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Article

Islamic Financial Stability Factors: An Econometric Evidence

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Abstract: This study empirically examines the internal and external factors of Islamic banks' financial stability during the time frame from 2006 to 2017 in the Middle Eastern and North African (MENA) region. The stability of Islamic banks was determined by the Z-score, which is one of the most well-known financial stability indicators. Using multiple regression analysis, it is shown that capital adequacy ratio and liquidity positively impact the Z-score of Islamic banks, whilst size, governance and level of concentration have a negative impact. This study recommends raising the capital and the liquidity level of Islamic banks as it helps to promote the financial stability of Islamic banks.

Keywords: financial stability; Islamic banking; Zscore; MENA region

1. Introduction

Financial stability is a recurring need in contemporary economic history, as several episodes of financial instability have affected countries with varying intensity, resulting in massive unemployment and loss of economic output. One of the most prominent episodes of financial instability was the crisis of 1929–1933. At that time, prominent economists struggled to establish a banking system capable of preserving long-term financial stability.

Their proposals became known as the Chicago reform plan. Unknowingly, their proposals were a natural reaffirmation of some of the fundamental pillars of Islamic principles and finance. In the wake of the Chicago Plan and in the literature that followed, it became clear that a financial system that conforms to Islamic principles is immune to instability (Askari et al. 2010).

Once again, in 2007–2008, the world was hit hard by the financial crisis, characterized by a gargantuan number of bankruptcies and other financial distress. This crisis has, once again, brought to light the old thorny issue of the search for financial stability. Incisive questions came to the surface more urgently (Belouafi et al. 2015).

Amid this heated debate, Islamic financial institutions and the principles that govern their operations have received much attention. Indeed, formal and structured Islamic banking institutions are of recent origin, although they were present in unorganized and private activities. Purely Islamic finance was first attempted in the 1940s. This experience took place in Malaysia and Pakistan, and it was known as a primitive attempt that was doomed to failure. In the late 1960s, Malaysia established the first institution whose main function was to manage pilgrimage funds, which is in accordance with Shariah guidelines (Iqbal and Molyneux 2005).

Following the oil boom (a global oil price crisis), several Islamic financial institutions were inaugurated in the Gulf countries, the most important of which was the Islamic Development Bank, created in 1974. Subsequently, the launch of Islamic banks was built successively in several countries, including the Dubai Islamic Bank in 1975, the Kuwait Finance House (KFH) in 1977, the Jordan Islamic Bank in 1978, the Bahrain Islamic Bank (BIB) in 1979, the Qatar Islamic Bank (QIB) in 1982 and the Faisal Bank in Egypt in 1981. This achievement encouraged non-Muslim countries such as the United Kingdom to create



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the Islamic Bank of Britain, which is considered the first international Islamic banking institution. The experience has been adopted by several countries, and as a result, the Islamic banking industry is now experiencing unprecedented growth (Iqbal and Molyneux 2005).

However, this industry has been the subject of several criticisms. In particular, Khan (2010) recognizes the existence of real divergences between the theoretical contributions of Islamic finance and its actual practice. Some theses question the origin of Islamic finance, as highlighted by Kuran (2004), who strongly believes that the emergence of this branch of finance was only intended to succeed the already existing Western practices to preserve the predominance of Islam and to consolidate the identity of Islam in all areas and not to design an alternative system to conventional finance. However, others are opposed to this reflection and explain that the similarity that may exist between the two models is justified by the desire to familiarize customers with the products offered by Islamic banking (Ahmad 1994; Yousef 2004).

Along the same line, the banking and financial system were entirely affected by the subprime crisis; in fact, this deep crisis has profoundly transformed the face of global finance. Moreover, it highlighted a number of concerns regarding the financial stability of the major financial system components as well as the main causes of instability. Indeed, it has been surprisingly noticed that notwithstanding the financial crisis, the activity of Islamic banks has grown considerably and has reached a high rate. Due to their nature and fundamental principles, many deductions indicate that Islamic banks provide greater stability and are not affected by the financial crisis (Hussein 2010). However, the factors that determine this stability remain ambiguous. Several studies have been conducted to examine the determinants of banks' financial stability focusing on both types of banks at the same time (Islamic and conventional) (Čihák and Hesse 2008; Shahid and Abbas 2012; Rahim et al. 2012; Hassan et al. 2019; Parsa 2022; Wijana and Widnyana 2022). To our knowledge, the majority of research dealing with this subject compared the financial stability of conventional and Islamic banks while employing a single econometric model without differentiating between the determinants of Islamic financial stability and those of conventional financial stability. In this context, the present work is the first instance where a dedicated and separate econometric model for the financial stability of Islamic banks is described.

The motivation to study this issue is due to two points. First, the average value of the financial stability of Islamic banks in the MENA region, according to the Z-score indicator during the period from 2006 to 2017, varies between -0.351 and 156.669 . This demonstrates the existence of significant differences with a standard deviation of 18.042% . These discrepancies raise the question of what exactly determines the financial stability of Islamic banks. Therefore, this study aims to fill this gap by examining the key variables that influence the financial stability of Islamic banks.

Moreover, the analysis of previous studies concluded that these studies have focused on the comparison of financial stability between conventional and Islamic banks, and few studies have focused on the determinants of financial stability. Furthermore, previous empirical studies present conflicting results regarding the stability of the Islamic financial system. For example, Ibrahim and Rizvi (2017) focused on the impact of Islamic bank size on financial stability. Widarjono (2020), Daoud and Kammoun (2020) and Pambuko et al. (2018) studied, on the one hand, the impact of bank-specific variables such as capital adequacy ratio, liquidity ratio, bank size and cost efficiency. On the other hand, they introduced external variables such as inflation and economic growth.

The importance of this study stems from several points. First, this study is essential because of the importance of financial stability. Indeed, the stability of the banking sector is the foundation for the stability of the entire financial system since banks play a central role in the money creation process, the payment system, the financing of investments and economic growth. Furthermore, to preserve monetary and financial stability, central banks and supervisory authorities have a particular interest in assessing the stability of the

banking system. The financial stability of banks has become one of the most pressing issues on the policy agenda in both developed and emerging markets, as the crisis has severely affected the financial intermediation process.

In addition, this study is important because it provides an opportunity to focus on the Islamic finance sector, whose asset size has increased to about USD 3.06 trillion in 2021 (compared to USD 2.75 trillion in 2020). The global Islamic financial services industry (IFSI) grew by 11.3% year-on-year and has so far proven resilience in the face of the COVID-19 pandemic (its first major test). The effects of a prolonged conflict between Russia and Ukraine on the dynamics of economic recovery and financial stability present another test of resilience (Islamic Financial Services Board 2022).

Second, few studies have explored the determinants of the financial stability of Islamic banks in MENA countries. For example, Čihák and Hesse (2010) and Rajhi and Hassairi (2013) chose a sample that included MENA countries but introduced other countries from West Africa and South Asia. As a result, to our knowledge, no study has focused solely on the MENA region. Therefore, this study is important because it focuses on a region that is the largest contributor to Islamic banking assets (Islamic Financial Services Board 2022).

The paper is structured as follows. Section 2 presents the theory and literature review related to the financial stability of Islamic banks. Section 3 presents the research hypotheses. Section 4 highlights the research methodology. The results and discussion of the study are presented in Section 5. The last section concludes the paper.

2. Literature Review

Previous studies have dealt with banking stability, and they were conducted to examine the factors of financial stability of the Islamic banking sector in several countries. Nevertheless, some have generally focused on conventional financial stability as well as the determinants of this stability, while others have assumed the importance of external factors.

2.1. Islamic Financial Stability Theories

The debate on Islamic financial stability began with purely theoretical studies that sought to explain the Islamic finance elements that could make it stable finance.

Indeed, the first factor is the structure of the bank balance sheet, which is an index for assessing the banking activity's financial risks. Thus, demand deposits and investment accounts make up the liability side of the Islamic banking balance sheet, while accounts for Islamic financing and investments that resemble traditional bank loans constitute the asset side. Therefore, the Islamic banking balance sheet permits balance sheet transmission, and it is presumed that the maturities of the assets and liabilities are matched (Ghassan and Krichene 2017).

Otherwise, it eliminates the mismatch between assets and liabilities because the deposit returns are inherent to asset returns. This risk of inadequacy was at the origin of several financial instabilities since it exposed banks to liquidity risks (Iqbal and Mirakhor 2011).

According to Islamic banking theory, the second stabilizing factor is profit and loss sharing. Indeed, Chishti (1985) recognizes that profit and loss-sharing financing is endowed with stabilizing tools incorporated into invested projects. This reasoning was explained by the absence of a gap between cash flows and payment commitments. The presence of the gap was, for a long time, considered a source of financial instability. Islamic banking intermediation treats bank deposits in such a way that changes in the value of deposits on the liability side immediately absorb shocks on the asset side. Additionally, credit risk is transferred from assets to liabilities through the 3P mechanism since neither the principal nor the return on investment deposits is guaranteed, so any losses that occur on the asset side could be absorbed on the liability side (Bourkhis and Nabi 2013).

Specifically, profit- and loss-sharing financing promotes financial stability because it spreads the bank's risk over a larger number of parties involved in the funded project (Zarqa 1983).

Moreover, profit and loss sharing allows the bank to actively participate in the investment, especially in productive sectors. The diversification of investments aimed at increasing projects, in addition to the careful monitoring by banks, leads to the reduction of potential risks (Khoutem and Nedra 2012; Said 2012). However, this argument remains questionable as several criticisms have been leveled at Islamic financial institutions because of their restricted use of PLS instruments (Khan 2010; Minhat and Dzolkarnaini 2016; Aggarwal and Yousef 2000). This situation is explained by several reasons. First, PLS instruments are very complex because of the procedures they require (Abedifar et al. 2013). Second, these instruments entail high risk (Šeho et al. 2020) as well as significant transaction costs (Louhichi and Boujelbene 2016).

The third factor responsible for the financial stability of Islamic banks that comes up most, in theory, is the quality of banking assets. It appears that Islamic banks have better asset quality due to their equity maintenance in terms of savings and investment deposits, fewer loan loss provisions and non-performing loans (Prima Sakti and Mohamad 2018).

This asset quality is firstly explained by the 3P agreements that do not require the investor to present collateral to reduce credit risk (Bourkhis and Nabi 2013); secondly, the prohibition of the sale of debt by Islamic finance in the case of debt-based agreements (Ahmed 2009); and finally, the involvement of Islamic banking institutions in projects that are financed through participation products such as Musharakah and Mudarabah allows better supervision of the default risk (Hassoune 2003).

The connection between the financial sector and the actual economy was cited in the literature as another factor contributing to the stability of Islamic finance. Indeed, Islamic banking theory argues that Islamic banks can establish a connection between the financial sphere and the real economy, thanks to the Shari'ah obligation that requires all financial transactions to be backed by a tangible asset. As a result, financial flows can meet the financing requirements of actual movements of goods and services (Njima and Zouari 2012).

2.2. Financial Stability and Its Determinants

This section discusses the main factors affecting the financial stability of Islamic banks established by empirical studies considered for this study.

Čihák and Hesse (2008) reported that cost-to-income ratio, bank size, loan-to-asset ratio, banking market concentration, and governance indicators were the significant determinants of bank financial stability in 20 countries over the period from 1993 to 2004. They conclude that the cost-to-income ratio, the loan-to-asset ratio and the Herfindahl-Hirschman Index (HHI) (which measures banking concentration) negatively affect banking stability. At the same time, the size of the bank and the governance indicators have a positive influence on financial stability.

Shahid and Abbas (2012) investigated the Pakistani case from 2006 to 2009. They noted a negative impact on the loan-to-asset ratio and the pace of inflation, while financial stability appears to be positively correlated with GDP growth.

Rahim et al. (2012) explored the factors of the financial stability of Malaysian banks for the 2005–2010 period. They found that the loan-to-asset ratio negatively impacts financial stability. On the other hand, the empirical results suggest that the size of the bank measured by bank assets as well as GDP growth promotes the financial stability of banks.

The banking stability in Turkey was studied by Elbadri (2015) over the period extending from 2006 to 2013. He considered external and internal factors as determinants of financial stability. The results demonstrated that the loan-to-asset ratio and total bank assets negatively impact financial stability. However, the study found a positive impact of cost-to-income ratio, inflation rate and GDP growth on financial stability.

According to Rajhi and Hassairi (2013), a higher share of loans in the asset structure leads to rising insolvency. Since financial stability declines as the loan-to-asset ratio rises and vice versa. In addition, the cost-to-income ratio negatively impacts the financial stability of banks. Moreover, the findings showed that the size of the bank, the liquidity

ratio, GDP growth and governance indicators are all variables that positively influence financial stability.

For a panel of six countries during the period from 2003 to 2010, [Altaee et al. \(2013\)](#) determined the factors influencing the financial stability of banks. The loan-to-asset ratio, GDP growth and inflation rate were found to be positively linked to financial stability.

[Wahid and Dar \(2016\)](#) used data from different variables from 38 banks in Malaysia; their study showed that bank size and cost-to-income ratio had a negative effect on the financial stability of Islamic banks. Moreover, the capital adequacy ratio and the return on assets ratio were found to be positively correlated to the stability of banks.

In addition, based on a study of 54 banks in six countries from 2007 to 2010, the regression analysis conducted by [Ouerghi \(2014\)](#) shows that the banking variables are not significant. Yet, the size of the bank seems to have a negative influence on its financial stability.

[Alandejani et al. \(2017\)](#) compared the resilience of Islamic banks to that of conventional banks while taking into account the global financial crisis. The results demonstrated that Islamic banks are more likely to fail, unlike their conventional counterparts. However, examining the resilience of each type of bank reveals differences in the explanatory variables and their effects. The return on assets ratio has been shown to negatively impact bank failure risk but only for Islamic banks. As for the quality of assets measured by the ratio (loan loss reserves/gross loans), it appears that this ratio has a negative impact on the risk of failure of Islamic banks. As for external variables, the study shows that a high bank concentration rate leads to a high risk of failure. The inflation rate positively impacts the risk of bank failure. In addition, the quality of regulation is negatively associated with bank failure risk.

[Ibrahim and Rizvi \(2017\)](#) sought to examine the effect of Islamic banks' size on their financial stabilities. They found that bank size has a positive impact on financial stability. Otherwise, large Islamic banks exhibit more financial stability than small banks. The analysis conducted by [Pambuko et al. \(2018\)](#) points out that the inflation rate is the main indicator of the financial stability of Islamic banks. It is found that the inflation rate, as well as liquidity, positively impact the financial stability of Indonesian Islamic banks.

The results of the empirical study conducted by [Widarjono \(2020\)](#) provide evidence that capital adequacy ratio, cost efficiency, bank size and inflation positively impact the stability of Islamic banks. The results of the study conducted by [Daoud and Kammoun \(2020\)](#) prove that the non-risk weighted capital ratio is the main factor of the stability of Islamic banks, which positively impacts the stability of banks. Size, loan ratio, deposit ratio and overhead ratio have a negative effect on the stability of Islamic banks. While GDP positively impacts the stability of Islamic banks. [Rashid et al. \(2017\)](#) demonstrated that bank concentration ratio, profitability, loan-to-asset ratio and GDP positively impact the stability of Islamic banks. However, inflation is negatively related to the stability of Islamic banks.

Importantly, the literature review above confirms the relation between bank stability and its external (macroeconomic variables) and internal determinants (bank-specific variables). However, previous studies show widely varying results. We admit that all the aforementioned empirical studies have not focused only on Islamic banks but rather compared Islamic banks and their conventional counterparts. In addition, previous studies were content to use a single econometric model including both types of banks at the same time. To fill this gap, we developed a specific econometric model for the financial stability of Islamic banks. This allowed us to explore the impact of each variable on Islamic banks' stability in a very clear way. For the first time, this research work provides an analysis of the financial stability of Islamic banks in the MENA region.

3. Hypotheses Development

Based on the previous discussion, it has been shown that the theoretical and empirical literature does not provide a coherent view of the determinants of Islamic financial stabil-

ity. Thus, taking into account the objective of this study, the following hypotheses were developed:

- H1.** *The capital adequacy ratio has a significant impact on the stability of Islamic banks.*
- H2.** *The ratio of financing to assets has a significant impact on the stability of Islamic banks.*
- H3.** *The cost-income ratio significantly impacts the stability of Islamic banks.*
- H4.** *The profitability ratio has a significant impact on the stability of Islamic banks.*
- H5.** *The liquidity ratio is negatively associated with the stability of Islamic banks.*
- H6.** *Bank size has a significant impact on the stability of Islamic banks.*
- H7.** *Banking concentration significantly impacts the stability of Islamic banks.*
- H8.** *GDP growth is positively associated with the stability of Islamic banks.*
- H9.** *Inflation rate is negatively related to the stability of Islamic banks.*
- H10.** *Governance is positively associated with the stability of Islamic banks.*

4. Research Methodology

4.1. Sample Population

To conduct this study, we adopted a quantitative approach. The sample utilized in this study consists of 31 Islamic banks from 12 MENA countries (United Arab Emirates, Saudi Arabia, Bahrain, Jordan, Kuwait, Qatar, Yemen, Palestine, Tunisia, Egypt, Turkey and Lebanon). The data set for this study covered the period from 2006 to 2017. This study employed a panel data set, and the used variables were based on previous empirical studies.

4.2. Data and Variables

Policymakers and academic researchers have focused on several quantitative measures to assess financial stability, mainly the Z-score. The “safety first” principle was developed based on Roy’s (1952) dissatisfaction with the simple rule of maximizing returns and also his traumatic wartime experience.

According to the safety first concept, the gross return should not be less than the disaster level, even in the face of a wide variety of potential outcomes, including disasters.

The development of this principle leads to the Z-score measure, which indicates the distance to insolvency by combining the accounting measures of profitability, leverage and volatility (Rajhi and Hassairi 2013). The Z-score is inversely related to the probability of a bank’s insolvency, i.e., the probability that the value of its assets becomes lower than the value of the debt, which indicates that a higher Z-score corresponds to a lower risk of insolvency. Thus, the Z-score ratio is a popular measure of bank strength. It is denoted as follows:

$$Z = \frac{(\mu + K)}{\sigma} \quad (1)$$

With μ denoting the bank’s average return on assets (ROA), K represents equity as a percentage of total assets and σ is the standard deviation of ROA as an indicator of return volatility (Bourkhis and Nabi 2013).

Overall, at the level of this study and as a dependent variable, we implement the Z-score as a measure of bank financial stability. Indeed, the Z-score is widely used to measure the financial stability of banks in previous empirical studies through the panel data regression technique.

The bank-specific variables include funding to assets ratio, capital adequacy ratio, cost-to-income ratio, profitability ratio, liquidity ratio and bank size. Whereas the external explanatory variables include bank concentration, GDP growth, inflation rate and governance. Table 1 depicts the independent and dependent variables.

Table 1. Formulas and coding of variables.

Variables	Measurement	Formulae
Dependent variables		
Financial Stability	Z-SCORE	ROA + CAR/SD of ROA
Independent variables		
Capital adequacy ratio	CAR	Total equity/Total assets
Financing-to-assets ratio	FAR	Total financing/Total assets
Cost-to-income ratio	CIR	Operating expenses/Operating income
Return on equity	ROE	Net income/Total equity
Liquidity-to-assets ratio	LIQ	Liquid assets/Total assets
Bank size	SIZE	Total banking assets of each Islamic bank for each year
Bank concentration	CONCR	% of bank assets held by the top three banks in each country
GDP growth	GDP	GDP growth (annual %)
Inflation	INF	Inflation (annual %)
Governance indicators	GOV	Calculated as the average of the six governance indicators

Note: CAR, FAR, CIR, ROE and LIQ were self-calculated from the banks' financial reports, while CONCR, GDP, INF and GOV were taken directly from databases.

4.3. Model Specification

In order to detect the different factors that impact the financial stability of Islamic banks in the MENA region, a multivariate explanatory method was employed in this study, namely linear regression. This is indeed a balanced panel that has the same number of observations (12 observations from 2006–2017) for all individuals (31 banks representing the 12 countries).

The regression model of this study is as follows:

$$\text{Z-SCORE}_{it} = \alpha + \beta_1 \text{CAR}_{it} + \beta_2 \text{FAR}_{it} + \beta_3 \text{CIR}_{it} + \beta_4 \text{ROE}_{it} + \beta_5 \text{LIQ}_{it} + \beta_6 \text{SIZE}_{it} + \beta_7 \text{CONCR}_{it} + \beta_8 \text{GDP}_t + \beta_9 \text{INF}_t + \beta_{10} \text{GOV}_t + \varepsilon_{it} \quad (2)$$

where α is the constant value; β refers to a vector of exogenous variable coefficients; i indicates an individual bank; t refers to the time period (year); Z-SCORE is the financial stability proxy of the bank; CAR, FAR, CIR, ROE, LIQ, and SIZE are the bank-specific variables; CONCR, GDP, INF and GOV are the macroeconomic control variables; and ε_{it} is the error term.

5. Empirical Results

5.1. Descriptive Analysis

Table 2 presents the descriptive statistics for all dependent and independent variables. The variable FAR is the most dispersed (857%). The mean for CAR of Islamic banks in the MENA region is 20.10%, which meets the level of capital requirements. The same ratio has a standard deviation of 18.17%, a maximum value of 1 and a minimum value of 0.01, which explains the variance that reaches 90.40%.

The average FAR has a mean of 7.11% and a standard deviation of 6.09%. Some Islamic banks in the MENA region have poor asset quality, while others have better bank asset quality according to values ranging from 0.00012 to 117.895.

Regarding the CIR, the average value is 64.1%, demonstrating that Islamic banks in the MENA region are not cost-efficient enough. A maximum value of 16.61 and a minimum value of −0.62 explain the value of the gap.

Moreover, the mean for ROE is 11.79%, which indicates that Islamic banks in the MENA region have average profitability that should be improved.

Table 2. Descriptive statistics.

Variables	Obs.	Mean	Std. Dev	Min	Max
Z-SCORE	372	17.111	18.042	−0.351	156.669
CAR	372	0.201	0.181	0.010	1
FAR	372	0.711	6.096	0.000124	117.895
CIR	372	0.641	1.012	−0.627	16.611
ROE	372	0.117	0.604	−1.510	11.114
LIQ	372	0.172	0.141	−0.098	0.918
SIZE	372	92,233.720	9223.372	0.094	10,141,103.7
GDP	372	0.038	0.0462	−0.279	0.261
INF	372	0.047	0.0475	−0.048	0.304
GOV	372	−0.171	0.4871	−1.89	0.725
CONCR	372	0.695	0.1720	0.353	1

In terms of liquidity, the LIQ has an average of 17.20% and a standard deviation of 14.15%. This reflects the low liquidity of Islamic banks in the MENA region. This observation is confirmed by the maximum value of this ratio, which reaches 0.918, and the minimum value, which is −0.098.

Additionally, the average for SIZE in our sample is 92,233.720; the minimum value is 0.094, while the maximum value is 10,141,103.7. This demonstrates that the selected sample of banks chosen is composed of different sizes.

In regard to GDP, the average in the MENA region is 3.8%, which demonstrates a healthy economic situation. With a standard deviation of 0.0475 and a mean inflation rate of 4.7%, the inflation rate appears stable. The average score for GOV was −17.14%, showing that the MENA region needs to make more efforts in this area. The MENA region's average CONCR is 69.54%, which indicates a moderately concentrated banking industry.

5.2. Correlation Analysis

This section presents the correlation between variables. According to Table 3, there is most likely no residual collinearity, as shown by the estimation of the residual collinearities. The independent variables' low correlation with one another is problematic.

Table 3. Correlation matrix.

Variable	Z-SCORE	CAR	FAR	CIR	ROE	LIQ	SIZE	GDP	INF	GOV	CONCR
Z-SCORE	1										
CAR	0.295 **	1									
FAR	−0.045	0.004	1								
CIR	0.026	0.061	−0.006	1							
ROE	−0.024	−0.072	−0.002	−0.061	1						
LIQ	0.164 **	−0.001	0	−0.053	0.007	1					
SIZE	−0.138 **	−0.176 **	−0.028	−0.007	0.144 **	−0.053	1				
GDP	−0.067	0.058	−0.012	−0.001	0.044	−0.005	−0.012	1			
INF	0.142 **	−0.180 **	−0.024	0.027	0.001	−0.021	−0.012	−0.188 **	1		
GOV	−0.128 *	0.114 *	0.042	−0.194 **	0.025	0.266 **	−0.106 *	0.318 **	−0.474 **	1	
CONCR	−0.160 **	0.1	0.018	0.133 *	−0.012	−0.122 *	0.094	−0.062	−0.117 *	−0.181 **	1

Note: ** The correlation is significant at the 0.01 level, * The correlation is significant at the 0.05 level.

The correlation coefficients in Table 3 indicate a significantly negative relation between the Z-score and GOV, which means that the stability of Islamic banks decreases when the governance indicators are high. The CAR and GOV are positively and significantly correlated, indicating that when institutional quality is high, banks are better capitalized.

Furthermore, the CIR seems to increase when the CONCR increases. In addition, the LIQ and CONCR are significantly and positively correlated, implying that bank liquidity is enhanced when the banking market is concentrated. On the other hand, the association between SIZE and GOV is negative, suggesting that bank assets increase when there is less

institutional quality. The relationship between INF and CONCR is negative and significant. This indicates that when the inflation rate is low, the banking market becomes increasingly concentrated.

5.3. Multivariate Regression Results

When considering a panel data sample, the very first thing that should be checked is the homogeneous or heterogeneous specification of the data-generating process (Khouiled 2018). To meet this objective, we used the Eviews software. Therefore, in the first step, a homogeneity test is performed. It is a case of absolute homogeneity, as shown in Table 4. Before treating a time series, it would only be appropriate to study its stochastic characteristics. If these characteristics, namely expectation and variance, are modified over time, the time series is considered non-stationary; in the case of an invariant stochastic process, the time series is then stationary (Bourbonnais 2015). The Dickey–Fuller test shows that all variables are stationary.

Table 4. Full sample regression results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22.00256	4.108131	5.355856	0.0000
CAR	33.49557	4.868726	6.879739	0.0000
FAR	−0.097172	0.138373	−0.702250	0.4830
CIR	−0.027461	0.859957	−0.031933	0.9745
ROE	0.372206	1.413665	0.263291	0.7925
LIQ	0.001261	0.000312	4.044979	0.0001
SIZE	$−1.80 \times 10^{-6}$	1.18×10^{-6}	−1.529305	0.1271
GDP	−8.734873	19.82698	−0.440555	0.6598
INF	22.86028	22.60057	1.011492	0.3125
GOV	−8.469133	2.282177	−3.710989	0.0002
CONCR	−20.48925	5.187345	−3.949853	0.0001
S.E. of regression	16.21113	Hannan–Quinn criteria		8.491203
Sum squared resid	94,608.26	Durbin–Watson stat		0.360040

5.4. Discussion

The obtained results of the coefficients estimation showed that five variables are significant at the 5% level. The capital adequacy ratio and the liquidity ratio positively impact the financial stability of Islamic banks. On the other hand, the bank size, the governance indicators and the bank concentration rate negatively impact the financial stability of Islamic banks.

According to Table 4, the CAR of Islamic banks in the MENA region has a positive impact on the Z-score. The positive correlation of 18.244 indicates that an increase in CAR would result in a corresponding increase in Z-score. This finding validates the first hypothesis (H_1). This result is explained by the need to enhance public confidence in Islamic banks in addition to the need to attract more customers to transact and place their deposits in the Islamic banking sector. This would certainly have an impact on improving the stability of this kind of bank. A high CAR could protect depositors from losing their deposits and increase public confidence in banks. This result could be because the banking institution with a high level of capital is considered to be very selective in its lending policy, especially since equity represents real cushions of protection against potential shocks. This result is consistent with the findings of Wahid and Dar (2016), Widarjono (2020) and Daoud and Kammoun (2020).

The estimation of coefficients shows that the LIQ is positively associated with the financial stability of Islamic banks. However, it is weakly related to Z-score. The coefficient of LIQ is 0.001; otherwise, the level of financial stability of Islamic banks in MENA increases by 0.1% when the level of liquidity increases by 1%. The hypothesis (H_5) is rejected. This result is explained by the fact that Islamic banks are exposed to liquidity risk as they convert their funds into long-term illiquid assets based on Mudarabah, Ijarah or Musharakah

contracts. This liquidity risk threatens their solvency. Aware of this problem, Islamic banks try to strengthen their liquidity to protect themselves against potential financial instability. This result is in concordance with that found by [Rajhi and Hassairi \(2013\)](#) and [Pambuko et al. \(2018\)](#).

The findings demonstrate that the SIZE, which is represented by bank assets, has a negative and low coefficient (-2.381×10^{-6}) that is inversely associated with the Z-score.

The hypothesis (H_6) is validated. Although the impact is small, this result means that large Islamic banks are less stable than small Islamic banks. This supports the “too big to fail” hypothesis, which holds that there is a negative correlation between bank size and financial stability since bigger banks are guaranteed by the government in the case of failure, which encourages them to take more risks. This negative coefficient is due to the difficulty of managing large banks. A second justification for this result is related to the difficulty Islamic banks have in adjusting their supervisory systems in terms of credit risk as they get larger. As explained by [Čihák and Hesse \(2008\)](#), supervision quickly becomes much more complex as the size of the banking operation increases, so problems related to adverse selection and moral hazard become increasingly important. This result is consistent with the results of [Elbadri \(2015\)](#), [Ouerghi \(2014\)](#) and [Daoud and Kammoun \(2020\)](#).

Bank concentration, represented by the concentration ratio CONCR, has a negative and significant influence on the stability of Islamic banks. This finding validates the seventh hypothesis (H_7). The negative value of the CONCR coefficient (-18.304) implies that the financial stability of Islamic banks in the MENA region decreases when the banking market is highly concentrated. This negative correlation shows that a concentrated market could have a destabilizing effect on financial stability by referring to the “too big to fail” hypothesis. The implicit or explicit assurance of being rescued in the event of bankruptcy encourages risk-taking by banks, which ultimately increases systemic risk. These findings are consistent with those of [Čihák and Hesse \(2008\)](#), [De Nicolo et al. \(2009\)](#) and [Alandejani et al. \(2017\)](#).

When considering the GOV, a negative correlation to the financial stability of Islamic banks was shown. The coefficient of GOV is -8.960 , which means that the financial stability of Islamic banks in the MENA region decreases by 80.96% when GOV increases by 1%. This finding rejects the tenth hypothesis (H_{10}). The inverse relationship detected between governance and financial stability could be explained by the fact that one of these indicators is represented by corruption, which is an indicator of the failure of legal and institutional systems. It increases uncertainty in banks and aggravates the problem of bad loans. These findings support the previous studies of [Bourkhis and Nabi \(2013\)](#).

5.5. Robustness Checks

Table 5 shows the results of the robustness check. We performed another regression of the variables to check the endogeneity problem in the previous table. The results in the Table 5 showed that our model has no endogeneity problem because the errors of the independent variables are not significant.

Table 5. A robustness check for the stability regression results.

Independent Variables	Coefficient	Std. Error	p-Value
C	24.291	3.213	0.000
CAR	18.244	4.521	0.000
LIQ	0.001	0.000	0.007
SIZE	-2.38×10^{-6}	0.000	0.022
GOV	-18.304	4.521	0.000
CONCR	-8.960	1.638	0.000

6. Conclusions and Recommendations

The main objective of this study is to empirically identify the determinants of the financial stability of Islamic banks in the MENA region. To do this, a multivariate study

based on linear regression was created to assess the factors of financial stability of Islamic banks in the MENA area using panel data for 31 banks in 12 MENA countries from 2006 to 2017.

Based on the findings, the financing-to-assets ratio, cost-to-income ratio, profitability ratio, GDP and inflation rate have no significant effect on financial stability as measured by the Z-Score. This indicates that, in general, the internal factors measured by the financial ratios do not affect financial stability. Moreover, the non-significance of GDP and the inflation rate can be explained by the stability of these two indicators.

On the contrary, the capital adequacy ratio has been found to present a strong influence on the stability of Islamic banks, which demonstrates that capital is used to enhance public confidence in these banks, as a high capital adequacy ratio protects depositors from the potential financial loss of their deposits. In this way, the monitoring of capital requirements should be thoroughly strengthened.

Moreover, liquidity has a positive but weak impact on the stability of Islamic banks. This result is explained by the restrictions they are exposed to in terms of liquidity instruments. Therefore, it is strongly recommended that Islamic banks appropriate sufficient quality liquid assets and be ready to raise funds in non-monetary markets to be used in case of liquidity needs. Small Islamic banks in the MENA region are more stable than large ones because of the size variable, which was found to have a detrimental impact on stability. Islamic banks are more stable when the banking sector is weakly concentrated since the concentration ratio has a large and negative impact on financial stability.

On the other hand, the governance variable strongly and negatively impacts the stability of Islamic banks, which could be explained by the low regulatory quality. Hence, it is recommended to effectively strengthen the regulatory and supervisory framework of Islamic banks.

Taken together, this research could be used as a guide to monitor the financial stability of Islamic banks and to distinguish between stable and troubled banks. Future studies can use other determinants different than financial ratios. In this context, a qualitative approach could be applied to give more results regarding the financial stability of Islamic banks. The conclusions drawn from this study have some implications. Due to the positive impact of CAR on the financial stability of Islamic banks, it would be wise for central banks and regulators of Islamic banks to pay particular attention to the capitalization level of these banks through the raising of equity to maintain the financial stability of Islamic banks.

Furthermore, the positive impact of LIQ on financial stability implies that if Islamic banks in the MENA region want to enhance their stability, they should increase their liquidity level. This requires that Islamic banks should appropriate sufficient quality liquid assets. It is, therefore, essential to focus on establishing an adequate liquidity management framework to mitigate liquidity risk.

It is recommended that financial authorities establish a mechanism to provide liquidity solutions and create entities capable of formulating highly liquid Sharia-compliant instruments. The negative relationship between bank size and financial stability implies that bank policymakers should act with caution when planning to increase the size of Islamic banks. As a result of the negative relationship between banking market concentration and the stability of Islamic banks, banking supervisors must consider encouraging the entry of new Islamic banks into the market to diversify the share of the banking market and enhance the financial stability of these banks. In addition, it is recommended to strengthen governance and includes it in all operations of Islamic banks. This study has certain limitations. The sample size of this study is small, and this is because this study examines the determinants of the financial stability of 31 Islamic banks in the MENA region. Future studies may consider a larger sample size. In this study, we used only one indicator of the financial stability of banks (Z-score); in future studies, the authors could use other indicators, including global uncertainty factors, or construct a financial stability index based on the aggregation of several economic and financial indicators to understand financial stability in the broadest possible definition.

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