Chapter 10
Financial Integration, Banking Competition Changes and Financial Stability: The Case of the MENA Region

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Contents

Abstract Over the past few decades MENA countries have adopted major financial reforms in favour of more financial integration which has led to changes in financial systems in general and the banking system in particular, characterized by an increased privatization process, foreign bank penetration and changes in the banking competition intensity. These changes raise many questions for the financial stability preservation especially that several banks encountered many difficulties to adapt to this new context and various followed strategies did not save many banks from significant distress situations following a considerable rise of risks.

Thus, the principal aim of this paper is to study the impact of financial liberalization, banking market structure and quality of MENA institutions on the likelihood

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of suffering a systemic banking crisis and to seek the optimal structure of banking system able to preserve financial stability.

Hence, using aggregate balance sheet data from banks across 13 MENA countries from 1990 to 2009, the paper is specifically directed towards analyzing the changes in banking structures and their capacity to ensure banking stability.

After calculation of a global financial liberalization index for MENA countries, we test several hypotheses between liberalization, banking structure and banking stability in the region. Our estimations are based on a country-specific fixed-effects model.

Given the challenges that MENA countries face, the empirical results of this study should be timely and helpful for policymakers.

Keywords Financial integration index • Banking competition • Governance • Zscore

10.1 Introduction

Following the recent financial crisis, there is a widespread desire to create a stable financial system in general and to ensure the stability of the banking system in particular.

Having a stable and efficient banking system contributes to many economic benefits and reduces the possible negative consequences of increased capital mobility.

Thus, an adequate banking structure can attest to banks effectiveness and capacity enabling them to overcome the risks to which they are prone in order to avoid distress situations.

During recent years, concerns on competition evolution in the banking industry and the possible trade-offs between the efficiency and stability of the system, are often at the centre of banking sector policy debate. The ongoing crisis leads to re-consider the links of changes in the competitive environment of banks and the stability issues.

This issue raises important challenges for the MENA region where the banking system is the main conduit for economic activities. Moreover, the last decade was characterized by substantial reforms to restructure the banking system, increase the privatization process and foreign bank penetration.

Indeed, financial reforms adopted by the MENA countries involved abolition of control regulations which affect the behaviour of the banks (such as the abolition of controls on the debtor and credit rates, fixing of quotas) and ending regulations of structures which condition the organization of banking industry directly (functional separation, entries barriers). As a consequence, three radical changes of the banking structures in all their components took place: change of property structures by a movement of privatization, foreign banks penetration, and the intensity of competition (the deregulation made possible the appearance of new actors which created a new exacerbated competition).

So these changes of structure in all their dimensions raise many interrogations for the maintenance of financial stability especially that several banks encountered various difficulties to adapt to this new context and various followed strategies did not save many banks from significant situations of distress following a considerable rise in risks.

Thus, the aim of this paper is to study the impact of financial integration and banking competition changes in MENA countries on the likelihood of suffering a systemic banking crisis and to seek the optimal structure of the banking system.

The remainder of this paper is organized as follows: Sect. 10.2 presents related theoretical and empirical literature on the relationship between banking market concentration and financial stability. A detailed exposition of the empirical methodology is presented in Sect. 10.3. We report the results and a variety of robustness tests in Sect. 10.4. Some conclusions and policy implications are offered in the final section.

10.2 Literature Review

The relation between financial liberalization and banking stability is the subject of several theoretical and empirical studies that try mostly to identify the effect of liberalization policies on banking stability.

The literature addresses the macroeconomic and microeconomic approaches of banking failure. Researchers[1] use mostly empirical approaches to study the macroeconomic sequence leading to banking instability. A clearly achieved result of these approaches is that the inappropriate institutional preconditions of the financial liberalization process constitute the main cause of crises and economic recessions.

The microeconomic aspect insists on banks behaviour as the origin of financial disturbances. In this respect, two major explanatory visions are opposed. The first is of neo-classic inspiration, where banking instability corresponds to exceptional episodes caused by external factors such as excess of public policies as sources of moral risk. According to this explanatory diagram and in spite of the frequency of banking crises in developing countries, the failure is not directly ascribed to the financial liberalization process, but to internal countries distortions. The second vision which is a post-Keynesian one supposes that the behaviour of banks and credit market imperfections are the main factors of dysfunctions.

This approach gives a central role to speculative behaviours resulting from the environment change created by financial liberalization.

Admittedly, there is no theoretical consensus on financial liberalization effect on banking stability. For the liberal dogma, the main problem is not due to the liberalization process, but rather in monitoring gaps and prudential regulation whose consequences are simply amplified by the financial opening.

[1] Kaminsky and Reinhart (2000, 2002, 2005), Kaminsky et al. (2003), Drees and Pazar-basioglu (1998), Hausmann and Eichengreen (2005), Turner (1996), Lindgren et al. (2004), Rossi (2006), Hutchison and McDill (1999), and Demirguç-Kunt and Detragiache (1998, 2003, 2005).

However, critical approaches (post-Keynesian and neo-structuralist) while criticizing the liberal theoretical justifications, warn against the negative effects of financial liberalization policies and the failure of many reforms to preserve banking stability.

We can conclude that the majority of these contributions on the causes of banking instability did not address the strategic interaction between banks and various banking structures on banking stability.

Recently, many studies (Demirguç-Kunt and Detragiache 2002; Demirguç-Kunt et al. 2004; Claessens and Laeven 2004; Bikker 2004; Bikker and Spierdijk 2007) have focused their analysis on the evolution of competition intensity and the banking market structure characteristics based in the New Empirical Industrial Organization (NEIO). These models, which include those of Bresnahan (1982) and Panzar and Rosse (P-R) (1982, 1987), do not rely on explicit information about market structure in order to determine the level of competition and provides a very simple approach to test the market structure of an industry for competitiveness.

Some of those studies (Barth et al. 2004; Beck et al. 2006a, b; Boyd et al. 2006; Schaeck et al. 2006) raise a controversial question in the context of the on-going financial crisis to examine if the banking stability is enhanced or weakened by the changes in banking structures (ownership and market structure) and the changes in the competition intensity.

The theoretical and empirical results reached show a considerable uncertainty concerning the relationship between competition and financial stability (Carletti 2010).[2]

The synthesis of the theories shows a controversy between theories which advocate for concentration as guarantees of stability and those which consider it as a source of fragility.

Thus, in this respect two opposing views arise. The competition- fragility hypotheses (Keeley (1990), Allen and Gale (2000, 2004), Beck and Laeven (2008), Jimenez et al. (2007), Beck (2008), Berger et al. (2008)) where more concentrated and less competitive banking systems are more stable. Those theoretical and empirical studies suggest that a less concentrated banking system is more responsible for the financial crises. Indeed, banks with a high capitalization can better face unfavorable shocks. The market power and profits which result are regarded as guarantees of stability. This market power confers to banking institution revenue which gives an additional value constituting an additional capital, which decreases the excessive risk-taking improving the quality of loans. However the competition intensification induced by financial liberalization, diminished the dominant position of banks. In short, the partisans of "concentration-stability" predict that large banks can better diversify and face unfavourable shocks.

The increase in banks sizes can be regarded as a force and constitute a generating factor of profit. But it can also constitute a multiplying factor of risk according to the partisans of "concentration fragility".

Whereas, for the new "competition-stability" view (Caminal and Matutes 2002; Boyd and de Nicola 2005; Boyd et al. 2006), increased competition may enhance

[2] For a survey see Elena Carletti, "Competition, Concentration and Stability in the Banking Sector," Background paper, in OECD Competition Committee Roundtable 2010.

bank stability, and may reduce significant implications for stressed banking systems in developing economies.

According to this view, several banks generally choose strategies of fusion to face competition. This process of concentration can cause the "too-big-to fail" policy as these banks will systematically be the subject of rescue in the event of failures. This intervention can exacerbate moral hazard and the risk taking of banks and thus increase the whole system's vulnerability. Moreover, the emergence of the financial conglomerates generates also possible moral hazard by the complication of their monitoring.

In the following paper, our aim is to investigate how financial liberalization, banking structures change, MENA country's institutions and business environment affect banking stability.

10.3 Methodology

10.3.1 The Data Set

Our sample represents panel data on commercial banks in the MENA[3] region for the period 1990–2009. The time interval under examination corresponds to an era characterized by substantial reforms to restructure MENA banking systems, increased banking market changes and foreign bank penetration.

Notes on variables and data sources are presented in Table 2 (Appendix). Table 3 reports descriptive statistics for the entire set of included variables (Bank specific variables, macroeconomic variables, institutional variables).

Bank level financial statements, structure and ownership are obtained from Bankscope database, different banks reports, and the financial structure Data set developed by Beck et al. (2008).

It's imperative to control for macroeconomic, regulatory and institutional factors that are likely to affect market structures, banking stability or both. The data used are retrieved from the World Development indicators (WDI) provided by the World Bank.

10.3.2 Empirical Models and Variables Selection

To test several hypotheses between liberalization, banking structure and financial stability, we follow a model similar to Berger et al. (2008), Demirgüç-Kunt and Enrica Detragiache (2010):

$$zit = \alpha it + \sum \beta k(Bit; Mit, Iit) + \epsilon it$$

[3] Algeria, Bahrain, Egypt, Morocco, Kuwait, Turkey, Tunisia, United Arab of Emirates, Jordan Lebanon, Saudi Arabia, Qatar and Oman.

The dependant variable is Z-score for country i at time t, Bit is the banking specific variables, Mit is the macroeconomic country specifications, It is the institutional variable and ϵit an error term. αit and βit denote the parameters to be estimated.

We estimate versions of panel data to test the following hypotheses:

H1: Financial liberalization and stability,
H2: Banking market structure and stability
H3: Banking market structure, governance and stability.

Three sets of factors might explain the stability of the banking system in a cross-country framework: namely bank industry factors, business environment and institutional variables. A set of control variables that capture macro-economic differences between countries is also used.

10.3.2.1 The Dependent Variable: The Z-Score

The Z-score became a popular measure of banking solidity in several empirical studies[4]: This ratio represents the bank's distance to default, and used as a proxy of banking soundness. This index combines the profitability and return volatility in only one measurement and is denoted as follows:

$$Z = \frac{\lambda + ROA}{\sigma ROA}$$

Where λ is the equity to assets ratio (capital ratio)
ROA is the Return on Assets (Bank's profitability)
σROA = The standard deviation of ROA (Volatility of earnings)

The Z-score increases with bank's profitability and capitalization, and decreases with increasing volatility of earnings. Hence, the Z-score can measure the probability of a bank becoming insolvent when the value of assets becomes lower than the value of debt. Thus, a higher Z-score implies a lower probability of insolvency risk and vice versa.

10.3.2.2 Bank Specific Variables

Structure variables:

In this study, we focus our analysis on one main banking structure changes and its impact on stability. Various measurements of banking market structure and competition belong to two principal approaches: structural and nonstructural ones.[5]

[4] Beck and Laeven (2008), Laeven and Levine (2008), Hesse and Čihák (2007), Gianni De Nicolò and Elena Loukoianova (2007), Asli Demirgüç-Kunt and Enrica Detragiache (2010), and Boyd et al. (2009).

[5] See Beck (2008) for a survey of literature.

Structural approaches are based on the SCP paradigm, the efficiency hypothesis and oligopoly models. The bulk of studies opt for the k-bank concentration ratio (CRk) or the Herfindahl-Hirschmann index (HHI) as a measure of market concentration.

To investigate market structure of MENA banking, we use the most frequently applied measure of concentration: the 3-bank concentration ratio (CR3). It is calculated as the fraction of assets held by the three largest commercial banks.

Two others indicators are used in this study the H-statistic and the Lerner index to measure banking market power. These two measures are based on the nonstructural approach hypotheses.[6]

The H-statistic frequently used in the "new empirical industrial organization literature" is designed to test the market structure of an industry for competiveness.

It is a variable that captures the competitiveness of the banking industry whereby $H \leq 0$ indicates monopoly equilibrium; $0 < H < 1$ indicates monopolistic competition and $H = 1$ indicates perfect competition.

Another variable used as a proxy for market power is the Lerner index. It ranges from 1 to 0, with higher numbers implying greater market power. The approach followed is similar to that of de Guevara et al. (2007) and Delis and Pagoulatos (2009) who defined the Lerner index as

$$L_{it} = \frac{(p_{it} - mc_{it})}{p_{it}}$$

Where p is the price of total assets computed as the ratio of total revenue to total assets; mc is the marginal cost of total assets. To calculate the Lerner index, we first estimate the following trans-log cost function:

$$\begin{aligned}\ln C = {} & \alpha_0 + \alpha_1 \ln Y + \frac{1}{2}\alpha_2 \ln Y^2 + \sum_{k=1}^{2} \beta_k W_k + \sum_{h=1}^{2} \mu_h \ln E_h \\ & + \frac{1}{2}\sum_{k=1}^{2}\sum_{m=1}^{2} \gamma_{km} \ln W_k \ln W_m + \sum_{k=1}^{2} \rho_k \ln Y \ln W_k + \sum_{h=1}^{2} \varepsilon_h \ln Y \ln E_h \\ & + \sum_{k=1}^{2}\sum_{h=1}^{2} \lambda_{kh} \ln W_k \ln E_h + \frac{1}{2}\sum_{h=1}^{2}\sum_{n=1}^{2} \psi \ln E_h \ln E_n + \ln u_c + \ln \varepsilon_c\end{aligned}$$

Where C denotes total cost, and Y is total assets. W is the vector of inputs (labor, funding, and other costs), and E is the vector which includes fixed assets, loan loss provisions, and equity capital. To obtain marginal cost, we differentiate with respect to Y as follows:

$$mc_{it} = \frac{\partial C}{\partial Y} = [a_1 + \alpha_2 \ln Y + \rho_1 \ln W_1 + \rho_2 \ln W_2 + \varepsilon_1 \ln E_1 + \varepsilon_2 \ln E_2] \frac{c_{it}}{Y}$$

[6] In reaction to theoretical and empirical contradictions of the structural models, nonstructural approaches were developed namely: the model of Panzer and Rose, the model of Bresnham and the model of Iwata.

Other specific variables:

Domestic credit provided by the banking sector (% of GDP) DCPS includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. This ratio is used to measure the growth of the banking system

Bank liquid reserves to bank assets ratio (%) is the ratio of domestic currency holdings and deposits with the monetary authorities xcwc to claims on other governments, nonfinancial public enterprises, the private sector, and other banking institutions. This ratio captures the banking system's liquidity. In countries whose banking system is liquid, adverse macroeconomic conditions should be less likely to lead to banking and financial crisis. An increase of this ratio is positively correlated with stability.

Interest rate spread (IRS) is the interest rate charged by banks on loans to prime customers minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits.

In simple terms, the net interest spread is like a profit margin. The greater the spread, the more profitable the financial institution is likely to be and vice versa.

10.3.2.3 Control Variables

The global financial liberalization index: *IGLF*

In the last decades, we note the proliferation of empirical studies trying to detect the impact of financial liberalization process on financial systems, investment and growth. However, in spite of this growing number, the indicators of financial liberalization measurement are still very limited.[7] In fact, the majorities of researchers build their own liberalization chronology and concentrate on the abolition of restrictions on financial sector.

We pursue an approach inspired from Laeven et al. (2003), Demirguc-Kunt and Detragiache (1999) and Kaminsky and Schmukler (2003). We will try, in what follows, to build a global index of financial liberalization for MENA countries. It is a compound index of three fundamental aspects of the financial liberalization process: The domestic financial sector deregulation, the stock market liberalization and capital account deregulation. The total index of liberalization evaluates jointly with the capital account, the stock market and the domestic financial sector liberalization.

Our sample covers 13 MENA countries over the period 1980–2009. For each country, three forms are identified:

Completely liberalized: If the three sectors are perfectly liberalized;
Partially liberalized: At least a sector is partially liberalized;
Repressed: Total restrictions for all sectors.

[7] the financial liberalization proxy – the deposit interest rate ceiling – is widely used in the literature but represents only one aspect of domestic liberalization.

This index is an inter-country average whose value varies between 1 and 3:
3 = Strong restrictions; 2 = Partial Liberalization; 1 = Total liberalization

To capture the capital account liberalization, we study the regulations evolution on the external financing of domestic financial institutions, the evolution of the exchange control, and controls of capital outflows. To measure the liberalization of the domestic financial system, we analyze regulations on debtor and credit interest rates, easing of banking legislation as regards of granting of credit, and deposits in different currencies. Finally, to detect stock markets liberalization, we study acquisition evolution and shares of domestic stock market by foreigners, capital repatriation, and interest and dividends.

We established these criteria after having gathered all the payments and have carefully studied the range of restrictions adopted throughout countries and years of several sources.[8]

The information sources include arrangements of exchange rate (Publications of the IMF and the restrictions and economic developments, various issues). The data base of emerging markets is from the publication of IFC. We use also various reports/ratios of the World Bank, annual reports of the central banks, as well as of the research tasks with chronologies of the restrictions of the financial system.

Macroeconomic variables

Bank soundness is also affected by macroeconomic variables, as slow output growth, high and volatile inflation, rapid exchange rate depreciation, high real interest rates, and rapid credit expansion have been found to be associated with bank instability. We included several financial and macroeconomic variables that have been consistently identified in the literature as significant in the determination of banking crises.[9] The control variables included in all regressions are:

Growth rate: A decline of growth rate generally weakens the capacity of the domestic borrowers to ensure the refunding of their debt and thus increases the risk of insolvency; borrowers' insolvency may be higher under decreasing economic performance which in turn deteriorates the banks' asset quality. In addition, recessions generally advance the episodes of banking distress Laeven and Majoni (2003). Thus, we expect a positive coefficient sign if investment opportunities increase under economic booms with the growth rate variable expected to be positively correlated with banking stability.

Inflation: INF, the volatility inflation rate in general affects the solidity of the economy and the banking system in particular, through several transmission channels. This volatility accentuates the credit and market risks. Inflation is measured by the annual growth rate of the GDP implicit deflator showing the

[8] The criteria employed to determine if the capital account, the domestic financial sector, and the stock market are entirely or partially liberalized, or repressed, are described in detail in Arafet Farroukh (2010, 2012) "Liberalisation financière et crise bancaire : la cas des pays emergents ATM".

[9] See, for instance, Demirgüç-Kunt and Detragiache (1998), Arteta and Eichengreen (2002), Glick and Hutchison (2001) and Mehrez and Kaufmann (1999).

rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant ones.
M2/Reserves international[10]: It is an indicator of confidence for investors in the interior financial system. This indicator informs about the capacity of the economy to resist the speculative pressures without correction of foreign exchange rate. Any increase in this ratio is a sign of vulnerability.

Thus, in robustness tests, we employ various combinations of these macroeconomic variables in alternative specifications. Macroeconomic variables are mainly retrieved from the world development indicators.

10.4 Empirical Results

10.4.1 A Method

We rely on a fixed effect model. This one was preferred to the random one despite that the Hausman test didn't succeed to allow us to choose between random and fixed effect model.[11] In fact, the latter is adapted to capture unobserved specific effects of countries, such as institutions, geographical characteristics, cultural norms, etc. Our regressions are estimated with a weighted least-squares procedure, employing a White correction for heteroskedasticity (cross-section weights).

We present main empirical results in Tables 10.1 and 10.2. Table 10.1 reports regressions results assessing the impact of financial liberalization sequencing on systemic stability as measured by the Z-score-technique. Regression specifications in Table 10.2 use different concentration and competition measures to seek the impact of banking structure changes on banking stability.

10.4.2 Main Findings

10.4.2.1 Financial Liberalization Sequencing, Concentration, and Banking Stability

Contrary to our anticipations, the empirical results indicate that financial liberalization measured by the global financial index is significantly positive at 1 %, so it has

[10] The money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This definition is frequently called M2; Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. The gold component of these reserves is valued at year-end (December 31) London prices.

[11] The results of Hausman test are reported in Table 10.2.

Table 10.1 Descriptive statistics

Variables	Mean	Standard deviation	Min	Max
C3	0.707	0.183	0.297	1
HSTAT	0.546	0.182	0.079	0.886
LEN	0.300	0.104	0.119	0.501
IGLF	1.409	0.452	1	2.666
BLASS	17.664	27.193	0.738	228.576
M2R	3.614	1.969	0.222	15.642
RI	8.606	6.479	0.086	36.266
NBT	110.145	31.221	50.925	249.374
GDPRG	5.965	5.962	0	50.7
INF	12.315	17.815	0.040	137.964
DCB	68.816	36.414	1.039	210.17

Source: Author calculation

Table 10.2 Financial liberalization sequencing, concentration, and banking stability.

Variables	1 FE	2fe	3 fe
Cst	73.65*	74.95*	74.56*
	(3.89)	(3.88)	(3.93)
C3	−80.56*	−72.33	−74.54*
	(3.75)	(−3.40)	(3.56)
Stock market liberalization	**11.41****		
	(2.57)		
Capital account liberalization		**7.60*****	
		(1.89)	
Financial lib.			**12.38****
			(2.44)
Bank reserve %	0.14**	0.15**	0.14**
	(2.40)	(2.56)	(2.32)
M2R	−2.27	−2.44	−3.23***
	(−1.31)	(−1.37)	(−1.77)
Real interest rate	−0.02	−0.04	0.0003
	(−0.10)	(−0.18)	(0.00)
Domestic credit	0.08	0.07	0.07
	(0.75)	(0.71)	(0.74)
Terms of trade	−0.16*	−0.19*	−0.16*
	(−2.71)	(−3.34)	(−2.77)
Real GDP growth	0.47	0.42	0.36
	(1.22)	(1.08)	(0.95)
Inflation	−0.35**	−0.28***	−0.35**
	(−2.10)	(−1.74)	(−2.08)
R2 (%)	30	27.54	29.48
Fisher	4.15	3.60	4.48
Prob. (fischer)	(0.0001)	(0.0005)	(0.000)

Heteroscedasticity consistent t-student are in parenthesis. ***, ** and * indicate statistically significance at 10, 5, and 1 respectively

a positive impact on Z-score which induces more stability (Table 10.2). According to the majority of existing empirical studies, liberalization generally has a negative effect on banking stability.

In our case, this result can be explained by the non advanced stage and recent adoption of financial liberalization process in MENA region. The majority of countries did not carry out a total financial liberalization yet.

In regressions 1 and 2 of Table 10.1, we try to study the effect of sequencing on banking stability. For stock market liberalization, we didn't find a significant result. Capital account liberalization enters the third regression with a negative and significant sign at 1 % level inducing more fragility for the banking system.

Hence, to guarantee a successful financial liberalization, MENA countries have to ensure banking solidity by an adequate prudential regulation able to limit the harmful effects of a total opening.

10.4.2.2 Banking Market Structure, Competition and Stability

As Table 10.3 reports, concentration (C3) enters regression (1) significantly negative at the 1 % level suggesting that an increase in banking market concentration has a negative impact on MENA banks financial soundness, which corresponds to the "concentration- fragility" view in the theoretical literature and generally confirms empirical findings by De Nicolo et al. (2004). In contrast, this result does not support theoretical arguments and earlier empirical findings (Beck et al. 2006) promoting the "concentration-stability view". We additionally control for the robustness of our main findings by adopting other competition measures.

In Specifications (2) we include the H-Statistic and in specification (3) the Lerner index.

The H-Statistic enters specification 2 positively and significantly at the 1 % level. The positive sign for the coefficient implies that the Z-score increases as the degree of competitive behaviour among financial institutions increases and therefore does not support the view that competitiveness gives rise to banking system vulnerabilities.

For Lerner index, we find that more monopolistic banking systems can induce to more fragility which confirms our first result.

10.4.2.3 Banking Market Structure, Governance and Stability

Finally, to test the impact of institutional variables on banking stability, we adopt the same methodology. We add to the baseline model the vector of institutional variables composed of the six indicators derived from World Governance

Table 10.3 Banking market structure, competition and stability

Variables	1 FE	2 RE	3 FE	4
Cst	71.19*	15.45	6.63	73.19*
	(3.78)	(1.34)	(0.63)	(3.84)
C3	**−83.12***			−84.07*
	(−3.90)			(−3.96)
HSTAT(−1)		**15.15*****		
		(1.74)		
LEN(−1)			**−11.90**	
			(−0.47)	
Financial lib. index	16.00*	12.14*	11.41***	17.22*
(−2)	(2.90)	(3.06)	(1.70)	(3.10)
Bank Reserve %	0.14**	0.05	0.23**	0.16**
	(2.46)	(0.61)	(2.28)	(2.02)
M2R	−3.06***	−1.43	−2.44	−3.66**
	(−1.74)	(−1.25)	(−1.32)	(−2.02)
Real interest rate	0.02	0.14	0.20	0.07
	(0.11)	(0.57)	(0.70)	(0.30)
Terms of trade	−0.16*	−0.14*	−0.18*	−0.18*
	(−2.86)	(−2.71)	(−2.84)	(−2.90)
Real GDP growth	0.44	0.40	0.29	0.38
	(1.16)	(1.03)	(0.67)	(0.99)
Inflation	−0.44**	−0.07	−0.17	−0.47*
	(−2.36)	(−0.40)	(−0.76)	(−2.71)
Domestic credit	0.08	−0.09*	0.23***	0.10
	(0.83)	(−2.72)	(1.71)	(0.96)
R2 (%)	31.40	33.63	24.20	35.42
Fisher	4.29	2.54	2.38	4.24
Prob. (fischer)	(0.0001)	(0.0171)	(0.0202)	(0.0001)

Heteroscedasticity consistent t-student are in parenthesis. ***, ** and * indicate statistically significance at 10, 5, and 1 respectively

Indicators compiled by Kaufmann and Kraay (2008). The empirical results are reported in Table 10.4.[12]

Examining the coefficients on the various institutional variables leads to a number of additional interesting results. The signs of all institutional variables are negative, but only one variable (political stability) is reported to affect positively the bank stability.

Our findings highlight also the importance of institutional environment in enhancing banking stability. Specifically, a sound regulatory quality and a better enforcement of rules of law, play an important role in reducing fragility in the MENA banking system. So we can conclude that stability in the banking system depends on legal and political institutions.

[12] Considering that the institutional indicators are highly correlated with each other, we introduce them separately.

Table 10.4 Banking market structure, governance and stability

Variables	1 (RE)	2 (FE)	3 (FE)	4 (FE)	5 (RE)	6 (FE)
Cst	38.29**	92.09**	97.69*	79.47**	31.91***	−3.86**
	(2.01)	(2.64)	(2.80)	(2.46)	(1.77)	(2.49)
C3	−10.72	−131.204*	−108.42*	−89.98*	−10.48	−88.40*
	(−0.78)	(−4.17)	(−3.67)	(−3.37)	(−0.78)	(−3.23)
Financial lib. index	16.455***	11.239	13.22	14.82	4.94	13.31
(−2)	(2.33)	(0.76)	(0.91)	(1.09)	(1.13)	(0.99)
Bank Reserve %	−0.021	0.119	0.18**	0.15**	−0.02	0.15**
	(−0.35)	(1.53)	(2.24)	(2.04)	(−0.45)	(2.15)
M2R	0.257	0.724	−2.56	−2.32	−0.42	−2.15
	(0.17)	(0.25)	(−1.02)	(−1.01)	(−0.32)	(−0.92)
Real interest rate	−0.153	0.129	−0.018	−0.09	−0.09	−0.13
	(−0.48)	(0.34)	(−0.05)	(−0.28)	(−0.34)	(−0.40)
Terms of trade	−0.136**	−0.045	−0.16***	−0.13***	−0.09	−0.15**
	(−2.11)	(−0.56)	(−1.91)	(−1.97)	(−1.54)	(−2.11)
Real GDP growth	0.41	0.765	0.42	0.41	0.24	0.47
	(0.99)	(1.56)	(0.76)	(0.85)	(0.62)	(0.94)
Inflation	−0.335	−0.753*	−0.717*	−0.58**	−0.40***	−0.54**
	(−1.50)	(−2.94)	(−2.99)	(−2.53)	(−1.87)	(−2.36)
Domestic credit	−0.137**	−0.003	0.076	0.09	−0.08***	0.06
	(−2.29)	(−0.03)	(0.70)	(0.83)	(−1.79)	(0.62)
Voice and accountability	**−11.65*** (−1.73)**					
Political stability		**11.411*** (1.94)**				
Government effectiveness			**−2.107 (−0.18)**			
Regulatory quality				**−5.98 (−0.59)**		
Rule of law					**−12.23*** (−1.82)**	
Control of corruption						**−3.86** (−2.04)**
R2 (%)	27.46	44	40.32	36.52	26.31	36.15
Fisher	2.66	3.33	3.32	2.80	2.30	2.59
Prob. (fischer)	(0.0134)	(0.003)	(0.0021)	(0.0072)	(0.0252)	(0.0124)

Heteroscedasticity consistent t-student are in parenthesis. ***, ** and * indicate statistically significance at 10, 5, and 1 respectively

10.5 Conclusion

The purpose of this paper is to examine the impact of financial liberalization, bank structures changes, and institutional environment on MENA banking stability over 1990–2008. Empirical results indicate that financial liberalization has a positive impact on Z-score which induces more banking stability. Our analysis provides also empirical evidence that MENA banking market concentration has a

negative impact on banks' financial soundness as measured by the Z-score technique while controlling for macroeconomic, bank-specific, regulatory and institutional factors. Empirical results from panel estimations hold when employing alternative concentration and competition measures. Our findings are consistent with the "concentration-fragility view". Finally, our findings highlight the importance of institutional environment in enhancing banking stability. Specifically, a better control of corruption, a sound regulatory quality, a better enforcement of rules of law, and a free voice and accountability play an important role in reducing fragility in the MENA countries.

Appendix 1: Criteria of Financial Liberalization

Criteria for full liberalization: 1		
Capital account	Domestic financial sector	Stock market
Criteria for partial liberalization: 2		
Strong restrictions criteria: 3		
Capital account	Domestic financial sector	Stock market
External financing: The banks and the companies can resort freely to the external financing	**Debtor and credit interest rates**: There is no control on interest rates (ceilings, floors)	**Acquisitions of capital by the foreign investors**: The foreign investors can hold domestic stockholders' equity without restrictions
Foreign exchange rate and other restrictions: No foreign exchange rate imposed for the transactions of the account running or the capital account. No restriction on the outflows of capital	**Other indicators**: elimination of the framing of appropriations (also subsidies). The deposits of currencies are allowed	Repatriation of capital, dividends and interests the capital, dividends, and the interest can be repatriated freely within 2 year starting from the initial investment
External financing: The banks and the companies can resort freely to the external financing	**Debtor and credit interest rates**: There is no control on interest rates (ceilings, floors)	**Acquisitions of capital by the foreign investors**: The foreign investors can hold domestic stockholders' equity without restrictions
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(continued)

Criteria for full liberalization: 1		
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Foreign exchange rate and other restrictions: No foreign exchange rate imposed for the transactions of the account running or the capital account. No restriction on the outflows of capital	**Other indicators**: elimination of the framing of appropriations (also subsidies). The deposits of currencies are allowed	Repatriation of capital, dividends and interests the capital, dividends, and the interest can be repatriated freely within 2 year starting from the initial investment

Appendix 2: Review of the Empirical Literature

Authors	Samples	Proxy of fragility	Model	Results
H1: Financial openness and banking fragility				
Démergu-Kunt et détragiache (1998)	Panel of countries (1980–1995)	Banking crises (dummy variable)	Logit	The liberalization of interest rate weakens the banking system
Démergu-Kunt et détragiache (2000)	Panel of countries (1980–1997)	Banking crises	Logit	Positive correlation between financial liberalization and banking crises
Farroukh and Alaya (2010)	32 emergent countries (1980–2008)	Banking crises	Logit	Financial liberalization
Ilan Noy (2004)			panel-probit	If liberalization is accompanied by insufficient prudential supervision of the banking sector, it will result in excessive risk taking by financial intermediaries and a subsequent crisis

(continued)

Authors	Samples	Proxy of fragility	Model	Results
H2: Structures of banking market and stability				
Allen et Gale (2004)				
Beck et al. (2006a, b)	69 pays (1980–1997)			Empirical obviousness that the concentration is a pledge of stability
(Uhde and Heimeshoff 2009)	25 European countries (1997–1995)	Z-score	Panel	Concentration has a negative effect on the European banks solidity
De Nicolo et al. (2004)	100 pays (1993–2000)		Logit	Positive relation between banking fragility and systemic risk
Benjanin Miranda et al. (2007)	Brazilian banks (2000–2005)	NPL	Panel	The empirical results indicate that banking concentration has a statistically significant impact on NPL, suggesting that more concentrated banking system may improve financial stability

Appendix 3: Notes on Variables and Data Sources

Variable	Description	Data sources
H-Statistic	Variable that captures the competitiveness of the banking industry whereby $H \leq 0$ indicates monopoly equilibrium; $0 < H < 1$ indicates monopolistic competition and $H = 1$ indicates perfect competition	Claessens and Laeven (2004) and Turk-Ariss (2009)
C3	Proportion of total assets held by the three largest institutions in a country, averaged over the period 1988–2003	Bankscope
Lerner index	Describes a firm's market power. The index ranges from a high of 1 to a low of 0, with higher numbers implying greater market power.	Authors' calculations Arafet (2011)
IGLF	Financial liberalization index	Authors' calculations
LC	Capital account liberalization	Authors' calculations
LI	Domestic financial liberalization	Authors' calculations
BLASS	Ratio of bank liquid reserves to bank assets	World Bank Development Indicators
DCPS	Domestic credit provided by the banking sector (% of GDP) includes all credit to various sectors on a gross basis	World Bank Development Indicators
IRS	Interest rate spread	World Bank Development Indicators

(continued)

Variable	Description	Data sources
GDP	Rate of growth of the gross domestic product	World Bank Development Indicators
M2R	Ratio of M2 to gross foreign reserves	World Bank Development Indicators
INF	Rate of change of the GDP deflator	World Bank Development Indicators
RI	Nominal interest rate minus the rate of inflation	World Bank Development Indicators
NBT	Change in the net barter terms of trade	World Bank Development Indicators

Correlation Matrix

	C3	HSTAT	LEM	IGLF	BLASS	M2R	RI	NBT	GDPRG	INF	DCB	ROA	ROE
C3	1												
HSTAT	−0.36	1											
LEM	0.33	−0.09	1										
IGLF	0.36	−0.003	0.003	1									
BLASS	0.16	0.16	0.03	−0.34	1								
M2R	−0.04	−0.04	−0.05	−0.04	−0.41	1							
RI	−0.15	−0.15	−0.29	0.14	0.01	−0.14	1						
NBT	0.06	0.06	0.36	−0.12	0.44	−0.18	−0.08	1					
GDPRG	0.07	0.07	0.21	0.03	−0.07	−0.07	−0.01	0.20	1				
INF	0.10	0.10	0.14	0.09	0.009	0.07	0.08	0.05	0.09	1			
DCB	0.08	−0.25	−0.60	−0.07	0.12	0.06	0.08	−0.21	0.17	−0.28	1		
ROA	−0.02	−0.04	0.31	−0.34	0.01	−0.01	−0.12	0.35	0.009	0.21	−0.23	1	
ROE	−0.04	−0.02	0.18	−0.18	0.03	−0.07	−0.18	0.27	0.01	0.34	−0.23	0.45	1

The correlation matrices analysis shows that the coefficients of correlation are low for selected variables which prove the non existence of multicollinearity problem

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