

Testing the Financial Stability of Banks in GCC Countries: Pre and Post Financial Crisis

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ABSTRACT

Stability of the banking system is underpinned through an effective bank monitoring mechanism since the sector is resilient to a range of single and combined shocks. Banks financial stability in the Gulf Cooperation Council (GCC) countries was empirically assessed by using z-score as a dependent variable. A group of macro and microeconomic independent variables were selected to measure their effects on banks stability. All banks in this region that are considered Conventional or Islamic banks were selected. The targeted period was 2003-2010 to cover pre- and post- financial crisis. It was found that there is no evidence that there is a significant difference between the financial stability of Conventional and Islamic banks for the periods 2003-2010, 2003-2007, and 2008-2010. However, Conventional banks tend to be financially stronger than Islamic banks for the pre- financial crisis.

Keywords: Testing, Financial Stability, Banks, Financial Crisis, GCC Countries

1. Introduction

The ever-increasing phenomenon of globalization has made the concept of productivity more vital both for nonfinancial and financial institutions, banks being part of them. Banks are largely driven by a competitive marketing strategy that determines the extent of their success and growth. The modalities of the banking business have changed a lot compared to the way they used to be. A number of factors seem to be at work in this regard, e.g. trends towards mergers and acquisitions, deregulation of financial markets including banks, a faster pace of innovations, the launching of new financial products, competition between local and foreign banks and the development of e-banking activities. After the global financial crisis that began by the end of 2007, a great debate among financial analysts questioning the financial stability of all corporations including banks. In December 2010 (revised in June 2011), Basel III was introduced to strengthen global capital and liquidity rules with the goal of promoting a more resilient banking sector. The objective of the reforms of Basel III is to improve the banking sector's ability to absorb shocks arising from financial and economic stress to reduce the effect from the financial sector to the real economy in case of crisis.

The economies of the country members of the Gulf Cooperation Council (GCC) share a number of aspects. All of them are oil exporters. At the same time they have large investments in real estate industry that was mainly funded by the banks in the region. Thus, they are exposed to the crisis from two sides: the drop of the oil prices during the recession and would be affected by the real estate sector that triggered the crisis. All Gulf Cooperation Council (GCC) countries were affected by the crisis. Their financial markets dropped with a range between 20-60%.

In this region there are two types of banks i.e. Conventional and Islamic banks, they share some aspects but at the same times they have different ways of doing their business. Islamic banks and Islamic scholars usually claim theoretically that since Islamic banks invest their funds through the “real economy” they have a better ability to absorb any financial crisis. Yet, this is to be proven empirically. This paper is an attempt to empirically test the variables that affect banks financial stability in Gulf Cooperation Council (GCC) countries pre and post-crisis and to test whether Islamic banks are more stable than Conventional banks.

2. Literature Review

Alkassim (2005) attempts to comparatively, studying the profitability between the Conventional and the Islamic banks in Gulf Cooperation Council (GCC) countries from 1997 to 2004. The study reached the following results: Firstly, bigger conventional banks are less profitable; secondly, higher capital ratios increase Islamic banks profitability, thirdly, total loans for both types of banking improves profitability, fourthly, deposits impact on Islamic banks profitability is negative whereas it contributes to Conventional banks profitability, fifthly, total expenses for conventional banks impact profitability negatively whereas total expenses for Islamic banks help profitability, and, finally, non-interest expense assists both Islamic and conventional banking profitability.

Abu Lughod (2007) studied the comparison of profitability, liquidity and capital structure of Islamic and Conventional banks in Gulf Cooperation Council (GCC) countries over the period 2000 to 2005. The study concluded that Islamic banks had higher profitability ratios in except in United Arab Emirates. The analysis of liquidity ratios showed that conventional banks are exposed to liquidity risk more than Islamic banks.

Čihák and Hesse (2008) empirically assessed the banks stability using z-score. They use a sample of 474 banks, 397 Conventional banks and 77 Islamic banks from 20 different countries. The study covered the period from 1993 to 2004. This means it does not take the recent financial crisis into the consideration. They used BankScope database as the main data source for those banks. They concluded that (a) small Islamic banks tend to be financially stronger than small commercial banks; (b) large commercial banks tend to be financially stronger than large Islamic banks; and (c) small Islamic banks tend to be financially stronger than large Islamic banks. A bank is considered large when it has one billion USD of total assets or more.

Hasan and Dridi (2010) compared the crisis effect on the Conventional and Islamic banks in eight countries. They studied 122 banks, 85 Conventional banks and 37 Islamic banks covering the period 2005-2009. They compared the changes of aspects pre- and post-crisis. The aspects of comparison are: (i) profitability; (ii) credit growth; (iii) assets growth; and (iv) external rating. They found that, in terms of profitability, Islamic banks achieved higher profitability than Conventional banks during the per-global crisis. However, Islamic banks contained the adverse impact on profitability in 2008 but suffered from larger decline in profitability in 2009 than Conventional banks. Islamic banks' credit and assets growth were twice higher than Conventional banks during the crisis.

Beck, Demirgüç-Kunt, and Merrouche (2010) conducted a larger sample of Islamic and Conventional banks to assess their business model, efficiency, and stability. They use two samples large and small. The larger one includes 141 countries and 2,956 banks, out of which 99 are Islamic banks. This sample covered countries with (a) only conventional, (b) only Islamic and (c) both conventional and Islamic banks. The small sample includes 486 banks across 20 countries, out of which 89 are Islamic banks. It contained only countries with both conventional and Islamic banks. Both samples covered the period from 1995 to 2007 thus both of them were pre-crisis. To cover the post-crisis period, the included a third sample that had 22 countries with 397 conventional and 89 Islamic banks. Out of these 486 banks, 112 are listed, 74 conventional and 38 Islamic. The authors concluded that their empirical estimations showed little significant differences between Islamic and Conventional banks.

Kristo and Gruda (2010) investigated the interrelationships among bank competition, efficiency and stability in Albanian banking system. Their study measured different factors that affect banks' stability over the period from 2005 to 2009. It compared net interest margin, non-performing loans percentage, return on equity, and z-score. These indicators proved that greater competition may be good for efficiency, but bad for financial stability.

Schinasi (2008) pointed that the on-going crisis reveals that the framework in place prior to the summer 2007 was inadequate for safeguarding financial stability against a systemic threat coming from both the real and

financial economies around the globe. All lines of defense against imbalances growing to systemic proportions failed to work as intended or hoped both private and official lines of defense.

Maher and Dridi (2010) examined the performance of Islamic banks and conventional banks during the recent global crisis by looking at the impact of the crisis on profitability, credit and asset growth, and external ratings in a group of countries where the two types of banks have significant market share. The analysis of their study suggests that Islamic banks have been affected differently than conventional banks. Factors related to Islamic banks business model helped limit the adverse impact on profitability in 2008, while weaknesses in risk management practices in some to Islamic banks led to a larger decline in profitability in 2009 compared to CBs. to Islamic banks' credit and asset growth performed better than did that of CBs in 2008–09, contributing to financial and economic stability.

Ali (2012) investigated and measured the efficiency of Islamic banks during financial and economic troubles, and to find out whether Islamic banks were efficient and stable. The study employed the on-parametric technique; Data Envelopment Analysis was used to test the hypotheses. The paper extends research, which suggests that large Islamic banks showed an increase in efficiency during 2006 to 2008 and decline during 2009. The results of the study showed that the efficiency of Islamic banks operates in Middle Eastern and non-Middle Eastern Counties have increased during an economic crisis.

Siraj and Pillai (2012), their study reviews and compares performance of conventional banks and Islamic banks operating in GCC region during 2005-10. The study investigates the presence, if any, of similarity in growth of chosen performance indicators of Conventional Banks and Islamic Banks in GCC region. The study covers six Islamic banks and six conventional banks. A comparative study is undertaken based performance indicators such as OER, NPR, ROA, ROE, EOA, operating expense, profit, assets, operating income, deposits and total equity. The analysis revealed that Islamic banks are more equity financed than conventional banks. Conventional banks registered growth in revenue during the period, but could not achieve improved profitability on account of higher provisions towards credit losses and impairment losses. The performance indicators were affected by financial crises as may be noted from the recessionary trends since 2007.

3. Hypotheses

1. First Hypothesis

H1: There is a significant difference between the financial stability of Islamic banks and Conventional banks for the period 2003-2010.

H0: There is no significant difference between the financial stability of Islamic banks and Conventional banks for the period 2003-2010.

2. Second Hypothesis

H1: There is a significant difference between the financial stability of Islamic banks and Conventional banks before the financial crisis.

H0: There is no significant difference between the financial stability of Islamic banks and Conventional banks before the financial crisis.

3. Third Hypothesis

H1: There is a significant difference between the financial stability of Islamic banks and Conventional banks after the financial crisis.

H0: There is no significant difference between the financial stability of Islamic banks and Conventional banks after the financial crisis.

4. Methodology and Data

4.1 Measuring Bank Stability

The dependent variable is the z-score as a measure of bank stability. Many recent papers used the z-score as a primary assessment of a bank risk. For example, the World Bank and the International Monetary Fund (IMF) used z-score to evaluate stability of banks. The calculation of the z-score is based on the historical accounting data extracted from the banks financial statements. It is a combination of capital adequacy, profitability and volatility measures. The z-score can be calculated as $z=(k+\mu)/\sigma$, where k is equity capital and reserves as a percent of total

assets, μ is average net income as a percent of total assets, and σ is standard deviation of return on assets (average net income as a present of assets) as a proxy of return volatility. A higher z-score indicates a lower default risk and vice versa. A higher σ indicates instability of a bank's income that lowers its z-score.

There is a different z-score form that assesses stability of banks. Altman's z-score uses five ratios to predict financial distress. These ratios can be calculated by using the banks financial statements. It predicts the likelihood of bankruptcy by using multiple discriminant analysis. Unlike the z-score used in this paper, Altman's z-score doesn't show the ratios volatility throughout the years.

When applying to Islamic banks, z-score is possibly criticized as a measurement to insolvency risk. The above z-score formula doesn't take into the account the ability of Islamic banks to share risks with its investors, depositors, and account holders. This comes from the fact that, for example, Islamic banks invest the saving and deposit accounts based on Mudarabah by which profit and loss is shared between the bank and account holders. Accordingly, even when Islamic banks experience losses, they can pass on a share of these losses to the investors rather than fully borne by the shareholders. As a result, equity and reserves are less vulnerable to losses in Islamic banks than Conventional banks.

A possible response to this argument is that Conventional banks are also able to pass on risks to their customers by adjusting deposit and loan rates. In addition, Islamic banks pass on losses indirectly to depositors by having reserves during good years and pay out from these reserves during bad years. To reflect this action on z-score, reserves are part of the z-score for Conventional and Islamic banks. As a result, z-score is generally an acceptable assessment of the default risk for Conventional and Islamic banks.

4.2 Data

The calculations in this paper were based on and extracted from BankScope database that contains the financial statements of more than 30,000 banks around the world. The sample covers all Conventional and Islamic banks that are based in Gulf Cooperation Council (GCC) counties. Banks were categorized other than Conventional (commercial according to Bank-Scope) or Islamic, were excluded from the data set. Some other researches categorized these two types of banks such as commercial and Islamic banks. However, an Islamic bank is a commercial bank based on Shariah-complaint banking. So, it is preferred to refer to commercial banks as Conventional banks in this paper because it is more precise. Banks that were dissolved or not active for any reason before the end of 2010 were also excluded from the data set. Banks that have less than three observations were omitted.

The sample covers all the six countries in Gulf Cooperation Council (GCC). They are (in alphabetical order): Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates. Conventional banks market share is always 100% for Oman because there are no standalone Islamic banks. However, Oman opened the door to create Islamic banks in the country in 2011 (Reuters, May 2011). There are three reasons behind using these counties. First, (except of Oman) these countries have Islamic banks and Conventional banks in their banking system. Second, the Islamic banks market shares in these countries are considerably increasing. It increased on average from more than 12% in 2003 to more than 23% in 2010. Third, this region holds about 48% of the Islamic banks assets around the world in 2010.

The total observations are 653 for 97 banks. 405 observations are for 55 Conventional banks and 248 observations are for 42 Islamic banks covering the period 2003 to 2010. This means that this paper covered five years pre-crisis and three years' post-crisis. More details in (table 1. and table 2.).

Table 1. Number of Observations by Bank Type

Observations	All Banks	Conventional	Islamic
2003-2007	363	240	123
2008-2010	290	165	125
All Observations 2003-2010	653	405	248

Table 2. Number of Banks per Type and Country

Country	All Banks	Conventional	Islamic
Bahrain	28	10	18
Kuwait	14	7	7
Oman	6	6	-
Qatar	10	6	4
Saudi Arabia	14	10	4
United Arab Emirates	25	16	9
Total	97	55	42

A few financial statements are available through BankScope database in unconsolidated form. So, the data in this paper were extracted from the consolidated financial statements only. The advantage of using the consolidated financial statements gives a wider perspective than looking at one bank's unconsolidated financial statement. In other words, there are market shares from other countries not included in this study implicitly included in it. However, this may affect the results by country. Since the unconsolidated financial statement and the foreign investments by banks are not available, we can't measure the effect whether it is significant or not.

4.3 Regression Analysis

The dependent variable is z-score that represents banks stability measure across time. The microeconomic independent variables are income diversity ratio, cost ratio, loans/total assets, and total assts. To highlight the banking industry status in a country, the banks market share was calculated and introduced in the model. Conventional banks market share in a country was reached by dividing the total assets held by the Conventional banks in a country by the total assets held by all banks in this country. The same was done for the Islamic banks. The macroeconomic independent variables are governance, consumer price index (CIP), and gross domestic product (GDP) growth.

The dummy variable is to differentiate between Conventional and Islamic banks. It takes a value of zero for Conventional banks and one for Islamic banks. For example, if Islamic banks are relatively weaker than conventional banks, the dummy variable would have a negative sign in the regression explaining z-scores.

At the country level, it is included a number of variables that take on the same value for all banks in a given country. In particular, it is included the gross domestic product (GDP) growth rate and inflation rate represented by the consumer price index (CPI).

This study accounts for the impact of governance on stability by using the governance indicator that was compiled by Kaufmann, Kraay, and Mastruzzi (2005). A single yearly index per country was extracted by having the average of the 6 governance measures of: (i) voice and accountability, (ii) political stability, (iii) government effectiveness, (iv) regulatory quality, (v) rule of law, and (vi) control of corruption across the available years. The governance indicator captures cross country differences in institutional developments that might have an effect on banking risk.

Some academic research papers have been built to analyse the dependent variable in relation to the independent variables for the same year. Other studies relate the dependent variable in year (t) with the independent variables of (t-1). The logic behind the last option is that the depended variable in year (t) is a result of the combination of independent variables in year (t-1). In other words, for example, the z-score of year (t) is a result of the total assets and the GDP growth of last year i.e. (t-1). Consequently, the total assets and the GDP growth of year (t) have affected the z-score of year (t+1). In this paper, it was decided to adopt this option because it is more consistent with the real life situation. The approach is to test using regressions of z-scores as a function of a number of variables, whether Islamic banks are less or more stable than Conventional banks. The estimate can be summarized as follows:

$$z_{i,j,t} = \alpha + \beta_1 D_i + \beta_2 SH_{j,t-1} + \beta_3 GOV_{j,t-1} + \beta_4 CPI_{j,t-1} + \beta_5 GDP_{j,t-1} + \beta_6 IDIV_{i,t-1} + \beta_7 CR_{i,t-1} + \beta_8 L_{i,t-1} + \beta_9 TA_{i,t-1} + \varepsilon_{i,t}$$

Where:

- $z_{i,j,t}$ is the z-score for bank i in country j at time t
- D_i is the dummy variable of bank i . 1 for Islamic banks and 0 for Conventional banks
- $SH_{j,t-1}$ is the market share in country j of each bank type at time $t - 1$
- $GOV_{j,t-1}$ is the governance in country j at time $t - 1$
- $CPI_{j,t-1}$ is the consumer price index in country j at time $t - 1$
- $GDP_{j,t-1}$ is the gross domestic product growth in country j at time $t - 1$
- $IDIV_{i,t-1}$ is the income diversity of bank i at time $t - 1$
- $CR_{i,t-1}$ is the cost ratio of bank i at time $t - 1$
- $L_{i,t-1}$ are the loans/total assets of bank i at time $t - 1$
- $TA_{i,t-1}$ are the total assets of bank i at time $t - 1$
- $\varepsilon_{i,t}$ is the residual

4.4 Variable Definitions

Below is a brief description of the variables and their calculation. (Table 3.) lists the source of each variable.

- Z-score: the dependent variable, $z = (k + \mu) / \sigma$, where k is equity capital and reserves as a percent of total assets, μ is average net income as a percent of total assets, and σ is standard deviation of return on assets (average net income as a percent of assets) as an indicator of return volatility.
- Total Assets: total assets of the bank in billion U.S. dollars.
- Loans/Total Assets: loans as a percent of total assets.
- Cost Ratio: overhead expense as a percent of income.
- Income Diversity: defined as $1 - \left| \frac{\text{Net interest income} - \text{Other operating income}}{\text{Total operating income}} \right|$. Its value can range from zero to one. One means: the total operating income of a bank is divided equally between net interest income and other operating income. Zero means: there is no diversification and a bank depends on one source to generate the total operating income. BankScope included income from associated companies in other operating income. In order to assess the diversification of the banks from its own operations, the author neutralized the effect of the income from associate companies from the above formula. In other words, it was deducted from both other operating income and from total operating income.
 - GDP growth: annual % of GDP growth.
 - Inflation: annual % change in consumer price index.
 - Banks dummy: 1 for Islamic banks, 0 for Conventional banks.
 - Banks market share: total assets of Islamic banks divided by the total bank assets in a country per year and total assets of Conventional banks divided by the total bank assets in a country per year.
 - Governance: average of the six governance measures: voice and accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption.

Table 3. Variable Sources

Variable	Source
Z-score	Author's calculation based on BankScope
Total Assets	BankScope
Loans/Total Assets	BankScope
Cost/Income	BankScope
Income Diversity	BankScope
GDP Growth	The Little Data Book – The world Bank*
Inflation	International Financial Statistics (IFS) – International Monetary Fund (IMF)**
Banks Market Share	Authors' calculation based on BankScope
Governance	Authors' calculation based on Kaufmann, Kraay, Mastruzzi (2009) – The World Bank*

* When the data for specific years were not available, the average of available years was calculated for unavailable data.

** The consumer price index for the United Arab Emirates was not available through the International Monetary Fund (IMF). Figures were taken from the Arab Monetary Fund instead.

5. Results and Discussion

5.1 Regression Analysis Results

In this section we shall discuss the regression results through explaining the relationship between the dependent variable and the independent variables and whether or not this relationship is significant in the model or not. We are going also to test empirically the three hypotheses. The regression results were divided into three sections. The first one shows the regression analysis of all banks in one set from 2003 to 2010. The second one covers the period from 2003 to 2007 pre-crisis. The last one covers post-crisis from 2008 to 2010.

We used the robust regression to address the problem of outliers. Robust regression uses a weighting scheme that causes outliers to have less impact on the estimates of regression coefficients. Hence, robust regression generally will produce different coefficient estimates than ordinary least square does. The discussion in this paper will be based on the significance level of 0.05 or 95%. Any coefficient that has a p-value of more than 0.05 will be considered as insignificant.

5.2 Regression analysis for 2003-2010

By looking at (table 4), we can find that is almost four times increase in the R-squared value when we used the robust regression. The standard deviation decreased by around 70% when robust regression was used.

All aspects of microeconomic have negative impact on the dependent variable (z-score) except of loans/total assets. All of impacts are significant except of total assets. The more overhead and the more income diversification, the less stable the banks become. However, the more loans issued by the banks, the more stable they become. It is widely known that the more income diversity a bank or corporation has the more stable it becomes. When income is diversified the associated risk is also diversified and mitigated. However, it is not the case in this model for the banks in Gulf Cooperation Council (GCC). This might be interpreted as the banks in this part of the world become more stable by specialization. They can generate more income across time from one source that increases the return on assets (ROA) resulting an increase in the z-score and eventually increase the stability of the banks. The interaction between income diversity and Islamic banks dummy gives conflicting results. The regression showed a negative coefficient when using ordinary least squares but it showed a positive coefficient when using the robust regression. We tend to rely on the robust regression results since it gave more R-squared. Although the general impact of the income diversity on all banks z-score is negative, it has a positive impact on the z-score for Islamic Banks. In other words, the more the income was diversified, the more stable the Islamic Banks became. In addition, this impact is significant.

All of the aspects of macroeconomic and the banks market share have positive impact on z-score. Except of governance, none of these impacts are significant. Governance has a positive and significant impact on z-score. Meaning the higher the country has a governance indicator the more stable the banks become.

Looking at the dummy variable that differentiates between Conventional and Islamic banks, it has a negative impact on z-score. But it is far from being significant at 95%. As a result the dummy variable does not have any significant influence towards the z-score. Thus, according to the sample and the model we analysed, there is no empirical evidence indicates that there is a significant difference between the z-score of Conventional and Islamic banks in Gulf Cooperation Council (GCC) for the period 2003-2010. In this case, we reject the H_1 and accept the H_0 .

5.3 Regression analysis for 2003-2007 pre-crisis

Splitting the data into a pre-crisis period (table 5.) results an increase of R-squared to 24.30%. In addition, the standard deviation is less compared to the one in the previous section. So, this model is a better predictor than the previous one.

The aspects of microeconomic give different impacts on z-score. The results show that there is a negative impact of income diversity and cost ratio towards z-score. However, only the impact of the income diversity is significant. This means like explained above that the banks in the sample are more stable when the income diversity is lower. There are two positive impacts on the z-score. They are the total assets and the loan/total assets. Loan/total assets impact is low but significant. Meaning that the banks took an expansionary policy of raising loans resulted in an increase in the income during the pre-crisis phase. Like the previous regression, the

interaction between the income diversity and the Islamic banks dummy gave the same result. In other words, the more the income was diversified, the more stable the Islamic Banks became. The impact is also significant. All the aspects of macroeconomic and market share give positive impact to z-score except of the GDP growth. All of these aspects are not significant except also of the governance.

Concerning the dummy variable that differentiates between Conventional and Islamic banks, the p-value of the dummy variable in (table 5) indicates it is not significant at 5% but significant at 10% using the robust regression. Taking the assumption of significance in this paper which is 5%, we can conclude that there is no empirical evidence indicates that there is a significant difference between the z-score of Conventional and Islamic banks in Gulf Cooperation Council (GCC) for the period 2003-2007. In this case, we reject the H_1 and accept the H_0 . However, it is worth to mention that it is a qualified rejection of the H_1 , since the p-values are slightly above 5%.

5.4 Regression analysis for 2008-2010 post-crisis

The R-squared is less than the previous sections. The standard deviation is slightly more than the previous sections as well. The aspects of microeconomic give a positive impact on the z-score except of the loans/total assets. All of these aspects are insignificant except of the cost ratio. The cost ratio has a negative impact that is also significant. It means, increasing the overhead expenses will be no good for increasing income. All the aspects of macroeconomic and the banks market share have a positive impact on z-score. But, all of these aspects are not significant. However, the governance significance is slightly above the 5% significance level.

Looking at the dummy variable that differentiates between Conventional and Islamic banks, it has a negative impact on z-score. But it is extremely far from being significant at 95%. As a result the dummy variable does not have any significant influence towards the z-score. Thus, according to the sample and the model analysed, there is no empirical evidence indicates that there is a significant difference between the z-score of Conventional and Islamic banks in Gulf Cooperation Council (GCC) for the period 2008-2010 post-crisis. In this case, we reject the H_1 and accept the H_0 .

Comparing the results of this study with Čihák and Hesse (2008) we can find there is no significant difference between the bank stability of Conventional and Islamic banks by using ordinary least square method to all banks. However, when they divided the sample into large banks and small banks the differences were significant. In this study it was not possible to divide the sample in to groups because there are only two Conventional banks that are considered small.

By looking at the financial statements of the Islamic banks covered in this paper, there are some interesting figures. BankScope database used a unified term "Net Interest Revenue" that is equal to total interest income minus total interest expense, for both Conventional and Islamic banks. To interpret net interest revenue for Islamic banks, it should mean net income from Islamic financing (total income from Islamic financing minus depositors' share of Islamic financing). There are 22 observations of negative "net income from Islamic financing" throughout the financial statements. If it is not an accounting classification issue, it might mean that there are Islamic banks decided to payout their depositors although there are no enough income from Islamic finance. This means "practically" Islamic banks are to bare losses although "theoretically" they share these losses with depositors. However, this argument is beyond the objective of this paper and it should be addressed in future studies.

Table 4. Regression Results: Dependent Variable: Z-score, 2003-2010

Variables	Method			
	Ordinary Least Squares		Robust Regression - Bisquare Weight function	
Constant	26.480 (0.141)	26.480 (0.141)	12.837 **(0.030)	12.837 **(0.030)
Dummy	23.546 (0.212)	23.546 (0.212)	-8.579 (0.166)	-8.579 (0.166)
Banks Share (-1)	-0.006 (0.977)	-0.207 (0.644)	0.105 (0.107)	0.098 (0.518)
Governance (-1)	0.716 (0.883)	0.716 (0.883)	6.142 *** (0.000)	6.142 *** (0.000)
CPI (-1)	0.235 (0.485)	0.235 (0.485)	0.201 *(0.082)	0.201 (0.082)
GDP Growth (-1)	0.215 (0.691)	0.215 (0.691)	0.090 (0.615)	0.090 (0.615)
Income Diversity (-1)	-8.555 (0.292)	-8.555 (0.292)	-7.195 *** (0.008)	-7.195 *** (0.008)
Cost Ratio (-1)	-0.057 *(0.077)	-0.057 (0.077)	-0.022 ** (0.050)	-0.022 ** (0.050)
loans/Total Assets (-1)	0.085 (0.263)	0.085 (0.263)	0.088 *** (0.001)	0.088 *** (0.001)
Total Assets (-1)	0.021 (0.837)	0.021 (0.837)	-0.034 (0.346)	-0.034 (0.346)
Income Diversity * Islamic Bank Dummy (-1)	-33.335 *** (0.002)	-33.335 *** (0.002)	14.579 *** (0.000)	14.579 *** (0.000)
Share of Islamic Banks * Islamic Bank Dummy (-1)	-0.201 (0.669)		-0.007 (0.966)	
Share of Islamic Banks * Commercial Bank Dummy (-1)		0.201 (0.669)		0.007 (0.966)
Observations	604	604	580	580
R-squared	0.057	0.057	0.225	0.225
Adjusted R-squared	0.040	0.040	0.210	0.210
Mean dependent var	27.622	27.622	20.333	20.333
S.D. dependent var	31.367	31.367	10.190	10.190

P-values are between parentheses.

** Significant at 5%, *** Significant at 1%

Table 6. Regression Results: Dependent Variable: Z-score, 2003-2007

Variables	Method			
	Ordinary Least Squares		Robust Regression - Bisquare Weight function	
Constant	49.189 **(0.014)	49.189 **(0.014)	16.703 *(0.060)	16.703 (0.060)
Dummy	-6.747 (0.706)	-6.747 (0.706)	-14.645 *(0.061)	-14.645 (0.061)
Banks Share (-1)	-0.262 (0.198)	-0.887 (0.148)	0.071 (0.430)	0.288 (0.313)
Governance (-1)	-0.845 (0.871)	-0.845 (0.871)	8.046 *** (0.001)	8.046 *** (0.001)
CPI (-1)	0.635 *(0.076)	0.635 (0.076)	0.098 (0.560)	0.098 (0.560)
GDP Growth (-1)	-0.402 (0.588)	-0.402 (0.588)	-0.168 (0.615)	-0.168 (0.615)
Income Diversity (-1)	-17.070 ** (0.031)	-17.070 ** (0.031)	-9.607 *** (0.008)	-9.607 *** (0.008)
Cost Ratio (-1)	0.000 (0.995)	0.000 (0.995)	-0.009 (0.603)	-0.009 (0.603)
loans/Total Assets (-1)	0.229 *** (0.001)	0.229 *** (0.001)	0.120 *** (0.000)	0.120 *** (0.000)
Total Assets (-1)	-0.147 (0.288)	-0.147 (0.288)	0.008 (0.892)	0.008 (0.892)
Income Diversity * Islamic Bank Dummy (-1)	-5.926 (0.568)	-5.926 (0.568)	14.101 *** (0.003)	14.101 *** (0.003)
Share of Islamic Banks * Islamic Bank Dummy (-1)	-0.625 (0.293)		0.217 (0.428)	
Share of Islamic Banks * Commercial Bank Dummy (-1)		0.625 (0.293)		-0.217 (0.428)
Observations	348	348	334	334
R-squared	0.086	0.086	0.243	0.243
Adjusted R-squared	0.056	0.056	0.217	0.217
Mean dependent var	25.968	25.968	20.130	20.130
S.D. dependent var	22.379	22.379	10.064	10.064

P-values are between parentheses.

** Significant at 5%, *** Significant at 1%

Table 1. Regression Results: Dependent Variable: Z-score, 2008-2010

Variables	Method			
	Ordinary Least Squares		Robust Regression - Bisquare Weight function	
Constant	53.020 *(0.061)	53.020 (0.061)	20.103 **(0.017)	20.103 **(0.017)
Dummy	45.264 (0.133)	45.264 (0.133)	-4.439 (0.618)	-4.439 (0.618)
Banks Share (-1)	-0.098 (0.779)	-1.183 (0.166)	0.038 (0.718)	-0.233 (0.358)
Governance (-1)	4.411 (0.651)	4.411 (0.651)	5.492 *(0.059)	5.492 (0.059)
CPI (-1)	0.175 (0.783)	0.175 (0.783)	0.056 (0.767)	0.056 (0.767)
GDP Growth (-1)	0.795 (0.374)	0.795 (0.374)	0.328 (0.216)	0.328 (0.216)
Income Diversity (-1)	-10.751 (0.495)	-10.751 (0.495)	-3.905 (0.404)	-3.905 (0.404)
Cost Ratio (-1)	-0.115 **(0.030)	-0.115 **(0.030)	-0.035 **(0.025)	-0.035 **(0.025)
loans/Total Assets (-1)	-0.266 *(0.095)	-0.266 (0.095)	0.027 (0.571)	0.027 (0.571)
Total Assets (-1)	0.078 (0.631)	0.078 (0.631)	-0.020 (0.686)	-0.020 (0.686)
Income Diversity * Islamic Bank Dummy (-1)	-41.528 *(0.054)	-41.528 (0.054)	11.127 *(0.081)	11.127 (0.081)
Share of Islamic Banks * Islamic Bank Dummy (-1)	-1.084 (0.204)		-0.270 (0.286)	
Share of Islamic Banks * Commercial Bank Dummy (-1)		1.084 (0.204)		0.270 (0.286)
Observations	255	255	244	244
R-squared	0.101	0.101	0.195	0.195
Adjusted R-squared	0.060	0.060	0.157	0.157
Mean dependent var	29.987	29.987	20.793	20.793
S.D. dependent var	40.465	40.465	10.612	10.612

P-values are between parentheses. ** Significant at 5%, *** Significant at 1%

6. Conclusions

In this study, an empirical analysis was conducted to assess the financial stability for all the banks in the Gulf Cooperation Council (GCC) countries that are classified as Conventional and Islamic banks during the period 2003-2010. The sample was split into two groups. The first one was to cover the pre-crisis period from 2003-2007. The second one was to cover the post-crisis period from 2008-2010. Using z-score as a measure it has been found that there is no empirical evidence supports the hypothesis that says there is a difference between the z-score of Conventional banks in the Gulf Cooperation Council (GCC) countries and Islamic banks in the same

region for all three periods. However, for the pre-crisis period 2003-2007, the significance of the dummy variable is slightly above the five per cent. The dummy variable coefficient is always negative using robust regression. Taking into the account that Islamic banks dummy is one. Meaning that, Islamic banks have lower z-score and are less stable than conventional banks for this period with a significance level that is about to reach the acceptable level of significance in this study which is five per cent.

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