

Comparing Effectiveness between Islamic and Conventional Bank during the Current Crises

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Abstract

This study is about comparing the efficiency of Islamic and conventional banks. Two methods, such as the stochastic frontier analysis (SFA) and the DEA, are applied to measure the efficiency of both sectors during the current crises. The results show that most of the efficiency scores of Islamic banks are very close to those of the conventional ones. However, comparing the efficiency scores of the IBs with their conventional counterparts and BI per year, we notice that the statistics show that IBs are slightly affected during the current crisis, whereas the CB which are heavily affected by these financial crises.

Keywords: Efficiency; Islamic banks; Conventional banks; Current crisis; DEA; The stochastic frontier analysis

Introduction

Banks operate in a highly competitive environment and their long-term sustainability is largely determined by their degree of efficiency. It should also be noted that the efficiency of a financial system, where the banking system dominates the productive sector, necessarily involves the efficiency of the banking intermediation.

Islamic banking is no exception to this standard. Indeed, in an unstable economic environment characterized by a multiplicity of financial crises, attention is gradually moving towards the techniques of Islamic finance since the financial system based on the principles of Sharia proves to be stable and resistant in front of the conventional system failures. Therefore, it has now become urgently necessary for Islamic banks to enhance their efficiencies to take advantage of this opportunity.

The main objective of this research paper consists in measuring, in the following sections, the efficiency of the Islamic financial system and the effect of the subprime crisis and the euro zone on its stability. We will later compare the efficiency of financial banks and their conventional counterparts. However, we should first understand the terms “conventional banks”, “Islamic banks”, “current crisis” and “banking efficiency.”

Islamic finance is based on the principles of Sharia which require justice, transparency and fairness. It differs from conventional financial practices through a different conception of the values of capital and labour. Thus, these practices emphasize ethics and morals which take their sources from the divine revelation and from the Sunnah while building economic and financial practices at the time of the Prophet Mohamed “the salvation of God be upon him”.

In general, banks are located in a highly competitive environment besides; their long-term sustainability is largely determined by their degree of efficiency. It should also be noted that the efficiency of a financial system, where the banking system dominates the productive sector, necessarily involves the efficiency of the banking intermediation. In this research, we will see the difference between the efficiency of the Islamic banks and that of the conventional ones in 29 countries. In the following sections, we will discuss the research methodology followed by the results and so that we can draw a conclusion in the final section of the research.

Literature Review

Although there has been a vast literature on the characteristics of efficiency of modern banking, particularly the work of the American and European banking markets, and even in the world, working on Islamic finance is still in its early stages.

Yudistira presented new evidence on the performance of 18 Islamic banks during the 1997/2000 period [1]. He used the nonparametric approach to analyze technical efficiency and the size of the Islamic banking operations. It appears clearly from the results of this study that the Islamic banks showed an overall efficiency during the period of sampling where year 2000 is regarded as the most effective one. However, it is interesting to note that Islamic banking institutions in 1998 and 1999 were inefficient (organizational brand) compared to 1997 and 2000 because the former years were the turmoil that hit the global economy.

The research of Ika and Abdullah compared and examined the performance of Islamic banks with that of the conventional banks of Indonesia. The data were based on the financial statements of commercial and Islamic banks during the period 2000-2007. In terms of inter-bank analysis, profitability measures generally showed no statistical difference between the Islamic and conventional banks during the 2000/2007 period and that of 2005-2007. This result seems to be consistent with the findings of other studies that found no significant difference between the profitability of the Islamic banks and that of their conventional counterparts [2]. Samad examined the efficiency of Islamic banks and commercial banks in Bahrain during the period after the Gulf War (1991-2001) concerning profitability, liquidity risk and credit risk.

In this study, six Islamic banks and 15 conventional commercial

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banks were considered. The results of this study showed that conventional banks in Bahrain had a huge volume of transactions compared with the Islamic ones.

In all accounts, the loans, assets, deposits, profits and equity of conventional banks have a dollar volume o activity much greater than that of Islamic banks. Therefore, in terms of volume, the efficiency of Islamic banks in Bahrain is inferior to that of conventional banks. This is expected because, firstly, conventional banks in Bahrain have an old network and more staff compared to the Islamic banks which are new on the market.

Secondly, the management of Islamic banks is conducted by a well trained and experienced staff in the management of traditional banks, though they do not have sufficient experience to make Islamic banks operate as they are significantly different in their mode of operation. This study also shows that Islamic banks are more liquid and therefore are exposed to the risk of low liquidity compared to the commercial ones.

Sufian examined the performance of the Islamic sector during the period 2001-2005 [3]. Several estimates of bank efficiency were evaluated using a non-parametric data envelopment analysis (DEA). The results show that, during the study period, the Malaysian Islamic banks were operating at the wrong scale of operations. Moreover, the results suggest that foreign banks offering Islamic banking services in Malaysia showed higher technical efficiency (77.7%) than their home counterparts.

Methodology and Model Specification

In this study, we will measure the efficiency of Islamic and conventional banks in several ways, first, on an accounting basis and then economically. The estimation of banking efficiency on an accounting basis generally requires the use of comprehensive information about the financial statements so as to identify the determinants of the banking profitability as measured by return on assets (ROA) or by returns on equity (ROE). Economically, estimating the effectiveness of a bank, or any other type of business, is carried out in different ways. However, the most commonly used methods are just two, such as the stochastic frontier analysis (SFA) and the DEA. In this study, two methods are applied for the examination of efficiency in the Islamic and conventional banking sector in 209 banks from 29 countries over the period 1999-2010.

The DEA method was developed by Charnes et al. [4]. It helps overcome the weaknesses of the traditional partial productivity ratios and the difficulties of applying the overall productivity ones [5-7]. The DEA is based on the concept of the production technology developed by Shephard [8], which helps represent the activity of the studied entities on the basis of the relationship between the overall used resources (inputs) and all the produced services (outputs). The calculated indicator is the “technical inefficiency score. Besides, the DEA approach has already been very often used to measure the banking technical inefficiency.

On the other hand, the SFA approach, which was also known as the “model error components”, was developed by Aigner et al., Meeusen and Van Den Broek [9,10] Integrating the random effects, also called the “stochastic frontier” method, is performed by decomposing the error into two terms: a random error component joining the measurement errors with the exogenous shocks, and an inefficiency component.

The former follows a symmetrical normal distribution, whereas the latter follows an asymmetrical distribution defined positively for a cost function and negatively for a production function.

In recent years, many extensions of the frontier stochastic models have been proposed. We can mention the model of Battese and Coelli [11]. Indeed, these models try to create more reliable estimators of individual inefficiencies.

Data and model specification

The data used in this part of our study are preliminary data about 209 Islamic and conventional banks in 29 countries over the period 1999-2010. The sample consists of financial institutions found in the database of the Bank Scope.

In our study, efficiency is measured using the (SFA) parametric approach and the (DEA) non-parametric approach.

Using the SFA method, we will proceed to the explanation of costs and profits. The form used in this type of analysis is essentially based on the translog form. Let Y be the endogenous variable that can take the value of the total cost (TC), or the value of the profit.

Three outputs (y1, y2, y3) and three inputs (I1, I2, I3) are taken into account. It should be pointed out that in the expression of the cost function, the inputs are presented according to their prices, where p1 is PERSONEXP, p2 OTHEREXP, and p3 INTERESTEXP. The outputs and the shape of the cost or profit function are considered in terms of quantities. Therefore, the general form of this expression is presented as follows

$$\begin{aligned} \text{LogCT} = & \alpha_0 + \sum_{m=1}^{m=3} \alpha_m \text{Ly}_m + \sum_{s=1}^{s=3} \beta_s \text{LogP}_s + \alpha_1 t + \frac{1}{2} \alpha_2 t^2 + \frac{1}{2} \sum_{m=1}^3 \sum_{m'=1}^3 \zeta_{mm'} \text{Ly}_m \text{Ly}_{m'} + \frac{1}{2} \sum_{s=1}^3 \sum_{s'=1}^3 \zeta_{ss'} \text{LP}_s \text{LP}_{s'} \\ & + \sum_{m=1}^3 \gamma_m \text{Ly}_m \text{LP}_s + \sum_{m=1}^3 \delta_m t \text{Ly}_m + \sum_{s=1}^3 \delta_s t \text{LP}_s + \gamma_E \ln E + \frac{1}{2} \gamma_{EE} (\ln E)^2 + \phi_{E1} \ln E \cdot \text{Ln}(p_1) + \phi_{E2} \ln E \cdot \text{Ln}(p_2) \\ & + \phi_{E3} \ln E \cdot \text{Ln}(p_3) + \nu'Z \end{aligned}$$

where Z is a vector of the control variables.

For the correct specification of the model, some hypotheses should be applied, the most important of which is the homogeneity regarding the prices. In other words, the following relationship should be checked:

$$\text{LnCT}(Y_1, Y_2, Y_3; \lambda p_1, \lambda p_2, \lambda p_3; t) = \text{LnCT}(Y_1, Y_2, Y_3; p_1, p_2, p_3; t) + \text{Ln} \lambda$$

Checking the above hypothesis leads us to draw the following constraints:

$$\beta_1 + \beta_2 + \beta_3 = 1$$

$$\begin{cases} \zeta_{11} + \zeta_{12} + \zeta_{13} = 0 \\ \zeta_{22} + \zeta_{23} + \zeta_{21} = 0 \\ \zeta_{33} + \zeta_{31} + \zeta_{32} = 0 \end{cases}$$

$$\begin{cases} \gamma_{11} + \gamma_{12} + \gamma_{13} = 0 \\ \gamma_{21} + \gamma_{22} + \gamma_{23} = 0 \\ \zeta_{31} + \zeta_{32} + \zeta_{33} = 0 \end{cases}$$

$$\zeta_{tp1} + \zeta_{tp2} + \zeta_{tp3} = 0$$

By applying the above constraints on the fundamental form, we get the following reduced form:

$$\begin{aligned}
 \ln\left(\frac{CT}{P_3}\right)_it &= \alpha_0 + \sum_{n=1}^m \phi y_n + \beta_1 L\left(\frac{P_1}{P_3}\right)_it + \beta_2 L\left(\frac{P_2}{P_3}\right)_it + \alpha_1 t + \frac{1}{2} \alpha_n t^2 + \frac{1}{2} \zeta_{11} (LY_1)^2 + \frac{1}{2} \zeta_{22} (LY_2)^2 \\
 &+ \frac{1}{2} \zeta_{33} (LY_3)^2 + \zeta_{12} LY_1 LY_2 + \zeta_{13} LY_1 LY_3 + \zeta_{23} LY_2 LY_3 + \frac{1}{2} \zeta_{11} \left[L\left(\frac{P_1}{P_3}\right)_it \right]^2 + \frac{1}{2} \zeta_{22} \left[L\left(\frac{P_2}{P_3}\right)_it \right]^2 \\
 &+ \zeta_{12} L\left(\frac{P_1}{P_3}\right)_it L\left(\frac{P_2}{P_3}\right)_it + LY_1 L\left(\frac{P_1}{P_3}\right)_it + \gamma_{22} LY_2 L\left(\frac{P_2}{P_3}\right)_it + \gamma_{31} LY_3 L\left(\frac{P_1}{P_3}\right)_it + \gamma_{32} LY_3 L\left(\frac{P_2}{P_3}\right)_it + \\
 &\delta_{ip1} t L\left(\frac{P_1}{P_3}\right)_it + \delta_{ip2} t L\left(\frac{P_2}{P_3}\right)_it + v_1 \text{inflation} + v_2 \text{TYPE} + v_3 \text{depliab} + v_4 \text{size} + v_5 \text{dpop} + \\
 &v_6 \text{marketshare} + v_7 \text{risktaking} + v_8 \text{cgp} + \varepsilon_{it}.
 \end{aligned} \tag{2}$$

Using the same inputs and outputs, we proceed to the study of efficiency using the nonparametric approach based on the DEA method. We will present the results of efficiency scores along with the results of the parametric approach.

On the basis of these estimates, we will assess the various technical efficiencies on a global scale, per type of bank, per year and per country.

Estimation Results

Results on the basis of the SFA approach

From the reduced form above (2), we will estimate the stochastic frontier so as to find technical efficiency. In fact, the latter's estimate leads to the following results, which will be shown in Table 1.

The Y_1 variable is the loan. In our results, the loan has a significant but negative effect on cost efficiency, both in variable and in invariable periods. Our results are consistent with the idea that if the loans are non-performing or past due, the operating costs rise due to the difficulty of dealing with these loans, that is to say, any deterioration in the credit quality reduces the efficiency cost. According to the study of Miller, Athanasoglou et al. [12] and Liu et al., a loan can negatively affect efficiency.

Concerning the second variable Y_2 , which implies the net liquid assets, and on the basis of the results estimated at an invariable time, probability takes a positive value equal to 0.018, that is below 5%, whereas its coefficient takes a negative value equal to -0.1525923, which means that the net liquid asset has a significant but a negative effect on the banks' cost efficiency. Our results are consistent with those of Miller and Abreu and Mendes [13] who found a negative relationship between liquidity and cost efficiency. This is a surprising result, in some way, especially in the current crisis during which we saw how banks were seeking liquidity.

For the variable inflation, the probability value is positive and significant for both cases, that is to say, in variable and invariable time with values respectively equal to 0.009 and 0.002, that is below 5%,

Variables	variables time		fixed time	
	Coefficient	P value	Coefficient	P value
Ly1	-0.3790551	0	-0.271085	0
Ly2	-0.1525923	0.018	-0.1199987	0.067
Lp13	0.9671127	0	0.9629787	0
Lp23	0.0549091	0.434	-0.0731529	0.305
Inf	0.0044499	0.009	0.0050373	0.002
Type	-0.1366234	0.193	-0.1065021	0.373
Size	0.3483109	0	0.3930674	0
Ms	0.4068711	0	0.2967125	0.03
Rt	-0.0534136	0	-0.0648248	0
_cons	8.902392	0	7.6328011	0.015

Table 1: Estimating the Translog cost frontier.

Variables	variables time		fixed time	
	Coefficient	P value	Coefficient	P value
Ly1	0.456777	0.012	-0.271085	0
Ly2	0.1377422	0.372	-1.119987	0.067
Lp13	0.6608384	0	0.9629787	0
Lp23	0.0400483	0.017	-0.0731529	0.305
Inf	0.013466	0.001	0.0050373	0.002
Type	-0.3070681	0.177	-0.1065021	0.373
Size	0.479026	0	0.3930674	0
Ms	0.1687359	0.529	0.2967125	0.03
Rt	-0.1004029	0.001	-0.0648248	0
_cons	6.044625	0	7.6328011	0.015

Table 2: Estimating the profit function.

and positive coefficient values equal to 0.0044499, in variable time and 0.0050373, in fixed time.

Therefore, inflation has a positive and significant impact on banks' cost efficiency. As a consequence, our results are consistent with the ones found by many authors, such as Bourke, Molyneux and Thornton, Demirgüç-Kunt and Huizinga, Athanasoglou et al., Pasiouoras and Kosmidou [12,14-17].

For the variable size, the coefficient value is 0.3483109 whereas that of the probability is 0.000, that is below 5%. On the basis of these results, the cost frontier moves up. Consequently, the larger a bank is, the less opportunities it has to minimize its costs. In the literature about the banking efficiency, the results regarding the effect of the bank size on inefficiencies differ. For example, on the one hand, Kwan and Sensarma [18,19] found that large banks are less efficient in cost than smaller ones. On the other hand, Roa [20] found that the size has no impact on cost inefficiencies in the United Arab Emirates.

The variable "SECURITIES" (total productive assets) has a significant and positive effect on the banking efficiency either in variable or in invariable time. Our results are consistent with the ones of Staikouras et al. [21] who found that this variable is positively related to efficiency but they also added that this relationship could be negative if a bank invests heavily in securities at the expense of lending.

The variables "Market Share and Risk Taking" are significant in variable and in fixed time with probability values below 5%. Several economists used the Risk Taking ratio to measure and assess banking efficiency. We can mention, for example, Kwan and Eisenbeis [22], Altunbas et al. [23] and Godlewski [24] who underline a simultaneous but negative influence between the risk level and banking performance.

Similarly, we re-estimated the profit function applying the same variables used in the cost function. The estimate has the following results (Table 2).

When reading this table, it seems that the sign of the size is positive and significant in variable time with a coefficient equal to (0.479026), and a probability of (0.000), where as in invariable time, the coefficient is (0.3939674) and the probability (0000). According to these results, the profit frontier moves up. As a consequence, the larger a bank is, the more possibilities it has as to maximize its profits. Due to their size, large-sized banks can diversify their investments and easily take more risks than small-sized ones. This enables them to generate substantial profits compared to smaller banks. However, the risk management of these large banks requires relatively higher costs than the small banks need.

Inflation, like the size, plays a positive role. It affects the banking

	country	EC_SFA_TV	EC_SFA_TI	EP_SFA_TV	EP_SFA_TI	DEA_CRS	DEA_VRS
mean	Global	95.50%	96.00%	97.30%	96.00%	65.50%	62.50%
mean	IB	94.50%	95.00%	97.40%	95.00%	65.20%	61.70%
mean	CB	96.50%	96.80%	97.10%	96.80%	64.90%	63.20%

Table 3: Average efficiency scores of Islamic and conventional banks.

	Country	EC_SFA_TV		EC_SFA_TI		EP_SFA_TV		EP_SFA_TI		DEA_CRS		DEA_VRS	
		IB	CB	IB	CB	IB	CB	IB	CB	IB	CB	IB	CB
mean	Arabie Saoudite	97.2%	95.70%	97.4%	96.10%	98.6%	97.20%	97.4%	96.10%	66.4%	66.10%	59.3%	59.40%
mean	Bahrain	92.60%	97.60%	93.00%	97.80%	99.20%	99.30%	93.00%	97.80%	71.10%	64.50%	60.20%	63.20%
mean	Egypte	97.10%	94.40%	92.60%	95.00%	98.30%	99.00%	92.80%	95.00%	62.50%	63.30%	60.70%	60.70%
mean	JORDAN	97.70%	97.70%	98.00%	97.90%	99.70%	99.70%	98.00%	97.90%	63.00%	63.80%	58.90%	72.70%
mean	Kuwait	97.40%	96.60%	95.90%	96.70%	97.50%	99.40%	95.90%	96.90%	68.50%	67.80%	67.20%	72.70%
mean	Malais ie	96.80%	96.40%	97.30%	96.80%	98.00%	98.10%	97.30%	96.80%	61.00%	63.00%	60.60%	65.80%
mean	Sudan	96.80%	97.90%	97.20%	98.20%	99.30%	99.90%	97.20%	98.20%	65.20%	69.20%	57.10%	69.10%
mean	Unite d Arab Emirate	97.60%	96.90%	97.90%	97.20%	96.60%	97.40%	97.90%	97.20%	61.30%	66.40%	64.70%	60.60%
mean	Yemen	68.40%	90.60%	70.80%	91.40%	83.90%	70.70%	70.80%	91.40%	63.90%	63.90%	63.70%	67.60%
mean	Qatar	97.60%	97.60%	98.00%	97.80%	96.40%	97.20%	98.00%	97.80%	70.30%	63.90%	60.30%	62.00%
mean	Tunisie	98.50%	98.30%	98.70%	98.50%	99.30%	99.60%	98.70%	98.50%	67.10%	67.60%	63.70%	57.00%
mean	Iraq	99.00%	91.30%	99.00%	90.70%	51.60%	36.90%	99.00%	90.70%	80.40%	51.00%	57.60%	57.00%
mean	SYRIA	96.30%	96.00%	96.90%	96.30%	95.00%	92.20%	96.90%	96.30%	71.30%	62.80%	69.30%	67.20%
mean	LEBA NON	97.90%	96.40%	98.10%	96.70%	99.50%	98.90%	98.10%	96.70%	62.70%	63.30%	61.70%	62.00%

Table 4: Average efficiency scores per country.

sector through its impact on the bank credit market. Indeed, an increase in the inflation rate results in a decrease in the real return rate. This will consequently affect the credit market and therefore the banking profitability because, with a high inflation, banks will give fewer credits.

The efficiency score using the DEA and SFA methods

Average efficiency scores of Islamic and conventional banks (Table 3): Regarding the DEA method, we will use both the model of constant returns to scale (CRS) of Charnes, Cooper and Rhodes [2] and the one of variable returns to scale (VRS) of Banker, Charnes and Cooper (BCC-1984). The choice of both models helps us calculate the technical efficiency to scale for each country and each Islamic and conventional bank.

The scores in the case of constant returns to scale are more important than they are in that of variable returns. In the case of constant returns, the scores reached, on average, 65.2% in the Islamic banks whereas they were 64.9% in the commercial banks, which means that Islamic banks are a bit more efficient than their conventional counterparts.

Furthermore, in the table above, the cost and profit efficiency scores in variable and invariable periods are presented using the SFA method.

It seems that the average value of the efficiency cost of conventional banks in variable and invariable time is slightly higher than that of Islamic banks. However, concerning the profit efficiency, we can see that Islamic banks, in variable time, have average efficiency scores a bit better than those registered by conventional banks, which is not the case in variable time where the efficiency scores of Islamic banks are lower than those of conventional banks.

Average efficiency scores per country: The table below summarizes the average efficiency scores per country of all the Islamic and conventional banks in the sample according to the basis of the DEA and SFA methods. Table 4 shows the detailed results of the average efficiency per country using the DEA and SFA methods. When reading

this table, it seems that the efficiency scores calculated with the DEA method are more important either in the case of constant returns to scale or in that of the variable ones.

According to the results, it appears that Bahrain, Egypt, Qatar are among the most important countries in which Islamic banks are the most efficient.

At the same time, using the SFA method, we presented the cost and profit efficiency scores both in variable and invariable times. Most of the average values of cost efficiency in both periods are somewhat larger for the Islamic banks than for the conventional ones. The efficiency scores of Islamic banks in variable time are between 91.6% and 99.6%, however, for commercial banks, they vary between 90.6% and 98.3%. The average cost efficiency values for Islamic banks in invariable time vary between 70.8% and 99.7%, whereas for commercial banks, they are between 90.7% and 98.2%. Saudi Arabia, Qatar, Jordan, Malaysia, the Russian Federation, the United Kingdom, the Cayman Islands and Singapore are among the countries where the cost efficiency scores are the most considerable.

Average efficiency scores of Islamic banks: Table 5 summarizes the average efficiency scores of all the Islamic banks of our sample using both the DEA and SFA methods. In the table above, and using the DEA method, we applied both the constant returns to scale model (CRS) of Charnes, and the variable one (VRS) so as to measure the efficiency of the Islamic banks. It appears that the efficiency scores of Islamic banks at both the constant and variable level very close to one another. The efficiency score values vary between 53.1% and 88.3% at the constant level and between 51% and 88% at the variable one.

The efficiency score values of the Islamic banks obtained using the SFA method are higher and more significant than those obtained through the DEA method.

According to the SFA method, most of the cost efficiency scores in

IB	bank name	EC_SFA_TV	EC_SFA_TI	EP_SFA_TV	EP_SFA_TI	DEA_CRS	DEA_VRS
mean	Al Rajhi Banking\$Invent	95.7%	96.0%	97.0%	96.0%	67.9%	55.5%
mean	Islamic Development Bank	97.7%	98.1%	99.7%	98.1%	70.8%	52.0%
mean	Alinma Bank	98.1%	98.3%	99.7%	98.3%	68.0%	67.0%
mean	Bank AlBilad	97.2%	97.4%	98.1%	97.4%	58.9%	62.5%
mean	Al baraka banking groupe B.S	96.0%	96.4%	99.3%	96.4%	75.9%	58.6%
mean	Kwait Finance House	96.4%	96.9%	99.3%	96.9%	66.4%	57.5%
mean	Investors Bank Bank BSC	95.1%	94.7%	96.7%	94.7%	71.8%	67.7%
mean	Shamil bank of bahrain B.S	97.1%	97.4%	98.2%	97.4%	69.7%	74.7%
mean	Bahrain Islamic Bank B.S.C	97.7%	98.0%	99.6%	98.0%	71.4%	62.6%
mean	Gulf finance house BSC	97.6%	97.9%	99.1%	97.9%	69.3%	52.1%
mean	Unicorn Investment Bank BSC	97.4%	97.7%	99.8%	97.7%	77.1%	68.0%
mean	Al Amin Bank	97.6%	97.9%	98.8%	97.9%	78.7%	64.9%
mean	Arcapita Bank B.S.C.	97.9%	98.1%	99.3%	98.1%	75.0%	71.0%
mean	Al-Salam Bank-Bahrain B.S.C.	97.8%	98.1%	99.5%	98.1%	64.0%	53.3%
mean	ABC Islamic Bank (E.C.)	98.3%	98.6%	99.2%	98.6%	69.1%	57.6%
mean	Khaleeji Commercial Bank	98.4%	98.5%	99.8%	98.5%	75.5%	56.0%
mean	Venture Capital Bank BSC	95.5%	96.2%	99.3%	96.2%	76.0%	53.7%
mean	Capivest	61.4%	62.9%	99.7%	62.9%	55.2%	53.6%
mean	Global Banking Corporation	64.8%	66.3%	99.9%	66.3%	71.2%	51.8%
mean	Faisal Islamic Bank of Egypte	96.5%	97.0%	98.3%	97.0%	53.4%	58.3%
mean	Albaraka bank egypte SAE	97.2%	97.7%	97.7%	97.7%	61.2%	63.9%
mean	MISR Iran developement bank	96.3%	96.9%	99.7%	96.9%	55.2%	65.3%
mean	Arkapita bank BSC	99.1%	99.3%	99.8%	99.3%	63.8%	70.7%
mean	Egyptian Saudi Finance Bank	96.3%	96.5%	99.8%	96.5%	55.1%	61.0%
mean	Bank Milli Iran	95.1%	95.7%	99.7%	95.7%	61.3%	72.3%
mean	Bank Mellat	91.8%	93.0%	98.8%	93.0%	71.9%	69.1%
mean	Bank Sadirat Iran	94.3%	95.0%	99.6%	95.0%	64.1%	55.6%
mean	Bank tejarat	86.8%	88.9%	98.1%	88.9%	69.9%	62.9%
mean	Bank Sepah	75.5%	79.4%	98.7%	79.4%	70.1%	64.8%
mean	Parsian Bank	93.4%	94.2%	95.8%	94.2%	68.7%	67.3%
mean	Bank keshavarzi-Agriculture	86.9%	88.2%	98.1%	88.2%	57.1%	53.6%
mean	Bank Refah	91.5%	93.0%	98.6%	93.0%	60.8%	66.9%
mean	Bank of industry and Mine	96.6%	97.1%	97.8%	97.1%	64.2%	55.0%
mean	Saman Bank	97.2%	97.6%	97.7%	97.6%	45.4%	51.4%
mean	Export Development Bank Of	97.4%	97.7%	98.9%	97.7%	62.5%	57.1%
mean	Agricultural Bank of Iran-B	93.0%	93.5%	98.1%	93.5%	54.4%	52.2%
mean	Jordan islamic bank	96.0%	96.6%	99.8%	96.6%	57.6%	48.9%
mean	Islamic international arab	98.4%	98.6%	99.6%	98.6%	71.0%	61.6%
mean	First investment company k	97.4%	97.8%	99.8%	97.8%	60.0%	69.8%
mean	Jordan dubai islamic bank	98.9%	99.0%	99.7%	99.0%	63.4%	55.4%
mean	Kuwait Finance House	96.2%	96.6%	99.6%	96.6%	59.8%	54.7%
mean	International investor company	98.8%	98.9%	99.6%	98.9%	60.3%	67.5%
mean	A'Ayan Leasing & Investme	97.3%	97.6%	99.6%	97.6%	88.3%	88.0%
mean	RHB islamic bank berhard	97.5%	97.8%	97.5%	97.8%	56.3%	58.2%
mean	Bank Muamalat Malaysia Berh	97.0%	97.4%	98.2%	97.4%	62.5%	65.5%
mean	Maybank Islamic Berhad	91.6%	93.6%	94.3%	93.6%	75.0%	63.1%
mean	Bank Islam Malaysia Berhad	97.1%	97.5%	98.6%	97.5%	57.4%	59.5%
mean	CIMB Islamic Bank Berha	99.0%	99.0%	99.2%	99.0%	53.8%	58.1%
mean	Amlslamic Bank Berhad	98.0%	98.1%	98.8%	98.1%	63.9%	66.2%
mean	Kuwait Finance House (Mala	97.2%	97.5%	99.6%	97.5%	57.7%	53.7%
mean	Tadamon Islamic Bank	96.7%	97.2%	99.5%	97.2%	58.4%	50.6%
mean	Islamic Co-operative devel	98.3%	98.6%	99.5%	98.6%	68.1%	51.0%
mean	Al baraka bank sudan	98.1%	98.4%	99.9%	98.4%	60.8%	60.5%
mean	Sudanese Islamic Bank (mil sdd)	98.3%	98.6%	99.6%	98.6%	64.1%	63.9%
mean	Al shamal islamic bank	93.0%	93.7%	97.7%	93.7%	72.6%	55.9%
mean	National Bank of Sudan	87.2%	88.0%	90.9%	88.0%	66.2%	56.7%
mean	Dubai Islamic Bank PLC	97.4%	97.6%	97.3%	97.6%	53.1%	57.3%
mean	Abu dhabi Islamic Bank P	97.9%	98.2%	96.7%	98.2%	60.0%	54.0%
mean	Emarate islamic banck pjsc	96.8%	97.2%	95.3%	97.2%	66.1%	71.1%
mean	Sharjah islamic bank	97.9%	98.2%	97.5%	98.2%	59.2%	67.7%

mean	Tamweel pjsc	97.9%	98.2%	96.2%	98.2%	68.4%	73.2%
mean	Shamil bank of yemen \$ bah	91.7%	92.4%	83.0%	92.4%	63.0%	61.8%
mean	Islamic bank of yemen for	92.9%	93.7%	81.4%	93.7%	58.0%	64.3%
mean	Tadhamon International Islamic Bank	26.9%	34.1%	86.4%	34.1%	69.9%	62.1%
mean	Saba Islamic bank	62.0%	62.9%	85.0%	62.9%	64.6%	66.7%
mean	Qatar islamic bank SAQ	97.1%	97.5%	96.3%	97.5%	68.3%	55.3%
mean	Qatar international islamic bank	97.7%	98.0%	96.7%	98.0%	67.4%	68.9%
mean	First Finance Company (Q.S.C.)	98.2%	98.5%	96.4%	98.5%	75.2%	56.8%
mean	Meezan bank limited	96.9%	97.0%	98.8%	97.0%	85.2%	66.0%
mean	Albaraka islamic bank BSC	99.2%	99.2%	98.3%	99.2%	62.6%	54.3%
mean	First habib modaraba	96.5%	96.3%	98.8%	96.3%	65.9%	66.3%
mean	Dubai Islamic Bank Pakistan Limited	95.8%	95.8%	99.1%	95.8%	56.6%	52.0%
mean	Dawood Islamic Bank	98.2%	98.2%	99.2%	98.2%	55.6%	59.8%
mean	Standard Chartered Modaraba	97.4%	97.7%	98.2%	97.7%	68.4%	54.2%
mean	First National Bank Modaraba	95.4%	95.6%	98.7%	95.6%	66.6%	59.4%
mean	shahjalal islami bank ltd	98.0%	98.2%	97.6%	98.2%	70.6%	63.6%
mean	ICB islamic bank limited	97.0%	97.3%	95.2%	97.3%	63.6%	63.9%
mean	Albaraka Tunisie	98.7%	98.9%	99.3%	98.9%	83.2%	86.0%
mean	Bank Ettamouil Saoudi Tounsi	98.4%	98.6%	99.4%	98.6%	65.1%	64.8%
mean	Türkiye Finans Katilim Bankasi AS	98.1%	98.4%	99.8%	98.4%	63.7%	64.1%
mean	Kuwait Turkish Participation Bank	56.0%	59.8%	99.8%	59.8%	84.4%	77.4%
mean	Islamic Bank of Brunei bhd	98.0%	98.2%	99.6%	98.2%	58.6%	57.2%
mean	Islamic Development Bank of Bru	98.6%	98.8%	99.6%	98.8%	60.5%	59.9%
mean	Bank Syariah Muamalat Indonesia	98.6%	98.6%	99.9%	98.6%	74.4%	77.5%
mean	Bank Syariah Mandiri	98.4%	98.4%	99.9%	98.4%	57.9%	51.7%
mean	Badr-Forte Bank	98.6%	98.4%	99.6%	98.4%	69.7%	57.2%
mean	Kurdistan International Bank	99.0%	99.0%	51.6%	99.0%	80.4%	57.6%
mean	Bank of London and The Mid	99.5%	99.6%	98.4%	99.6%	57.5%	61.9%
mean	Islamic Bank of Britain Plc	98.2%	98.5%	100.0%	98.5%	62.5%	50.1%
mean	European Islamic Investment Ban	99.2%	99.3%	99.8%	99.3%	55.6%	60.4%
mean	Al-Tawfeek Company for Investme	99.5%	99.5%	99.9%	99.5%	55.5%	59.1%
mean	Islamic Bank of Asia (The)	99.6%	99.7%	99.9%	99.7%	56.2%	62.8%
mean	Arab Islamic Bank	99.2%	99.3%	99.8%	99.3%	71.8%	65.4%
mean	Arab Gambian Islamic Bank	99.6%	99.6%	99.8%	99.6%	59.0%	66.7%
mean	Syria International Islamic Bank	98.7%	98.6%	90.1%	98.6%	79.2%	74.6%
mean	Cham Islamic Bank SA	93.8%	95.2%	99.9%	95.2%	63.5%	64.0%
mean	Islamic Bank of Thailand	96.6%	96.9%	96.8%	96.9%	60.1%	65.1%
mean	Arab Finance House Holding SAL	97.9%	98.1%	99.5%	98.1%	62.7%	61.7%
mean	Banque Al Wava Mauritanienne Islamique-	97.7%	97.7%	83.8%	97.7%	60.3%	60.7%

Table 5: The average efficiency scores of all the Islamic banks.

	CB	EC_SFA_TV	EC_SFA_TI	EP_SFA_TV	EP_SFA_TI	DEA_CRS	DEA_VRS
mean	National Commercial Bank	95.9%	96.0%	97.2%	96.0%	67.5%	66.1%
mean	Riyad Bank	94.4%	94.9%	96.7%	94.9%	73.3%	64.7%
mean	Saudi British Bank (The)	94.8%	95.2%	96.5%	95.2%	68.8%	65.3%
mean	Banque Saudi Fransi	95.5%	95.8%	97.0%	95.8%	61.5%	51.4%
mean	Arab National Bank	96.0%	96.3%	97.3%	96.3%	69.4%	57.0%
mean	Saudi Hollandi Bank	96.6%	96.9%	97.4%	96.9%	65.0%	58.2%
mean	Saudi Investment Bank (The)	96.5%	96.8%	97.5%	96.8%	63.9%	52.9%
mean	Bank Al-Jazira	97.0%	97.3%	98.3%	97.3%	59.4%	60.0%
mean	Samba Financial Group	95.0%	95.3%	97.0%	95.3%	65.9%	58.6%
mean	Arab Banking Corporation BSC	96.6%	96.9%	99.5%	96.9%	53.0%	57.3%
mean	Ahli United Bank BSC	96.8%	97.1%	99.4%	97.1%	62.0%	66.9%
mean	BMB Investment Bank-Bahrain	98.6%	98.8%	99.4%	98.8%	56.5%	64.1%
mean	Gulf International Bank BSC	96.0%	96.5%	99.0%	96.5%	74.5%	68.4%
mean	BBK B.S.C.	97.5%	97.8%	99.8%	97.8%	62.5%	71.4%
mean	Investcorp Bank BSC	98.5%	98.7%	99.5%	98.7%	65.9%	62.7%
mean	National Bank of Bahrain	97.3%	97.5%	99.7%	97.5%	56.0%	53.6%
mean	United Gulf Bank (BSC) EC	98.2%	98.4%	99.3%	98.4%	56.9%	58.9%
mean	BMB Investment Bank-Bahrain	98.6%	98.7%	99.3%	98.7%	64.4%	59.3%

mean	Awal Bank	97.0%	96.9%	97.4%	96.9%	68.7%	61.5%
mean	International Banking copt	97.1%	97.4%	99.5%	97.4%	83.8%	82.0%
mean	BMI Bank BSC	98.9%	99.0%	99.9%	99.0%	69.7%	52.0%
mean	National Bank of Egypt	91.8%	92.6%	99.4%	92.6%	68.2%	51.2%
mean	Banque Misr SAE	81.1%	83.2%	98.9%	83.2%	66.9%	60.0%
mean	National Societe Generale B	94.8%	95.4%	99.1%	95.4%	61.3%	57.5%
mean	Arab African Internatio	98.8%	99.0%	99.9%	99.0%	59.5%	58.9%
mean	Banque du Caire SAE	99.1%	99.2%	99.5%	99.2%	61.8%	57.1%
mean	HSBC Bank Egypt S A E	95.4%	95.4%	99.4%	95.4%	67.7%	66.8%
mean	Suez Canal Bank	95.8%	96.2%	99.5%	96.2%	67.0%	61.7%
mean	Commercial International Ba	92.6%	92.7%	99.1%	92.7%	56.3%	63.7%
mean	Bank of Alexandria	96.9%	97.2%	99.4%	97.2%	63.2%	58.4%
mean	Arab International Bank	96.8%	97.1%	99.8%	97.1%	70.2%	82.2%
mean	Barclays Bank - Egypt S.A.E.	98.1%	98.3%	99.4%	98.3%	65.5%	62.3%
mean	Al Watany Bank of Egypt	96.4%	96.8%	98.4%	96.8%	62.9%	53.3%
mean	National Bank for Developm	90.1%	92.0%	95.3%	92.0%	52.3%	55.7%
mean	Arab Bank Group	96.5%	96.7%	99.3%	96.7%	65.9%	51.2%
mean	Arab Bank PLC	96.1%	96.4%	99.5%	96.4%	64.4%	65.5%
mean	Jordan Ahli Bank Plc	97.4%	97.7%	99.8%	97.7%	74.6%	76.9%
mean	Housing Bank for Trade & F	97.8%	98.0%	99.6%	98.0%	68.4%	65.9%
mean	Bank of Jordan Plc	97.5%	97.7%	99.8%	97.7%	70.0%	52.7%
mean	Cairo Amman Bank	98.7%	98.9%	99.7%	98.9%	60.4%	50.5%
mean	Union Bank	97.4%	97.6%	99.8%	97.6%	62.5%	58.5%
mean	Capital Bank of Jordan	98.5%	98.6%	99.7%	98.6%	61.6%	65.6%
mean	Arab Jordan Investment Bank	97.8%	98.0%	99.7%	98.0%	53.7%	52.2%
mean	Invest Bank	98.2%	98.5%	99.8%	98.5%	53.0%	60.7%
mean	Jordan Commercial Bank	97.7%	97.9%	99.8%	97.9%	61.6%	61.9%
mean	Arab Banking Corporation (J	98.3%	98.5%	99.6%	98.5%	68.8%	62.7%
mean	National Bank of Kuwait S.A.	97.8%	98.0%	99.8%	98.0%	58.0%	65.7%
mean	Kuwait Projects Company Ho	98.3%	98.3%	99.7%	98.3%	70.7%	71.0%
mean	Gulf Bank KSC (The)	98.1%	98.3%	99.8%	98.3%	65.3%	70.9%
mean	Ahli United Bank KSC	96.6%	96.9%	99.8%	96.9%	71.7%	82.9%
mean	Gulf Investment Corporation	92.3%	93.1%	97.8%	93.1%	73.3%	73.0%
mean	Malayan Banking Berhad	95.2%	95.7%	98.1%	95.7%	64.4%	66.4%
mean	Public Bank Berhad	92.8%	93.4%	98.5%	93.4%	69.6%	71.8%
mean	CIMB Bank Berhad	95.6%	96.1%	98.2%	96.1%	60.5%	67.7%
mean	RHB Bank Berhad	95.5%	95.9%	98.4%	95.9%	80.4%	82.6%
mean	AmBank (M) Berhad	96.6%	97.0%	99.1%	97.0%	67.1%	63.5%
mean	Hong Leong Bank Berhad	96.3%	96.6%	98.0%	96.6%	53.9%	56.7%
mean	HSBC Bank Malaysia Berhad	96.8%	97.1%	97.9%	97.1%	71.6%	72.9%
mean	OCBC Bank (Malaysia) Berhad	96.8%	97.1%	97.8%	97.1%	54.2%	60.5%
mean	United Overseas Bank (Malay	96.9%	97.2%	97.7%	97.2%	56.1%	57.3%
mean	Deutsche Bank (Malaysia) Bhd.	97.8%	98.0%	97.6%	98.0%	59.2%	58.9%
mean	Bank of Tokyo-Mitsubishi UFJ	98.1%	98.3%	98.2%	98.3%	60.1%	63.6%
mean	Royal Bank of Scotland Berh	98.4%	98.6%	98.1%	98.6%	59.0%	67.6%
mean	Omdurman National Bank	98.0%	98.2%	99.8%	98.2%	65.7%	65.8%
mean	Blue Nile Mashreq Bank Ltd	98.8%	98.9%	100.0%	98.9%	61.9%	54.9%
mean	Saudi Sudanese Bank	99.0%	99.2%	100.0%	99.2%	85.4%	86.2%
mean	Savings & Social Development Bank	98.7%	98.9%	100.0%	98.9%	67.6%	69.5%
mean	Animal Resources Bank	98.9%	99.2%	100.0%	99.2%	68.7%	76.4%
mean	Export Development Bank	98.6%	98.9%	100.0%	98.9%	65.6%	66.0%
mean	Sudanese French Bank (The	98.6%	98.8%	99.8%	98.8%	68.6%	60.2%
mean	Farmers Commercial Bank	98.6%	98.7%	99.5%	98.7%	73.5%	70.9%
mean	Elnilein Bank	91.9%	92.7%	99.9%	92.7%	65.7%	71.6%
mean	National Bank of Abu Dhabi	96.1%	96.4%	97.9%	96.4%	68.7%	71.6%
mean	Emirates Bank International PJSC	96.2%	96.4%	96.3%	96.4%	71.1%	63.4%
mean	Abu Dhabi Commercial Bank	96.3%	96.7%	96.8%	96.7%	71.6%	65.4%
mean	First Gulf Bank	96.9%	97.2%	97.6%	97.2%	62.7%	54.6%
mean	Mashreqbank	96.8%	97.1%	97.4%	97.1%	55.7%	53.6%
mean	National Bank of Dubai Public	95.9%	96.2%	97.0%	96.2%	58.9%	49.6%
mean	Union National Bank	96.8%	97.1%	97.4%	97.1%	71.7%	59.6%

mean	Commercial Bank of Dubai P.S.C.	97.3%	97.6%	96.9%	97.6%	71.8%	69.8%
mean	National Bank of Ras Al-Khaimah (P.S.C.)	98.2%	98.4%	98.3%	98.4%	57.7%	45.5%
mean	Bank of Sharjah	98.1%	98.3%	97.5%	98.3%	78.6%	69.1%
mean	Arab Bank for Investment &	97.7%	98.0%	98.1%	98.0%	61.9%	64.8%
mean	International Bank of Yemen YSC	90.9%	91.8%	72.1%	91.8%	63.8%	70.5%
mean	National Bank of Yemen	90.5%	91.2%	55.9%	91.2%	66.2%	69.6%
mean	Yemen Kuwait Bank for Trade and	90.3%	91.3%	84.2%	91.3%	61.6%	62.8%
mean	Qatar National Bank	96.9%	97.0%	97.8%	97.0%	66.9%	57.4%
mean	Masraf Al Rayan (Q.S.C.)	99.7%	99.8%	97.0%	99.8%	74.0%	75.2%
mean	Commercial Bank of Qatar (The) QSC	96.6%	96.9%	97.2%	96.9%	66.9%	72.7%
mean	Doha Bank	97.4%	97.6%	97.2%	97.6%	74.9%	75.5%
mean	International Bank of Qatar Q.S.C.	97.6%	97.9%	97.5%	97.9%	61.9%	60.9%
mean	Ahli Bank QSC	97.8%	98.0%	97.1%	98.0%	55.0%	49.5%
mean	Banque Nationale Agricole	98.4%	98.6%	99.9%	98.6%	67.7%	60.5%
mean	Union Bancaire pour le Commerce et l'Industrie	98.4%	98.6%	99.7%	98.6%	71.6%	54.5%
mean	North Africa International Bank	98.4%	98.5%	99.5%	98.5%	65.5%	48.5%
mean	Tunisian - Kuwaiti Development Bank-	98.0%	98.3%	99.2%	98.3%	65.5%	64.6%
mean	Dar Es Salaam Investment Bank	91.3%	90.7%	36.9%	90.7%	51.0%	57.4%
mean	International Bank for Trade and	96.8%	97.0%	94.6%	97.0%	68.9%	66.2%
mean	Arab Bank Syria SA	96.5%	96.7%	95.5%	96.7%	50.2%	58.8%
mean	Banque Bemo Saudi Fransi SA	94.0%	94.7%	88.0%	94.7%	63.1%	63.5%
mean	Bank Audi Syria	96.6%	96.8%	90.5%	96.8%	69.2%	80.1%
mean	Banque de l'Industrie et du Travail	94.3%	94.8%	99.6%	94.8%	62.0%	53.8%
mean	Syrian Lebanese Commercial Bank SAL	94.9%	95.3%	99.1%	95.3%	61.3%	68.3%
mean	Bank Audi SAL -	96.5%	96.8%	99.4%	96.8%	62.4%	65.5%
mean	BLOM Bank s.a.l.	96.1%	96.4%	98.5%	96.4%	65.3%	65.5%
mean	Byblos Bank S.A.L	96.7%	97.1%	98.5%	97.1%	57.6%	67.0%
mean	Bankmed, sal	97.1%	97.5%	98.9%	97.5%	84.9%	75.5%
mean	Fransabank sal	96.7%	97.0%	98.7%	97.0%	68.2%	56.6%
mean	Banque Libano-Francaise	97.7%	97.9%	98.9%	97.9%	54.9%	56.3%

Table 6: The average efficiency scores of all the conventional banks.

id	Year	EC_SFA_TV	EC_SFA_TI	EP_SFA_TV	EP_SFA_TI	DEA_CRS	DEA_VRS
mean	1999	97.0%	96.0%	97.2%	96.0%	62.8%	63.3%
mean	2000	96.8%	96.0%	97.2%	96.0%	63.0%	62.6%
mean	2001	96.6%	96.0%	97.2%	96.0%	66.1%	63.5%
mean	2002	96.3%	96.0%	97.2%	96.0%	61.9%	60.8%
mean	2003	96.1%	96.0%	97.3%	96.0%	65.6%	62.5%
mean	2004	95.8%	96.0%	97.3%	96.0%	64.3%	61.8%
mean	2005	95.5%	96.0%	97.3%	96.0%	65.4%	63.0%
mean	2006	95.2%	96.0%	97.3%	96.0%	65.5%	61.5%
mean	2007	94.8%	96.0%	97.3%	96.0%	68.5%	61.4%
mean	2008	94.5%	96.0%	97.3%	96.0%	67.6%	63.1%
mean	2009	94.1%	96.0%	97.3%	96.0%	65.2%	61.8%
mean	2010	93.7%	96.0%	97.3%	96.0%	64.9%	64.4%

Table 7: Per year efficiency scores.

time variable are between 91.5% and 99.6%, whereas in invariable time, they vary between 92.4% and 99.7%, which means that inefficiency is, on average, between 8.5% and 0.4%, in variable time, and 7.6% and 0.3%, in invariable time.

The variable profit efficiency scores range from 81.4% to 99.9%, whereas in invariable time, they are between 88% and 99.7%.

Efficiency scores of conventional banks: Table 6, summarizes the average efficiency scores of all the conventional banks of our sample using both the DEA and SFA methods. Using the SFA method, we can see that most of the cost efficiency scores, in variable time, range from 81.1% to 99.7%, whereas in invariable time, they are between 83.2% and 99.8%.

According to the SFA method, the results indicate that most of the cost efficiency scores, in variable time, are between 81.1% and 99.7%, whereas, invariable time, they range from 83.2% to 99.8%.

It appears that the values of the efficiency scores of Islamic and conventional banks via the SFA method are very close to one another.

On the basis of the DEA method, the efficiency score values obtained via the constant returns to scale model (CRS) vary between 50.2% and 84.9%, however, through the variable returns to scale model, they range from 51.2% to 86.2%.

The results obtained using the DEA method show that Islamic banks are slightly more efficient than the conventional ones.

Per year efficiency scores:

➤ **The per year efficiency scores of Islamic and conventional banks**

The table below summarizes the per year average efficiency scores of all the conventional and Islamic banks of the sample using both the DEA and SFA methods (Table 7).

On observing the efficiency scores all over the analyzed period, we find that these scores, at the constant level, are very similar to those at the variable time. The efficiency score values vary between 61.9% and 68.5%, at the constant level, and between 60.8% and 64.4% at the variable one.

The per year banks' efficiency scores are more important according to the constants returns to scale model.

Under the SFA method, most of the cost efficiency scores in invariable time are almost the same with a value of 96%, however, in variable time, they are between 93.4% and 97%. The profit efficiency scores in variable time range from 97.2% to 97.2%, whereas, in invariable time, they are almost the same; 96% (Graph 1).

➤ **Comparison of the per year efficiency scores of Islamic and conventional banks (Table 8)**

By examining the average efficiency scores all over the analyzed period, we can see that, during the 1999/2006 period, banks registered significant efficiency levels exceeding 95%. However, from 2007 onward, efficiency declined, according to the results of the SFA method. This decrease in efficiency can be explained by the outbreak of the subprime crisis, in 2007, as well as by that of the euro zone.

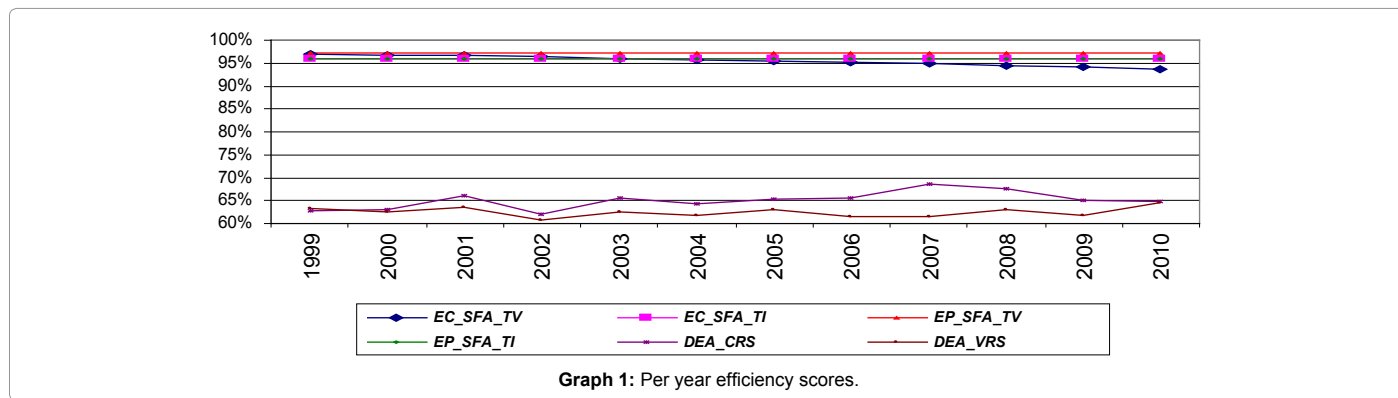
By analyzing the previous table, we can see that the per year efficiency scores of the Islamic and conventional banks are very close to one another during our research period; 1999-2010.

On the basis of the SFA method, the cost and profit efficiency scores, in variable time, during the 2007/2010 period, are stable for Islamic banks, however, for conventional banks, they fell sharply. This decline of the efficiency scores within conventional banks can be explained by the emergence of the current crises.

According to Erkki Liikanen's report [25], the 2007-2008 period presents the first phase of the "subprime crisis" that caused the collapse of the investment portfolios and generated a lack of confidence in the financial markets and consequently affected the functioning of the market. This explains the results generated in this study where the efficiency scores of conventional banks, according to both the SFA and DEA methods, showed a decrease in 2007 and 2008.

Similarly, according to Erkki Liikanen's [25] report, the early 2009 presented the third phase; it is about the "economic crisis". The crisis now hit the real economy and the public finance, the thing which explains the slight decline of the Islamic banks' efficiency scores. The Islamic banks are not attacked by this crisis because they are far from the development of the mortgages which are forbidden by the Islamic law and the Sharia. For this reason, the subprime crisis did not affect the Islamic financial institutions. Nevertheless, its influence on Islamic banks is not excluded disproportionately because of its effects on the real economy and the financial markets in general. Its effects are due to an infection of the traditional financial institutions and the rest of the other economic sectors.

Our results show that the efficiency scores of the Islamic banks dropped slightly in 2010 according to both the SFA and DEA methods.



Graph 1: Per year efficiency scores.

Year	EC_SFA_TV		EC_SFA_TI		EP_SFA_TV		EP_SFA_TI		DEA_CRS		DEA_VRS	
	IB	CB	IB	CB	IB	CB	IB	CB	IB	CB	IB	CB
1999	96.0%	97.9%	95.0%	96.80%	97.4%	97.1%	95.0%	96.8%	70.3%	75.0%	61.9%	64.6%
2000	95.8%	97.7%	95.0%	96.8%	97.4%	97.1%	95.0%	96.8%	73.8%	72.2%	64.9%	60.6%
2001	95.6%	97.5%	95.0%	96.8%	97.4%	97.1%	95.0%	96.8%	75.8%	76.4%	63.9%	63.2%
2002	95.3%	97.3%	95.0%	96.8%	97.4%	97.1%	95.0%	96.8%	70.8%	73.0%	60.1%	61.3%
2003	95.0%	97.0%	95.0%	96.8%	97.4%	97.1%	95.0%	96.8%	74.6%	76.6%	59.1%	65.6%
2004	94.7%	96.7%	95.0%	96.8%	97.4%	97.1%	95.0%	96.8%	74.6%	74.1%	62.9%	60.8%
2005	94.4%	96.4%	95.0%	96.8%	97.4%	97.1%	95.0%	96.8%	79.1%	72.1%	65.0%	61.3%
2006	94.1%	96.1%	95.0%	96.8%	97.4%	96.2%	95.0%	96.8%	75.8%	65.2%	58.7%	63.9%
2007	93.9%	95.8%	95.0%	96.8%	97.5%	95.3%	95.0%	96.8%	75.0%	67.1%	59.4%	63.2%
2008	93.7%	90.5%	95.0%	96.8%	97.5%	92.2%	95.0%	96.8%	75.0%	65.6%	59.2%	60.5%
2009	93.6%	80.1%	95.0%	96.8%	97.5%	89.1%	95.0%	96.8%	69.4%	60.9%	61.7%	59.3%
2010	93.6%	75.7%	95.0%	96.8%	97.5%	87.2%	95.0%	96.8%	69.4%	56.5%	64.2%	59.6%

Table 8: Per year efficiency cores of Islamic and conventional banks.

This can be explained by the fact that 2010 is the year where the fourth phase called “sovereign debt crisis” exists. Given the current institutional framework of the European Union, the systemic links between the banks and the sovereign debt represent considerable challenges. The Greek crisis spread in various countries of the euro area and became a major worldwide concern. The crisis affected the global markets of the East and West such as the Japanese stock market and other markets in Europe and in the United States as well as in many countries around the world. The Gulf countries had not been immune to these effects even though they had no clear direct relationship with the crisis.

It can be concluded that Islamic banks had been only slightly and indirectly affected by the European crisis.

Summary and Conclusion

This study aims at defining the efficiency of the Islamic and conventional banks. For this reason, we suggest evaluating the efficiency of a 209-bank sample over the 1999/2010 period.

The used estimates are the stochastic frontier analysis (SFA) and the DEA method. The empirical analyzes conducted in this study show significant results. First, according to both the SFA and DEA methods, the average efficiency scores of Islamic banks is close to that of conventional banks

The results obtained through the DEA method suggest that the average efficiency scores of Islamic banks with constant returns to scale reached 65.2% and with variable returns to scale 61.7%, whereas for conventional banks, the scores reached 64.9% for the constant returns to scale and 63.2% for the variable ones. Therefore, according to the SFA method, it seems that the average value of the conventional banks’ efficiency is slightly higher than that of the Islamic banks.

Our empirical results also show that the average efficiency per country is slightly higher for Islamic banks than for their conventional counterparts, still according to the DEA method. The results also show that Bahrain, Egypt, Qatar and Turkey are among the countries where Islamic banks are the most efficient.

Still on the basis of the SFA method, the profit cost efficiencies scores in variable and in invariable time are very similar but with a slight increase within Islamic banks. Saudi Arabia, Qatar, Jordan, Malaysia, the Russian Federation, the United Kingdom, the Cayman Islands and Singapore are among the countries where the cost efficiency scores are the highest. As for the results of the profit efficiency scores, Bahrain, Jordan, Cayman Islands and Singapore are among the countries where Islamic banks are the most efficient.

By analyzing per year efficiency scores, we can say that Islamic banks have been affected by the European crisis only slightly and indirectly.

According to the SFA method, the cost and profit efficiency scores, in varying times during the 2007/2010 period, are stable for the Islamic banks, however for the conventional banks, they declined. This fall can be explained by the outbreak of the current crises.

The efficiency scores of conventional banks, according to both the SFA and DEA methods, declined in 2007 and 2008. This can be explained by the fact that the 2007/2008 period is the first phase of the “subprime crisis” that caused the collapse of the investment portfolios and created a an atmosphere of mistrust in the financial markets and, therefore, affected the functioning of the market.

We found out that in 2009, the efficiency scores of Islamic banks declined a bit. This year is the third phase where we talk about an “economic crisis” which is now affecting the real economy and the public finance. The Islamic banks are not attacked by this crisis as they don’t use mortgages, which are forbidden by the Islamic law and by the Sharia.

Furthermore, the Greek crisis spread to more countries in the euro zone and became a worldwide major concern. It affected the markets in the East and in the West, such as the Japanese stock market and other exchange markets in Europe and in the United States as well as in many countries around the world. The Gulf countries were not immune to these effects even though they have no apparent direct links with the crisis.

Therefore, we can say that the Islamic banks are but slightly and indirectly affected by the European crisis.

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