Islamic Banks and Financial Stability: An Empirical Analysis of the Gulf Countries

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ABSTRACT

The recent financial crisis of 2007-2008 is a good experiment to test the difference between the Islamic and the conventional model in terms of stability and banking risk. Using Z-score as an indicator of banking stability, our regression analysis (covers a matched sample of 136 banks from the Gulf countries in which (50) banks are Islamic and (86) are conventional between 2003 and 2012. Up to now, we have obtained the following results: small Islamic banks tend to be financially more stable than small conventional ones, large conventional banks tend to be financially more stable than large Islamic banks, and small Islamic banks tend to be financially stronger than large Islamic banks. Empirical results also show that conventional banks were most affected by the financial crisis. Similarly, analyzing the impact of Islamic banks on financial stability by studying the effect of market share in terms of credit supply, the empirical results show that the increase in market share in terms of the offering of loans by Islamic banks negatively affects financial stability, and thus leads to the increase of market share in terms of credit supply for conventional banks improving financial stability.

Keywords: *Islamic finance, financial Stability, banking risk, Z-Score*

JEL Classification: *G21,G32,G33*

1. INTRODUCTION

The summer of 2007 gave birth to the famous world financial system crisis, since then, a terrible instability has occurred causing the collapse of several banks and a near collapse of several states. The consequences of this crisis pushed different stakeholders to seek solutions or alternatives to the financial failures (Abu-Tapanjeh, 2009). In this context, particular attention was given to Islamic finance as a remedy for a system that continues to weaken in strength and pull the financial landscape backwards (Garas, 2012). The successive international financial institution crises have raised several questions about the contribution of Islamic finance to financial stability.

Islamic banks today are a crucial part of the economy and are the global finance leader; they are growing rapidly thanks to the opportunities they have. However, profitability remains the crucial element that forms the basis of these banks. In this context, there is a consensus around the idea that Islamic banks are more efficient and less risky than conventional banks and have a more important part to play in economic growth than the others (Bashir, 1999). In other words, Islamic banks, like conventional ones, are positioned as intermediaries between capital suppliers and the issuers of securities and tend to enjoy a fairly large power with respect to depositors and a key role in maintaining payment system stability (Said and Al-Hayek, 2012). It is widely recognized in the literature that Islamic banking performs better in terms of control functions than conventional banking because it adheres to Islamic principles such as profit and risk sharing, the prohibition of interest, prohibition of speculation, the backing of tangible assets and the prohibition of investing in illegal areas.

Economists and Islamic jurists began to criticize operations with interest performed by conventional banks in Muslim countries. The conventional model has lost its credibility in the international arena; this is due to lack of ethics, trust and morale. In addition, this system has been proven fragile with waning strength in the face of shocks during the crisis period (Hasen and Dridi, 2010).

The study of the influence of some indicators relative to the stability of the banking system has long had an important place in the economic and financial literature. A new focus on this issue appeared after the development and the apparent growth of the Islamic financing system, defined as an ethical finance whose moral values are derived from the Koran and more generally from Sharia law, different in its foundations and principles from the conventional system.

The study of Islamic finance allows us to say whether it can contribute to ensuring a climate of financial stability**.** Examining its contribution, we reach the conclusion relative to the Islamic banks, that they are safe from turmoil, effective and well-structured financial institutions. An explanation of the level of stability during the crisis lies behind this. To sum up, this leads us to ask whether Islamic banks have any effect on overall financial stability.

A better understanding of banking policies requires a thorough understanding of the determinants of the stability of Islamic and conventional banks. In general, it is necessary to understand the impact of changes in financial indicators on bank earnings in order to shed light on their levels of stability.

This article will, therefore, be organized as follows: in the first section, we review the major empirical studies carried out on the stability of the Islamic banking system. In the second section, we describe the assumptions and research methodology adopted to analyze the stability of Islamic and conventional banks in the Gulf countries. Finally, we present the results.

Review of literature

At the end of the financial crisis period and after, the issue of monitoring the financial stability and the soundness of the banking system are a key priority. With the existence of two types of banking, Islamic and conventional, which have different characteristics, a better understanding of banking policies requires a thorough understanding of their behaviors and in particular their levels of stability and which we need to pay more attention to.

The purpose of the Islamic financial system, like the conventional financial system, is the mobilization of financial resources and their allocation among different investment projects. However, there are several differences between these two systems from a foundational perspective. On one hand, traditional banking intermediation is based on generating interest on debt and on allowing the transfer of risk. On the other hand, Islamic banks are based on the principle of sharing profits and losses (Hassen and Dridi, 2010). Similarly, Islamic law also prohibits speculation which is defined as the sale of goods of uncertain existence and characteristics; speculation, therefore, represents a central element in triggering the global financial crisis.

In Islamic literature, the principle of sharing profits and losses is considered the ideal base for all financial transactions. However, in practice, it works differently; it indicates that most of the financial operations offered by Islamic banks do not match the form of the principle of sharing profits and losses. Similarly, their contribution to Islamic banking income remains very low (Aggarwal and Yousef, 2000; Chong and Liu, 2009; Dar and Presley, 2000; Kaleem and Isa, 2003). (Beck et al, 2010) conclude that the differences between Islamic and conventional banks are smaller than what has been assumed in the literature. Failure to develop the application of funding based on the principle of "PLS" (Profit and Loss Sharing) is due to certain regulatory issues and supervision constraints.

According to Solé (2007), a better understanding of and more scrutiny in the analysis of the Islamic banking industry from the perspective of financial stability is of major importance. While Islamic banks have become systemically important, these banks are today enjoying rapid growth in terms of size and interactions with conventional banks that are systemically important. Similarly, the absence of Islamic hedging instruments can weaken the situation of Islamic banks which can be subject to shocks.

Another study by, Boumediene and Caly (2009), which aims at analyzing the stock returns of Islamic and conventional banks during the subprime crisis, showed that the return volatility of Islamic banks is relatively lower than that of conventional banks which allows us to conclude that Islamic banks have weathered the financial crisis more than conventional banks, but we cannot confirm that they are not affected by the crisis. In the same logic, Hassan and Dridi (2010) conducted a study to analyze the impact of the financial crisis on Islamic and conventional banks. Using banking data from eight countries, Bahrain, Jordan, Kuwait, Malaysia, Qatar, Saudi Arabia, Turkey and the United Arab Emirates, for a total of 120 banks, they examined the effects of the crisis on profitability, credit growth and asset growth. The authors found that Islamic banks have shown strong resistance, mainly during the early stages of the crisis.

According to Boumediene and Caly (2009) and Hassan and Dridi (2010), three factors contributed to Islamic banks remaining stable during the period of crisis. The first factor is that Islamic banking activities are related to the real economy. The second factor is that Islamic banks are not exposed to the risks of toxic products. The third factor is that Islamic banks have kept many of their assets in liquid from as compared to conventional banks.

Among the studies that have examined the financial stability of Islamic banks, the work of Cihák and Hesse (2010) is a good example. They analyzed the financial stability of 19 banking

systems, the sample being composed of 77 Islamic and 397 conventional banks between 1993 and 2004. The authors found that small Islamic banks tend to be more financially stable than small conventional banks; large conventional banks tend to be more financially stable than large Islamic banks; and the small Islamic banks tend to be more financially stable than the large conventional ones. It also showed that Islamic banks are more exposed to difficulties in management and the increase of the market share of Islamic banking has no significant influence on the stability of other banks. According to Imam and Kpoder (2010) and the findings of Cihák and Hesse (2010), the more Islamic banks grow, the less stable they trend to become. According to Iman and Kpoder (2010), the increase in size of Islamic banks is only explained by the increase in their potential and their market share induced by a growth economy. In the case of a crisis and in the absence of growth, horizons may narrow and this can lead to the financial instability of Islamic banks. They argue that Islamic trust is a fundamental factor to conventional finance and helps diversify systemic risk.

Similarly, the work of both Rajhi and Hassiri (2013) represent an extension of work started by Cihák and Hesse (2010). They analyzed financial stability for 16 countries including ten countries in the MENA region and six countries in Southeast Asia, for a total of 467 conventional banks and 90 Islamic banks between 2000 and 2008. Empirical results showed that the average levels of the stability of Islamic banks measured by the proxy Z-scores are higher than conventional banks except for small Islamic banks. These results are in contradiction with the results found by Cihák and Hesse (2010). The latter also show that credit risk and income diversity are the main reasons for the insolvency of Islamic banks.

As described below, in case of conflicting views on the contribution of Islamic finance to financial stability, Turk-Ariss (2010) suggests that more research is needed to determine whether Islamic banks can help contribute to establish a climate of financial stability. This becomes an interesting line of future research to test the differences between these two systems.

2. METHODOLOGY AND DATA

2.1 Banking Stability

Lindgren, Garcia and Saal (1996) define the banking as the ability of the bank to withstand adverse events such as banking panics, major political changes, liberalization of the financial sector and natural disasters. Therefore, it reflects the ability of the bank to be solvent and to remain viable in difficult economic conditions by means of their capital and reserves. The financial soundness indicators (FSI: Financial Soundness Indicators) include, in addition to measures relating to the capitalization of the bank, a number of related asset quality and profitability indicators that provide additional information on the health of the bank. In this article we consider the Z-score as a measure of the stability of banks and accounting ratios that are part of financial soundness indicators (FSI).

The ratio Z-score is a popular measure of bank soundness since it is inversely related to the probability of bank insolvency. It is expressed as follows:

$$Z = \frac{(\mu + K)}{\sigma}$$

With :

- **μ** : represents the average performance of the bank's assets (ROA)
- **K**: Equity as a percentage of total assets
- **σ** : the standard deviation of the ROA as a proxy for the volatility of returns

The probability of insolvency is defined as the probability that the π loss exceeds the capital **E**

$$P[\pi \leq -E] = P[ROA \leq -K] = \int_{-\infty}^{-k} f(ROA)d(ROA)$$

According to Nicolo (2000), this probability satisfies the following inequality:

$$P[ROA \leq -K] \leq \frac{\sigma^2}{(\mu + K)^2} = \frac{1}{Z^2}$$

Consequently, an increase in the Z-score is equivalent to a decrease in the upper limit of the insolvency risk. Following the assumption of normality of returns to the bank, the Z-score can be interpreted as the number of standard deviation by which profits are expected to fall in order to deplete equity.

2.2 -Modeling

We build the Z-score for each bank (i) at time (t) in the country (j). Based on the analysis of panel data, we estimate a modified econometric model following Cihak and Hesse (2010) and Hassiri and Rajhi (2013) that allows us to test the effect of the financial crisis and market share in terms of volume of loans distributed by banks, while controlling for specific variables of the bank and macroeconomic variables.

The econometric model can be formulated as follows:

$$Z_{i.j.t} = \alpha + \beta Z_{.i.j.t-1} + \Theta B_{i.j.t-1} + \sum \eta_S S_{i.j.t} T_S + \sum \varphi_S P T_S + \omega M_{j.t} + \lambda G_{j.t} + \varepsilon_{i.j.t} \quad (1)$$

The $Z_{i.j.}$ is the dependent variable (Z-score), which expresses the level of stability of the bank (i) in the country (j) at time (t), $Z_{.i.j.t-}$ is a lagged variable indicating the effect of continuing financial stability, the $B_{i.j.t-1}$ is a vector of variables specific to the bank, the T_S is a dammy variable that takes the value of (1) if the bank in question is an Islamic bank, and (0) otherwise, the $S_{i.j.t} T_S$ is the interaction between the bank type with the market share, the PT_S is the interaction between the bank and the period of crisis 2007/08, $M_{j.t}$, represents the vector of the macro-economic variables, the $G_{j.t}$ is an indicator of governance by country, (j) for time (t), and finally $\varepsilon_{i.j.t}$ for the error term.

The $\varepsilon_{i.j}$ is composed as follows $\varepsilon_{it} = \alpha_i + \mu_{it}$ with α_i which designates the unnoticeable individual specific effect (that is a unique error component for the bank (i), μ_{it} reflects the interaction of the unobserved sources of the individual and temporal variation as:

$E(\alpha_i) = E(\mu_{it}) = 0$

$E(\alpha_i \mu_{it}) = 0$

$E(\alpha_i \alpha_j) = \sigma_a^2$ *if* $i=j$ *and 0 si* $i \neq j$

$E(\mu_{it} \mu_{js}) = \sigma_u^2$ *if* $i = j$; $t = s$ *and 0 if* $i \neq j$ *et* $t \neq s$

The individual specific effect α_i is integrated into the explanatory model of bank profitability to explicitly deal with heterogeneity across banks.

However, the presence of a lagged variable makes conventional techniques to estimate panel data inappropriate. Thus, the use of panel data with fixed or random effects does not solve the problems inherent to dynamic econometric models. This is due to the correlation between the endogenous and the residuals from the regression ($\alpha_i + \mu_{it}$). In order to remedy this difficulty, we estimate the equation by the GMM method.

The GMM system quality evaluations depend notably on the validity of the matrix of the instruments and the hypothesis that the error does not present an auto interrelationship. Two tests are proposed then:

Test 1 (Instruments): the matrix of the instruments should not be correlated with the disturbance so that the regression remains correct. This hypothesis is evaluated using the Sargan test.

Test 2 (autocorrelation of residuals) as the reference equation was passed in first differences, residuals obtained are expected to be correlated with order (1), but not in the order (2) tests AR (1) and AR (2) Arellano and Bond (1991) are used to test this hypothesis.

2.3. Variable control and hypothesis

Insolvency risk can be influenced by internal factors that are specific to the bank and by external factors. For internal factors, we have tried to gather as many indicators and variables that represent the financial statements of Islamic and conventional banks and can be compared as possible. The explanatory variables include a number of risk characteristics, discussed in the literature and that are related to bank income, credit risk, capitalization, asset quality, efficiency, liquidity and size. To identify the type of impact on the bank's Z-score, we introduced a variable that takes the value of (1) for an Islamic bank and the value of (0) for a conventional.

Among bank data used in the econometric model, we find the one provided by Miller (1997), Abreu and Mendes (2002), or Naceur et al (2010). They interpret the loan to asset ratio as a measure of credit risk: the higher the ratio is, the greater the number of loans granted by the bank and therefore the higher the risk of default and credit risk increases, negatively, influencing banking stability. Similarly, the intermediation ratio defined as the ratio of total deposits to total loans, is used as a proxy for liquidity risk: the higher the ratio is, the less liquidity the bank has. This is reflected through an additional risk-taking which correspond to an over-intermediation situation influencing negatively the banking stability. Indeed, in case of urgent need of capital, the bank cannot rely on its loans as long as they are paid off only at defined maturities. As a result, it causes problems of insolvency. The analysis of the assets quality of assets, which is a concept very close to the credit risk, we use two ratios. The first is the “Provision on loans over gross loans”, the higher the rate of funding is , the greater the probability of the credit to be highly classified will be. The second ratio correspond to “Provision on the credits on income of interest”, which measures the part of the losses on the credits in regard to the realized returns.

We also introduce into the model financial structure variables represented by the variable ratio "total capital to total deposits," financial independence, also called, funded ratio presented by the own capital to total assets ratio and finally the coverage ratio presented in the report 'own capital to total loans. These three ratios are widely used in the literature to identify the financial strength of the banking system.

Regarding the efficiency of banking, it is generally measured by the cost-income ratio, the higher the ratio is, the more inefficient is the bank. This ratio was used by Cihak and Hesse (2010) and Hassiri and Rajhi (2013). They find that a bank is more effective because it is able to use its resources well and can master its costs, which generates better performance and, as a result, a higher level of stability.

Finally, we analyze the effect of size on bank stability using the logarithmic of total assets. Several research studies have obtained different results. There are those who believe that size has a positive impact on banking stability, that is to say that, large size helps reduce costs due to economies of scale, which lead to an improvement in the levels of stability. Others found a negative impact and focus on the fact that the bigger the bank is, the more difficult it is to manage. Jonghe (2010) found that small

banks are better able to withstand adverse economic conditions, while Barros et al (2007) argue that small banks are more likely to achieve good performance and less likely to see poor performance. Conversely, large banks are less likely to achieve good performance and more likely to perform poorly.

Similarly, in this work, we thought to improve the reference model used by Cihak and Hesse (2010) and Hassiri and Rajhi (2013) by adding to the basic model the variable (P) which takes the value (1) if the year in question belongs to the crisis period 2007/2008, otherwise (0). The interaction between the crisis and Islamic and conventional banks indicator is useful to test whether Islamic banks are protected from financial turbulence, and whether the crisis has the same effect on both banking systems.

To take into account the impact of market concentration on financial stability, Cihak and Hesse (2010) used the Herfindahl-Hirschman Index (HHI). They did not find a relationship between the increase in the market share of Islamic banks and the level of stability of other banks. In this work, we propose to study this relationship but in changing the HHI which represents "the market share in terms of total assets" to "market share in terms of credit supply," measured by the total bank credit ratio (i) which is divided by the sum of the total appropriations for the entire sample by country (j).

This ratio is used to detect the impact of market share in terms of the offering of loans of by Islamic and conventional banks on banking stability of other banks. Specifically, we shall have a view of the contribution of an increase of 1% in the volume of loans on bank stability and see whether Islamic loans present more risk than their conventional counterparts.

When considering banking stability, several macroeconomic variables can positively or negatively influence it. We incorporate into the model a specific control variable for each country of our study. We follow Cihak and Hesse (2010) and Hassiri and Rajhi (2013) in their choice of variables such as: "GDP growth rate, inflation and exchange rate," but we add to these macroeconomic variables other variables that are believed to have a direct or indirect relationship on banking stability, such as "the money supply growth, oil earnings as a percentage of GDP and the market capitalization of listed company as a percentage of GDP."

To control for the institutional environment, we construct a governance index (per year and per country) which represents the estimations tool of the following six governance indicators established by Kaufmann et al. (2010): "control of corruption, political stability, regulatory quality, rule of law, accountability and finally government efficiency."

2.4 Data

The empirical analysis will be conducted on a sample of 136 banks from Gulf countries, "the United Arab Emirates, Iran, Bahrain, Saudi Arabia, Kuwait, Qatar and Oman" in which (50) banks are Islamic and (86) are conventional. We exclude Iraq from the sample due to lack of banking data. We use balance sheets taken from the period 2003-2012. Individual banks data were collected from the BANKSCOPE data base.

Table (1) shows the distribution of the sample based on the size and the function of the bank in each country. To capture the effect of size on banking stability, we used the threshold of $ 1 billion so as to separate large Islamic banks from those of smaller sizes the same for the conventional banks. The choice of threshold is arbitrary, but it has been used in many previous studies, (Mercieca et al, (2007); Hesse and Cihak ,(2010); Hassiri and Rajhi, (2013)).

The nature of the banking system in the Gulf countries is not the same. We observe three types of banking system. There is a totally Islamic system in Iran, a dual system in countries like

Bahrain, Qatar, Kuwait, Saudi Arabia and the United Arab Emirates and a totally conventional system in Oman.

The selection sample is justified by the fact that the banking system in the Gulf countries is a subject of study. It contains a large number of Islamic banks with a significant market share. Gulf Islamic banks account for a significant share of banking system assets in the GCC[1] (17% of total assets). Their assets represent 28% of Islamic banks in the world. They have realized great growth compared to the banking industry in general (5% per year over the last five years) and the growth of their resources is higher than that of their employees. These banks offer attractive opportunities for the conventional system. Indeed they provide an important source of cash, new funding sources and opportunities for fruitful cooperation in the creation of new products.

El Korchi (2005) notes that Islamic institutions work in 75 countries, but most of the Islamic banks in these countries have a very small market share. To analyze the impact of Islamic banking on the stability of other banks, using a sample of "big countries" may not lead to a result like the one of Cihak and Hesse (2010). The lack of significance of the relationship is explained mostly by the low contribution in terms of the weight of the Islamic industry in the overall sample.

We notice from the sample description table, the disparity of the variables' average values between Islamic and commercial banks, which reflects the difference between these two types of banking industry. These two variables suggest that the structure of the sample is not homogeneous with a large gap between the maximum and the minimum value of the capital ratio and other ratios presented. This allows us to conclude that the sample is heterogeneous as it contains big and small banks with different characteristics.

3. RESULT AND INTERPRETATION

The changing levels of stability of Islamic and conventional banks between 2003 and 2012 shows that the average Z-score is between 20% and 30% for both types of banking industry. Analysis of the variable lag in the GMM dynamic model shows that the adjustment of the level of stability to the steady state rate is different between the two types of banks. The coefficient is statistically significant: δ is a positive sign; it is about 0.84 for Islamic banks and 0.34 for the conventional. This shows that the stability level of the previous year has an effect on the future level of bank stability but with different degrees. Islamic banks are more sensitive than the conventional in terms of persistent financial stability (Table N: 5).

The Z-score of Islamic banks follows an oscillating movement. We can observe that from 2005 until 2007, the level of stability followed a downward trend and has decreased from 29% to 22%. During the crisis, the level of stability increased from 22% in 2007 to 27% in 2008; that is to say, an upward trend which shows that Islamic banks were not directly affected by the financial crisis, especially in the crisis' first stage. This is mostly, explained by the fact that Islamic banks are not exposed to the risks of toxic by-products. The Islamic model prohibits the establishment of operations that are not based on tangible assets, and prohibits any type of securitization and speculation, which represent the main reasons for the spread of shocks. But from 2008 to 2012, we observe that the level of stability of Islamic banks follows a downward trend, the decrease is continuous in time and is reaches 21% in 2012. The downward trend level of stability after the crisis is explained largely by the

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global economic recession. This has, negatively, influenced Islamic banking because it is strongly linked to the real economy. From the graph, we conclude that Islamic banks have not been directly affected by the subprime crisis, especially in the early stages of the crisis, but they are indirectly affected by the economic downturn caused by it. These results are consistent with Hassen and Dridi's findings (2010).

As for conventional banks, we see that between 2005 and 2009, the level of stability follows a continuous backwards trend. The Z-score decreased from 29% to 25% in 2007. In times of crisis, the Z-score continued to decline to 22% in 2009. Starting from 2009, we see a slight improvement in a steady trend on the order of 24% until 2012. These results show that average conventional banks were directly affected by the subprime crisis, while Islamic banks remained strong during the crisis period. Regression analysis for the entire sample shown in (Table N: 3) confirms the results found. The effect of the financial crisis on the stability of conventional banks is statistically significant with a negative sign; however, it was not the case for Islamic banks in terms of effect.

For further analysis, we thought to analyze each industry separately by introducing the effect of size into each system (The variable that takes the value of (1) for the big banks and the value of (0) for the contrary) (see Table 5). The regression results show that large Islamic and conventional banks are affected in the same way. The interaction between big banks in periods of crisis shows a negative relationship and is statistically significant on the stability of banking and is around -5% for both types of banks. So whatever type of banking, Islamic or conventional, both are subject to risks more so than smaller banks. The results for small banks show a positive relationship, meaning that small banks have escaped the crisis. The size of the bank is a systemically important factor to make banks in distress more exposed to "too big to fail" risk.

The analysis of the distribution level Z-Score is based on the size of the bank type shown in the graph for the Gulf countries, which shows that small Islamic banks tend to be financially more stable than small conventional ones; the large conventional tend to be financially more stable than large Islamic banks; and the small Islamic banks tend to be financially more stable than the large Islamic banks. These results are consistent with findings by Cihak and Hesse (2010).

As for the analysis of the impact of the market share in terms of credit supply on banking stability, the results show that any increase in the market share in terms of credit supply for the Islamic banking system, negatively, affects the stability of the banking system, or vice versa for conventional banks, any increase in the market share of conventional banks improves banking stability (Table N: 3). This is explained by the fact that the loans extended by Islamic banks present more risk than those of their conventional counterparts, since Islamic loans are based on the principle of "PLS (Profits and Losses Sharing)" and not on the transfer of risk. To manage credit risk, conventional banks can rely on hedging instruments or impose guarantees that sometimes exceed the amount of credit or the establishment of securitization transactions. Conventional banks can rely on these hedging techniques more than the creation of provisions in risk management. This type of coverage is absent by nature in the Islamic system. They are based solely on its funds in real assets, in the form of loans as a guarantee but may suffer losses due to a decline in market prices and on what it constitutes as provisions for loans. This makes Islamic banks more vulnerable to risks, which can have a negative influence on the stability of other banks.

The analysis of credit risk for the entire sample (Table N: 3) using the proxy total loans to total assets shows a negative and statistically significant relationship to banking stability. In other words, any increase in this ratio results in an increase in the number of loans granted by the bank, which increases the risk, and which can negatively influence banking stability. By analyzing each

industry separately, the relationship was reversed for Islamic banks. We observe a positive and statistically significant relationship, that is to say more credit risk increasing by 1% over Islamic banking, becoming more stable by 0.12%. As a result, we can say that risk-taking improves the stability of the Islamic system but creates a systemic risk to the stability of other banks.

For the analysis of the ratio of the quality assets on banking stability, results show a negative and statistically significant relation for conventional banks (Table N: 5). This relationship is explained by the fact that, the higher the provisioning rate, the more loans are likely to go classified, which adversely affects the stability of conventional banks, reaching a measure of 0.21. As for the Islamic banks, this relationship is not statistically significant for the four established regressions.

The analysis of the intermediation ratio shows a negative and a statistically significant relationship on banking stability for both types of industries (no significantly remarkable gap). In other words any increase in the volume of loans from the level of deposits can result in taking on additional risk that reflects a situation of over-intermediation leading to an adverse effect on banking stability.

Regarding the financial sustainability ratio, it shows a positive and statistically significant relationship to banking stability for both types of industries (no significantly remarkable gap). Indeed, the increased level of equity, results in a decreasing need for long-term finance and the substitution of debt by other capital, which reduces the probability of bankruptcy. The same applies to the equity ratio of total deposits, which shows that both types of banks are financially structured to borrow more and to increase their funding. This ratio is positive and has a statistically significant relationship with Z-score.

Analyzing the coverage ratio which represents the stability of the bank to cover its loans with its own equity, we find a negative and statistically significant relationship on bank stability for both types of industries (no significant difference). This negative relationship may be explained by the fact that by increasing the margin of safety, the amount of resources will be less exploited which can negatively affect bank profitability.

The efficiency ratio and asset size show a negative relationship. The bigger the bank becomes, the harder it becomes to manage. Consequently, the rise load bank negatively increases to affect profitability and the stability of conventional banks.

The results of the analysis of internal determinants of banking stability in both systems show that in general, they are identical to the expected signs discussed in section two, and that there was no significant remarkable difference between internal determinants for both systems.

Regarding the analysis of macro-economic variables, the regression results show that there is a negative and statistically significant relationship between GDP growth and banking stability. This relationship is mostly explained by the economic downturn (lower level of investment, consumption and the level of lending), the risk was high during the crisis which negatively affects banking stability.

Similarly, there is a positive and statistically significant relationship between market capitalization of listed companies and banking stability, this is to say, any increase in the market value of 1% for all of the outstanding shares, can positively affect the Transfer stability by0.12% .

Regarding the exchange rate, there is a positive and statistically significant relationship between the exchange rate and banking stability, that is to say, any appreciation of the USD against the local currency enhances banking stability. This relationship is explained by the fact that Gulf countries oil revenues are denominated in USD. The massive influx of capital cannot be absorbed entirely by the economies of oil-producing countries. The latter invest in the markets through banks and thus positively affect their revenue.

Finally, governance variability, growth in money supply and income from oil as a percentage of GDP had no significant effect on bank stability.

4. CONCLUSION

The banking crises cascade which shook the business world reduced the performance of some financial institutions and pushed various stakeholders to find several remedies to the financial failures that occurred. The successive crises experienced by financial institutions have raised several questions about the contribution of Islamic finance to financial stability. This article attempts to empirically answer the following question: To what extent can Islamic finance contribute to ensuring a climate of financial stability?

To answer this question, we examined a matched sample including 136 banks among which were 50 Islamic banks and 86 conventional from the Gulf countries. We used the Z-score method as a measure of banking stability. We found that small Islamic banks tend to be financially more stable than small conventional ones; large conventional banks tend to be financially more stable than large Islamic ones and small Islamic banks tend to be financially more stable than large Islamic banks.

Similarly, we found that Islamic banks have not been directly affected by the subprime crisis, especially in the early stages of the crisis, but they were indirectly affected by the economic downturn. The results show that the size of the bank presents a systemically important factor that puts Islamic and conventional banks in distress and at greater risk.

Regarding the impact of Islamic banks on financial stability by studying the effect of market share in terms of credit supply, the empirical results show that the increase of market share in terms of loan offered by Islamic banks, negatively affects financial stability and the increase of market share in terms of credit supply for conventional banks improves financial stability. This is explained by the fact that the loans extended by Islamic banks present more risk than those of conventional banks.

Finally, a comparative analysis of the determinants of domestic banking stability in both systems shows that in general, the results are identical to the expected signs discussed and that there was no significant difference between the outstanding internal determinants for both systems.

Table 1: Overview of the input data: Authors' calculations based on Bank Scope data

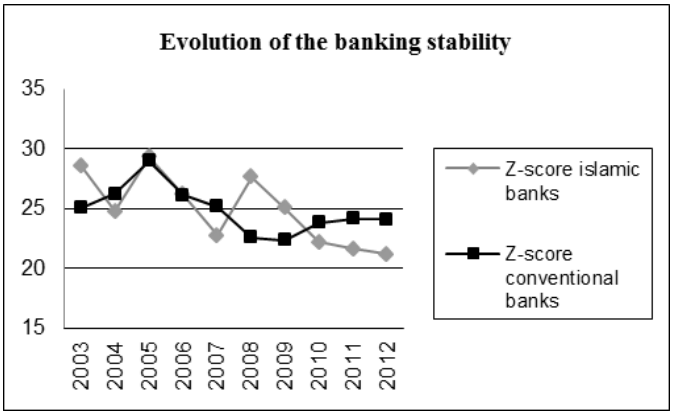
	Conventional banks		*Islamic Banks*		
	Large banks	*Small banks*	*Large banks*	*Small banks*	*Total*
Iran	0	0	15	0	15
Saudi Arabia	9	1	3	1	14
Kuwait	10	7	5	1	23
Oman	8	3	0	0	11
Qatar	7	1	3	0	11
United Arab Emirates	13	5	6	1	25
Bahrain	11	10	9	7	37
Total	58	27	41	10	136

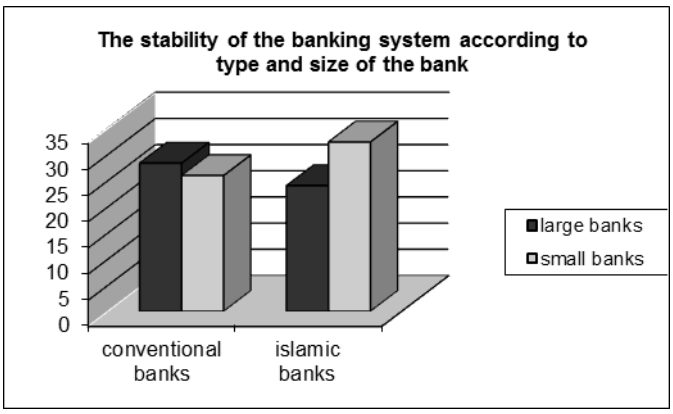
Table 2: Descriptive statistics

	Conventional banks				**Islamic Banks**				
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Z-score	823	27.35196	25.3361	-2.0887	215.2652	430	24.99808	44.92807	-1.082154	425.3702
Leverage ratio	823	28.65539	22.61105	-15.686	132.2268	430	36.58332	31.94695	.7688411	100
Asset quality	823	3.527776	22.00395	-100	434.0909	408	6.922036	23.30866	-110	213.1579
Efficiency	823	149.2929	591.5541	-1120	13150	429	611.418	2730.18	-2735.417	33574.04

Fig1

Source: calculation done by the author, data from BANKSCOPE





Source: calculation done by the author, data from BANKSCOPE

Table 3: Regression according to type

	All banks			
	1	**2**	**3**	**4**
Z-score (L1)	.4920007	.4839129	.5861963	.5908517
	0.000***	0.000***	0.000***	0.000***
Credit Risk (L1)	-.1336139	-.1676927	-.0391333	-.1395369
	0.001***	0.000***	0.283	0.001***
Liquidity (L1)	.0001027	.0001068	.0000156	.0000117
	0.105	0.100	0.822	0.874
Equity_dep (L1)	-.0000363	-.0000261	-.0000248	-.0000204
	0.042**	0.155	0.196	0.302
Hedging risk (L1)	-.0009096	-.0010011	-.001152	-.0013001
	0.000***	0.000***	0.000***	0.000***
Leverage ratio (L1)	.040293	-.0326319	.0988044	.0427052
	0.174	0.455	0.001***	0.236
LLP_Net interest income (L1)	-.0000923	.0004233	.0009749	.0035656
	0.960	0.822	0.574	0.086*
Asset quality (L1)	-.006528	-.0795165	.0062196	.0202605
	0.863	0.197	0.876	0.627
Efficiency (L1)	-.0001813	.0003688	.0000626	-4.84e-06
	0.732	0.564	0.854	0.989
Size (L1)	-1.526322	-3.916199	.4438829	.2875597
	0.032**	0.001***	0.297	0.560
Islamic bank dummy*crisis	-1.037268	-4.874985	-1.655353	-2.762648
	0.787	0.228	0.635	0.474
Conventional bank dummy*crisis	-4.637006	-3.486744	-5.857421	-4.838719
	0.024**	0.082*	0.003**	0.042**
Islamic bank* Market part	-2.945503	-3.783406	-6.848392	-.8523592
	0.000***	0.112	0.012**	0.809
Conventional bank * Market part	7.936352	10.89335	1.974799	1.958968
	0.000***	0.000***	0.000***	0.001***
Earnings Petroleum			.0684059	.1026931
			0.118	0.364
Money supply			-.066849	-.0773568
			0.369	0.416
GDP			-	-

Table 4: Regression according to size

	All banks			
	1	**2**	**3**	**4**
Z-score (L1)	.4898372	.4787527	.6011874	.5864877
	0.000***	0.000***	0.000***	0.000***
Credit Risk (L1)	-.1134902	-.1527551	-.0416689	-.1362575
	0.003**	0.000***	0.255	0.001***
Liquidity (L1)	.0000759	.0001086	.0000225	7.81e-06
	0.218	0.090*	0.744	0.913
Equity_dep (L1)	-.0000391	-.0000271	-.000018	-.0000198
	0.026**	0.137	0.345	0.313
Hedging risk (L1)	-.0009343	-.0009582	-.0011068	-.0012524
	0.000***	0.001***	0.000***	0.000***
Leverage ratio (L1)	.1064852	-.0123046	.0685962	.033147
	0.000***	0.773	0.016**	0.301
LLP_Net interest income (L1)	.0000443	.001158	.0011663	.003076
	0.980	0.522	0.494	0.129
Asset quality (L1)	-.006785	-.0720888	.0058543	.0302869
	0.855	0.237	0.884	0.466
Efficiency (L1)	-.0005007	.0001771	.000052	-.000043
	0.334	0.779	0.878	0.903
Size (L1)	-1.267155	-2.560258	.0244394	.3888031
	0.000***	0.022**	0.953	0.412
Large banks *crisis	-2.198135	-3.599811	-4.446722	-2.217031
	0.065*	0.005**	0.004**	0.213
Small banks *crisis	-3.348722	-2.995818	-1.257253	-2.185441
	0.216	0.274	0.642	0.467
Small banks * Market part	37.94071	102.9648	-111.3136	204.3232
	0.769	0.418	0.322	0.105
Large banks * Market part	.047598	-6.753435	-1.106645	-1.744083
	0.805	0.001***	0.020**	0.001***
Earnings Petroleum			.0365132	.0875036
			0.398	0.428
Money supply			.080372	-.1022137
			0.275	0.278
GDP			.0692774	-

			.0075614	.2562729					.3184056
			0.958	0.161				0.622	0.071**
Exchange rate			.0028648	.0037199	***Exchange rate***			.0029421	.0039851
			0.000***	0.000***				0.000***	0.000***
Inflation			-.0201224	.036678	***Inflation***			-.028367	.0471183
			0.601	0.416				0.455	0.290
Market capitalization			.0332156	.1111624	***Market capitalization***			.0254047	.1292663
			0.065*	0.000***				0.153	0.000***
Governance		.4088126		3.044574	***Governance***		-1.281387		.9623917
		0.876		0.586			0.619		0.862
_cons	27.95507	48.57247	-.5522106	1.073388	**_cons**	5.59597	37.76464	4.482134	-.4506395
	0.000***	0.000***	0.906	0.874		0.118	0.000***	0.354	0.945
observation	1086	1032	992	992	**observation**	1086	1032	992	992
Prob > chi2	0.000	0.000	0.000	0.000	**Prob > chi2**	0.000	0.000	0.000	0.000
Sargan test	0.000	0.000	0.000	0.000	**Sargan test**	0.000	0.000	0.000	0.000
Arellano-Bond test					**Arellano-Bond test**				
AR (1)	0.000	0.000	0.000	0.000	**AR (1)**	0.000	0.000	0.000	0.000
AR (2)	0.292	0.104	0.140	0.118	**AR (2)**	0.694	0.226	0.240	0.340

Table 5: Regression by type of industry

	Islamic banks				*Conventional Banks*			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Z-score (L1)	.840719	.8382944	.8379392	.8517741	.3453753	.3680197	.3230769	.406651
	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Credit Risk (L1)	.1249394	.1413797	.1588871	.1408938	-.0515315	-.0367278	.0295043	-.0163267
	0.073**	0.062**	0.009**	0.014**	0.233	0.424	0.538	0.772
Liquidity (L1)	-.0028237	-.0028476	-.0027405	-.0028275	-.000252	-.0001011	-.0001496	-.0003402
	0.000***	0.000***	0.000***	0.000***	0.016**	0.371	0.206	0.013**
Equity_dep (L1)	.0001384	.000136	.0001349	.0001385	.0006427	.0002873	.0003453	.0007544
	0.000***	0.000***	0.000***	0.000***	0.000***	0.136	0.086**	0.002**
Hedging risk (L1)	-.0018979	-.0019055	-.0018745	-.0019238	-.0008556	-.0011247	-.0008929	-.000597
	0.007**	0.009**	0.010**	0.008**	0.000***	0.000***	0.001***	0.060*
Leverage ratio (L1)	.0875923	.1235273	.1353276	.0926656	.0386087	.1275794	.1952304	-.0180377
	0.112	0.073*	0.039**	0.118	0.361	0.001***	0.000***	0.791
LLP_Net interest income (L1)	.0001227	-.0000965	-.0004648	-.0013614	.0052026	.0044557	.0019451	.0047922
	0.952	0.963	0.788	0.401	0.085*	0.229	0.626	0.277
Asset quality (L1)	.0538014	.0630713	.0710802	.0813653	-.0103672	-.2158829	-.0157868	.1150573
	0.320	0.267	0.174	0.115	0.674	0.009**	0.845	0.217
Efficiency (L1)	-.0005042	-.0008014	-.000722	-.0008017	-.0027819	-.0005733	-.0013744	-.0017654
	0.231	0.128	0.156	0.110	0.000***	0.712	0.353	0.277
Size (L1)	.9292487	1.652862	2.352281	1.183912	-2.694034	.3049552	1.88893	-4.007005
	0.285	0.208	0.061*	0.235	0.004**	0.477	0.005**	0.008**
Large banks dummy *crisis	-5.755228	-5.573434	-6.681362	-4.934835	-5.084418	-4.345094	-5.596499	-8.128957
	0.030**	0.043**	0.019**	0.063*	0.000***	0.001***	0.000***	0.000***
Small banks dummy *crisis	9.894542	9.157012	6.672884	8.818642	1.577457	-.811663	.2215316	1.427708
	0.068*	0.102	0.234	0.099*	0.472	0.702	0.922	0.574
Small banks * Market part	-402.6394	-316.7601	-243.6142	-305.633	99.93964	327.7673	180.4624	134.2342
	0.051*	0.137	0.166	0.066*	0.324	0.003**	0.157	0.358
Large banks * Market part	-.1900557	-1.935847	-3.102203	-1.327451	6.272786	1.156269	.2077226	11.37336
	0.585	0.323	0.093*	0.252	0.000***	0.003**	0.665	0.000***
Earnings Petroleum			.104191	.0147009			-.2529777	-.0567617
			0.260	0.875			0.021**	0.683
Money supply			-.0435533	-.0970528			.0769369	.0715514
			0.733	0.408			0.388	0.467
GDP			.1072421	.044002			.3696818	-.0552682

			0.703	0.870			0.020**	0.780
Exchange rate			.0005464	.0005113			-2.36507	-3.077373
			0.181	0.525			0.040**	0.028**
Inflation			.0643186	.0709099			.0298907	.0527384
			0.501	0.452			0.451	0.227
Market capitalization			.0463192	.0441463			.0425088	.0591153
			0.168	0.146			0.072*	0.025**
Governance		-2.687659		-.7294153		.3684633		5.401124
		0.473		0.883		0.916		0.367
_cons	-11.20399	-18.33828	-32.12648	-17.69892	37.34794	12.62375	2.823625	42.9319
	0.253	0.177	0.023**	0.140	0.000***	0.008**	0.587	0.000***
observation	328	309	296	309	733	704	696	696
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sargan test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test								
AR (1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR (2)	0.818	0.869	0.813	0.800	0.492	0.896	0.969	0.078

Table 6: Regression country (in the Islamic specification)

	Z-score (L1)	*Credit Risk (L1)*	*Liquidity (L1)*	*Equity_dep (L1)*	*Hedging risk (L1)*	*Leverage ratio (L1)*	*LLP_Net intrest (L1)*	*Asset quality (L1)*	*Efficiency (L1)*	*Size (L1)*	*Islamic *crisis*	*Islamic* Market part*	*_cons*
Iran	.9053591	.2466296	-.1175446	.0044645	-.0061887	.7757843	-.0109237	-3.385159	.0033984	4.593092	15.91626	-.410747	-50.5112
	0.000***	0.738	0.758	0.978	0.600	0.412	0.933	0.436	0.112	0.225	0.655	0.864	0.402
Saudi Arabia	1.083271	-.0910507	-.0102439	-.0058071	.0026474	.0242715	.0748563	-.233848	.0000749	.3231736	4.569978	-14.29252	
	0.000***	0.077*	0.087*	0.082*	0.786	0.657	0.015**	0.148	0.910	0.199	0.041**	0.003**	
Kuwait	.9363992	-.0011904	-5.33e-07	.0000769	.0000131	-.0087041	.0015625	-.0051766	-.0000367	-.0294082	-2.277254	.3072311	1.027455
	0.000***	0.934	0.995	0.682	0.847	0.656	0.512	0.557	0.846	0.908	0.063*	0.410	0.693
Oman	.9006699	.037909	.0094768	-.0082928	.0237071	-.027565	.0521609	-.222181	.0172503	-.1947342			.2268589
	0.000***	0.730	0.010**	0.013**	0.655	0.830	0.423	0.615	0.157	0.728			0.977
Qatar	.7199869	-1.045751	.0127583	-.0009936	.0275971	-1.243927	-.177939	6.456426	.0752354	.42237	.8031627	-4.18024	80.88071
	0.000***	0.000***	0.000***	0.023**	0.096*	0.000***	0.165	0.000***	0.000***	0.724	0.861	0.167	0.000***
United arab Emirates	.7330256	-.0354355	.0187926	-.0201859	-.0002582	.060997	-.0046272	.0226736	-.001819	.8250564	-6.20355	1.351233	-.1851002
	0.000***	0.343	0.021**	0.009**	0.812	0.111	0.659	0.689	0.000***	0.015**	0.017**	0.780	0.952
Bahrain	.9423346	-.0264336	.0000206	-7.43e-06	-.0003476	.0247055	.0005441	.0002359	.0000519	.215217	-1.399354	-3.849999	-.4752519
	0.000***	0.314	0.937	0.630	0.370	0.160	0.301	0.994	0.886	0.450	0.342	0.336	0.860

	Prob > chi2	Sargan test	AR(1)	AR(2)
Iran	0.000	0.884	0.000	0.082
Saudi Arabia	0.000	0.000	0.056	0.000
Kuwait	0.000	0.052	0.000	0.213
Oman	0.000	0.020	0.000	0.108
Qatar	0.000	0.000	0.002	0.624
United arab Emirates	0.000	0.012	0.000	0.841
Bahrain	0.000	0.038	0.000	0.371

Table 7: Regression by country (in the conventional specification)

	Z-score (L1)	*Credit Risk (L1)*	*Liquidity (L1)*	*Equity_dep (L1)*	*Hedging risk (L1)*	*Leverage ratio (L1)*	*LLP_Net intrest (L1)*	*Asset quality (L1)*	*Efficiency (L1)*	*Size (L1)*	*Conv bank *crisis*	*Convbank * Market part*	_cons
Iran	.8961348	.0650579	-.0504871	-.0121764	-.0049812	.6329302	.0293539	-3.812063	.0036716	3.736674			-33.21993
	0.000***	0.921	0.883	0.939	0.659	0.437	0.787	0.367	0.068*	0.253			
Saudi Arabia	1.009425	-.0812286	-.002632	-.0032041	-.0006392	-.1205422	.0272875	-.1711305	-.0005106	-2.303854	-2.628331	2.603176	26.57991
	0.000***	0.035**	0.446	0.006***	0.869	0.007**	0.275	0.000***	0.032**	0.001***	0.009**	0.020**	0.000***
Kuwait	.9807922	-.0000699	.0001208	-.0001813	-.0000116	-.0016117	.0010676	-.0027501	.0001028	.3359621	-1.953033	-2.256512	-1.593862
	0.000***	0.996	0.180	0.335	0.863	0.906	0.669	0.750	0.691	0.042**	0.001***	0.010**	0.308

Oman	.913771	-.0125927	.0093735	-.0081978	.0161844	-.0206442	.0620522	-.3138171	.0137919	-.2398968	-2.342655	.1395214	4.573099
	0.000***	0.816	0.001***	0.000***	0.544	0.730	0.036**	0.114	0.135	0.532	0.175	0.633	0.362
Qatar	.7457938	-1.04489	.0125864	-.0008871	.0261087	-1.300848	-.1670396	6.234929	.0750493	-1.733606	-2.684573	1.506942	97.41814
	0.000***	0.000***	0.000***	0.040**	0.117	0.000***	0.196	0.000***	0.000***	0.223	0.411	0.051*	0.000***
United arab Emirates	.7380792	-.051332	.0176516	-.0191149	-.000612	.0559276	-.004778	.021254	-.0018558	.8117526	-2.550343	.2438693	1.024566
	0.000***	0.161	0.025**	0.011**	0.571	0.128	0.641	0.701	0.000***	0.202	0.029**	0.850	0.829
Bahrain	.9387015	-.0398264	-.000077	-2.35e-06	-.0003053	.0176301	.0008467	-.0000485	-.0005106	-.4998039	-.6616804	2.208058	4.674776
	0.000***	0.184	0.775	0.883	0.443	0.337	0.108	0.998	0.032**	0.331	0.556	0.226	0.285

	Prob > chi2	**Sargan test**	**AR(1)**	**AR(2)**
Iran	0.000	0.944	0.000	0.020
Saudi Arabia	0.000	0.000	0.014	0.291
Kuwait	0.000	0.046	0.000	0.126
Oman	0.000	0.016	0.041	0.186
Qatar	0.000	0.000	0.002	0.740
United arab Emirates	0.000	0.004	0.000	0.953
Bahrain	0.000	0.021	0.000	0.409

Annex

Annex 1: Variables description.

Variable	Description	Source
Z-score	Defined as Z= (μ +K)/σ, where K is equity capital as percent of assets, μ is the average return as percent of assets, and σ is the standard of deviation of return on assets as a proxy for return volatility.	Authors'calculations based on BankScope data
	Measures the number of standard deviations for return realization, it has to fall in order to deplete equity, under the assumption of normality of bank returns	
Credit Risk	Defined as Ratio : Loans / Total Asset	BankScope
Liquidity	Defined by the ratio: Loans / Deposit Short	BankScope
Financial structure	Defined by the ratio : Equity / Deposit Short	BankScope
Hedging risk	Defined by the ratio: Equity / Total Loans	BankScope
Financial autonomy	Leverage ratio : Equity / Total Asset	BankScope
		BankScope
Asset quality	Loan Loss Provisions / Net interest income	
	Loan Loss Provisions / Total Loans	
Efficiency	Cost to income ratio	BankScope
Size	Natural logarithm of total assets	BankScope
Market part	Defined by the ratio of total loans of the bank (i) on total credits of all the specimen country (j)	Authors'calculations based on BankScope data
Crisis	Represented by an indicator variable that takes the value (1) if the year in question belongs to the crisis period 2007/2008 and (0) if not	Variable Dammy
Earnings Petroleum	Earnings from petroleum as a percentage of GDP	The World Bank
Money supply	Money growth supply annual percentage	The World Bank
GDP	Annual GDP growth in percentage	The World Bank
Exchange rate	Official exchange rates by country	The World Bank
Inflation	Inflation rates by country	The World Bank
Market	Market capitalization of listed companies as a	The World Bank

capitalization	percentage of GDP	
Governance	Average of the six governance measures: control of corruption, political stability, quality of the regulation, authority of the law, responsibility and finally efficiency of the public powers.	Authors'calculations based on BankScope data

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