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Determinants of bank Performance: Comparative Study Between Conventional and Islamic Banking in Bahrain

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Abstract In this study, Data Envelopment Analysis (DEA) is used to examine the determinants of banking performance in Bahrain between 2005 and 2009. This performance is analyzed through a comparative study of 12 banks (six conventional and six Islamic banks). A diversity of internal and external banking characteristics were used to forecast this performance. The main of them are the return on assets (ROA), return on equity (ROE), and efficiency (EFF). Our determinant study of bank performance confirms previous investigations. The increase in size of Islamic banks and the rapid growth in the customers' deposits are the important factors of performance. Moreover, our results indicate that the variables related to the government intervention have a negative impact on the banking performance in the conventional funding model.

Keywords Conventional banks · Data envelopment analysis (DEA) · Efficiency · Islamic banks · Performance

Introduction

Banks are considered the major drainage channels of savings into the productive system. In fact, they allow optimal allocation of available resources between all the productive sectors (Ana and Jean, 2000). Moreover, they benefit from a crucial role in its system by operating in a highly competitive environment. Therefore, in the long-term durability is largely determined by their degree of efficiency. It should be noted that the efficiency of a financial system, in which the banking system dom'inates the productive sector, necessarily involves the efficiency of banking intermediation. Islamic banking cannot escape this finding. Indeed, in an unstable economic environment

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characterized by a multiplicity of financial crises, the attention is gradually moving to the techniques of Islamic finance. The financial system based on the principles of Shari'ah proves to be stable and resistant to the conventional system failures (Haseeb and Ramiz, 2010). Therefore, the Islamic banks should enhance their efficiency in order to take advantages of this opportunity. The concept of efficiency puts in interaction some inputs and outputs used per a production unit (Sandrine, 2007). Thus, it compares the units produced with an implemented factor of production. Therefore, a study that investigates the determinants of efficiency has a major interest. Our study shows crucial results which encourage us to advance major interpretations (Table 1).

About Islamic Finance

Islamic finance (IF) is making considerable changes since its appearance in the 1990s. Today, it includes banking, capital market, and insurance. These changes are supported by several facts. Indeed, the oil crisis plays a key role in triggering the financial transactions complying with the Shari'ah as a law of its regulations. During the seventies, oil producing countries had significant liquidity. They decided to invest this surplus in Islamic financial transactions (Olivier and Krassimira 2009). On its part, the financial crisis has significantly strengthened the development of this new funding. Furthermore, following the latest "Subprime" crisis, the worst since 1929, economists have emphasized a series of macro- and microeconomic paradigms which highlight the fragility of the conventional financial system (Kamaruddin et al. 2008). IF derives its legitimacy from its link with the Islamic laws and reflects some principles that can distinguish it from conventional finance (CF). We distinguish between two positive principles (payment of an alms "zakat" and its attachment to the real activity) and three negative principles (prohibition of Riba, condemnation of financing an illicit sector and prohibition of speculative "Gharar"). In its operations, IF is interesting in all its forms by a real actives. The expression of the prohibition of Riba is presented in its clearest form in Surat II (Albakara), from verse 275 to verse 281: "Those who consume interest cannot stand [on the Day of Resurrection] except as one stands who is being beaten by Satan into insanity. That is because they say, "Trade is [just] like interest." But Allah has permitted trade and forbidden interest. So whoever has received an admonition from his Lord and desists may have what is past, and his affair rests with ALLAH. But whoever returns to [dealing in interest or usury] - those are the companions of the Fire;

Table 1 Sample of Islamic and conventional banks

Islamic banks	Conventional banks
Bahrain Islamic Bank BSC	Ahli United Bank BSC
Investors Banks BSC	Arab Banking Corporation BSC
Gulf Finance House	BBK BSC
Khaleeja Commercial Bank	MBI Bank BSC
Elaf Bank	Gulf International Bank BSC
Venture Capital Bank BSC	National Bank of Bahrain

they will abide eternally therein (275). Allah destroys interest and gives increase for charities. And Allah does not like every sinning disbeliever (276)…. O you who have believed, fear Allah and give up what remains [due to you] of interest, if you should be believers (278). And if you do not, then be informed of a war [against you] from Allah and His Messenger. But if you repent, you may have your principal - [thus] you do no wrong, nor are you wronged (279)". The Riba is defined as all the surplus or usufruct. In the Islamic law, interest is synonymous with usury. All the sources of IF prohibit interest (Dalel and Bessem 2013). It is a sum paid as the party against borrowed funds or rescheduling of the payment of a debt. In other words, the borrower must repay after a period the amount of credit beside a surplus. Therefore, the period allowed for the payment of the credit is paid. In addition, the Islamic law explicitly condemns "Gharar" and "Maysir". Thus, the Qur'an stresses in Surat 5, verses 90 and 91 "O you who have believed, indeed, intoxicants, gambling, [sacrificing on] stone alters [to other than Allah], and divining arrows are but defilement from the work of Satan, so avoid it that you may be successful (90). Satan only wants to cause between you animosity and hatred through intoxicants and gambling and to avert you from the remembrance of Allah and from prayer. So will you not desist?" This postulate refers to any form of contract in which the right of the contracting parties is determined by an uncertain event. This principle characterizes gambling and sponsorship. Besides, it characterizes any form of sale that has a vague ambiguous, uncertain, or hidden element that is bound by event. This principle characterizes gambling and sponsorship. The Shari'ah also prohibits financing an illicit sector. It advocates that all Muslims cannot deal with goods considered illicit (haram). Besides these negative principles, Islam emphasizes other positive aspects. In this context, IF is interpreted as a participatory finance since it is based on the principle of sharing the profit and loss. In fact, the creditor shares loss or gain with the borrower. This principle is regarded as an alternative to the principle of any interest prohibition of interest. This means that the contract should not be defined because its clauses are in favor of only one of the two contracting parties. Thus, IF eliminates the power of either of the two parties. In addition, it requires that any transaction should be linked to a tangible asset. Indeed, IF is attached to the real economy, which favors the establishment of a more stable economy. The presence of a tangible asset in Islamic economics allows establishing a strong link between the two (real and financial) spheres. In addition, we are required to pay the "zakat" which means purification, growth and blessing. This obligation is a key pillar of Islam. It is paid to the needy. This principle is reflected in several Qur'anic verses, such as verse 103 of Surat "tlTaouba": "Take, [O, Muhammad], from their wealth a charity by which you purify them and cause them increase, and invoke [Allah's blessings] upon them. Indeed, your invocations are a reassurance for them. And Allah is Hearing and Knowing."

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Literature Review

Both qualitative and quantitative methods and techniques are used to measure banking performance. Several variables and statistical techniques have been incorporated by various studies, and results are drawn from them aiming at performance evaluation. Thus, banking performance can be analyzed in terms of profitability, growth, efficiency, liquidity, credit risk performance, and solvency (Hanif et al., 2012). Since the Great Depression of the 1940s, financial performance analysis of commercial banks has been of great interest to academic researches such as inter alia (Flamini et al., 2009, Al-Tamimi, 2010 and Aburime, 2005; Ongore, 2011 and Oloo, 2011…). In the case of Sub-Saharan Africa (SSA), Flamini et al. (2009) argue that commercial banks in the SSA are more profitable than in the rest of the world with an average return on assets (ROA) of 2 %. The high return in the region is explained by investment in risky ventures. Moreover, the high profitability in commercial banking business in the SSA is justified by the existence of huge gap between the demand for bank service and the supply thereof. This implies that in the SSA, the number of banks is small compared to the demand for the services. Accordingly, there is less competition as banks charge high interest rates. This is especially true for East Africa where the few government-owned banks take the lion's share of the market. Al-Tamimi (2010) and Aburime (2005) show that the performance of commercial banks can be affected by internal and external factors. These factors can be classified into bank-specific (internal) and macroeconomic variables. The individual bank characteristics which affect the bank's performance are

the principal internal factors. They are considered internal because they are influenced by the internal decisions of the management and the board. The external factors are sector-wide or countrywide factors which are beyond the control of the company and affect the profitability of banks. More recently, Ongore (2011) has shown that ownership identity can also influence the performance of firms. In order to investigate the impact of ownership identity, we include the concept of moderating variable. In this work, ownership identity is classified into foreign and domestic. The domestic vis-à-vis foreign classification is based on the nature of the existing major ownership identity in Kenya.

Some other studies have incorporated sector-specific factors that affect the overall banking sector in their study performance (Chantapong, 2005; Olweny and Shipho 2011). Nevertheless, (Ongore and Kusa 2013) incorporated key macroeconomic variables (inflation and GDP) in their analysis. They examined whether ownership identity influenced the relationship between banking performance and its determinants. It is evident that market power (MP) and efficiency structure (ES) have effects on banking performance as highlighted by Athanasoglou et al. (2005). The MP theory recommends that increased external market forces results into profit. According to Nzongang and Atemnkeng in Olweny and Shipho (2011), balanced portfolio theory also added an additional dimension into the study of banking performance.

There is a general consensus in literature that Islamic banks are better than conventional banks in terms of performance (Samad, 2004; Awan 2009; Rosly and AbuBakar, 2003; Safiullah, 2010). Using data for the years 1990–98 and numerous hypotheses and general perceptions about the practice of Islamic banking, Iqbal (2001) examined the conventional and Islamic banking performance. The techniques used to evaluate the performance of Islamic banks were both trend and ratio analyses. The performance of Islamic banks was compared with that of conventional banks that are the control group. It is obvious that Islamic banking is an interest-free banking; making it compulsory to take an active part in business profit and loss sharing. According to Bader et al. (2008), Islamic banks prefer to take less risk.

After studying the performance of 43 Islamic and 33 conventional banks for the period 1990–2005 in 21 countries using data envelopment analysis, Bader et al. (2008) argued that there is no difference between the overall efficiency of conventional and Islamic banks, regarding cost, revenue, and profit efficiency. Their study focused on the average and overtime efficiency of banks based on their size, age, and region using static and dynamic panels.

By applying CAMEL test, Jaffar and Manarvi (2011) analyzed and compared Islamic and conventional banks operating Pakistan from 2005 to 2009. They selected five banks and six conventional banks to measure and compare their performance. They documented that Islamic banks performed better in possessing adequate capital and better liquidity position while conventional banks pioneered in management quality and earning ability. For both streams of banking, Asset quality was almost the same. Usurious banks recorded slightly smaller loan loss ratio showing improved loan recovery policy, whereas UNCOL ratio analysis showed a nominal better performance for non usurious banks.

According to the Central Bank of Bahrain (CBB, 2012), Bahrain has quickly become a worldwide leader in Islamic finance. Islamic institutions are growing at a faster pace in Pakistan within a smaller period. Currently, there are seven

Islamic insurance companies (Takaful) and two Re-Takaful companies working in the kingdom. Additionally, Bahrain is at the forefront in the market of Islamic securities (sukuk), counting short-term government sukuk and leasing securities. In this case, we note that the Central Bank has played a leading role in the insertion of this innovative financial industry. In particular, the growth of Islamic banking has been notable in Bahrain with total assets in this segment jumping from US$1.9 billion in 2000 to US$25.4 billion by August 2012, a rise of over 12 times. The market share of Islamic banks correspondingly increased from 1.8 % of total banking assets, in 2000, to 13.3 %, in August 2012. Thus, it is pertinent to study comparative performance of well-established (conventional banking) and newly introduced (Islamic banking) to uncover the strengths and weaknesses of each stream.

Comparison of Some Bank Indicators

The Total Balance Sheet

The total balance sheet or the total asset is an indicator of the size of a financial institution. It includes all the activities bank obtained from the available sources. The comparison utility of this indicator is to know the activity volume both of institutions (Figs. 1 and 2).

We can mention here a greater volume of businesses from traditional banks compared to Islamic bank (IB). It is very logical, essentially, for two reasons. First, Islamic banking activity is relatively new compared to its traditional counterpart. Indeed, modern Islamic finance reached 30 years of existence in 2006. The second reason,

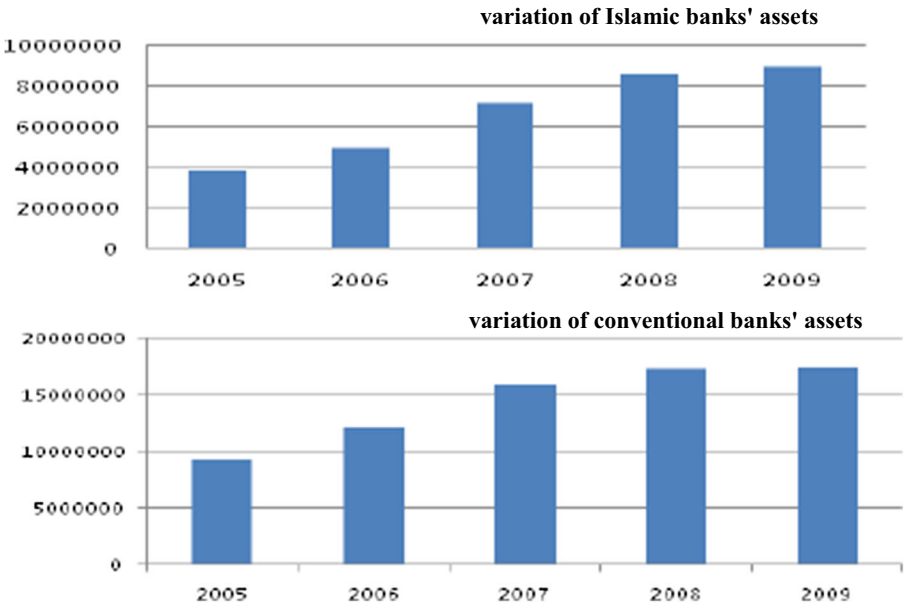

Fig. 1 Comparison of banks' average assets between conventional and Islamic banks

Fig. 2 Comparison of ROE average (in %) between conventional and Islamic banks

which is simply a consequence of the first, is that the majority of traditional banks are groups. That is why they constitute consolidated entities. Their scope of consolidation is more "extended" to share a greater presence in various markets worldwide. This confirms the idea of the need for more alliances between IB to be more competitive. It should be noted that a rising trend of total assets characterizes the both categories of banks. However, growth in the total assets of Islamic banks is higher. This result predicts a promising future for IB.

The Bank Profitability

Bank profitability is measured by the ratio of the activity output and the used means to achieve this result. In a bank, the profitability is achieved through satisfactory results to satisfy the various stakeholders. Indeed, the complexity of banking activity comes from the diversity of the beneficiaries who surround it. The shareholders seek to maximize their dividends, and the customers want a higher remuneration. In addition, the bank seeks to include some of its outcome in its balance sheet. This is important to increase the level of assets: They are the solutions to the problems in the case of risk.

A profitable bank is the one that can associate the different interests in order to ensure its sustainability and growth in such a turbulent environment. The bank profitability is generally measured by financial ratios. A financial ratio is a relationship between two economic and financial variables. This method reduces the multitude of figures in the financial statements to a limited number of ratios easier to interpret. It is a part of the analysis methods of financial statements. We propose to analyze two profitability ratios, ROA and return on equity (ROE), in order to conduct a comparative study between the two categories of banks.

Profitability in ROE Terms

$$\text{The expression of the ROE: } \text{ROE} = \text{Net income} \Big/ \text{Equity}$$

This ratio is also called the financial profitability coefficient. It is considered among the most financial indicators used to measure banking performance. It shows the contribution of equity in the realization of the result. It measures, in some way, the investor's returns level, that is, the higher it is, the more the funds allocated are more effectively used to achieve a positive result. However,

the increase may be illusory because it may indicate a low level of capital and not a favorable result. The evolution of the financial return for both categories of banks is shown in Fig. 2.

The graphical inspection of the ROE average evolution shows that the trends for both categories of banks are inverse. The IB trend is downward, whereas that of the conventional bank (CB) is on the rise. By referring to this result, it may be noted that despite the efforts of IB in terms of activity and emergence based on this indicator, the situation of IB is apparently degraded compared to CB. However, this result should be taken cautiously. In fact, according to Sharia, an IB must have a high rate of equity (a low ROE ratio), but this constraint does not exist for CB. The divergence of both Islamic and conventional law imposes significant differences in the composition of the balance sheets of both types of banks. This last remark has its consequences on the ratio of the ROA profitability.

Profitability in ROA Terms

$$\text{The expression of the ROA is: } \text{ROA} = \text{Net Income} \Big/ \text{Total Assets}$$

As in the previous paragraph, we propose to study the levels and variation in this ratio for each category in order to see the later average variations. Its evolution for the types of banks is shown in Fig. 3.

It is also an indicator of the banking performance analysis. This indicator shows the contribution percentage of the assets held by the bank in the achieved result. However, it has limits that should not be neglected. On the one hand, its formula does not take into account the activities outside the balance sheet. The latter ones take the magnitude of the previous years. On the other hand, the assets are classified in this ratio in the same rank. In other words, they do not take into account the degree of the risk which varies from one asset to another. Finally, the valuation principles of assets, which may differ from one bank to another, make the comparisons less relevant. However, the use of this ratio remains widespread in the financial statements analysis of the banks in order to decide their returns.

The Bank Efficiency

It may be noted that IB are more efficient than CB during the study period, except for the year 2009 (Fig. 4). It should be noted that in a comparative study, IB hold the top

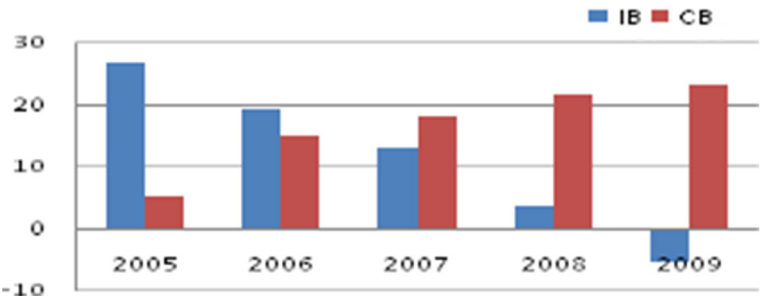

Fig. 3 Comparison of ROA average (in %) between conventional and Islamic banks

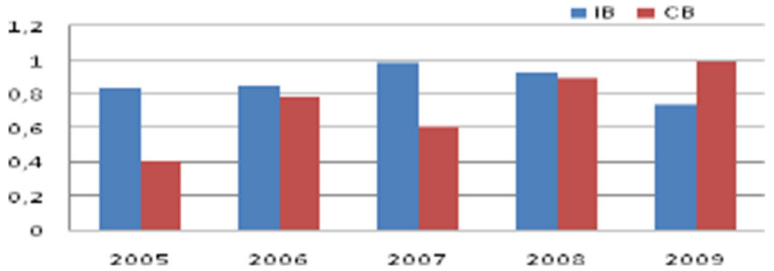

Fig. 4 Comparison of bank efficiency between conventional and Islamic banks

positions particularly during the years marked by the outbreak of the financial crisis (2007 and 2008). We can conclude, from this comparison, that despite its shortcomings, the ratio analysis provides no benefit for IB compared to CB. However, the analysis of relative efficiency scores shows a benefit for IB. This conclusion leads us to reflect on the research of the main determinants of performance for both parties. This is a study of panel data.

Determinants of Bank Performances

In the study of the relationship between performance and its traditional determinants for a banking firm, we will treat the above performance in its three forms: economic profitability (ROA), financial profitability (ROE), and technical efficiency (will be noted EFF). The proposed determinants are presented in Fig. 5.

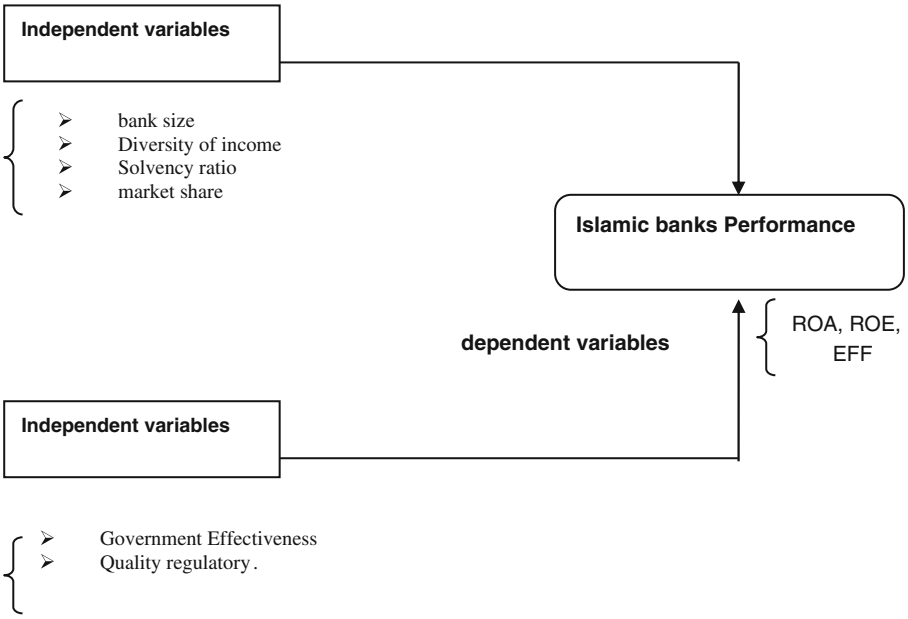

Fig. 5 Determination of TE both in constant and variable returns to scale

Research Methodology

The data used in this study are cross-country bank-level data, compiled from income statements and balance sheets of six conventional and six Islamic banks each year all over the 2004–2009 period in Bahrain. The main data source is the BankScope database compiled by IBCA. In so far as possible, the BankScope database converts the data into common international standards to facilitate the comparisons. It uses panel data due to the advantage that it has. It helps to study the behavior of each bank over time and across space (Baltagi, 2005; Gujarati, 2003).

The Model Specification and Variable Selection

The main dependent performance indicators used in our research are the ROA, ROE, and EFF. The most important determinants (independent variables) are market share (MS), income diversity (ID), total assets (TA), the equity-to-asset ratio (EQTA), and loans to assets (NL/TA). The government variables used as independent variables are government effectiveness (GEFF) and regulatory quality (RQ).

The objective of this study is to analyze and compare the conventional and Islamic performance in return on asset, return on equity, and efficiency terms. Thus, the following baseline model was used:

$$Y_{it} = \alpha_{it} + \alpha_1 PM_{it} + \alpha_2 DR_{it} + \alpha_3 Log(TA)_{it} + \alpha_4 EQTA_{it} + \alpha_5 NL\Big/TA_{it} \\ \alpha_6 GEFF_{it} + \alpha_7 RQ_{it} + \varepsilon_{it}$$

Y_{it}	Performance of bank *i* at time *t* as expressed by the ROA, ROE, and EFF
α_{it}	Intercept
MS_{it}	Market share of bank *i* at time *t*
DR_{it}	Income diversity of bank *i* at time *t*
TA_{it}	Total assets of bank *i* at time *t*
$EQTA_{it}$	Equity-to-asset ratio of bank *i* at time *t*
NL/TA_{it}	Loans to assets of bank *i* at time *t*
$GEFF_t$	Government effectiveness of Bahrain at time *t*
RQ_t	Regulatory quality of Bahrain at time *t*
ε_{it}	Error term where *i* is cross sectional and *t* time identifier

Performance Model in ROE Terms

$$ROE_{it} = \alpha_{it} + \alpha_1 PM_{it} + \alpha_2 DR_{it} + \alpha_3 Log(TA)_{it} + \alpha_4 EQTA_{it} + \alpha_5 NL\Big/TA_{it} \\ \alpha_6 GEFF_{it} + \alpha_7 RQ_{it} + \varepsilon_{it} \quad (1)$$

Performance Model in ROA Terms

$$ROA_{it} = \alpha_{it} + \alpha_1 PM_{it} + \alpha_2 DR_{it} + \alpha_3 Log(TA)_{it} + \alpha_4 EQTA_{it} + \alpha_5 NL\Big/TA_{it} \\ \alpha_6 GEFF_{it} + \alpha_7 RQ_{it} + \varepsilon_{it} \quad (2)$$

Performance Model in EFF Terms

$$\mathrm{EFF}_{it} = \alpha_{it} + \alpha_1 \mathrm{PM}_{it} + \alpha_2 \mathrm{DR}_{it} + \alpha_3 \mathrm{Log(TA)}_{it} + \alpha_4 \mathrm{EQTA}_{it} + \alpha_5 \mathrm{NL} \Big/ \mathrm{TA}_{it} \quad (3)$$
$$\alpha_6 \mathrm{GEFF}_{it} + \alpha_7 \mathrm{RQ}_{it} + \varepsilon_{it}$$

Variable Definition

Market Share

Most studies conducted in relation to bank performances focused on the application of market power (MP) and efficiency structure (ES) theories (Athanasoglou et al., 2005). The MP theory suggests that increased external market forces result in profit. Furthermore, the hypothesis states that only firms with a large market share and well-differentiated portfolio can win their competitors and earn monopolistic profit. In this respect, the high concentration ratio in the market creates greater efficiency in these markets yielding a positive profit-concentration relationship (Berger and Hannan 1989). Moreover, the ES theory highlights that enhanced managerial and scale efficiency leads to higher concentration and then to higher profitability.

Income Diversity

In order to control the differences in the structure of the bank's income, we introduce a measure of income diversity that follows Laeven and Levine (2005). The income of banks captures the degree at which banks diversify their activities from traditional lending to other activities. In the Islamic bank context, the net interest income is generally defined as the sum of the positive and negative income flows associated with the PLS arrangements of the International Monetary Fund, 2004.

Total Assets

The bank's asset is a key variable that affects the profitability of a bank. Current asset, credit portfolio, fixed asset, and other investments are banks' assets. Often, a growing asset (size) is related to the age of the bank (Athanasoglou et al., 2005). More often than not, the loan of a bank is the essential asset that generates the key share of the bank's income. Loan is the most important asset of commercial banks from which they produce their income. The bank's profitability is determinate by the quality of loan. The loan portfolio quality has a direct bearing on bank profitability. Thus, nonperforming loan ratios are the excellent proxies for asset quality. In order to study the performance of banks by different scholars, we used different types of financial ratios. The banks' performance is the major concern of all banks to keep the amount of nonperforming loans at a low level (Sangmi and Tabassum, 2010).

Equity/Total Assets (EQ/TA)

This ratio indicates the ability of the banks to honor their engagements to their clients based on their own resources. Staikouras et al. (2007) show the ratio of equity to total assets captures the bank's risk preferences and the bank management quality. It reflects the degree to which shareholders have their own capital at risk, and hence may reflect their incentives to monitor management and assure that the institution operates efficiently. Under the "moral hazard" hypothesis, the higher this ratio is, the more efficient the institution is likely to be (Eisenbeis et al., 1999). Thus, given that a high degree of capitalization is a clear indication of risk aversion in the operation of the banks in favor of quality management, a high equity ratio benefits the operating performance of the credit institutions. Hence, a negative coefficient is expected for the equity ratio. Nevertheless, apart from the risk, a bank's capital level directly affects operating expenses by providing an alternative to deposits as a funding source for loans. Since raising equity typically involves higher expenses than raising deposits, the coefficient of the equity ratio is expected, in this case, to be positive. Overall, the sign of the coefficient of the equity ratio is ambiguous.

Net Loans/Total Assets (NL/TA)

The ratios of loans to total assets included to measure the output and funding mix of each financial institution. It is obvious that the ratio of loans to assets is concerned, since operating expenses related to originating, maintaining, and monitoring loans should be much higher than those needed for trading and available for sale securities; banks with a greater proportion of loans in their balance sheet are expected to present higher costs.

Government Variables

Berger et al. (2005) argue that it is essential to account for the static, selection, and dynamic effects of all the major different types of governance that are important for a nation in the same model of bank performance. There is a wealth of research on governance and performance bank. We took two of several indicators used in the literature, government effectiveness (GE) and regulatory quality (RQ). These two variables indicate the degree of institutional harmonization in the country.

Data Envelopment Analysis

In this study, DEA is used to examine the determinants of banking performance across the Bahrain country between 2005 and 2009. This performance is analyzed through a comparative study of 12 banks (six conventional banks and six Islamic banks). A diversity of internal and external banking characteristics were used to forecast this performance. The main of them are ROA, ROE, and efficiency.

The DEA developed by Charnes et al. (1978), is one of the important methods recognized for assessing efficiency and comparative analysis of

decision-making units (DMUs) which function in a system that consists of uniform units.

The DEA method is founded on a model of linear programming in order to define the TE levels, in cases of constant or variable returns to scale. In particular, the DEA can be carried out either with the assumption of constant returns to scale (CRS)[1] (Thanassoulis, 2001) according to the model of Charnes et al. (1978) or with the assumption of variable returns to scale (VRS)[2] (Thanassoulis, 2001) according to the model of Banker et al. (1984).

Regression Results and Discussions

Before developing our regression, some tests concerning the quality of adjustment are necessary. According to Newey (1985), an important test should be done. Durbin-Wu-Hausman (DWH) test was used to test the endogeneity for all three equations. The null hypothesis of the DWH endogeneity test means that an ordinary least squares (OLS) estimator of the same equation would yield consistent estimates. This stipulates that endogeneity among the regressors would not have deleterious effects on OLS estimates. A rejection of the null implies that endogenous repressors' effects on the estimates are meaningful.

The global significance of the model estimation is tested using Fisher test. The values 4.7 and 5.6, on model 1, mean that the proportion of variance in the dependent variable explained by the model is 4.7 and 5.6 times greater than that of the variance of the dependent variable which remains unexplained for conventional and Islamic banks, respectively. The same reason is done for the remnant models (2 and 3). In addition, according to three models, the R^2 value which approximates 1 indicates a good adjustment for the three models.

Based on the above explanation, the estimated coefficients of Eqs. (1), (2), and (3) are given in Table 2.

[1] In the DEA model of constant returns to scale (CRS) (Charnes et al. 1978), the higher x is (which constitutes the inputs or, in other words, the production factors used in the productive process), the more y increases (which constitute the output produced), at an equivalent quota. E.g., if the number of the productive factors is doubled, the quantity of the output is doubled as well. Figure 6 shows how an input (x) is used to produce an output (y). If assumed that the output is changed in direct proportion to the input (constant returns to scale), the efficiency frontier is defined by a straight line starting from the beginning of the axes (which determines the production function) and passes through the point of the unit with the highest ratio of outputs to inputs (Charnes et al., 1978). These units are ($\varnothing_0$ or P). Unit ($\varnothing_0$ or P) is "inefficient" since it could produce the same amount of output with less amount of input by (X"−X_0). The inefficiency of $\varnothing_0$ is determined by the ratio TE=y_0 ∅' / y_0 ∅.

[2] In the case of variable returns to scale (VRS), when x increases, then y increases either less (descending returns to scale) or more (increasing returns to scale) than the increasing quota of x. The DEA model of variable returns to scale (Banker et al. 1984) is chosen when it is not previously known if a percentage change of inputs would cause an equivalent percentage change in output/s. More specifically, in the case of increasing organizational complexity of the DMUs, due to an increase in the size and the variety of their activities, the outputs are not modified in a way directly proportional to the inputs (variable returns to scale) (Banker et al., 1984). According to (Fig. 6), the DMUs R, R', P, and P' that are found on the curve of the variable returns to scale are efficient. The efficiency frontier is formed if the efficiency data (outputs/inputs) of the specific DMUs are joined with straight lines. As a result, concerning VRS, the inefficiency of the organization ($\varnothing_0$) is expressed using the ratio TE=y_0 $\varnothing_0$/y_0 ∅. This ratio shows that the magnitude of inefficiency is less in this case than when we have constant returns to scale such as OX'/OX">OX_0/OX"

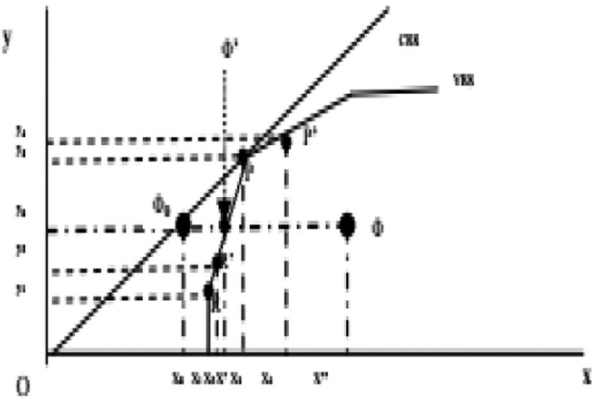

Fig. 6 Determination of TE both in constant and variable returns to scale. Adapted from Charnes et al. (1978)

As shown in the table, conventional banks' market share has a positive and statistically significant impact on financial profitability at 1 % level. However, the same variable has a positive but non significant effect in Islamic bank case (model 1). In both models, the market share has a positive but non significant effect on economic profitability (model 2). In contrast, the findings indicate that a 10 % increase in the market share increases Islamic banks efficiency by around 0.029 %. We also see that the market share has a negative but non significant impact on conventional banks' efficiency when the funding is made

Table 2 Results of the estimations

Vbls	Model 1 (ROE)		Model 2 (ROA)		Model 3 (EFF)	
	CB	IB	CB	IB	CB	IB
C	15.2 (0.5)	18.7 (0.3)	−1.1 (0.9)	−2.3 (0.6)	1.3 (0.05)**	1.9 (0.6)
MS	0.02 (0.004)*	0.001 (0.2)	0.0002 (0.7)	0.6 (0.7)	−2.3 (0.4)	2.9 (0.08)***
ID	−13.6 (0.001)*	0.06 (0.022)**	−11.7 (0.000)*	2.5 (0.3)	−0.003 (0.9)	0.09 (0.03)**
LTA	0.03 (0.7)	0.04 (0.021)**	0.02 (0.7)	0.06 (0.03)**	−0.006 (0.008)*	−2.72 (0.002)*
EQTA	0.2 (0.08)***	0.3 (0.09)***	0.1 (0.08)***	0.07 (0.08)***	−0.009 (0.7)	−0.34 (0.02)**
NL/TA	0.19 (0.05)***	0.7 (0.03)**	4.8 (0.4)	0.03 (0.2)	0.004 (0.9)	0.2 (0.01)**
GEFF	−37.1 (0.01)**	−9.3 (0.03)**	−23.7 (0.01)**	−2.5 (0.01)**	−0.71 (0.03)**	−2.14 (0.3)
RQ	5.2 (0.7)	4.3 (0.8)	12.5 (0.1)	0.34 (0.03)**	−0.18 (0.5)	−0.57 (0.5)
Observations	60	60	60	60	60	60
No. banks	6	6	6	6	6	6
R^2	0.54	0.64	0.82	0.64	0.79	0.72
F-statistic	4.7 (0.000)	5.6 (0.000)	3.8 (0.001)	2.6 (0.003)	3.7 (0.005)	4.2 (0.005)
Durbin-Watson	5.357	5.209	5.273	5.632	5.512	5.839
Hausman test (p value)	63.42 (0.000)	54. 53 (0.000)	62.21 (0.000)	(0.000)	(0.000)	(0.000)

*, **, and *** indicate significance at the 1, 5, and 10 % levels, respectively

by a conventional model (model 3). The marginal participation of Islamic banks' market share on economic profitability, financial profitability, and efficiency has several meanings. Although the total asset of non-usurious banks continues to improve, Islamic finance is still in its preliminary phase compared to conventional finance. In this context, Huda (2012) showed that in the Islamic financing framework, debt financing techniques such as *Murabaha*,[3] *Istisn'a*,[4] and *Salem*[5] dominates those participatory technical or "profit and loss sharing" modes such as *Al-Mudhraba*[6] and *Al-Musharaka*.[7] The latter financing method discriminates between Islamic and conventional banks. However, by referring to our study and other works (Hassan and Ahmed, 2002 and Huda, 2012), we find that the exploit of Islamic banks in this financing remains limited. This result revels that Islamic banks practice away from their theoretical model (Siddiqi 1980 and Sundararajan 2002).

Model 1 indicates that a 5 % increase in income diversity increases Islamic banks' performance in the ROE terms by around 0.06 % and by around 0.09 % in terms of EFF (model 3). The income diversity has a negative effect in the ROE and EFF in the conventional bank case. These results are consistent with the findings. This indicates that Islamic banks are able to diversify their income more than their usurious counterparts. This comparative advantage of Islamic bank provides it with development opportunities outside its appearance regions. In the ROE and ROA models, we find that total assets of Islamic banks perform better than conventional banks. This difference can be explained by the quality of the assets. In fact, Ongore and Kusa (2013) pointed out that poor asset quality or high nonperforming loans to total asset are related to poor banking performance.

The equity-to-asset ratio is a measure of solvency determined on the basis of the information derived from a business or farm, a balance sheet. The term solvency refers to the ability of a farm or business to pay all its debt if it had to immediately sell the business or farming operation. The equity-to-asset ratio specifically measures the amount of equity the business or farm has when compared to the total assets owned by the business or farm. Based on this last definition, the table below shows that, at 10 % level, equity/total assets (EQTA) has a positive and significant impact on the ROE and ROA for both finance models (financial and Islamic). This implies that the two models are complementary to honor their commitments. This result is in line with the findings of Gheeraert and Weill (2014). They reveal that the two funding models combine to create a more appropriate framework for economic transactions. For the

[3] A particular kind of sale where the seller expressly mentions the cost of the commodity purchased, and sells it to another person by adding some profit thereon. Thus, Murabaha is not a loan given with interest, but a sale of a commodity for cash/deferred price.

[4] A contract of exchange with deferred delivery is applied to specified made-to-order items.

[5] Advance payment for goods which are to be delivered at a specified future date. Under normal circumstances, a sale cannot be affected unless the goods are in existence at the time of the bargain. However, this type of sale is an exception, provided that the goods are defined and the date of delivery is fixed. The objects of a sale must be tangible goods that can be defined on the basis of the quantity, quality, and workmanship.

[6] A special kind of partnership where one partner gives money to another to invest it in a commercial enterprise. The investment comes from the first partner called "rabb-ul-mal", while the management and work is an exclusive responsibility of the second, who is called "mudarib".

[7] A joint enterprise or partnership structure with profit/loss sharing implications is used in Islamic finance instead of interest-bearing loans

panel result of model 3, we find that the effect of (EQTA) on performance determined by efficiency is statistically significant at 1 % level but it is negative. This indicates that an increase in (EQTA) prevents the efficiency of the two types of banks. Hence, in our context, the equity-to-asset ratio appears as an obstacle to performance when it is determined by the banking efficiency.

The panel estimation indicates that the ratio of loans to assets (NL/TA) has a positive and significant impact only on model 1 which measured performance in the ROE terms. The magnitude of 0.05 implies that a 10 % rise in (NL/TA) raises performance on ROE by around 0.19 % if the financing is done in a conventional framework. In an Islamic financing framework, the magnitude of 0.03 implies that a 5 % rise in (NL/TA) raises performance on ROE by around 0.7 %. Thus, the resources in the form of deposits appear very useful in the performance gain due to their level of safety and stability. As an intermediary institution, bank deposits are the most common as to ensure its strength and vitality in all it credit operations. Indeed, these resources of deposits fuel the "functioning motor" of the bank. In the EFF model, we find that loans to assets (NL/TA) have positive and significant impacts on performance measured by the banking efficiency for Islamic banks. This result is consistent with that of Sufian and Chong (2008). In contrast, the same variable has a positive but non significant impact on the same context for conventional banks. Furthermore, the findings reveal that in the three models, the estimated effect for the variables "governmental efficacy" is negative. This result is inconsistent with what was expected. In fact, it is estimated that the effectiveness of the state intervention has a positive impact in pushing the financial system performance forward. This finding is important because in the Arab countries, this condition is not true, and even is the reverse in reality! These results are in concordance with the impacts of the quality regulatory (QR) for both bank types. In fact, QR has no significant effects on the different models except in model two for Islamic banks. The magnitude of 0.03 implies that a 5 % increase in the QR decreases classic banking performance on the ROA by around 0.34 % for model 2. This indicates that regulatory policies will lead to increases in economic efficiency in conventional funding model. In general, we emphasize that the government environment presents an obstacle for the performance of banks whether the financing type is.

Conclusion

In this study, we try to compare bank performance between Islamic and conventional banks. Three indicators return on equity (ROE), returns on assets and bank efficiency (EFF) are used in order to determine this performance. To achieve this goal, we used a DEA method to evaluate the effects of some bank indicators and governmental variables on ROE, ROA, and EFF. We find evidence that the impact of income diversity, bank size, solvability indicators, and loans to assets on the performance of Islamic banks measured by return on equity (ROE). In contrast, we find that the market share, solvability indicators and net loans to total assets (NL/TA) have significant effects on the ROE for conventional banks. The same is observed for the other two models (ROA and EFF). In fact, we remark that some variables, such as bank size, are more appropriate on the ROA in the case of Islamic banks. However, other variables are significant in the case of conventional banks. Therefore, both usurious and non

usurious banks play a fundamental role in banking performance in Bahrain. The Islamic banking sector acts as a complement to the conventional banking on the Muslim countries where both systems coexist and the Islamic sector reaches a medium penetration in the total banking sector. Both models complement each other to create an adequate framework for the performance of the banks and the economy in general.

The "niche" markets of Islamic finance and banking can be explained by the imitation strategy of these conventional banks especially in their debt products. Islamic banks should focus on investment products with which they participate with clients in the case of loss or profit. This continues to encourage them to cross the phase of a simple financial intermediation and to intervene with investments products in its operations. Moreover, as it is highlighted by Huda (2012), compared to participatory technical or "profit and loss sharing" modes, financing products are the most used in the IBs. In this situation, customers do not find divergence between the two types of banks because the practices of non usurious banks are similar to those in conventional banks.

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