**
lnLOANS	0,3957	0,3995	-0,0038	0,0170
lnSECURITIES	0,1285	0,1290	-0,0005	0,0222
lnLA	0,4033	0,4004	0,0029	0,0139
lnPERSONEXP	0,4172	0,3464	0,0708	0,0386
lnLOANS*lnLOANS	0,0769	0,0774	-0,0006	0,0023
lnLOANS*lnSECURITIES	-0,1145	-0,1167	0,0022	0,0051
lnLOANS*lnLA	-0,0212	-0,0205	-0,0007	0,0014
lnSECURITIES*lnSECURITIES	0,1011	0,1021	-0,0010	0,0036
lnSECURITIES*lnLA	-0,0684	-0,0689	0,0005	0,0029
lnLA*lnLA	0,0329	0,0330	-0,0002	0,0007
lnPERSONEXP*lnPERSONEXP	-0,0003	-0,0059	0,0056	0,0032
lnPERSONEXP*lnLOANS	0,0430	0,0339	0,0091	0,0046
lnPERSONEXP*lnSECURITIES	-0,0564	-0,0397	-0,0167	0,0086
lnPERSONEXP*lnLA	0,0300	0,0284	0,0015	0,0019
Probability > chi2				0,9664

Table 3: Statistics for the arguments of the cost-frontier function

Variable		Mean	Standard Deviation	Minimum	Maximum
lnTOTALCOST	overall	6,8564	2,1455	-0,4141	14,5537
	between		2,1481	2,1309	14,5537
	within		0,8524	2,9451	9,1508
lnLOANS	overall	5,1795	2,5465	-2,7988	10,4183
	between		2,4195	-2,1652	9,7068
	within		0,9667	-2,3657	7,7873
lnSECURITIES	overall	6,1571	2,1968	-2,5344	10,7905
	between		2,0720	0,7703	9,9131
	within		0,8574	0,5797	8,6233
lnLA	overall	4,5557	2,3734	-3,3302	9,3142
	between		2,1677	-1,5618	8,1801
	within		1,0172	-0,1042	7,8581
lnPERSONEXP	overall	0,0197	1,7043	-4,2028	17,8739
	between		2,2166	-3,5738	16,7185
	within		0,3832	-1,6673	2,4077
SIZE	overall	43,1454	333,6532	-1,6094	4986,9930
	between		253,9436	2,1570	2067,1260
	within		207,4721	-1538,0430	2963,0120
ROA	overall	0,0191	0,0733	-0,8000	0,5399
	between		0,0618	-0,2167	0,3326
	within		0,0531	-0,5642	0,3660
ROE	overall	0,1174	0,2909	-1,1514	4,6680
	between		0,2191	-1,1514	0,9374
	within		0,2411	-1,1628	4,2003
RISKTAKING	overall	0,2372	0,2318	-0,2000	1,0000
	between		0,2090	0,0393	0,9461
	within		0,1184	-0,3217	0,8567
MARKETPOWER	overall	0,1324	0,2006	0,0000	0,9758
	between		0,1825	0,0000	0,7408
	within		0,0655	-0,1526	0,4372

Table 4: Correlation between determinants of cost-efficiency

	SIZE	ROA	ROE	RISKTAKING	MARKETPOWER	GDPCP	GDPCT	DPOP	DMDE
SIZE	1								
ROA	0,0798	1							
ROE	0,0366	0,4540*	1						
RISKTAKING	0,0308	0,2054*	-0,0943*	1					
MARKETPOWER	0,009	0,094	0,034	-0,0959	1				
GDPCP	0,0962*	0,1830*	0,0865*	0,2144*	0,0677	1			
GDPCT	0,0793*	0,1578*	0,0503	0,2446*	0,025	0,9210*	1		
DPOP	-0,0209	0,1256*	-0,0065	0,3399*	0,1947*	0,2053*	0,1724*	1	
DMDE	-0,0278	0,1815*	0,0559	0,2725*	-0,0503	0,2665*	0,3769*	0,3892*	1

*, ** and *** significant at levels 10%, 5% and 1% respectively.

Table 5: Tobit model for explanatory variables of scores efficiency

	1	2	3	4	5	6	7
CONSTANT	0,829	0,8293	0,8322	0,854	0,8318	0,8497	0,7928
	(0,0122)***	(0,0122)***	(0,0137)***	(0,0146)***	(0,0138)	(0,0149)	(0,0161)***
SIZE	0,014	0,0115	0,0186	0,0352	0,0158	0,0329	0,0074
	(0,0138)	(0,014)	(0,0148)	(0,0158)**	(0,015)	(0,0159)**	(0,0125)
ROA	-0,0298	-0,0293	-0,0221	-0,0265	-0,022	-0,0275	-0,0391
	(0,0135)**	(0,0136)**	(0,0145)	(0,0142)*	(0,0146)	(0,014)**	(0,0119)***
MARKET POWER	-0,0238	-0,0214	(0,0145)	-0,0221	-0,0232	-0,0255	-0,0034
	(0,0137)*	(0,0139)	(0,0145)	(0,014)	(0,0145)	(0,0141)*	(0,0121)
DPOP			(0,0145)		-0,0276		
			(0,0145)		(0,0178)		
URBANPOPPERC				-0,055		-0,055	
				(0,0176)		(0,0166)***	
GDPC			0,0334	-0,0018	0,0348	0,0239	
			(0,0189)*	(0,0161)	(0,0191)*	(0,0174)	
RISKTAKING			-0,0227	0,0039	-0,0242	-0,013	
			(0,0194)	(0,0163)	(0,0197)	(0,0198)	
D_middle-EAST							-0,0096
							(0,0136)
D_UK							-0,1395
							(0,0401)***
D_islamicbkgsystem							-0,0035
							(0,0148)
D_subprime							0,129
							(0,0123)***

Prob> chi^2	0,03	0,05	0,04	0,00	0,06	0,00	0,00
Log-likelihood	228,23	224,51	230,52	233,98	226,79	230,95	279,11
Number of observations	334	334	334	334	334	334	334

*, ** and *** significant at levels 10%, 5% and 1% respectively.

Regressions 2,5 and 6 are run on a sample excluding UK islamics banks.

Table 6: Tobit estimate for the determinants of efficiency for commercial banks of selected countries

	1	2	3	4	5
CONSTANT	0.8172	0.8191	0.8189	0.8249	0.8193
	(0.0094)***	(0.0113)***	(0 .0113)***	(0.0125)***	(0.0113)***
SIZE	.0051	0.0067	0 .0060	0.0038	0.0047
	(0.0119)	(0.0122)	(0.0134)	(0.0128)	(0.0129)
ROA	-.0159				
	(0 .0111)				
ROE		-0.0201	-0.0203	-0.0200	-0 .0210
		(0.0113)*	(0.0114)*	(0.0113)*	(0.0114)*
MARKET POWER	0 .0265	0 .0268	0.0268	0.0287	0.0272
	(0.0111)**	(0.0118**	(0.0113)**	(0.0114)**	(0.0113)**
DPOP		0 .0065	0.0058	-0.0165	
		(0.0203)	(0.0203)	(0.0156)	
URBANPOPPERC					0.0072
					(0.0339)
GDPC		0.0003	0.0017	0.0126	-0.0036
		(0.0133)	(0.0134)	(0.0154)	(0.0341)
RISKTAKING		-0.0020	-0.0025	-0.0011	- 0.0022
		(0.0127)	(0.0124)	(0.0124)	(0.0123)
Prob> chi^2	0.02	0,09	0,09	0.06	0.09
Log-likelihood	369.27	369.96	369.97	370.48	369.95
Number of observations	537	537	537	537	537

Figure 1: Evolution of Islamic banks efficiency from 2001-2008.

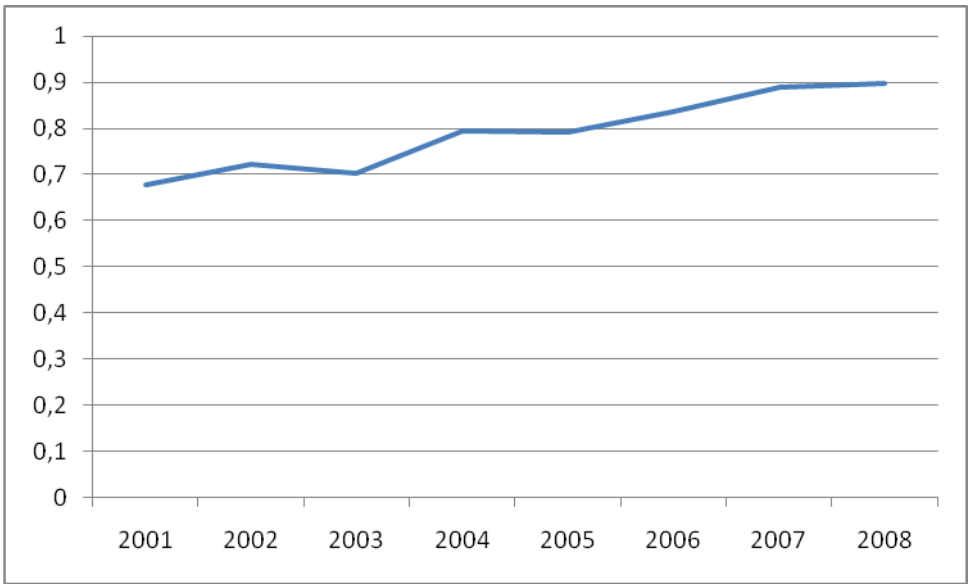
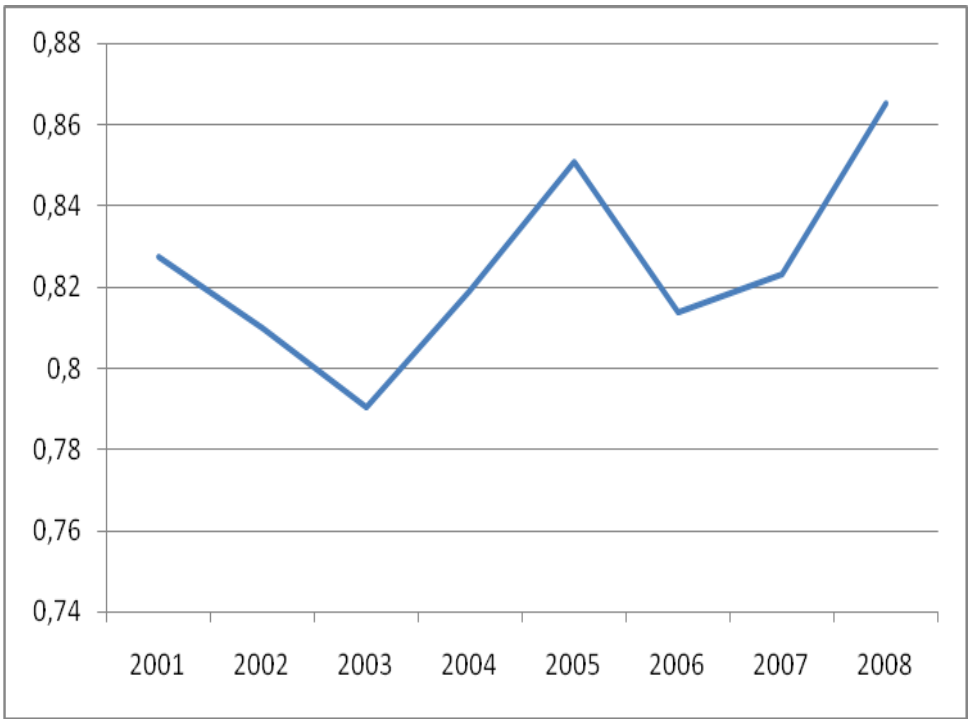
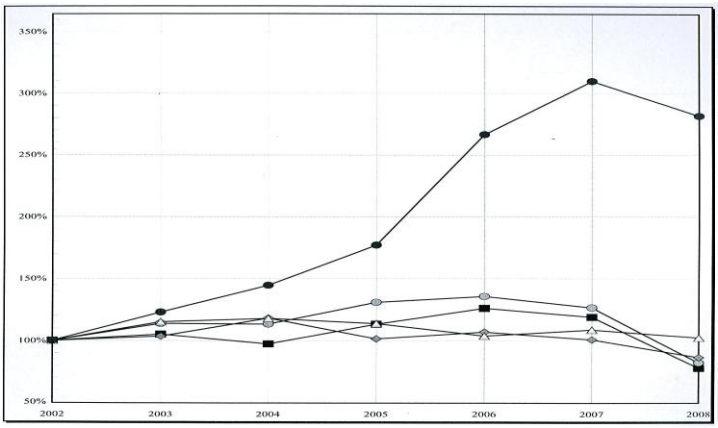


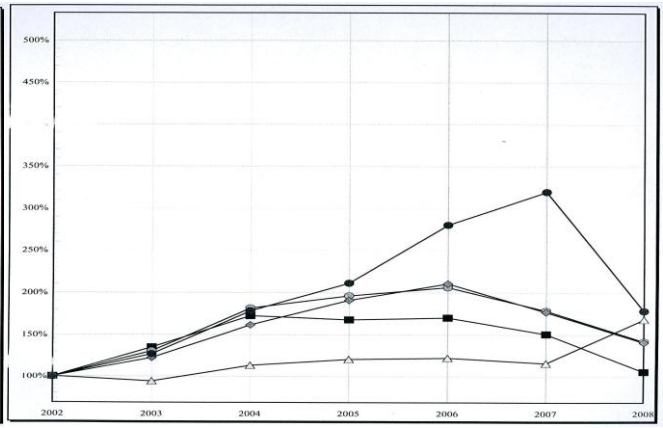
Figure 2: Evolution of commercial banksefficiency in selected countries from 2001-2008



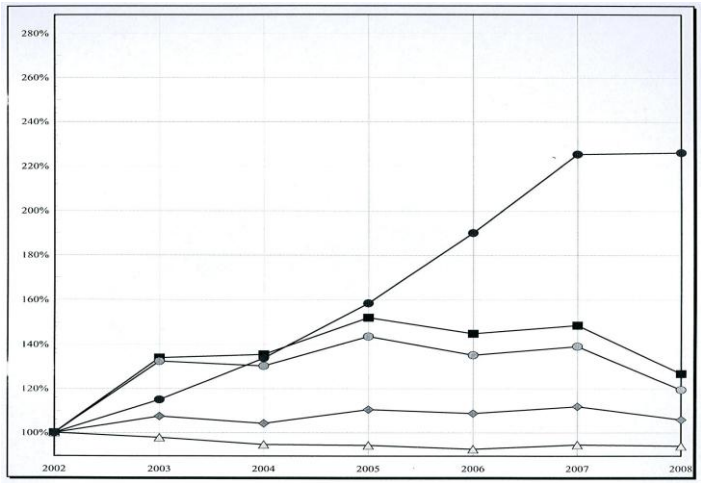
<u>Figure 3</u>: Evolution for selected statistics of commercial and Islamic Banks in the selected countries



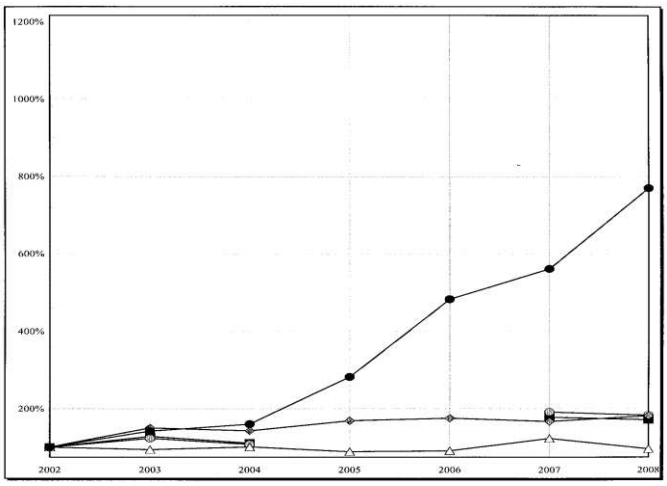
a- Commercial banks in Middle East



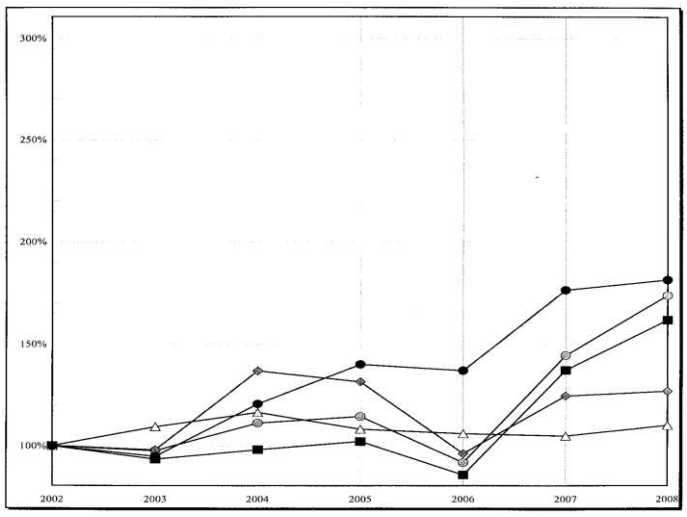
b- Islamic banks in Middle East



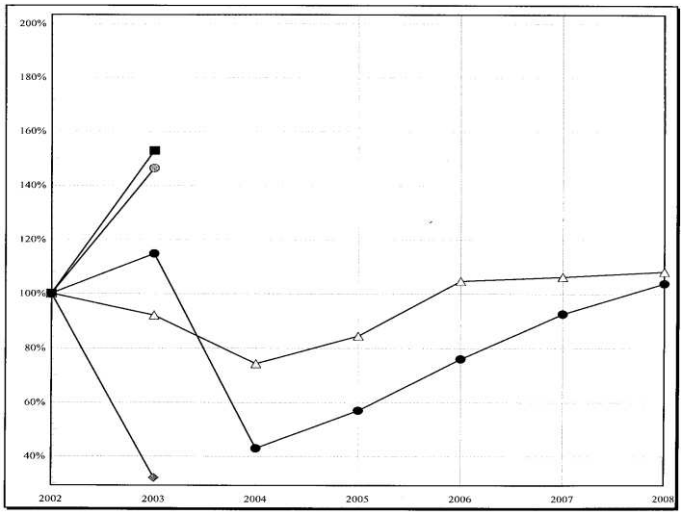
c- Commercial Banks in Asia



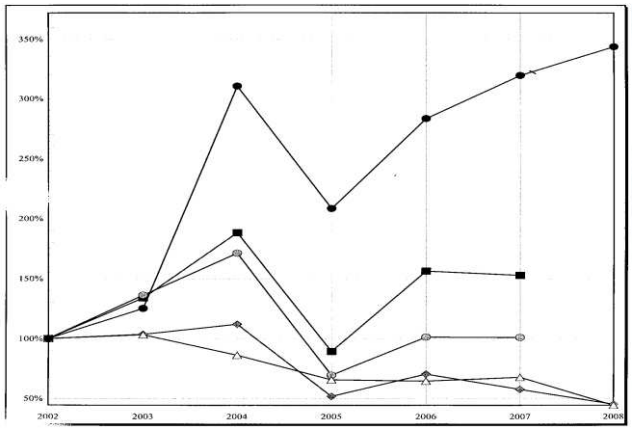
d- Islamic Banks in Asia



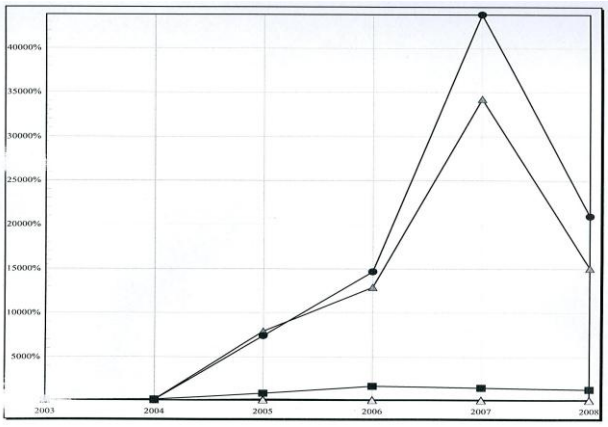
e- Commercial Banks in Africa



f- Islamic banks in Africa



g- Commercial Banks in UK



h- Islamic Banks in UK

Equity / Total Assets
Net Interest Margin
Return on Average Assets (ROAA)
Return on Average Equity (ROAE)

Total Assets

Source : Bankscope, Bureau Vandijk, 2009

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