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Risk Measures in Islamic Banks

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Abstract The aim of this study is to examine empirically the variables of the risks of Islamic banks in the Gulf countries. Methodologically, we use a sample of 23 Islamic banks during the period from 2007 to 2012. From the empirical findings, we can show that the variable volatility of return on assets and the regulatory variable explains the banking risks. We have also shown that size influences banking risks. In addition, we find that the size influences banking risks. It has allowed us to see that the big banks can invest in more risky projects.

Keywords: *Islamic banks, risks, volatility of return on assets, volatility of return equity*

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1. Introduction

Islamic finance is still recent compared to his counterpart conventional. It is based on financial instruments specific to its specific nature. Islamic banks are also exposed to financial risks. These risks are multiple and multidimensional. They affect the performance of the banking system. In fact, the definition of risk is a classic approach but important since it constitutes the point of departure of their management. The risk in a banking sector is generally a result of movements of deregulation, regulation and the competition. Where, financial institutions must increase their monitoring in the management of risks and comply with the standards of prudential regulation.

The concept of risks is probably one of the subjects that arouse the most research in the field of mathematical finance. So in this paper, we try to answer at the question related to the risks in Islamic banks. In addition, the study of the risks in Islamic banks is one of the main objectives in the recent financial literature. In our paper, we investigate empirically for the determinants of the risk in Islamic banks. To do, we employ a sample composed by 23 Islamic banks during the period of study from 2007 to 2012. We employ a regression by Ordinary Least Square.

Furthermore, the observation of the empirical results allowed us to remark that the variable volatility of return on assets (SD ROA) and the regulatory variable explains the banking risks. We have also shown that size influences banking risks. In addition, we find that the size influences banking risks.

The rest of our paper is organized as follows. In section 2, we present the literature review relative to the risks in banks. Section 3 describes the data used in this study. Section 4 describes the econometric methodology. Section 5 discusses the main empirical results. Section 6 concludes.

2. Literature Review

Islamic finance is a new branch of finance. Studies that are interested in Islamic finance are now multiple and diverse. But most of this work was in the form of a comparative study between Islamic banks and conventional banks.

The practice of Islamic finance also differs from one country to another. In this sense K. Brown (2003), has done a job where he compares Islamic banks in different countries.

Iqbal (2001) publish an article that focuses on a period from 1990 to 1998. He found that Islamic banks have worked well during this period and have resisted problems well.

The literature devoted to the study of risks in Islamic banks is scarce. In 2001, Khan and Ahmed Carried out a study in the form of a questionnaire addressed to the different Islamic banks in different countries. The authors found that the most important risk for the sample of banks studied is the risk of margin followed by operational risk.

In addition, credit risk plays an important role and is considered one of the most important risks. This risk is related to non-payment of consideration. It can be at the root of other risks, namely liquidity risk. Other research by Iqbal *et al.* (2007) in his book *"An introduction to Islamic finance"* Have shown that the biggest risk in lending banks is credit.

Furthermore, Van and Iqbal (2008) asserts in its *"Risk analysis for Islamic banks'* book that the credit risk is the main cause of failure of banks. They also added that it is important to carefully analyze the risks. This analysis enriches the risk management debate and the risk management process. This process consists of two steps the first is to identify the variables that is to say, identify sources of risk, while the second is to develop methods to quantify risk using mathematical models".

3. The Data

The purpose of this paper is to examine empirically the variable of risks in Islamic banks. We employ a sample of 23 Islamic banks in the gulf countries during the period of study from 2007 to 2012. Financial data and accounts are extracted from the site of the Islamic Development Bank and Financial publications and annual reports of Islamic banks.

4. The Model

In this paper, we will refer to the model**,** in which we studied the variable of risks in Islamic banks.

We use three models:

$$\mathbf{Z-score_{i,t}} = \beta_0 + \beta_1 \mathbf{REG_{i,t}} + \beta_2 \mathbf{SIZE_{i,t}} + \beta_3 \mathbf{LIQUI_{i,t}} + \beta_4 \mathbf{LLOSS_{i,t}} + \beta_5 \mathbf{AGE_{i,t}} + \mu_{i,t} \quad (1)$$

$$\sigma \mathbf{ROA_{i,t}} = \beta_0 + \beta_1 \mathbf{REG_{i,t}} + \beta_2 \mathbf{TAILLE_{i,t}} + \beta_3 \mathbf{LIQUI_{i,t}} + \beta_4 \mathbf{LLOSS_{i,t}} + \beta_5 \mathbf{AGE_{i,t}} + \mu_{i,t} \quad (2)$$

$$\sigma \mathbf{RO_{Ei,t}} = \beta_0 + \beta_1 \mathbf{REG_{i,t}} + \beta_2 \mathbf{SIZE_{i,t}} + \beta_3 \mathbf{LIQUI_{i,t}} + \beta_4 \mathbf{LLOSS_{i,t}} + \beta_5 \mathbf{AGE_{i,t}} + \mu_{i,t} \quad (3)$$

Where, Risk measurement is based on three variables: Z-score, volatility of return on equity and volatility of return on assets.

The Z-score is equal to the return on assets plus the own fund ratio divided by the standard deviation of the return on the asset.

The volatility of return on equity is the standard deviation of return on equity. This variable has been applied in several studies. Return on equity is calculated as: net profit / equity.

The third variable used to measure risk is the volatility of asset returns. It is measured by the standard deviation of return on assets, where the return on assets is the ratio of net profits to total assets.

The variables relating to banking risks are:

Bank regulation: the regulatory capital is set by the Basel Committee to support the soundness and stability of banks. It contains solvency ratios used internationally.

These ratios must be met by all financial institutions. The ratio of Regulation is a relationship between equity and total assets. It imposes on the bank to have a minimum amount of own funds that must be greater than 8%.

The size of the bank: This variable is measured by the natural logarithm of total Assets. This variable may have an influence on the risk incurred by the bank. A Bank with a fairly diversified portfolio, it can easily access capital market. Size allows the bank to engage in riskier activities than those of small sizes.

LLOSS: It represents the value of provision for loss divided by the bank's total assets. Provisions are the funds the bank keeps to cover its losses. Generally the more the provisions are important the greater the level of risk of the bank.

The liquidity ratio: This ratio is obtained by dividing the liquid assets to liquid liabilities. It determines the ability of the bank to meet its short-term commitments. That is, assess the bank's ability to pay its debts in the short term. This ratio must be greater than 100% so that there is more security in the regulations of the debts.

The age of the bank: This variable also influences the risk of bank insolvency. The older the bank, the broader its experience, the more it would have the skills to select more profitable projects.

In our study, we used the value 1 to designate banks that are less than or equal to 20 years of age. The value of 2 is given to banks that have an age between 20 and 30 years. The value of 3 is used when banks are older than 30 years.

5. Empirical Results

In this section, we specify the type of estimate for models which is a regression on panel data. The choice of this type of regression is justified by the presence of the two dimensions in the data used, the first dimension is time (a period of 6 years) and the second is individual (the sample used is composed of 23 Islamic banks).

The estimation is done by the SPSS software, using the "INPUT" method, which forces all the explanatory variables to enter the model whatever the results of the tests of bad model specifications.

The descriptive statistics for the first regression show that the Z-score is on average 0.8673 with volatility equal to 0.7417.

The independent variables injected into the regression show that capital regulation is on average 145.3192, which is higher than the minimum required by the government (8%). We can conclude that the banks considered in this study comply with the recommendations of the Basel Committee.

The ratio of liquidity deployed has an average value of 235.023 which is greater than 100% with a maximum value of 33805.4 and a minimum value equal to 0.003.

The size of the bank in averages is 20.4932, which allows us to conclude that the banks are mostly small.

Finally, the reserve ratio is on average 0.03607, which suggests a small amount of bad debts.

According to the statistics of the age variable, the average age of banks considered is between 10 and 30 years, with an average of 1.46, that is to say an average age of 15 years.

The SD ROE has an average of 0.185. Indeed, this variable is more volatile than the "SD ROA" because the Islamic banking industry has a low or negative ROE.

These losses are due to unfavourable economic conditions and lower market prices. Now Islamic products are backed by real assets (Assets-backed securities) in addition to the absence of effective risk management tools. The "SD ROE" varies between 0.0625 and 0.451.

In continuation of the analysis of the results, we conduct a test of correlation between the variables used. Table 1 presents the empirical results of correlation test. Furthermore, the empirical findings show that the majority of Pearson correlation coefficients do not exceed the tolerance limit (0.7), which does not cause problems in estimating the two models of the two models.

Table 1. Test of Jarque-Bera

	Skewness[1]		Kurtosis[2]	
	Statistical	**Stderror**	**Statistical**	**Stderror**
Z-score	-1,613	, 202	5,046	, 401
Liqui	12,000	, 202	144,000	, 401
Regl	12,000	, 202	144,000	, 401
LLOSS	11,566	, 202	136,618	, 401
CUT	-4.424	, 202	24,995	, 401
AGE	1,227	, 202	, 079	, 401
SD ROA	1,716	, 206	2.012	, 410
Liqui	1,091	, 206	, 937	, 410
Regl	1,421	, 206	, 895	, 410
LLOSS	7,092	, 206	57,624	, 410
CUT	, 086	, 206	, 755	, 410
AGE	1,162	, 206	-, 082	, 410
N valid (listwise)				
SD ROE	1,180	, 202	1,492	, 401
Liqui	12,000	, 202	144,000	, 401
Regl	11,566	, 202	136,618	, 401
LLOSS	12,000	, 202	144,000	, 401
CUT	-4.424	, 202	24,995	, 401
GE	1.227	, 202	, 079	, 401
N valid (listwise)				

[1]Coefficients of symmetry
[2]Coefficients of flattening.

The table of the matrix correlation shows that the variables **"liqui"** and **"Coarse"** are perfectly and positively correlated. In addition, according to Cohen tags [1] (1988), the variable **"LLOSS"** is strongly and positively correlated with the variables **"Liqui"** and **"Coarse".** This said that we will have problems of multi-colinearity in the regressions that we will perform. Indeed, the variable **"LLOSS"** is approximated by the ratio reserves / total assets due to the lack of data on the total amount of credit.

There is also a positive correlation between regulation and default risk for Islamic banks that follow logic of sharing profits and risks. By seeking an adequate security cushion, bank executives are relaxing efforts to select and monitor projects. They then choose more risky projects and provide less effort in their supervision.

- Test for poor model specification

*** Normality (Jarque-Bera)**

The normality test **(Jarque-Bera)** conventionally refers to the calculation of symmetry coefficient (skewness) and kurtosis (kurtosis). Indeed, if these coefficients differ respectively from zero and three then the process generating a series of returns follows a non-normal distribution. Otherwise, the normal distribution is completely characterized by the expectation and variance[2].

[1]If the correlation is around 0.1, it is a small effect, which means a weak correlation. If the correlation is around 0.3, it is a medium-sized effect, which means an average correlation. If the correlation is around 0.5, it is a large size effect which means a strong correlation

[2]If the Skeweness is 0 and kurtosis gets 3: The distribution is called normal. If the skewness and kurtosis are respectively less than 0 and 3; the distribution is called asymmetrical left and platikurtique. Otherwise, the distribution is said asymmetrical right and leptokurtic.

The table of the test of Jarque-Berashows that for the dependent variable and a Z-score SD ROE, all independent variables except age, have a kurtosis **"kurtosis"** high and much higher than **3.** It informs us of the high probability of achieving extreme values. The **symmetry** factor, it is strictly different from 0 for all variables examined. This coefficient varies between **-4.424** for the variable **"size"** and **12** for the variables **"Liqui"** and **"Coarse"** and with a negative bias for the dependent variable. Concerning the dependent variable SD ROA, all the independent variables, except LLOSS, show a flattening coefficient of less than 3, the distribution is asymmetric on the left (platikurtic distribution). This coefficient varies between **0.086** for the variable **"size"** and **7092** for **"LLOSS"** variable.

We can then conclude that the distribution is biased in both directions (negative and positive). In light of these figures, the hypothesis of symmetry is rejected in this investigation.

For the regression of Z-score, Distributive Durbin Watson displays a value of **1.653** which is close to **2.** That said, a priori, there is a lack of autocorrelation of errors. However, the graph shows that to the left of the normal distribution lies residual autocorrelations. Therefore, it is necessary to refer to the statistical table for a firm and precise interpretation.

According to the statistical table for the **1st regression,** the Durbin Watson statistic is less than the lower limit **of$_1$= 1.66.** Residuewe reject the hypothesis **H_0** autocorrelation of absence and in accordance with graph that shows the existence of autocorrelation left of the normal distribution of residuals.

For the **second regression,** the Durbin Watson statistic has a value of **1.973** which is greater than the upper terminal **d2 = 1.8.** We do not reject **H_0** Of non-autocorrelation of residues, although the graph indicates that there are correlations to the right of the normal distribution of residues. For the **third regression,** the Durbin Watson has a value of **2.2** which is equal to the upper bound **4-d2 = 2.2.** Residuewe reject the hypothesis **H_0**of no autocorrelation in accordance with graphic indicating the existence of autocorrelation to the right of the normal distribution of residuals.

Autocorrelation of the residuals of the variables Z-score, SDROA, SDROE

-Multi-colinearity test

- Variance Inflation Factor (VIF)

The independent variable **"Coarse"** is excluded from the regression seen the colinearity problem remains. In other words, according to hypothesis 1 of the multiple regressions, the explanatory variables are linearly related.

Economically, these variables that present near-exact linear relations generally satisfy an accounting identity. When the variables are linearly related, the **X** matrix is of a lower rank to the number of variables. Therefore, the **X'X** matrix is not invertible (singular).

To estimate the multi-colinearity, one should perform the regression of each exogenous variable Xj with the other exogenous (p-1), and then examine the coefficient of determination. They baptized the variance inflation factor **(VIF)** the quantity.

We speak of an inflation factor because we have the following relation:

. $V(\hat{a}_j)=\frac{\sigma_\epsilon^2}{n}v_j, V_j=\frac{1}{1-R_j^2}.$ The standard deviation of the estimate is multiplied by a factor. $\sqrt{v_j}$.

Table 2. Statistics of collinearity

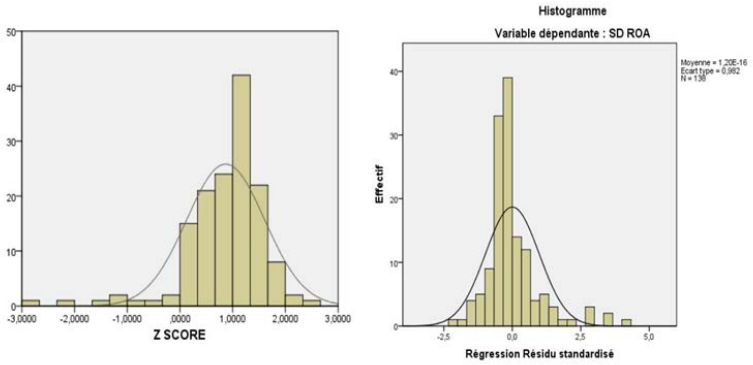
Variables	95% intervals of		Correlations			Statistics of	
Explanatory	Confidence for B					Collinearity	
	Thickheaded	Limit	orrelation	Partial	Part	Tolerance	VIF
	Lower	Top	simple				
			Z-score				
Constant	-, 083	1,468					
Liqui	, 000	, 001	, 183	, 233	, 230	, 025	39,487
LLOSS	-6,619	-, 765	, 149	-, 207	-, 203	, 025	39,455
CUT	-, 029	, 043	, 029	, 034	, 033	, 997	1,003
AGE	-, 121	, 218	, 022	, 048	, 046	, 991	1,009
			SD ROA				
Constant	-, 261	-, 014					
Liqui	-, 037	, 042	, 148	, 012	008	, 917	1,091
Regl	, 157	, 229	, 717	, 677	, 626	, 671	1,491
LLOSS	-, 043	, 330	, 113	, 131	, 090	, 886	1,129
CUT	, 001	, 013	-, 272	, 205	, 142	, 586	1.707
AGE	-, 020	, 005	-, 330	-, 103	-, 070	, 675	1,481
			SD ROE				
Constant	, 090	, 278					
Liqui	, 000	, 000	-, 059	-, 056	-, 056	, 025	39,487
LLOSS	-, 252	, 457	-, 050	, 049	, 048	, 025	39,455
AGE	-, 007	, 034	, 117	, 112	, 111	, 991	1,009
CUT	-, 005	, 003	-, 033	-, 037	-, 036	997	1,003

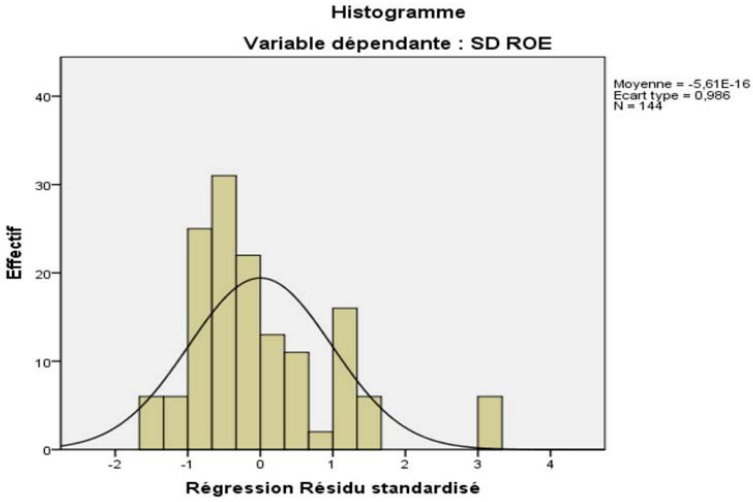
Table 3. ANOVA and Regression Summary

Z-score	Sum	DDL	Average	F	Sig	R	R-two	R-two
	squares		squares					Adjusted
Regression	6,009	4	1,502	2,874	, 025	, 276	, 076	, 050
Residue	72.668	139	, 523					
Total	78,677	143						
SD ROA	Sum squares	Ddl	Average squares	F	Sig	R	R-two	R-two Adjusted
Regression	, 291	5	, 058	30,705	, 000	, 733	, 538	, 520
Residue	, 250	132	, 002					
Total	, 541	137						
SD ROE	Sum squares	Ddl	Average squares	F	Sig	R	R-two	R-two Adjusted
Regression	, 022	4	, 005	, 710	, 586	, 142	, 020	-, 008
Residue	1.065	139	, 008					
Total	1,086	143						

Table 4. Results of coefficient estimates

	Variables	Coefficients		Coefficients		
Regression	Explanatory	Not standardized		Standardized		
		AT	Standard Error	Beta	T	Sig.
	Constant	, 692	, 392		1,766	, 080
	Liqui	, 000	, 000	1,445	2,821	, 005
Z SCORE	LLOSS	-3.692	1,480	-1,277	-2.494	, 014
	CUT	, 007	, 018	, 033	, 401	, 689
	AGE	, 048	, 086	, 046	, 561	, 576
	Constant	-, 137	, 062		-2.205	, 029
	Liqui	, 003	, 020	, 009	, 140	, 889
SD ROA	*Regl*	*, 193*	*, 018*	*, 764*	*10,571*	*, 000*
	LLOSS	, 143	, 094	, 096	1,520	, 131
	CUT	*, 007*	*, 003*	*, 186*	*2,406*	*, 018*
	AGE	-, 008	, 006	-, 086	-1,189	, 236
	(Constant)	, 184	, 047		3,878	, 000
	Liqui	-1,084E-5	, 000	-, 350	-, 664	, 508
SD ROE	LLOSS.	, 103	, 179	, 302	, 573	, 568
	AGE	, 014	, 010	, 112	1,326	, 187
	CUT	-, 001	, 002	-, 036	-, 433	, 665





The table of colinearity statistics shows the variables **"Liqui"** and **"LLOSS"** the values of the partial correlations and party down below the zero order correlation (simple). This means that SDROE and the Z-score, within Islamic banks, are explained by other variables. As for the second regression, the independent variables contribute to explain the SDROA within the Islamic banks to the countries of the Golf.

The tolerances of the variable **"Liqui"** and **"LLOSS"** are near 0, there is a multi-colinearity manifest and the standard deviation of the regression coefficients will be inflated. A variance inflation factor (VIF) is generally considered to be greater than 2.

In our case, for the two variables already mentioned, the FIV is well above 2, namely 39,487 and 39,455 respectively in the first and third regression. This suggests the existence of a multi-colinearity problem. By cons, in the second regression, the tolerances of all dependent variables are well above zero, with lower VIF the critical value 2.

In this paper, we examine the relationship between independent variables and banking risk, taking into account the age of the banks. We can use the OLS method (ordinary least squares).

For a model to be of quality the improvement obtained with the independent variables must be large and the residuals between the observed values and the regression line must be small. To examine this, we use the SPSS tests of the F value.

This means that the probabilities of obtaining an F-value of this size by chance are less than 0.05%. Independent variables explain, on average, the variability of the dependent variable. However, for the first and third regression, we find that the variability of Dependent variable explained by the regression is very low and the respective F values are not significant at the 5% threshold. When the model provides a significant improvement, it should be reported to what extent the data are adjusted to this model. In a way, it is possible to measure in what weighting the model represents the dispersion of points in the graph.

This information exists in the table above with the index "R" which represents the value of the multiple correlation of the model. It represents the combined correlation of all independent variables of a model with the dependent variable. The R^2valueindicates the percentage of variability of the dependent variable explained by the regression model. We can therefore say that the volatility of the return on assets can explain nearly 53% of the risks in the Islamic banks. Note that it is extremely rare to find such a high coefficient. The value of R adjusted by the number of degrees of freedom is an estimate of the robustness of this model if we take a different sample from the same population.

Only the second regression SDROA has anadjusted R^2 tolerable 52%. In other words, the model helps explain Islamic banks' risk-taking. The result of the first regression (dependent variable Z score), shows that the model provides a poor goodness of fit (R^2 = 5%). Therefore, we cannot push the analysis any more since the regression is not globally significant.

Given the results of the second regression (dependent variable SD ROA), we can conclude that the regulatory variable is statistically and economically significant at the

1% threshold. In fact, this variable has a relatively small coefficient.

The model provides a coefficient of determination R^2 (adjusted by 52%) relatively high compared to the other two regressions. Therefore, we can conclude that this regression contributes better to explain the risk of Islamic banks.

According to the results of the third regression (dependent variable SD ROE), we find that the model is not statistically significant (adjusted R^2equal to -0.8%). Moreover, all the estimated coefficients are not significant.

Finally, the age variable, although not related to the risk of insolvency, we can conclude that the seniority of the banks does not have an impact on the volatility of return on equity and the volatility of profitability Economic and the Z-score.

To determine the relative importance of the significance of the independent variables, we need to consider the standardized coefficients. The **"Coarse"** helps the model better because it has a higher coefficient absolute standard that the variable **"Size",** which is still significant.

6. Conclusion

An attempt was made to assess the risks of Islamic banks in the Golf region. We have therefore studied the behaviour of 23 Islamic banks spread over 5 Golf countries during the period 2004-2009. The statistical analysis has shown that Islamic banks are sensitive to the level of capitalization and size.

First, the capital ratio is, on average, statistically and economically significant for Islamic banks in the Golf region. Then we see that an increase in the capital ratio leads to an increased risk of the Islamic banks studied but rather contributes to increase it.

"The positive relationship between regulation and risk is explained by a greater risk-taking than the hedging effect of an increase in capital. If the increase in regulation increases the return on assets, it has a negative effect on performance (risk-adjusted returns). Because of their presence in the financial markets, these banks are subject to greater market pressure".

The Basel Capital Regulatory Agreements seek to promote market discipline. They require banks to disclose market information in order to get an idea of their state of health.

Our sample refers to banks with different sizes. In fact, we note that the size effect positively influences the risk taking of these banks. That said, larger banks, which benefit from a large security cushion, are at greater risk than smaller banks.

On the one hand, this state of affairs is in conformity with the orthodoxy which stipulates that banks of size and size bear a higher risk. On the other hand, the paradigm of sharing profits and losses, on which Islamic banks are founded, represents a safety net for banks in terms of moral risk and anti-selection.

However, we find that age, does not explain the risk run by Islamic banks. Indeed, although the age of the banks studied varies between 10 and 30 years, it is clear that this variable does not affect the risk since, on the one hand, most of these banks have changed activity only recently and On the other hand, the reputation and the originality of the Islamic banks ensue essentially from their conformity with the rules of the Sharia' and not on the age of the bank.

As for liquidity, we absolutely tolerate the neutrality of this variable vis-à-vis the risk. Unlike conventional banks, Islamic banks are established in connection with the prohibition of interest and usury. Therefore, Islamic banks are not subject to liquidity crises in the absence of the activity of the creation of the currency, although they are exposed to a potential liquidity risk triggered by insolvency such as case of "*Mourabha"***.**

The empirical part of this work was based on the exploitation of a model. The results show that the volatility of variable yield assets (ROA SD) is the one that explains more than other variables, the banking risks. The variable regulation has also had a significant impact on banking risks. We have also shown that the size influences the banking risks. It allowed us to see that the bank is larger more it can invest in riskier projects.

After this study, some research approaches could be explored. In this sense, we can examine the effect of the composition of Sharia' board on risk-taking in Islamic banks. In addition, we can test the influence of the capital structure of Islamic banks on the risk to them.

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Appendix -A

List of Banks

Country	banks	Number of banks
bahrain	ABC islamic Bank	12
	Al Baraka Bank islamic	
	Arcapita Bank	
	Bahrainislamicbank	
	Capivest Bank	
	Gulf Finance House	
	Internetionalinvestmentbank	
	Investors Bank	
	Khaleej Commercial Bank	
	Kuwait Finance House Bahrain	
	Liquidity management center	
	Unicominvestmentbank	
United ArabEmirates	Abu Dhabi islamicbank	4
	DubaiIslamic Bank	
	EmiratesIslamic Bank	
	Sharjah Islamic Bank	
SaudiArabia	Al rajhi Bank	2
	Bank Aljazira	
Qatar	First Finance Company	3
	International Islamic	
	Qatar Islamic Bank	
kuwait	Kuwait Finance House	2
	Gulf Investment House	

The correlation matrix
N = 138

Regression SD ROA		SD ROA	Liqui	Regl	LLOSS	CUT	AGE
Pearson SD ROA Correlation		1,000	, 148	**, 717**	, 113	**-, 272**	**-, 330**
	Liqui	, 148	1,000	**, 232**	-, 028	**-, 233**	-, 097
	Regl	**, 717**	**, 232**	1,000	, 090	**-, 513**	-, 445
	LLOSS	, 113	-, 028	, 090	1,000	**-, 239**	, 076
	CUT	**-, 272**	**-, 233**	**-, 513**	**-, 239**	1,000	**, 482**
	AGE	**-, 330**	-, 097	**-, 445**	, 076	**, 482**	1,000
Sig. (Unilateral)	SD ROA	.	, 042	, 000	, 093	, 001	, 000
	Liqui	, 042	.	, 003	, 372	, 003	, 129
	Regl	, 000	, 003	.	, 146	, 000	, 000
	LLOSS	, 093	, 372	, 146	.	, 002	, 187
	CUT	, 001	, 003	, 000	, 002	.	, 000
	AGE	, 000	, 129	, 000	, 187	, 000	.

The "SD ROA" marries a negative relationship with the variable "Size" and the variable "Age". A priori, that said, as the age of the bank and its size increases the risk is low.

The correlation matrix
N = 144

Regression SD ROE		SD ROE	Liqui	Regl	LLOSS	AGE	CUT
Correlation of Pearson SD ROE		1,000	-, 059	-, 059	-, 050	, 117	-, 033
	Liqui	-, 059	1,000	1,000	, 987	-, 054	, 024
	Regl	-, 059	1,000	1,000	, 987	-, 054	, 024
	LLOSS	-, 050	, 987	, 987	1,000	-, 042	, 031
	AGE	, 117	-, 054	-, 054	-, 042	1,000	, 026
	CUT	-, 033	, 024	, 024	, 031	, 026	1,000
Sig. (Unilateral)	SD ROE	.	, 241	, 241	, 278	, 081	, 349
	Liqui	, 241	.	, 000	, 000	, 259	, 388
	Regl	, 241	, 000	.	, 000	, 259	, 388
	LLOSS	, 278	, 000	, 000	.	, 309	, 356
	AGE	, 081	, 259	, 259	, 309	.	, 379
	CUT	, 349	, 388	, 388	, 356	, 379	.

Note: The standard deviation of financial profitability is negatively correlated with the variables Liqui, LLOSS, Regl and Taille. Indeed, as the size of the bank increases as much the risk decreases. Similarly, banking regulations are a risk-reducing factor in Islamic banks.

The correlation matrix
N = 144

Regression Z score		Z SCORE	Liqui	Regl	LLOSS	CUT	AGE
PearsonZ SCORE Correlation		1,000	, 183	, 183	, 149	, 029	, 022
	Liqui	, 183	1,000	**1,000**	**, 987**	, 024	-, 054
	Regl	, 183	**1,000**	1,000	**, 987**	, 024	-, 054
	LLOSS	, 149	**, 987**	**, 987**	1,000	, 031	-, 042
	CUT	, 029	, 024	, 024	, 031	1,000	, 026
	AGE	, 022	-, 054	-, 054	-, 042	, 026	1,000
Sig. (Unilateral)	Z SCORE	.	, 014	, 014	, 366	, 366	, 398
	Liqui	, 014	.	, 000	, 388	, 388	, 259
	Regl	, 014	, 000	.	, 388	, 388	, 259
	LLOSS	, 037	, 000	, 000	, 356	, 356	, 309
	CUT	, 366	, 388	, 388	.	.	, 379
	AGE	, 398	, 259	, 259	, 379	, 379	.

Note : Significant at the 5% threshold.