

## **ISLAMIC BANKS AND FINANCIAL STABILITY IN THE GCC: AN EMPIRICAL ANALYSIS**

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### **ABSTRACT**

Since the inception of Islamic banking in the late 1970s, it has grown rapidly all over the world, especially in the GCC where Islamic banking has rapidly become a substantial part of the financial system.

The ongoing turbulence in global financial markets highlights the importance of financial stability for broader economic developments. It is argued that Islamic banking is a viable alternative to promote economic growth and is better-suited to absorb macro-financial shocks because structural advantages over the traditional banking. Given the recent political uprisings in the GCC, the financial stability in these countries has become a major concern not only for countries themselves but also for the rest of the world.

This study aims to empirically analyse the financial strength of Islamic banks based on the data covering individual Islamic and commercial banks in the GCC, including Turkey. It reveals that the financial stability of the large commercial banks is more stable than the financial stability of the large Islamic banks. On the other hand, the financial stability of the small Islamic banks is more stable than the financial stability of the small Commercial banks.

**Key Words:** Islamic Banks, Financial Stability

### **GCC ÜLKELERİNDE İSLAM BANKALARI VE FİNANSAL İSTİKRAR: EKONOMETRİK ANALİZ**

#### **ÖZET**

İslami bankacılık 1970 sonlarında başlamasına karşın, dünya genelinde, özellikle İslami bankacılığın finansal sistemin önemli bir parçası olduğu GCC ülkelerinde hızla büyümüştür.

Küresel finansal piyasalarda devam eden türbülans, daha kapsamlı bir ekonomik gelişme için finansal istikrarın önemini ortaya koymaktadır. İslami bankacılığın, ekonomik büyümeyi sağlamada uygun bir alternatif olduğu ve geleneksel bankacılığa göre yapısal avantajları sebebiyle makro-finansal şokları aşmada daha uygun olduğu iddia edilmektedir. GCC ülkelerindeki son dönemdeki politik yükselme koşullarında, bu ülkelerdeki finansal istikrar, sadece ülkelerin kendisi için değil fakataynı zamanda dünya açısından temel kaygı odağı olmuştur.

Bu çalışma, Türkiye dahil, GCC ülkelerinde İslami ve ticari bankacılık verilerine dayanarak İslami bankacılığın finansal gücünü ampirik olarak analiz etmeyi amaçlamaktadır. Çalışmada elde edilen temel sonuç, büyük ölçekli ticari bankaların finansal istikrarı, büyük ölçekli İslami bankaların finansal istikrarından daha güçlüdür. Diğer yandan, küçük ölçekli İslami bankaların finansal istikrarı, küçük ölçekli ticari bankaların finansal istikrarından daha güçlüdür; şeklindedir.

**Anahtar Kelimeler:** İslami Bankalar, finansal İstikrar

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## 1. INTRODUCTION

While Islamic banking initially was developed as a result of the religious prohibition of the payment or receipt of interest to fulfil the needs of Muslims, Islamic banking has now gained universal acceptance. It has been recognised as one of the fastest growing areas in banking and finance.

The experiment of Islamic banking started in the mid-1960s in Egypt, and proved that Islamic methods of banking were practical and relevant for a banking system, albeit with some refinements. The idea continued to develop theoretically until 1974 when the Islamic Development Bank (IDB) was established, and this was followed by many banks all over the world. Since then, Islamic banking has become a vibrant alternative to conventional banking in the world. It has grown in size and number both in the Muslim and non-Muslim worlds. Not only financial institutions originating from Islamic countries, but also financial institutions with Western-origins offer financial services on interest-free basis on a worldwide scale.

Islamic banking is based on the Sharia that prohibits interest and requires financial transactions to be linked to real economic activity. The basic paradigm of Islamic banking cannot be altered and the Sharia unequivocally prohibits paying and receiving interest, namely *Riba*, on financial transactions: Money is just a medium of exchange, not an asset that can earn a return on itself (El-Gamal, 2006). Accordingly, Islamic banks cannot pay or charge a fixed, predetermined interest rate of return on deposits and loans. Lenders and borrowers in an Islamic transaction are essentially engaged in venture financing and hence the share the associated risk and profits based on profit and loss sharing (PLS) principle of Mudarabah.

Greater fairness emerges from PLS transactions since the risk associated with such a transaction is borne by financier as well as the entrepreneur. This will result in both parties working sufficiently hard to ensure the success of the venture (Halabi, Ridzwa and Shanmugam, 2002). On the contrary, it is claimed that since Islamic banks operate based on PLS principle (Mudarabah), this puts a greater emphasis on operational risk and information disclosure. For instance; Islamic banks cannot mitigate credit risk by demanding collateral from borrowers. In other words, the complexity of PLS-based transactions gives rise to operational risks stemming from information asymmetries. In addition to this, Islamic banks do not have enough control over the management of projects financed operating in compliance with Mudarabah principle (Errico and Farahbashsh, 1998).

The number of Islamic financial institutions worldwide has risen to over 450 today in more than 75 countries. Forty percent of Islamic banks are based in Arab countries, and the Gulf countries serve as a major centre. Total sharia-complaint assets worldwide amounted to around US\$890 billion at the end of 2010. 81 percent of sharia-compliant assets accumulated in MENA region. Nearly one-half of Islamic banks are in Saudi Arabia followed by the UAE at 20%, Kuwait at 17.4%, and Bahrain at 11% (Muhari, 2010), which are the members of the GCC. This basically implies that the GCC countries accounted for around 41 % of the total assets based of Islamic banking worldwide (Caplen and DiVanna 2010; Wilson, 2009).

Islamic finance has continued an upward momentum as traditional markets struggle with the repercussions of the Global Finance Crisis (GFC). Islamic finance held a compound annual growth rate of 23.46 per cent from 2006 to 2010. It reveals that sharia-complaint assets rose by 8.85 per cent from US\$822 billion in 2009 to US\$890 billion in 2010, however, contrasted against the global banking industry. It is not wrong claiming that the direct impact of the GFC on Islamic banking operations has been limited to institutions that access conventional capital market or have participated in transactions requiring a group of banks to provide financing (Caplen&DiVanna, 2010).

The reminder of this study unfolds as: section 2 briefly explains the specific risks inherited in Islamic banks in comparison with conventional ones. In the following an overview of the related studies in the literature section 4 outlines the method and data used. Empirical results are represented in section 5. Finally, section 6 follows with concluding remarks and further research.

## **2. SPECIFIC RISKS IN ISLAMIC BANKING IN COMPARISON WITH CONVENTIONAL BANKING**

On a theoretical level financial instruments based on profit and loss sharing principle are superior financial instruments in a sense that they are in the nature of risk sharing properties of equity, and that the financial institutions operating in compliance with interest-free principles will promote growth in a country by providing long-term financing to growth-oriented sectors of the economy. However, the optimality and the use of such financial instruments will decrease as the level of informational asymmetries increases within an economy. As such, the financial institutions operating in accordance with Islamic principles could only provide long-term financing in the economies where adverse selection and moral hazard problems are minimal.

There are several fundamental differences in terms of the risks inherited by Islamic and conventional banks. Table-1 summarizes the characteristics and provides a synoptic comparison between Islamic banking and traditional banking.

**Table-1: A Comparison Between Islamic and Conventional Banking**

Characteristics	Paradigm Version of Islamic Banking	Conventional Banking
<b>Nominal value guarantee of:</b> <i>Demand deposits</i>	Yes	Yes
<i>Investment deposits</i>	No	Yes
<b>Equity-based system where</b> <i>Capital is at risk</i>	Yes	No
<b>Rate of return on deposits</b>	Uncertain, not guaranteed for investment deposits. Demand deposits are never remunerated	Certain and guaranteed
<b>Mechanism to regulate final returns on deposits</b>	Depending on bank performance/ profits from investment	Irrespective of bank performance / profits from investment
<b>PLS principle is applied</b>	Yes	No
<b>Use of Islamic modes of financing: PLS and non-PLS modes</b>	Yes	Non-applicable
<b>Use of discretion by banks with regard to collateral</b>	Possible for reducing moral hazard in PLS modes Yes in non-PLS modes	Yes, always
<b>Banks' pooling of depositors' funds to provide depositors with professional investment management</b>	Yes	No
<b>Source:</b> Sundararajan and Errico (2002), Annex Table 2. See also Errico and Farahbashsh (1998), p.10		

First, banks operate in interest-free base collect deposits from the public whereas investment banks in the conventional financial system sell their capital to the public. This indicates that shareholders of an investment company are entitled to a number of rights stemming from the ownership of a proportion part of the company's equity capital. As such, a shareholder has a right of receiving a regular flow of information on developments of the company's business and exerting voting rights relative to his share on important matters. Hence, shareholders are in a position to make decisions, monitor the company's performance and influence strategic decisions. On the other hand, banks operating in interest-free base share their net profits (or losses) with depositors according to the profit loss sharing ratio stipulated in contracts made by two parties. Investment deposits cannot be withdrawn before maturity.

Obaidullah (2005) study claims that the withdrawal risk may persuade management to vary from PLS principles by paying competitive market returns to investment account holders regardless of realised performance. In addition to this, depositors do not have voting rights since they are not entitled to the ownership of the bank. Therefore, they are not in a position to influence the bank's investment policy. Second, banks operating in interest-free base (paradigm version) appear to be better poised than traditional counterparts to absorb the external shocks due to the structure of their balance sheets and the use of profit and loss sharing arrangements. In the case of operational losses, unlike the conventional banks, Islamic banks have the ability to reduce the nominal value

of investment deposits, that is, reduce the nominal value of a portion of their liabilities. Consequently, it can be pronounced that solvency risks that may arise from an asset-liability mismatch are typically lower than that in the traditional banking. Third, banks operating compliant with Islamic principles are not supposed to reduce credit risk by systematically requiring collateral or other guarantee as a pre-requisite for granting PLS facilities. Fourth, banks operating according to Islamic principles can pool all of their deposits to provide depositors with professional investment management. From this point of view, banks operating in compliant with Islamic rules show operational similarity with conventional investment companies including mutual funds (Sundajaran and Errico, 2002).

It is clear to all that the GFC of 2008-09 has brought the forefront wide range of issues concerning the stability and soundness of financial system, leading to questioning the need for regulatory reform, adequacy of the existing international financial market environment, and the search for a more enduring solution. In this context, Islamic banking has withdrawn attention increasingly in the sense of its contribution to viability and resilience.

According to Moody's, Islamic financial institutions in the Gulf region showed strong resilience during the GFC turmoil, however, they are not risk-immune emanating from lack of liquid assets and Islamic interbank market. Islamic banking had relatively lesser impact immediately since it has ban on interest and lack of structured products preventing it from investing in assets that turned toxic for conventional banks (Bloom Invest Bank, 2009). It seems that the global expansion of Islamic finance has continued and its development has remained dynamic in the following period of the GFC (IFSB, 2010).

### **3. LITERATURE REVIEW**

There has been a number of studies concentrating on the empirical investigation of Islamic banks' efficiency (see Noor & Ahmad, 2011; Belanes and Hassiki , 2011). However, not many studies have empirically investigated comparing the stability of Islamic banks versus traditional banks. In recent years, especially in the following of the GFC, we have been observing an increase in the number of studies addressing these issues.

Imam & Kpodar (2010) study looks at Islamic banking around the world, identifying the sources of its expansion and formulating policy advice on how to stimulate its further growth. In another words, the study claims that income per capita, share of Muslims in the population and status as oil producers are the significant factors in the diffusion of Islamic banking. The study came to this conclusion by using country-level data for 1992-2006 for 117 countries.

Noor & Ahmad (2011) study investigates the performance of the World Islamic banks within the context of Asia Financial Crisis on 1997 and Global Financial Crisis on 2008 consisting of 25 countries in Muslim world during the period 1997-2009. The empirical finding of this study suggests that Islamic banks are well prepared for the GFC.

Abedifar, Molyneux and Terazi (2011) study investigates risk and stability features of Islamic banking using a sample of 456 banks from 22 countries over the period 2001-2008. They found that there was no significant difference between Islamic and traditional banking in terms of insolvency risk. In addition, they claim that Islamic banks write-off credit more frequent or/and lower loan recoverability in comparison with traditional banks.

It is criticized that the use of z-score for Islamic banks could be misleading since the risk-sharing arrangement provide additional protective buffer in deposit liabilities, meaning that the book values of capital and reserves may underestimate financial strength of Islamic banks. Al Zaabi (2011) study, based on Z score model developed by Altman, attempted to predict bankruptcy and measure the financial performance of major Islamic banks in the UAE. One of the findings of the paper is that Z-score model can be adapted by Islamic banks as an independent credit risk analysis approach to measure the competencies and financial strengths of potential projects.

Cihak&Hesse (2010) study provides a cross-country empirical analysis of the role of Islamic banks in financial stability. In the study they regress banks' individual z-scores as a measure of financial strengths to other bank specific measures and macroeconomic variables by applying the pooled ordinary least squares technique . Using the z-score as a measure of bank individual stability for 19 banking system, they found that the larger Islamic banks tend to be riskier than smaller Islamic banks and similar large banks, while smaller banks tend to be more stable than smaller commercial banks.

Hassan & Dridi (2010) examines the performance of Islamic and commercial banks during the GFC . They looked at the impact of crisis on profitability, credit and asset growth, and external ratings in a group of countries where dual banking system exist with a significant market share. It reveals that Islamic banks' credit and asset growth performed better than did that of conventional banks in 2008-09, contributing to financial and economic stability. In addition, factors related to Islamic banks' business model helped limit the adverse impact on profitability in 2008, while weaknesses in risk management practices in some Islamic banks lead to a larger decline in profitability in 2009 compared to conventional banks. In sum, it is empirically suggested that Islamic banks have been affected differently by the GFC than conventional banks.

#### **4. METHODOLOGY AND DATA**

The individual bank data used in this empirical study were obtained from Thomson Reuters data base. The empirical study deals with 54 commercial banks and 16 Islamic banks belonging to the GCC countries, including Jordan and Turkey over the period of 2001-2010. Although Jordan currently is not a member of the GCC, she was included in the countries under investigation since Jordan was invited by the GCC to apply for membership on May 10, 2011 and this invitation was welcomed in Jordan. Five out of six GCC states have Islamic banks, the exception being Oman, having no local Islamic bank (Wilson, 2010). As a result, Oman is not studied although she is a member of the GCC.

The dataset used in the empirical analysis do not include the commercial banks running Islamic banking through Islamic windows. Our sample covers banks in the following

jurisdictions (alphabetically ordered): Bahrain, Jordan, Kuwait, Qatar, Saudi Arabia, United Arab Emirates and Turkey. In total, we have 700 observations for 16 Islamic banks and 54 commercial banks over the period 2001 to 2010. Appendix V shows the role and the description of individual variables used in model.

To classify whether a bank is conventional or Islamic, we have used the Thomson Reuters Knowledge database. In our calculation, large banks are defined as those with total assets of more than US\$1 billion. All others are classified as small banks. By doing so, we attempted to capture the importance of bank size on stability in Islamic and conventional banks, presenting the empirical results separately for sub-samples of large banks and small banks. Although the threshold used to separate the large banks from small banks is arbitrary, we followed the earlier studies in this manner. About 81 percent of the Islamic banks and 89 per cent of the commercial banks in our data set fall into large bank category.

There are several issues relating to Reuters Thomson Knowledge data base need to be mentioned. The Islamic banks available in Reuters Thomson Knowledge data base are publicly traded banks. Thomson Reuters' Islamic banking data for the GCC is amounted to about US\$219 billion, constituting more than half of the total shairah-complaint assets worldwide. Thus, the sample we studied could be considered as a wide range of coverage of Islamic banking.

In the study, it is mainly investigated the determinants of Z-scores for large and small the Islamic and the Commercial Banking Systems. Our methodology depends on panel pooled regression models. As in all models, Redundant Fixed Effects Tests indicate that panel pooled regression models with Ordinary Least Squares (OLS) can be applied for modelling the Z score equation

In order to analyse the financial strength of Islamic banks we adopt an approach similar to Cihak and Hesse 2008; Cihak and Hesse, 2010) that uses a modelling approach that link risk, bank individual financial features and country features. The main part of our approach is to test, using regressions of z-scores as a function of a number of variables. A general class of panel models of the form is (Cihak and Hesse, 2010);

$$z_{i,j,t} = \alpha + \beta B_{i,j,t-1} + \gamma I_{j,t-1} + \sum \delta_s T_s + \sum \phi_s T I_{j,t-1} + \sum \varphi_s B_{i,j,t-1} T_s + \varpi M_{j,t-1} + \sum \lambda_j C_j + \sum \pi_t D_t + \varepsilon_{i,j,t}$$

where the dependent variable is the z-score  $z_{i,j,t}$  for bank  $i$  in country  $j$  at time  $t$ ;

$B_{i,j,t-1}$  is a vector of bank-specific variables;  $I_{j,t-1}$  contains time-varying industry-specific variables;  $T_s$  and  $T_s I_{j,t-1}$  are the type of banks and the interaction between the

type and some of the industry-specific variables;  $M_{j,t-1}$ ,  $C_j$ , and  $D_t$  are vectors of macroeconomic variables, country and yearly dummy variables, respectively; finally,

$\varepsilon_{i,j,t}$  is the residual.

## **5. EMPIRICAL RESULTS**

Descriptive statistics of the variables and the correlation matrix of the variables are given at the Appendix VI and Appendix VII. Total observations of the variables are 700. The correlation matrix of the variables in level for all banks indicates z-score is positively correlated with LOAN-ASSET, INCD, IBMSH and GDP; on the other hand z-score is negatively correlated with other variables.

The results of panel unit root tests are given at the Appendix VIII. All the variables are not stationary in level, but stationary in the first differences for all the models. Appendix VIII for the results of panel unit root tests gives that the p values are lower than 0.05 critical values, and thus null hypothesis has been rejected. These results indicate that the unit root process in these series and unit root process for each unit (banks) do not have a unit root in the first differences for all the models.

Table-2 shows the Panel Pooled Model Results. All models satisfied the diagnostic tests. In the all models, Redundant Fixed Effects Tests indicate that pooled regression models can be applied for modelling the z-score equation. In the all models, Wooldridge Test (2002) is applied for autocorrelation problem after conformity of pool Model has been determined. Hypothesis of  $H_0$  is accepted that specifying there is no autocorrelation in the all models. LR test for heteroscedasticity shows that there is no heteroscedasticity in the all models.

Table-2/A, all bank results show that INCD, EXCRD, NLTA, H\_INDEX, D3 (small and large banks dummy) and AR (1) variables are significant statistically at %5. INCD, EXCRD, NLTA, H\_INDEX, D3 and AR (1) affect the z-score in the same direction. As INCD, EXCRD, NLTA, H\_INDEX, D3 and AR (1) increase then Z score rises, vice versa. On the other hand, as D3 dummy variable representing the large bank and the small banks is significant, we analyse z-score for the large bank and the small banks in detail by considering Islamic and Commercial banking systems.

Table-2/B, Commercial large bank results shows that INCD, INFR, IBMSH, H\_INDEX and AR (1) variables are significant statistically at %5 significant level. INCD and AR (1) affect the z-score in the same direction, while INFR, IBMS and H\_INDEX affect the z-score negatively. As increasing the variables, INCD and AR (1) then Z score rises, vice versa. On the other hand, as increasing the variables, INFR, IBMS and H\_INDEX then z-score decrease.

Table-2/C, Commercial small bank results shows that INCD, IBMSH, H\_INDEX and AR (1) variables are significant statistically at %5 significant level. H\_INDEX and AR (1) variables affect the z-score in the same direction, while INCD and IBMSH affect the z-score in the opposite direction. As increasing the variables, H\_INDEX and AR (1) then z-score rises, vice versa. On the other hand, as increasing the variables, INCD and IBMS then z-score decrease.



TABLE-2 PANEL POOLED MODELS RESULTS (Dependent Variable, Z SCORE)											
ALL BANKS RESULTS (A)				COMMERCIAL BANKS RESULTS							
				Large Banks Results (B)				Small Banks Results (C)			
Variables	Coef	t-Stat	Prob	Variables	Coef.	t-Stat	Prob.	Variables	Coef	t-Stat	Prob
CIR	-0.079	-1.312	0.189	CIR	-1.53	-1.12	0.26	CIR	0.15	0.34	0.74
INCD	<b>0.857</b>	<b>5.485</b>	<b>0.000*</b>	INCD	<b>3.55</b>	<b>5.86</b>	<b>0.00*</b>	INCD	<b>-3.08</b>	<b>-3.66</b>	<b>0.00*</b>
EXCRD	<b>0.006</b>	<b>2.270</b>	<b>0.023*</b>	EXCRD	-0.01	-1.07	0.29	EXCRD	-0.01	-1.52	0.14
INFR	0.001	0.155	0.876	INFR	<b>-8.73</b>	<b>-4.05</b>	<b>0.00*</b>	INFR	0.06	1.51	0.14
IBMSH	-0.007	-0.003	0.997	IBMSH	<b>-10.1</b>	<b>-2.93</b>	<b>0.00*</b>	IBMSH	<b>-12.0</b>	<b>-2.37</b>	<b>0.02*</b>
NLTA	<b>0.435</b>	<b>3.234</b>	<b>0.002*</b>	NLTA	-0.12	-0.15	0.88	NLTA	0.76	0.51	0.62
GDP	0.475	0.655	0.512	GDP	1.13	0.61	0.55	GDP	-2.10	-0.70	0.49
H_INDXX	<b>2.184</b>	<b>2.304</b>	<b>0.021*</b>	H_INDXX	<b>-3.23</b>	<b>-1.93</b>	<b>0.05*</b>	H_INDXX	<b>1.32</b>	<b>2.80</b>	<b>0.01*</b>
D1	-0.189	-1.203	0.229	C	<b>5.40</b>	<b>4.26</b>	<b>0.00*</b>	C	<b>5.14</b>	<b>2.60</b>	<b>0.01*</b>
D2	-0.739	-0.991	0.321	AR(1)	<b>0.69</b>	<b>9.05</b>	<b>0.00*</b>	AR(1)	<b>0.46</b>	<b>3.09</b>	<b>0.00*</b>
D3	<b>0.240</b>	<b>7.891</b>	<b>0.000*</b>								
C	<b>3.195</b>	<b>3.401</b>	<b>0.000*</b>								
AR(1)	<b>0.878</b>	<b>47.68</b>	<b>0.000*</b>								
R-squared	0.79	Mean Dep. var	2.61	R-squared	0.66	Mean Dep. var	2.82	R-squared	0.62	Mean Dep. var	1.01
Adj. R-squared	0.79	S.D. Dep.var	2.06	Adj. R-squared	0.62	S.D. Dep.var	1.46	Adj. R-squared	0.52	S.D. Dep.var	1.09
S.E. of regress.	0.94	Akaike info C.	2.73	S.E. of regress.	0.89	Akaike info C.	2.70	S.E. of regress.	0.76	Akaike info C.	2.47
Sum squared R.	546	Schwarz C.	2.82	Sum squared R.	71	Schwarz C.	2.97	Sum squared R.	19.95	Schwarz C.	2.87
Log likelihood	-849	Hann-Quinn C.	2.77	Log likelihood	123.87	Hann-Quinn C.	2.81	Log likelihood	-45.5	Hann-Quinn C.	2.62
Prob(F-stat)	0.00*	D-W Stat.	2.18	Prob(F-stat)	0.00*	D-W Stat.	1.88	Prob(F-stat)	0.00*	D-W Stat.	2.12
Heteroscedasticity LR Test	F-statistic	Prob.		Heteroscedasticity LR Test	F-statistic	Prob.		Heteroscedasticity LR Test	F-statistic	Prob.	
	28.52	0.74*			23.76	0.56*			22.75	0.38*	
Autocorrelation Wooldridge Test	F-statistic	Prob.		Autocorrelation Wooldridge Test	F-statistic	Prob.		Autocorrelation Wooldridge Test	F-statistic	Prob.	
	18.08	0.66*			25.27	0.48*			28.86	0.43*	
Redundant Fixed Effects Tests	Cross-section F	Prob.		Redundant Fixed Effects Tests	Cross-section F	Prob.		Redundant Fixed Effects Tests	Cross-section F	Prob.	
	1.480	0.22*			8.056	0.23*			1.857	0.14*	

Source: Calculations of the Authors

Table-3/A, Islamic large bank results shows that CIR, INCD, EXCRD, IBMSH, H\_INDX and AR (1) variables are significant statistically at %5 significant level. INCD and AR (1) affect the z-score in the same direction, while CIR, EXCRD, IBMSH and H\_INDEX affect the z-score in the opposite direction. As increasing the variables, INCD and AR (1) then z-score rise, vice versa. On the other hand, as increasing the variables, CIR, EXCRD, IBMSH and H\_INDEX then z-score decrease.

Table-3/B, Islamic small bank results shows that INCD, EXCRD, H\_INDEX and AR (1) variables are significant statistically at %5 significant level. INCD, H\_INDEX and AR (1) variables affect the z-score in the same direction, while EXCRD affects the z-score negatively. As increasing the variables, INCD, H\_INDEX and AR (1) then Z score rises, vice versa. On the other hand, as increasing the variables, EXCRD then z-score decreases.

As comparing the large Islamic and the large Commercial banks according to the variables affecting z-score, we found that CIR and EXCRD variables affect the z-score of Islamic large banks inversely, while CIR variable has no effect on the z-score of the Commercial large banks. On the other hand, INFR variable affects the z-score of the Commercial large banks inversely, while INFR variable has no effect on the z-score of the Islamic large banks. Other variables in the model B and D affect z-score in the same way.

As comparing the small Islamic and the small Commercial banks according to the variables affecting z-score, we found that EXCRD variable affect the z-score of Islamic small banks inversely, while EXCRD variable has no effect on the z-score of the Commercial small banks. On the other hand, IBMSH variable affects the z-score of the Commercial small banks inversely, while IBMSH variable has no effect the z-score of the Islamic small banks. Another important point is that INCD variable affect the z-score of Islamic small banks directly, while INCD variable affect the z-score of Commercial small banks inversely. These results from those Islamic small banks manage more efficiently INCD variable than Commercial small banks.

TABLE-3 PANEL POOLED MODELS RESULTS (Dependent Variable, Z SCORE)							
ISLAMIC BANKS RESULTS							
Large Banks Results (A)				Small Banks Results (B)			
Variables	Coef	t-Stat	Prob	Variables	Coef	t-Stat	Prob
CIR	-0.13	-2.02	0.04	CIR	-0.05	-1.67	0.10
INCD	1.03	5.40	0.00*	INCD	0.08	2.26	0.03*
EXCRD	-0.01	-2.04	0.04*	EXCRD	-10.1	-3.12	0.00*
INFR	0.00	-0.36	0.72	INFR	0.01	0.44	0.66
IBMSH	-3.31	-11.00	0.00*	IBMSH	-3.14	-1.64	0.11
NLTA	0.39	0.74	0.46	NLTA	-0.01	-0.61	0.55
GDP	-0.08	-0.10	0.92	GDP	0.49	1.15	0.26
H_INDX	-2.80	-2.51	0.01*	H_INDX	2.19	2.84	0.01*
C	2.66	3.15	0.00*	C	1.72	2.56	0.01*
AR(1)	0.90	45.90	0.00*	AR(1)	3.48	2.63	0.01*
R-squared	0.83	Mean Dep. var	3.0	R-squared	0.56	Mean Dep. var	1.82
Adj. R-squared	0.83	S.D. Dep.var	2.2	Adj. R-squared	0.45	S.D. Dep.var	3.73
S.E. of regress.	0.90	Akaike info C.	2.6	S.E. of regress.	1.10	Sum squared R.	42
Sum squared R.	347	Schwarz C.	2.7				
Log likelihood	-573	Hannn-Quinn C.	2.7	F-stat	4.98		
Prob(F-stat)	0.0*	D-W Stat.	2.2	Prob,F-stat)	0.0*	D-W Stat.	1.5
Heteroscedasticity LR Test	F-statistic		Prob.	Heteroscedasticity LR Test	F-statistic		Prob.
	38.97		0.41*		24.56		0.37*
Autocorrelation Wooldridge Test	F-statistic		Prob.	Autocorrelation Wooldridge Test	F-statistic		Prob.
	32.97		0.52*		22.9		0.31*
Redundant Fixed Effects Tests	Cross-section F		Prob.	Redundant Fixed Effects Tests	Cross-section F		Prob.
	9.7		0.17*		1.66		0.18*

Source: Calculations of the Authors

Table-4 shows the coefficient of variation (CV) for all banking systems. The coefficient of variation measures the variability of a series of numbers independently of the unit of measurement used for these numbers. In order to do so, the coefficient of variation eliminates the unit of measurement of the standard deviation of a series of numbers by dividing it by the mean of these numbers. The coefficient of variation can be used to compare distributions obtained with different units (Abdi, 2010).

Table-4 Coefficient of Variation (CV) for All Banking Systems				
	Commercial Banks		Islamic Banks	
	Large Banks	Small Banks	Large Banks	Small Banks
Std. Dev. ( $\sigma$ )	1,447	1,052	2,195	0,896
Mean ( $\mu$ )	2,766	0,968	2,880	0,946
Coefficient Of Variation (CV) $CV=(\sigma/\mu)*100$	52,314	108,678	76,215	94,675

Source: Calculations of the Authors

The CV of large commercial banks is smaller than the CV of the large islamic banks. It means that the financial stability of the large commercial banks is more stable than the financial stability of the large Islamic banks. The CV of small islamic banks is smaller than the CV of the small commercial banks. This result shows that the financial stability of the small islamic banks is more stable than the financial stability of the small commercial banks.

## **6. CONCLUSIONS**

Although the GCC has resulted in a large decline in oil prices and has reduced the profitability of all financial institutions in the GCC, including Islamic banks, it may also present opportunities (Wilson, 2010). This work covers the relationship between financial stability and banks financial performance as well as macro indicators in a sample of publicly traded banks in the GCC, including Turkey. As the major international banks have been weakened by the GFC, this undoubtedly presents an opportunity for the GCC Islamic banks which have been adversely affected.

Coefficient of variation result shows that the financial stability of the large Commercial banks is more stable than the financial stability of the large Islamic banks. On the other hand, the financial stability of the small islamic banks is more stable than the financial stability of the small commercial banks.

Pooled panel regression results show that the effects of the macroeconomic variables and financial ratios on the z-score vary across banking groups. One of the important reasons of this situation is the management skills differences across the banking systems in the face of the risks from the changes in the macroeconomic variables and financial ratios.

As a result, as increasing the management skills of any banking systems, the negative effects of the changes of the macroeconomic variables and financial ratios decreases or vice versa.

This study needed to be extended through several perspectives. By modelling the sample data set, governance, various market structure measures of the banking sector in the countries studied and alternative bank performance measures could be added as explanatory variables.

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**APPENDIX I: Top 25 Countries by Shariah-Compliant Assets**

Rank	Country	Sharia-complaint assets	%
		(US\$ million)	
1	Iran	314.897,4	33,4
2	Saudi Arabia	138.238,5	14,7
3	Malaysia	102.639,4	10,9
4	UAE	85.622,6	9,1
5	Kuwait	69.088,8	7,3
6	Bahrain	44.858,3	4,8
7	Qatar	34.676,0	3,7
8	Turkey	22.561,3	2,4
9	UK	18.949,0	2,0
10	Bangladesh	9.365,5	1,0
11	Sudan	9.259,8	1,0
12	Egypt	7.227,7	0,8
13	Indonesia	7.222,2	0,8
14	Pakistan	6.203,1	0,7
15	Syria	55.277,7	5,9
16	Jordon	5.042,4	0,5
17	Brunei	3.314,7	0,4
18	Yemen	2.338,7	0,2
19	Thailand	1.360,8	0,1
20	Algeria	1.015,1	0,1
21	Mauritius	992,2	0,1
22	Switzerland	935,5	0,1
23	Tunisia	770,1	0,1
24	Singapore	725,0	0,1
25	Palestine	612,5	0,1

**APPENDIX II: Islamic and Conventional Banks Considered in The Analysis**

<b>BAHRAIN</b>	<b>BANKS</b>	
1	AHLI UNITED BANK	Conventional Bank
2	BBK BANK	Conventional Bank
3	UNITED GULF BANK	Conventional Bank
4	ARAB BANK CORP. BSC	Conventional Bank
5	SAUDI BANK	Conventional Bank
6	NATIONAL BANK OF BAHRAIN	Conventional Bank
7	BAHRAIN MIDDLE EAST BANK	Conventional Bank
8	AL BARAKA	Islamic Bank
9	BAHRAIN ISLAMIC BANK	Islamic Bank
<b>JORDAN BANKS</b>		
1	ARAB BANK PLC	Conventional Bank
2	BANK OF JORDAN	Conventional Bank
3	JORDAN KUWAIT BANK	Conventional Bank
4	UNION BANK	Conventional Bank
5	CAIRO AMMAN BANK	Conventional Bank
6	JORDAN AHLI BANK	Conventional Bank
7	SOCIETE GENERALE DE BANQUE JORDAN	Conventional Bank
8	CAPITAL BANK OF JORDAN	Conventional Bank
9	JORDAN DUBAI ISLAMIC BANK	Islamic Bank
10	JORDAN ISLAMIC	Islamic Bank
<b>KUWAIT BANKS</b>		
1	AHLI UNITED BANK	Conventional Bank
2	BURGAN BANK	Conventional Bank
3	AL AHLI BANK OF KUWAIT	Conventional Bank
4	GULF BANK	Conventional Bank
5	NATIONAL BANK	Conventional Bank
6	COMMERCIAL BANK OF KUWAIT	Conventional Bank
7	BOUBYAN BANK	Islamic Bank
8	KUWAIT FINANCE HOUSE	Islamic Bank
<b>QATAR BANKS</b>		
1	AHLI BANK QSC	Conventional Bank
2	COMMERCIAL BANK OF QATAR	Conventional Bank
3	QATAR NATIONAL BANK	Conventional Bank
4	DOHA BANK	Conventional Bank
5	QATAR ISLAMIC BANK	Islamic Bank
6	QATAR INTERNATIONAL ISLAMIC BANK	Islamic Bank
<b>TURKEY'</b>		
<b>BANKS</b>		
1	TÜRKİYE HALK BANKASI	Conventional Bank
2	TÜRKİYE VAKIFLAR BANKASI	Conventional Bank
3	AKBANK	Conventional Bank
4	ALTERNATİF BANK	Conventional Bank
5	DENİZBANK	Conventional Bank
6	YAPI VE KREDİ BANKASI	Conventional Bank
7	TEKSTİL BANK	Conventional Bank
8	FINANSBANK	Conventional Bank
9	GARANTİ BANKASI	Conventional Bank
10	ŞEKERBANK	Conventional Bank
11	TÜRK EKONOMİ BANKASI	Conventional Bank
12	FORTİS	Conventional Bank
13	İŞ BANKASI	Conventional Bank
14	BANK ASYA	Islamic Bank
15	ALBARAKA TÜRK	Islamic Bank
<b>UAE BANKS</b>		
1	ABU DHABI COMMERCIAL BANK	Conventional Bank
2	BANK OF SHARJAH	Conventional Bank
3	COMMERCIAL BANK OF DUBAI	Conventional Bank
4	EMIRATES NBD	Conventional Bank
5	MASHREQBANK PSC	Conventional Bank
6	NATIONAL BANK OF FUTAIRAH	Conventional Bank

**APPENDIX II: Islamic and Conventional Banks Considered in The Analysis**

7	UNION NATIONAL BANK	Conventional Bank
8	NATIONAL BANK OF ABU DHABI	Conventional Bank
9	FIRST GULF BANK	Conventional Bank
10	SHARIAH ISLAMIC BANK	Islamic Bank
11	ABU DHABI ISLAMIC BANK	Islamic Bank
12	DUBAI ISLAMIC BANK	Islamic Bank
<b>S.ARABIA BANKS</b>		
1	BANQUE SAUDI FRANSI	Conventional Bank
2	SAUDI BRITISH BANK	Conventional Bank
3	ARAB NATIONAL BANK	Conventional Bank
4	RIYAD BANK	Conventional Bank
5	SAUDI HOLLANDI BANK	Conventional Bank
6	SAMBA FINANCIAL GROUP	Conventional Bank
7	SAUDI INVESTMENT BANK	Conventional Bank
8	AL RAJHI BANK	Islamic Bank
9	ALBILAD BANK	Islamic Bank
10	BANK AL JAZIRA	Islamic Bank

**APPENDIX III: Number of Banks by Country in the GCC**

country	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Bahrain	7 CB 2 IB	7 CB 2 IB	7 CB 2 IB	7 CB 2 IB	7 CB 2 IB	7 CB 2 IB	7 CB 2 IB	7 CB 2 IB	7 CB 2 IB	7 CB 2 IB
Jordan	8 CB 2 IB	8 CB 2 IB	8 CB 2 IB	8 CB 2 IB	8 CB 2 IB	8 CB 2 IB	8 CB 2 IB	8 CB 2 IB	8 CB 2 IB	8 CB 2 IB
Kuwait	6 CB 2 IB	6 CB 2 IB	6 CB 2 IB	6 CB 2 IB	6 CB 2 IB	6 CB 2 IB	6 CB 2 IB	6 CB 2 IB	6 CB 2 IB	6 CB 2 IB
Qatar	4 CB 2 IB	4 CB 2 IB	4 CB 2 IB	4 CB 2 IB	4 CB 2 IB	4 CB 2 IB	4 CB 2 IB	4 CB 2 IB	4 CB 2 IB	4 CB 2 IB
Turkey	13 CB 2 IB	13 CB 2 IB	13 CB 2 IB	13 CB 2 IB	13 CB 2 IB	13 CB 2 IB	13 CB 2 IB	13 CB 2 IB	13 CB 2 IB	13 CB 2 IB
UAE	9 CB 3 IB	9 CB 3 IB	9 CB 3 IB	9 CB 3 IB	9 CB 3 IB	9 CB 3 IB	9 CB 3 IB	9 CB 3 IB	9 CB 3 IB	9 CB 3 IB
Saudi Arabia	7 CB 3 IB	7 CB 3 IB	7 CB 3 IB	7 CB 3 IB	7 CB 3 IB	7 CB 3 IB	7 CB 3 IB	7 CB 3 IB	7 CB 3 IB	7 CB 3 IB

Notes: CB quotes to conventional banks whereas IB refers to Islamic bank.

**APPENDIX IV: Total Assets of Islamic Banks Used by Country (US\$ million)**

countries	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Sharia Compliant T.Assets (*)	%
Bahrain	4134	4417	4731	5733	7127	8784	11852	13590	15937	18363	44858	40,93
Jordan	172	1294	1537	1739	2034	2263	2442	2776	3284	4062	5042	80,56
Kuwait	8734	9374	11133	12637	18075	24594	34908	40928	45036	50073	69088	72,48
Qatar	1247	2175	2560	3478	4460	6342	8770	12437	15684	19715	34676	56,86
Turkey	720	1077	1395	2401	3397	4713	8517	8393	12112	13476	22561	59,73
UAE	6425	8345	9454	13067	18759	29347	37080	41052	44428	80537	85622	59,02
S. Arabia	15492	16774	19880	24021	31208	35872	44174	55514	55839	62769	138238	45,41

Sources: Authors calculations based on Thomson Reuters Knowledge Database. (\*)The Banker (2011), Top 500 Islamic Financial Institutions.

**APPENDIX V : Description of Variables Used in the Analysis**

Variables	Abbr.	Definition	Source
Z-score	Z-SCR	Measurement of the financial Strength. Defined as $z = (k + \mu) / \sigma$ , where k is equity capital as per cent of assets, $\mu$ is average return as per cent of assets, and $\sigma$ is standard deviation of return on assets as a proxy for return volatility. Measures the number of standard deviations a return realization has to fall in order to deplete equity, under the assumption of normality of banks' returns.	Authors' calculations Reuters data.
Net Loans Total Assets	NLTA	Ratio of loans to assets (per cent).	Reuters data.
Cost Income Ratio	CIR	Measurement of the efficiency and profitability. Ratio of cost to income (per cent).	Reuters data.
Income Diversity	INCD	Measurement of risk = $[1 - (\text{Net Operating Income} - \text{Other Operating Income}) / \text{Operating Income}]$	Authors' calculations based on Cihak and Hesse (2008) Reuters Knowledge Database
Herfindahl Index	H-INDX	Sum of squared market shares of banks in the system.	Authors' calculations based on Reuters knowledge data.
GDP Growth	GDP	Growth rate of nominal GDP, adjusted for inflation (in local currency).	IMF (International Financial Statistics)
Inflation	INFR	Year-on-year change of the CPI index (per cent).	IMF (International Financial Statistics)
Exchange Rate Depreciation	EXCRD	Year-on-year change in the nominal exchange rate, local currency per U.S. dollars (per cent).	IMF (International Financial Statistics)
Share of Islamic Banks	IBMSH	Market share of Islamic banks in a country per year.	Authors' calculations based on Reuters knowledge data.
Country Dummy	D1	Country Codes	
Islamic Bank Dummy	D2	Equals 1 for Islamic banks; 0 otherwise	Authors' calculations based on Reuters Knowledge Database
Large and Small Bank Dummy	D3	Equals 1 for banks having assets larger than 1 billion USD; 0 otherwise	Authors' calculations based on Reuters Knowledge Database



APPENDIX VI Descriptive Statistics of The Variables for All Banks									
	Z_SCORE	LOAN_ASSET	INFR	INCD	IBMS	H_INDEX	GDP	CIR	EXCR
Mean	2.555864	0.522600	6.971800	0.733657	0.122229	0.248171	0.057114	0.375400	4.387284
Median	2.195000	0.550000	4.250000	0.740000	0.140000	0.180000	0.053000	0.310000	0.176000
Maximum	10.82000	0.900000	68.49000	2.180000	0.310000	0.650000	0.268000	9.680000	74.80000
Minimum	-2.750000	-0.050000	4.870000	3.000000	0.010000	0.010000	0.057000	0.010000	0.000000
Std. Dev.	2.081709	0.189752	10.57633	0.344197	0.077474	0.175171	0.053625	0.485146	12.33726
Skewness	0.861157	-0.796061	4.403305	2.623571	0.032432	0.985368	0.895376	13.24510	4.081574
Kurtosis	4.377912	3.758507	25.14124	37.93785	2.015077	2.819204	5.939891	223.8099	20.50174
Jarque-Bera	141.8961	90.71383	16560.57	36405.43	28.41651	114.2308	345.6179	1442547.	10877.65
Probability	0.000000	0.000000	0.000000	0.000000	0.000001	0.000000	0.000000	0.000000	0.000000
Sum	1789.105	365.8200	4880.260	513.5600	85.56000	173.7200	39.98000	262.7800	3071.099
Sum Sq. Dev.	3029.126	25.16807	78189.32	82.81144	4.195523	21.44866	2.010069	164.5214	106393.4
Observations	700	700	700	700	700	700	700	700	700

g APPENDIX VII Correlation Matrix of The Variables in Level for All Banks									
	Z_SCORE	LOAN_ASSET	INFR	INCD	IBMS	H_INDEX	GDP	CIR	EXCR
Z_SCORE	1.000000	0.100552	0.166735	0.029302	0.155759	-0.013534	0.200202	0.146756	0.131378
LOAN_ASSET	0.100552	1.000000	0.215229	0.225478	0.311570	-0.133002	0.032264	0.128585	0.108026
INFR	-0.166735	-0.215229	1.000000	0.050903	0.324909	-0.162089	0.169896	0.141390	0.615743
INCD	0.029302	-0.225478	0.050903	1.000000	0.047721	-0.056418	0.097680	0.036334	0.026397
IBMS	0.155759	0.311570	0.324909	0.047721	1.000000	-0.334986	0.022724	0.178289	0.190739
H_INDEX	-0.013534	-0.133002	0.162089	0.056418	0.334986	1.000000	0.043429	5.74E-05	0.194808
GDP	0.200202	0.032264	0.169896	0.097680	0.022724	0.043429	1.000000	0.105275	0.300403
CIR	-0.146756	-0.128585	0.141390	0.036334	0.178289	5.74E-05	0.105275	1.000000	0.126840
EXCR	-0.131378	-0.108026	0.615743	0.026397	0.190739	-0.194808	0.300403	0.126840	1.000000

APPENDIX VIII Panel Unit Root Test Results						
Variables	Levin, Lin & Chu t		Im, Pesaran and Shin W-stat		ADF - Fisher Chi-square	
	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**
CIR	-11.72	0.0000	-5.2297	0.0000	55.3266	0.0000
INCD	-12.8784	0.0000	-6.3106	0.0000	62.4066	0.0000
EXCR	-8.1410	0.0000	-3.6617	0.0000	38.571	0.0000
INFR	-330.363	0.0000	-108.629	0.0000	31.8813	0.0000
IBMS	-8.1133	0.0000	-2.7578	0.0000	31.425	0.0000
NL/TA	-4.0956	0.0000	-1.6036	0.0344	26.3739	0.0232
GDP	-19.5226	0.0000	-4.6365	0.0000	39.0257	0.0004
H-INDEX	-8.9265	0.0000	-3.1326	0.0009	38.1695	0.0000
All Variables in First Differences, Cross Sec.=70, Obs.=700, **Significant at %5						

