



ARE ISLAMIC BANKS MORE RESILIENT TO GLOBAL FINANCIAL CRISIS THAN CONVENTIONAL BANKS?

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ABSTRACT

Development of global finance in recent years is marketed with the fastest growth in Islamic finance. The recent global financial crisis is characterized by the failure of a number of conventional banks. This led many researchers to reexamine the efficiency of Islamic banks compared to conventional ones and to study their capacity to resist to the financial crisis. The objective of our analysis is to study if Islamic banks are more resilient than conventional banks to the recent global financial crisis. To do this, two empirical investigations are proposed. The first one is based on the equality mean test. We compare the performance of IBs and CBs during global crisis (2007-2008) and after the crisis (2009-2010) in term of profitability, liquidity, efficiency, capital adequacy and leverage. The second investigation uses the Z-score as an indicator of bank stability in order to study the impact of the crisis on IBs and CBs. The main result derived from the first empirical test show that, when we consider the two periods, IBs become less profitable, more prone to credit risk and less efficient than CBs in the post crisis period. From the second investigation, we conclude that small banks fared better than large ones, IBs are less financially stable than CBs and large IBs perform better than large CBs, as suggested by Cihak and Hesse (2008).

Keywords: Islamic banking, Conventional banking, Financial crisis, PLS system, Z-score, Ratio analysis.

JEL Classification: G01, G21.

1. INTRODUCTION

Last decades are characterized by an important development of economic growth, where financial system plays a crucial role. Banks were at the center of this development. Nevertheless, this period is also characterized by a higher number of financial crises which affected all geographic area (Stiglitz, 2003; Chapra, 2008). Recent global financial crisis is described as the worse one. It started in USA and spread to the rest of the world, it also attacked spreads on

sovereign in Europe. Wide literature tried to explain the causes of the global crisis. They argued that the major cause is financial imbalances. Nevertheless, there is no full agreement among researchers and policymakers about the origin of these financial imbalances.

Some authors pointed out that extend period of excessively loose monetary policy in USA and very low interest rates over the period 2002-2004 may have encouraged intermediaries to increase leverage and banks to take more credit and liquidity risk; and may have intensify the demand for and supply of credit, causing asset prices to rise (Taylor, 2007; Adrian and Shin, 2008; Borio and Zhu, 2008). Another explication of financial imbalances is based on greater dispersion of current account positions across countries matched by larger net capital flows among countries (Merrouche and Nier, 2010). High capital inflows may reduce the funding cost for domestic banks, it also may reduce long term interest rates, encouraging investors an aggressive search for yield. In this case, total supply of credit to the domestic economy may increase causing a rise of local assets prices (Bernanke, 2005; Reinhart and V.R. Reinhart, 2008). The main explanation of financial imbalances and then of the global crisis is based on inadequate supervision and regulation. King (2010) argued that supervision and regulation failed to stop the excessive rise of risk fuelled by the macroeconomic factors.

Where there is large literature explaining causes of the global financial crisis, few researcher propose solutions. Some of them are based on the enhancement of banking supervision and the amelioration of regulatory means. Other solutions are proposed by Muslim researchers, they suggest the use of Profit and Loss Share (PLS) system based on *Sharia*. They argue that Islamic banking may become the alternative model for conventional system (Ayub, 2007; Rafique, 2008; Vandore, 2008).

Islamic banking system appears in the 1970's by the establishment of the "Dubai Islamic Bank" (DIB) in the United Arab Emirates, followed by the "Islamic Development Bank" (IDB) in Jeddah, Saudi Arabia. Thereafter, others Islamic banks were created in many Islamic countries. Islamic banking is based on different business law: Profit and Loss Sharing principle, fix charges established beforehand, no interest, and lender-borrower collaboration. The PLS principle can be applied through different approaches. The first one is *Musharaka* (partnership) used to finance long term projects. The customer contributes some of his own equity capital to the investment, the rest is provided by the bank. The second one is *Mudaraba* (trustee finance contrast). In this case, the all capital required to finance the project is provided by the bank, the customer offers his expertise and his labor. The third one is *Ijara* (leasing contrast), it is similar to the conventional operating lease, but without option of ownership for the customer (lessee)¹.

This manner of operating helps Islamic banks to be more stable, because they encourage investors to diversify and to increase their profits. Therefore, investment will grow and efficiency

¹ There are different others contrasts: *Ijara wa eqtina'*, *Istisna'a* (leasing contrast), *Qard-el-hasna* (interest free loan), *Jo'alah* (service charge), *Bai' bi-thaman ajil* or *bai' muajjal* (credit sale or differed payment sale), *Bai' salem* or *bai' salaf* (future sale contrast- purchase with differed delivery).

will be ameliorated. There are large studies on comparison of efficiency between CBs and IBs, but few ones focused on comparison in crisis periods (Dridi and Hasan, 2010; Boukhris and Nabi, 2013).

In this study we try to explain if IBs are more resilient to recent global financial crisis than CBs. In the first empirical investigation we conduct a comparative analysis based on non-parametric test on a set of financial ratios. Our objective is to compare the performance of IBs and CBs during the global crisis (2007-2008) and after the crisis (2009-2010) in term of profitability, liquidity, efficiency, capital adequacy and leverage. In a second empirical investigation, we test an econometric model to assess the impact of the global crisis on the Z-score, which is a bank's stability indicator.

The main result derived from the first empirical investigation is that, during financial crisis IBs are more profitable than CBs, but after the crisis they become less profitable than CBs. From the second empirical investigation we conclude an important result, IBs are less financially stable than CBs, but large IBs perform better than large CBs.

The rest of the paper is organized as follows. In the second section we present an overview on Islamic banking concept. In the third section we conduct an empirical study to analyze the impact of global crisis on IBs and CBs and to test which type of banks is more resilient to crisis. Section four concludes.

2. ISLAMIC BANKS AND FINANCIAL CRISIS

Islamic banks and conventional banks have a similar role. They manage all types of risks such as liquidity risk, operational risk and others. The main difference between them is that IBs operate in accordance with the rules of Islamic principles and *Sharia*.

The aim of IBs is not only the creation of maximum returns on capital but also the achievement of socio-economic goals of the Islamic region, such as full-employment, high economic growth rate, equitable distribution of wealth and income, socioeconomic justice (Chapra, 1995; Zaher and Hassan, 2001; Hassan and Mervyn, 2007). Business arrangements and contracts in Islamic finance are derived from the four main sources of Islamic law (*Sharia*) which are: the *Quran*, the *Sunna*, the *Ijmaa* and the *Qiyas*. The use of interest or usury (*Riba*) is prohibited by Islamic law.

Islamic banking and finance are based on the concept of justice, which can be reached through the sharing of risk. Therefore, the main principle of Islamic banking is the share of profit and losses as an alternative to conventional banking system based on interest. Many studies argue that the principles of Profit Sharing System (PLS) can help IBs to be more stable than interest based system that can lead to excessive fluctuations of return rates, inflation and others economic fundamentals (Pervez, 1990; Chapra, 1995; Turen, 1995).

International Association of Islamic Banks (1995) supported that PLS system is based on economic rationales and can lead financial system to be more stable for many reasons. Firstly PLS system help Islamic banking to improve the capital allocation efficiency because the allocation

funds is principally based on the soundness of projects and the return on capital essentially depends on productivity. Secondly, the PLS system can reduce unjust distribution of wealth created by credit system which depends on interest. Thirdly, under PLS system, all projects can be accepted, there are no projects that can be rejected because expected return are lower than the cost of debt. Thereby, the volume of investment can rise, creating more jobs. Fourthly, Islamic finance helps more liquid and more robust financial market by reducing speculation and by encouraging trading stocks and investment certificates based on PLS principles. Finally, PLS system can reduce inflationary pressures on the economy because the supply of money cannot exceed the supply of good. Therefore, PLS system, linkage with the real economy and the prohibition of *Riba* could prevent financial crisis (Ahmed, 2002).

From the point of view of Muslim scholars, the main cause of the emergence of financial crisis of 2007-2008 is imprudent and excessive lending and risk taking. These practices are due to essentially three factors: inadequate financial market discipline due to the absence of the PLS system; the expansion of the size of derivatives, such as Credit Default Swap; and the “too big to fail” concept².

To study the different impact of global crisis on IBs and CBs, one must firstly compare the modes of transaction of the two types of banks.

First of all, IBs are based on Sharia principles, so their product and services are different from those of CBs. Number of studies discussed the factors enabling IBs to be more resilient to global financial crisis. According to the Sharia principles, the main factor is the prohibition of selling debt by IBs. Moreover, IBs doesn't invest in toxic assets and mortgage backed securities. Chapra (2008) shows that debt selling and derivatives are the main causes of the financial crisis. Second, the two types of banks differ in the way they deal with risk-taking. In the CBs, risk is transferred to them by depositors which receive guaranteed and predetermined rate of return of their investment. However, in the IBs, profit and losses are shared, the return for the investors are not guaranteed and depend on the banks performance. Another point of divergence between the two types of banks is the risk transfer. In CBs borrowers pay interest independently of the return of their investment. So, CBs transfer the risk through credit default swaps or securitization, financing is debt-based. However, in IBs, there are two main uses of sources: *Musharaka* (Equity participation) and *Mudharaba* (Trustee finance). In the *Musharaka* contract, both banks and investors contribute to the capital of project and share possible profit or losses according to their shareholding capital. In the *Mudharaba* contrast, IBs provide the required capital for a project, the investor contribute expertise, labor and management of the firm in this case, only profit are shared by the bank and investor, losses are supported by the banks.

Few studies conduct a comparative analysis on IBs and CBs performance during and after the global crisis. Dridi and Hasan (2010) analyzed the impact of the global crisis on profitability, credit growth, asset growth and external rating, on the sample of 120 Islamic and conventional banks.

² This concept means that if the bank collapses, the government will bail out because it's the guarantor of deposits.

Their results support the stronger resilience of IBs during the crisis. Nevertheless, by 2009 the crisis is transmitted to the real economy and IB's profitability decline sharply compared with CBs. They argue that IBs contribute to financial stability during the crisis. Boukhris and Nabi (2013) studied the resilience of IBs compared to CBs during global crisis. Their main findings are the following: *i*- before the financial crisis, IBs were more profitable than CBs; *ii*- IBs became less profitable after the crisis; *iii*- CBs were more resistant to the crisis than IBs.

3. BANK'S PERFORMANCE DURING AND AFTER THE GLOBAL CRISIS: NON PARAMETRIC ANALYSIS

3.1. Methodology and Financial Ratio

In order to analyze the impact of financial crisis on the performance and position of Islamic banks, we use financial ratios. Based on the equality mean test, we perform both inter-temporal and inter-banks comparisons for the period of 2007-2010. Our objective is to compare the performance of conventional banks and Islamic banks during the global financial crisis (2007-2008) and after the crisis (2009-2010) in term of profitability, liquidity, efficiency, capital adequacy and leverage.

Profitability ratio: are used to measure the ability of a bank to generate earnings as compared to its expenses and others costs during a specific periods of time. The higher profitability ratios are associated with better performance. Our study is based on the common used profitability ratios: Return on Average Assets (ROA) and Return on Average Equity (ROE)³. ROA indicates net earnings per unit of equity of capital, whether ROA indicates the capacity of banks to convert its assets into profits and net earnings based on profitability ratio. Olson and Zoubi (2008) shown that Islamic banks are more profitable than conventional banks.

Capital adequacy ratio: used to indicate the bank's health to face shock withstanding losses. The bank's capital is considered as a cushion for already existing banking problems. As a capital adequacy ratio we use capital Asset Ratio as considered by Munawar (2001). Siddiqui (2008) argued that the higher the capital adequacy ratio, stronger is the bank.

Liquidity ratios: it's a measure of bank's ability to meet its short-term debt obligations. Higher liquidity ratio is associated with larger margin of safety of banks to cover short term debts. There is several measure of liquidity. In this study we consider two measures; loan to deposit ratio as proposed by Hassan (1999) and net loans to total assets ratio as used by Hassan and Bashir (2003).

Efficiency ratio: it's a measure of the bank's operating costs as a percentage of its total income. It shows how effectively the bank utilizes its assets and how it manages its liabilities. The lower this ratio is better. In the present paper and based on several studies (Olson and Zoubi, 2008; Siddiqui, 2008), we consider three measure of efficiency, cost to income ratio, net interest margin and other operating income to average assets ratio.

Leverage ratio: is a measure of financial health of the bank. It indicates bank's ability to meet its financial obligations. Higher leveraged banks are predisposed to high risk of bankruptcy if they

³ Siddiqui (2008).. Olson and Zoubi (2008).

can't pay their debt⁴. Our study is based on two types of ratio, equity to total asset ratio and equity to total liabilities ratio.

3.2. Data and Sample

Data are collected for conventional and Islamic banks in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE and Malaysia, based on the importance of Islamic banks in their banking system and data availability. In many countries where IBs represent an important portion of the banking system, detailed banking data are not readily available. The sample covers 64 conventional banks and 30 Islamic banks, over the period 2007-2010.

It is important to note that Islamic banking model and market structure differ with countries. For example, Kuwait, CBs do not have Islamic windows. The Malaysian IBs included in our sample are all subsidiaries of CBs. We don't consider Islamic banking activities conducted by CBs due to lack of data.

3.3. Results

3.3.1. Profitability

Figure 1 shows that the ROA decrease significantly over the whole period for both Islamic and conventional banks. During crisis period (2007-2008) the mean of ROA is higher for Islamic banks than for conventional ones, but it being higher for Islamic banks in post crisis period (2009-2010).

Figure 2 shows that during the whole period of study the mean of ROE decrease significantly for Islamic banks. For conventional banks it decreases until 2009 but it increases in 2010. The ROE is higher for Islamic banks during crisis periods but it becomes lower after the crisis.

Table 1 reports t-test for equality means results for the whole period of study and for all ratios. It shows that conventional banks are more profitable than Islamic banks at 10% level of risk. Nevertheless, Islamic banks are more profitable only in the post crisis period as shown in table 2.

3.3.2. Capital Adequacy

The evolution of the capital to asset ratio is illustrated in figure 3 for Islamic and conventional banks. For the CBs the capital to asset ratio is constant during the whole period. However, for IBs the ratio drops down from 2007 to 2009 but it increases in 2010. Table 1 shows that there is a significant difference in the capital to asset ratio between the two types of banks for the whole period (p-value is 1.18%). IBs have higher level of solvency than CBs. When we consider the two periods separately, the latter result is confirmed for the post crisis period (table 3).

3.3.3. Liquidity Ratio

Figure 4 illustrates the evolution of the loan to total asset ratio, it shows that the ratio increases from 2007 to 2009 for the two types of banks, but it declines by 2010. Figure 5 shows a stability of

⁴ Islamic banks don't use debt financing, so the larger source of their funds is based on shareholder equity.

the loan to deposit ratio for the whole period for the CBs. For the IBs, there is an important increase in 2010. Table 1 indicates that for the period of our study that the loan to deposit ratio is significantly larger for IBs, so CBs are less prone to credit risk. When the two sub-periods are considered, table 4 shows that for IBs during crisis period, the loan to total asset ratio is significantly larger. During post crisis period, the loan to deposit ratio is significantly larger for IBs, this signify that IBs convert a larger part of their deposit to loans.

3.3.4. Efficiency Ratio

The cost to income ratio is one of the three measures of efficiency considered in this paper. The lower this ratio is better as it measures how costs are changing compared to income. Figure 6 shows that there is no important variation in cost to income ratio for conventional banks. However, for Islamic ones the ratio grows after the crisis passing from 43.95% in 2008 to 92.25% in 2009 and 72.44% in 2010. Table 5 shows that cost to income is significantly larger in Islamic banks in post crisis period. This result is maintained even when we consider the whole period, as shown in table 1.

Our second measure of efficiency is Net Interest Margin (NIM). The higher this ratio is considered better. Figure 7 shows that NIM of Islamic banks is higher than NIM in conventional banks for the whole period. Nevertheless, we observe a sharp decrease in NIM for Islamic banks in post crisis period. The t-test results reported in table 1 confirm this statement; Islamic banks are more efficient than conventional ones in the whole period, reflected by lending activities and managing the lending expenses. When we consider the two sub-periods, we conclude that the crisis doesn't affect significantly the efficiency of the two types of banks; Islamic banks are more efficient during and after the crisis as illustrated in table 5.

The third measure of efficiency considered in this paper is other income operating to average asset ratio. Figure 8 illustrates a notable decline of this ratio for conventional banks in 2008, by contrast for Islamic banks the ratio increases in the same year. The t-test results reported in table 1 shown that there is no significant difference between Islamic and conventional banks for the whole period. Nevertheless in the crisis period there is a significant difference between Islamic and conventional banks, as reported in table 5. Our results support the hypothesis that Islamic banks efficiency is better than conventional banks during crisis period.

3.3.5. Leverage Ratio

Figures 9 and 10 show that for the whole period of study conventional banks are more leveraged than Islamic banks, because they depend more than Islamic banks on debts and liabilities. This difference is significant in the post crisis period, as given by the t-test results in table 6.

4. THE EFFECT OF THE GLOBAL FINANCIAL CRISIS ON ISLAMIC VERSUS CONVENTIONAL BANKS: A PANEL DATA ANALYSIS

4.1. Z-Score Model Specification

In order to test which type of bank is more resilient to recent financial global crisis, we focus our second approach on a panel data analysis to determine bank's financial soundness variables. Bank's soundness is proxied by the Z-score ratio. A higher Z-score correspond to higher probability of bank's insolvency. According to Cihak and Hesse (2008); Demirgüç-Kunt *et al.* (2006) and Maechler *et al.* (2005) we estimate a panel model using Z-score for bank *i* at time *t* in country *j* as dependent variable. The model controls for banks specific variables and macroeconomic variables.

$$\text{Z-score}_{i,j,t} = \alpha + \beta_1 \text{LAR}_{i,j,t-1} + \beta_2 \text{CIR}_{i,j,t-1} + \beta_3 \text{TA}_{i,j,t-1} + \beta_4 \text{IDIV}_{i,j,t-1} + \beta_5 \text{INF}_{j,t-1} + \beta_6 \text{GDP}_{j,t-1} + \beta_7 \text{IBSIZE}_{i,j,t} + \beta_8 \text{SIZE}_{i,j,t} + \beta_9 \text{IB}_{i,j,t} + \beta_{10} \text{IBCRISIS}_{i,j,t} + \beta_{11} \text{CBCRISIS}_{i,j,t} + \sum \theta_j C_j + \epsilon_{i,j,t}$$

Table 7 presents definition of variables. LAR, CIR, TA and IDIV are banks specific variables; INF and GDP are macroeconomic variables. In order to test if conventional banks are stronger than Islamic banks we add *Islamic banks dummy* and *size Islamic banks dummy*, if CBs are stronger, this variables take a positive sign. In the purpose of testing if large bank resist better to the crisis, we add a *Size dummy variable*, which should take a positive sign if small banks are more affected by crisis. To test if IBs resist better than CBs to the crisis we introduce a dummies crisis variables interacted with both Islamic and conventional banks. We add *country dummies* in order to capture the difference across countries in the policy response to the crisis.

Our model is estimated using the Random-effect Generalized Least Square⁵. Robust regression technique is performed to avoid heteroscedasticity problem in the data. To overcome potential endogeneity we include lags of one year of the independent variables⁶.

4.2. Results

Regression results are summarized in table 8. They show that banks specific variables such as loan to total assets ratio and cost to income ratio are not significant. However, total asset variable is significant (specifications 6 and 7) and negative, so bank stability decrease with size. Macroeconomic variables are not significant, reflecting their very general nature, they don't allow for capturing of differences across countries, nor their policy response to the crisis. When we add country dummies variables, the result is significantly improved.

Bank's size has a negative and significant impact on stability. This signifies that small banks fared better than large ones. This result confirms the finding of Boukhris and Nabi (2013) that

⁵ Based on our unbalanced panel data, Hausman test is performed in order to know if our model is with Random-Effect or with fixed-Effect.

⁶ Only banks specific variables and macroeconomic variables.

suggest that large banks are less stable from small ones. Islamic bank dummy variable is negative and significant in the regressions (1), (2), (3), (4) and (5). This suggests that IBs are less financially stable than CBs. When we examine if size of IBs has an impact on bank stability; the results show that size of IBs has a positive and significant impact on probability of default. Large IBs perform better than large CBs. This result is due to the fact that in several countries, IBs have a better diversification, economies of scale, solid reputation and dominate the market. This helps them to provide more stable source of funds and to be financially more robust. This result corroborate with those proposed by [Cihak and Hesse \(2008\)](#).

When we interact conventional bank dummy with crisis dummy, our results confirm those of non-parametric analysis found in previous section. The variable is positively correlated with Z-score, then conventional banks resist better to the global financial crisis of 2007-2008 than Islamic banks.

5. CONCLUSION

Development of global finance in recent years is marketed with the fastest growth in Islamic finance. The recent global financial crisis is characterized by the failure of a number of conventional banks. This led many researchers to reexamine the efficiency of Islamic banks compared to conventional ones and to study their capacity to resist to the financial crisis.

The objective of our analysis is to study if Islamic banks are more resilient than conventional banks to the recent global financial crisis (2007-2008). To do this, two empirical investigations are proposed. The first one is based on financial ratios. We compare the performance of IBs and CBs using t-test for equality means during global crisis (2007-2008) and after the crisis (2009-2010) in term of profitability, liquidity, efficiency, capital adequacy and leverage. The results show that conventional banks are more profitable than Islamic banks during crisis. Nevertheless, Islamic banks are more profitable only in the post crisis period. IBs have higher level of solvency than CBs for the whole period and even for the post crisis period when we consider the two periods separately. The loan to deposit ratio is significantly larger for IBs for the post crisis period, this signify that IBs convert a larger part of their deposit to loans. Our results support the hypothesis that Islamic banks efficiency is better than conventional banks during crisis period.

The second investigation uses the Z-score as an indicator of bank stability in order to study the impact of the crisis on IBs and CBs. From the second investigation, we conclude that small banks fared better than large ones, IBs are less financially stable than CBs and large IBs perform better than large CBs, as suggested by [Cihak and Hesse \(2008\)](#).

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Appendix

Figure1

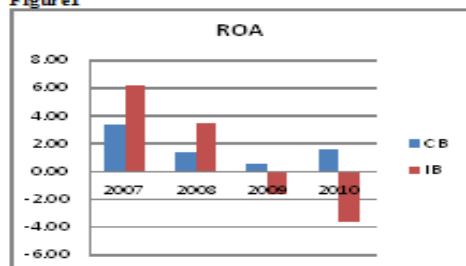


Figure2



Figure3

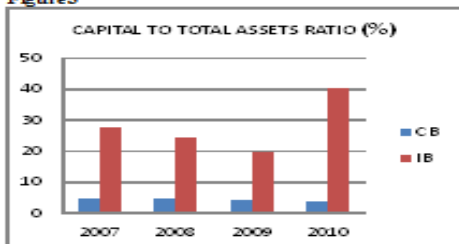


Figure4

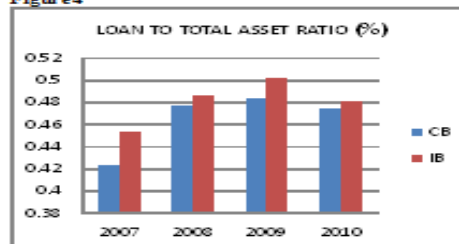


Figure5

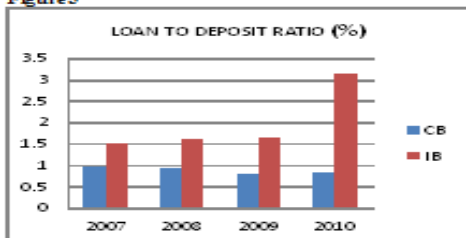


Figure6

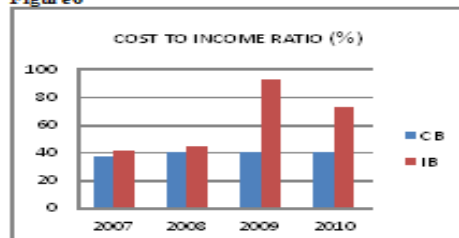


Figure 7

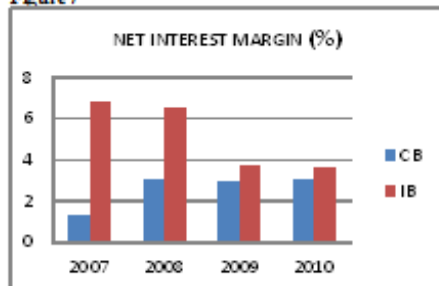


Figure 8

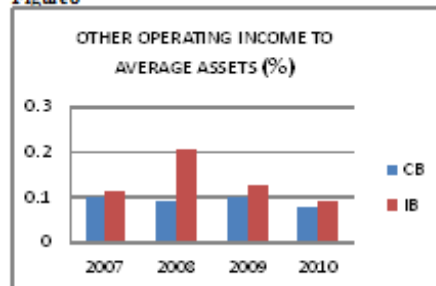


Figure 9

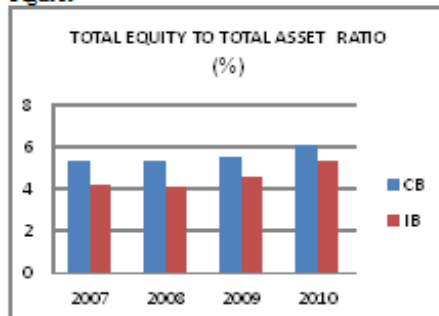


Figure 10

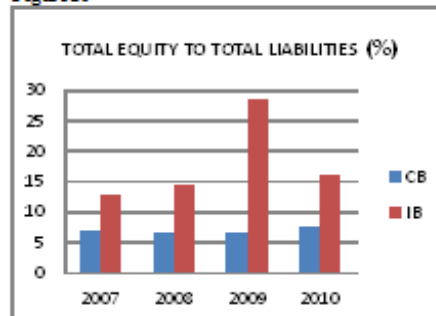


Table- 1. T-test for equality of means: 2007-2010: whole period (mean IB – mean CB)

Variable	Obs	Mean	Std. Err.	Std. Dev.	t-value	p-value
ROE IB	108	7.894046	2.314496	24.05295	-1.7228	0.0859
ROE CB	217	11.92854	1.185146	17.45828		
ROA IB	108	1.485583	0.7695423	7.997318	-0.1546	0.8772
ROA CB	215	1.588758	0.2731586	4.005292		
TOTAL EQUITY/ TOTAL ASSET IB	110	4.470768	2.051567	21.51701	-0.4066	0.6845
TOTAL EQUITY/ TOTAL ASSET CB	247	5.566675	1.548886	24.34266		
TOTAL EQUITY/ TOTAL LIABILITIES IB	83	18.16726	7.083259	64.53156	2.1007	0.0365
TOTAL EQUITY / TOTAL LIABILITIES CB	224	6.930927	1.934636	28.95499		
CAPITAL/ TOTAL ASSETS IB	105	27.89104	14.10457	144.5288	2.5317	0.0118
CAPITAL/ TOTAL ASSETS CB	241	4.115262	0.8969846	13.92494		
LOAN /TOTAL ASSET IB	89	0.4801314	0.0233891	0.2206523	0.5641	0.5731
LOAN /TOTAL ASSET CB	235	0.4639648	0.0152504	0.2337848		
LOAN /DEPOSIT IB	79	1.858974	0.2932402	2.606376	4.7156	0.0000
LOAN /DEPOSIT CB	226	0.8752007	0.0690006	1.037306		
NET INTEREST MARGIN IB	101	5.377594	0.7222982	7.259007	3.4416	0.0007
NET INTEREST MARGIN CB	204	2.547343	0.4550118	6.498868		
OTHER INCOME OPERATING/ AVERAGE ASSETS IB	105	0.1346341	0.0472306	0.48397	0.7600	0.4478
OTHER INCOME OPERATING /AVERAGE ASSETS CB	217	0.0896272	0.0342719	0.5048565		
AVERAGE EQUITIES/ AVERAGE ASSETS IB	114	3.176379	1.637569	17.48445	-1.0108	0.3128
AVERAGE EQUITIES/ AVERAGE ASSETS CB	243	5.792135	1.596665	24.88955		
COST /INCOME IB	40	83.3442	15.06003	95.24801	4.3644	0.0000
COST /INCOME CB	98	40.12439	1.622848	16.06537		

Table- 2. T-test profitability ratios (IB – CB)

	Variable	Obs	Mean	Std. Err.	Std. Dev.	t-value	p-value
CRISIS PERIOD 2007-2008	ROE IB	60	4.7652	0.8135	6.3016	3.4719	0.0007
	ROE CB	111	2.1638	0.3328	3.5063		
	ROA IB	60	16.6909	1.384	10.7205	1.0366	0.3014
	ROA CB	113	13.8624	1.8457	19.6205		
POST CRISIS PERIOD 2009-2010	ROE IB	48	-2.6139	1.1624	8.0535	-3.5436	0.0005
	ROE CB	104	0.975	0.4326	4.4117		
	ROA IB	48	-3.1020	4.450	30.8311	-3.5187	0.0006
	ROA CB	104	9.8273	1.4277	14.5605		

Table- 3. T-test capital adequacy ratios

	Variable	Obs	Mean	Std. Err.	Std. Dev.	t-value	p-value
CRISIS PERIOD 2007-2008	CAPITAL / TOTAL ASSETS IB	55	25.999	18.1094	134.303	1.1762	0.2414
	CAPITAL / TOTAL ASSETS CB	122	4.4618	1.3498	14.909		
POST CRISIS PERIOD 2009-2010	CAPITAL / TOTAL ASSETS IB	50	29.9716	22.1127	156.36	1.8215	0.0703
	CAPITAL / TOTAL ASSETS CB	119	3.7599	1.1817	12.891		

Table- 4. T-test liquidity ratios

	Variable	Obs	Mean	Std. Err.	Std. Dev.	t-value	p-value
CRISIS PERIOD 2007-2008	LOAN /TOTAL ASSET IB	49	0.4695	0.0311	0.2183	1.7535	0.0813
	LOAN /TOTAL ASSET CB	119	0.4495	0.0221	0.2420		
	LOAN /DEPOSIT IB	43	1.5509	0.2508	1.645	0.4988	0.6186
	LOAN /DEPOSIT CB	113	0.9406	0.1328	1.4121		
POST CRISIS PERIOD 2009-2010	LOAN /TOTAL ASSET IB	40	0.4931	0.0356522	0.225484	0.3491	0.7275
	LOAN /TOTAL ASSET CB	116	0.4787	0.0208	0.2250		
	LOAN /DEPOSIT IB	36	2.2269	0.5685	3.4110	4.3548	0.0000
	LOAN /DEPOSIT CB	113	0.8097	0.0374	0.3983		

Table- 5. T-test efficiency ratio

	Variable	Obs	Mean	Std. Err.	Std. Dev.	t-value	P-value
CRISIS PERIOD 2007-2008	NET INTEREST MARGIN IB	57	6.6814	1.1964	9.0329	2.3024	0.0227
	NET INTEREST MARGIN CB	106	2.1430	0.8646	8.9020		
	OTHER INCOME OPERATING/ AVERAGE ASSETS IB	55	0.16	0.0753	0.5586	3.0880	0.0024
	OTHER INCOME OPERATING /AVERAGE ASSETS CB	103	0.09329	0.0497	0.5046		
	COST /INCOME IB	50	42.649	2.496	17.6516	-0.5081	0.6120

POST CRISIS PERIOD 2009-2010	COST /INCOME CB	104	37.8543	1.4422	14.7079		
	NET INTEREST MARGIN IB	44	3.6884	0.5024	3.3328	1.7415	0.0838
	NET INTEREST MARGIN CB	98	2.9845	0.151	1.4951		
	OTHER INCOME OPERATING/ AVERAGE ASSETS IB	50	0.1066	0.055	0.3893	0.2514	0.8018
	OTHER INCOME OPERATING /AVERAGE ASSETS CB	114	0.0863	0.0475	0.5072		
	COST /INCOME IB	40	83.3442	15.06	95.248	4.3644	0.0000
	COST /INCOME CB	98	40.1243	1.6228	16.0653		

Table- 6. T-test leverage ratio

	Variable	Obs	Mean	Std. Err.	Std. Dev.	t-value	p-value
CRISIS PERIOD 2007-2008	TOTAL EQUITY/ TOTAL ASSET IB	59	4.1125	2.6555	20.397	1.7728	0.0783
	TOTAL EQUITY/ TOTAL ASSET CB	124	5.334	2.0771	23.129		
	TOTAL EQUITY/ TOTAL LIABILITIES IB	39	13.460	6.1433	38.365	-0.3465	0.7294
	TOTAL EQUITY/ TOTAL LIABILITIES CB	110	6.7392	2.6193	27.471		
POST CRISIS PERIOD 2009-2010	TOTAL EQUITY/ TOTAL ASSET IB	51	4.885	3.2125	22.941	0.2213	0.8251
	TOTAL EQUITY/ TOTAL ASSET CB	123	5.8011	2.3082	25.599		
	TOTAL EQUITY/ TOTAL LIABILITIES IB	44	22.339	12.2498	81.256	1.7186	0.0877
	TOTAL EQUITY/ TOTAL LIABILITIES CB	114	7.1158	2.8507	30.437		

Table- 7. Definition of variables

Z-score	$Z=(ROA + \text{Capital to asset ratio})/\sigma \text{ ROA}$ Where σ is the standard deviation of ROA (proxy of variation of return)
LAR	loan to total asset ratio
CIR	cost to income ratio
TA	log total assets
SIZE	dummy size =1 if large bank = 0 if small bank
INF	Inflation
GDP	Growth rate of nominal GDP
IDIV	Income diversity= 1- [(net interest income – other operating income)/total operating income]
IB	IB dummy= 1 if Islamic bank = 0 if conventional bank
IBSIZE	size of IB= 1 if large Islamic bank = 0 if small Islamic bank
IBCRISIS	IB dummy*crisisdummy
CBCRISIS	CB dummy*crisis dummy
C	Country dummy variable

Table- 8. Random-Effect GLS regression

	1	2	3	4	5	6	7	8
loan to total asset ratio	-1.961 (0.863)		-1.778 (0.875)	-4.0888 (0.720)	-5.3236 (0.641)	0.5876 (0.959)	3.8278 (0.697)	
cost to income ratio	-0.0012 (0.949)	0.0013 (0.937)	0.0002 (0.991)	-0.00831 (0.672)	-0.0090 (0.649)	-0.0009 (0.963)	0.0010 (0.953)	0.0026 (0.876)
log total assets	-2.658 (0.715)	-0.3721 (0.955)		-14.575 (0.028)**	-16.503 (0.010)***	-2.182 (0.798)	-3.2034 (0.672)	1.2010 (0.874)
dummy size	-61.02 (0.001)***	-58.68 (0.001)***	-64.93 (0.000)***			-41.842 (0.028)**	-40.163 (0.031)**	-59.731 (0.003)***
inflation	0.1124 (0.472)	0.1115 (0.442)	0.1165 (0.455)	0.14329 (0.389)	0.0785 (0.616)	0.2076 (0.219)		0.2203 (0.169)
GDP	0.0160 (0.959)	0.0595 (0.831)	0.0340 (0.912)	-0.2181 (0.530)	-0.0554 (0.861)	-0.2748 (0.438)		-0.2543 (0.436)
Income diversity	-0.4111 (0.521)	-0.0140 (0.902)	-0.3868 (0.543)	-0.5879 (0.358)	-0.4979 (0.435)	-0.4584 (0.465)	-0.3431 (0.522)	-0.0070 (0.951)
IB dummy	-66.213 (0.001)***	-59.209 (0.008)***	-65.474 (0.001)***	-35.022 (0.087)*	-38.704 (0.054)*	-8.1508 (0.485)	-8.407 (0.479)	
size of IB	64.684 (0.008)***	60.305 (0.001)***	64.625 (0.008)***	21.7718 (0.352)	25.251 (0.273)			44.566 (0.037)**
IB dummy*crisisdummy				0.8378 (0.771)	0.2951 (0.918)	2.2358 (0.442)	1.203 (0.591)	2.2369 (0.382)
Cb dummy*crisis dummy				2.0531 (0.268)		3.1307 (0.099)*	3.011 (0.087)*	3.0201 (0.082)*
Bahrain						-85.92 (0.000)***	-86.484 (0.000)***	-70.198 (0.000)***
Kuwait						-65.56 (0.005)***	-65.399 (0.005)***	-47.326 (0.034)**
Qatar						-52.954 (0.020)**	-56.31 (0.014)**	-41.091 (0.057)*
Saudi Arabia						-57.246 (0.007)***	-56.716 (0.009)***	-45.83 (0.022)**
United Arab Emirates						-55.109 (0.008)***	-55.439 (0.008)***	-44.993 (0.020)**
Malaysia						-56.525 (0.016)**	-57.428 (0.016)**	-43.261 (0.049)**
constant	76.768 (0.006)***	1.9605 (0.093)*	68.025 (0.000)***	82.166 (0.007)***	91.274 (0.002)***	111.05 (0.001)***	113.08 (0.000)***	57.057 (0.065)*
Observations	167	180	167	167	167	167	182	180
R-squared	0.2425	0.2113	0.2418	0.1303	0.1318	0.4331	0.4342	0.4328

*:significant at 10%; **: significant at 5%; ***: significant at 1%.