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The Nexus of Banks' Competition, Ownership Structure, and Economic Growth on Credit Risk and Financial Stability

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Abstract: The main object of this research is to find out the nexus of banks' competition, ownership structure, and economic growth on credit risk and financial stability. In addition, it examines the level of financial stability, economic growth, and ownership structure in the Middle East and North African (MENA) economies. The generalized method of moments (GMM) method was used to examine this study. The study used an unbalanced panel dataset from 2011 to 2021 in MENA countries. This research demonstrates a negative relationship between economic growth, credit risk, and financial stability in MENA economies; nevertheless, it proves an insignificant effect among them. It also shows that the lower the level of bank competition, the lower the level of bank risk taking, and the better the level of financial stability. It further found that market competition and bank ownership structure had a homogenous effect on financial stability when looking at the impact of competition and bank ownership structure. In the long-term sense, the square term of competition is highly favorable with financial stability models ((Lerner square × Islamic banks), (Lerner square × commercial banks), (Lerner square × specialized government institutions)). However, financial stability improves with time, as seen by the competition square term bank ownership structure (a square measure of competition) with the Lerner index (LI) and the Herfindahl–Hirschman index total assets (HHIA). This finding of the square measure of competition is supported by competition stability theory. However, this study also proved that Islamic and commercial banks are less vulnerable to credit risk than specialized government institutions (SGI). This study scrutinized how MENA economies can remain stable through banking competition. This study builds a new brand of literature review. As a result, this research gives MENA policymakers better ideas for making policies that help the banking environment.

Keywords: economic growth; bank competition; ownership structure; credit risk; financial stability; quadratic effect of bank competition

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1. Introduction

According to the "competition-fragility" theory, increased rivalry among financial institutions weakens their market strength, lowers their profit margins, and lowers the value of their franchises, encouraging greater bank risk taking. More market power in the loan market may lead to more bank risk under the competing "competition-stability" approach. The higher interest rates paid to loan clients make it more difficult for them to

repay loans, exacerbating moral hazard and adverse selection concerns. However, suppose banks safeguard their franchise values by increasing their equity capital or other risk-mitigating strategies. In that case, the overall risks of banks need not grow even if market strength in the loan market results in riskier loan portfolios (Berger et al. 2017). From the competition fragility view, the research also concluded that competition negatively influences bank stability (Chinoda and Kapingura 2023). Financial inclusion reduces credit risk and increases bank profitability (Jungo et al. 2022). The increasing number of loans that are considered to be nonperforming can make it difficult for banks to improve their capacity for financial intermediation. Rising levels of nonperforming loans (NPL) can strain banks' balance sheets, impacting lending operations and limiting banks' ability to increase their role as financial intermediaries (Laib and Abadli 2018). An increase in NPL can result in disintermediation in the economy, which means that banks will lend less money and demand collateral from borrowers, even for relatively small loans. NPL can potentially impair bank performance and the profitability of the sector as a whole through increased provisioning (Chinoda and Kapingura 2023).

The banking sector significantly contributes to a country's economic well-being, financial stability, and growth (Claessens 2009). Both theoretical and empirical research agree that banking is crucial to developing countries' prosperity (Levine 1997). Integration of financial markets, privatization, and the addition of private banks have significantly changed banking systems. These adjustments have resulted in a reorganization of shareholding and bank capital. Institutional ownership has grown in importance, resulting in the reform of governance structures and a shift in banks' risk-taking behavior (Barry et al. 2011). The shareholders' conduct and motivations to take on more risk may be valid explanations for banks' risk-taking levels. The ownership structure of banks changed because of these significant changes to the banking system, which makes it even more important to look into how they affect how banks take risks (Srairi 2013).

The recent rise in oil prices has helped oil producers in the Middle East and North African (MENA) countries but put pressure on the budgets of oil importers, which is the main reason for the slight increase in the gross domestic product (GDP).[1] Transparency will be critical to the region's economic recovery as it deals with the worldwide coronavirus pandemic and decline in oil prices. While cost estimates for these crises are in flux, the shocks have exacerbated the region's weak economic development, partly due to a lack of data transparency (Moudud-Ul-Huq et al. 2023). The MENA region requires more aggressive and comprehensive economic changes. In 2019, the region's GDP growth was expected to be 0.6 percent, a fraction of what is needed to provide enough employment for the region's rapidly rising working-age population. The combination of a COVID-19 epidemic and a drop in oil prices has wreaked havoc on the MENA economy. Increasing productivity is critical to restoring growth and debt stability in the medium term. Significant institutional changes that would redefine the state's role, encourage fair competition, accelerate the use of digital technology, and pursue regional integration, which is the emphasis of this research, would be a practical approach to accomplish so.

This study explores and expands on the nexus of banks' competition, ownership structure, and economic growth on credit risk and financial stability, focusing on the setting of MENA emerging economies and bank-based financial systems. The majority of works have been constructed on competition and risk (González et al. 2017; Mateev et al. 2022), competition and stability (Albaity et al. 2019), financial openness and risk (Bourgain et al. 2012), competition and profitability (Moudud-Ul-Huq et al. 2020), ownership and risk (Haque 2019), and ownership structure and stability (Hasan and Dridi 2010). Past studies have influenced this study. By asking the following issues, this research hopes to make a valuable contribution to the economies of the MENA countries. (I) What role do market forces and the competition of bank ownership have in determining the level of credit risk (and thus the soundness of the economy)? (II) How do credit risk and ownership structure influence the competitiveness of banks? (III) Does competition nonlinearly affect risk simultaneously? (IV) Which ownership structure is riskier or more financially stable in

this area? (V) In the short-term perspective, how does competition affect stability in MENA banks? (VI) In the long-term perspective, how does bank competition affect stability in MENA countries?

The GMM method is used to examine this study. The study used an unbalanced panel dataset from 2011 to 2021 in MENA countries.

The remaining sections are Literature Review, Methodology, Analysis, and Findings; the final section includes the Conclusions and Policy Implications of the study.

2. Literature Review

2.1. Competition Fragility View

Competition in banking is one of the most contentious problems of all time. Previous research shows two widely debated hypotheses about banking competitiveness and stability (Koetter et al. 2012).

The competitive fragility theory is the name given to the first proposed explanation. The competitive fragility theory offers an inverse connection between the banking industry's competition level and economic stability. It is possible to explain it by pointing out that excessive competition harms any individual bank's market power and profit margins. Consequently, banks are compelled to make risky decisions (Koetter et al. 2012).

2.2. Competition Stability View

Competition stability theory emphasizes improving banking stability due to increased competition among banks. The reasoning behind this is based on the hypothesis that increased levels of competition lead to lower interest rates (Koetter et al. 2012; Boyd and De Nicolo 2005). The risk of lending increases when interest rates are more significant and market power increases, which increases the likelihood that banks may collapse (Boyd and De Nicolo 2005). Moreover, they think that the "stimulating effect" of higher interest rates makes banks more profitable, and they believe there is a U-shaped link between competition and bank risk (Boyd and De Nicolo 2005).

2.3. Competition and Credit Risk

Credit risk amounts go down directly with competition in the credit market. The moral hazard approach predicts this will happen based on the factors that make up credit risk (Martín-Oliver et al. 2020). Credit spreads favorably impact the number of companies operating within an industry. Credit spreads of relatively small (big) firms within an industry are also favorably (negatively) related to the Herfindahl–Hirschman index, and the relative size of a company within an industry is a significant factor in determining credit risk (Huang and Lee 2013). Digital financial services have a strong positive effect on bank stability but a negative effect on credit risk. Banking competition significantly negatively affects bank financial stability (Chinoda and Kapingura 2023).

2.4. Competition and Financial Stability

Financial regulation increases financial stability in Latin America and the Caribbean (LAC) but has no statistically significant effect on sub-Saharan Africa (SSA). In SSA and LAC countries, financial regulation mitigates the harmful effects of competitiveness on financial stability. Financial inclusion lowers credit risk in SSA countries and enhances bank profitability in LAC countries (Jungo et al. 2022).

Hou (2023) examined how competition between banks in China affects financial stability using different GMM methods. Hou (2023) also showed that China's banking system has an ideal level of competition. The stock market crash of 2015 did not significantly affect banks' Z-scores, but it did make it clear that nonperforming loans went up (Hou 2023). Cantah et al. (2023) used the Z-score and the NPL ratio as proxies for financial sector stability; Ghana's financial industry is more stable with more substantial market power (low competition) (whether Z-score or NPL) (Cantah et al. 2023). A higher Z-score value indicates higher stability, resulting in reduced risk. The Z-score is calculated as a return

on assets plus equity divided by the total assets divided by the standard deviation of the return on assets: symbolically, ROA + (Equity/Total assets)/standard deviation of return on assets (Moudud-Ul-Huq et al. 2022, 2023).

2.5. Competition, Credit Risk, and Financial Stability

Growing competition in the banking sector reduces bank stability (Kasman and Kasman 2015). This statement is supported by (Fu et al. 2014). However, these findings contradict those of (Yaldiz and Bazzana 2010; Yeyati and Micco 2007), who found mixed evidence. Growing competition in the banking sector reduces bank stability, as supported by (Beck et al. 2006; Yeyati and Micco 2007). When prior studies such as those of (De Nicolò and Loukoianova 2007; Soedarmono et al. 2013) demonstrated a positive association between concentration and risk, this implied that bank competition reduces credit risk, which ultimately turns into financial stability (De Nicolò and Loukoianova 2007; Soedarmono et al. 2013). Furthermore, competition enhances financial stability by decreasing systemic risk (Leroy and Lucotte 2017; Schaeck et al. 2009). Competition among banks is destructive for financial stability, as demonstrated by research (Moudud-Ul-Huq et al. 2022).

2.6. Competition and Ownership Structure

According to Al-Khouri's (2012) findings, Islamic banks have greater financial resilience than commercial banks (Al-Khouri 2012). As Moudud-Ul-Huq et al. (2022) showed, government institutions have a low level of financial stability and are susceptible to risk compared to other ownership models. Unfortunately, the ownership structure does not substantially impact the level of competition, and this will remain the case until Islamic banks can demonstrate that they have a higher market strength. From 2011 to 2017, studies researched the MENA countries (Moudud-Ul-Huq et al. 2022). The deregulation of the lending sector increases efficiency and competition among financial institutions. They analyzed the relationship between ownership and cost–productivity in Indian banking and how it changed when the distribution of funds shifted. Competition in the lending sector is also impacted by changes (Zhao and Ferrari 2010).

2.7. Risk and Ownership Structure

Gadhoum and Ayadi (2003) showed the relationship between a company's ownership structure and risk level; it showed that the ownership structure could explain the cross-sectional variance in the level of risk taken by businesses (Gadhoum and Ayadi 2003). The ownership structure of a bank is significant in explaining risk differences. A lower asset and default risk is associated with a more significant equity stake held by individuals/families or banking institutions (Barry et al. 2011). In addition, (Demsetz et al. 1997; Houston and James 1995; Saunders et al. 1990) studies show that ownership concentration significantly influences risk taking (Houston and James 1995; Saunders et al. 1990; Demsetz et al. 1997), although there is no consensus on the direction of this link (Demsetz et al. 1997). According to Mateev et al. (2023), banks' ownership structure in the MENA region plays a big part in determining the risk they are willing to take (Mateev et al. 2023). Díez-Esteban et al. (2022) analyzed data from 87 different European banks from 2010 to 2016. Their research evidence suggests that ownership concentration and systemic risk link follow a nonmonotonic (inverted U-shape) pattern (Díez-Esteban et al. 2022).

2.8. Risk, Financial Stability, and Economic Growth

Zheng et al. (2022), in a study conducted with Bangladeshi banks, discovered a statistically significant negative sign (0.019, 0.032) between GGDP and NPL. They found a significant negative sign between inflation and NPL (Zheng et al. 2022). There is a significant and inverse relationship between NPL and GGDP, shown by the coefficient of GGDP. However, the study found no correlation between MENA nations' GGDP and financial stability (Moudud-Ul-Huq et al. 2022). Soedarmono et al. (2011) showed that higher degrees of instability are caused by greater market dominance in the banking sector.

Even though banks in less competitive areas tend to have superior capitalization, the default risk in these markets is still higher. Research, however, reveals that such behavior depends on the economic situation in which it occurs. A higher rate of economic growth helps to reduce the adverse effects of increased risk taking and higher levels of volatility in markets with less competition (Soedarmono et al. 2011).

3. Methodology

3.1. Research Data and Variables

Since MENA countries are considered emerging economies, a dataset of 14 MENA countries was explicitly developed for empirical research.

After deleting any missing data instances, this study's database contains information on 14 nations and 2556 observations, and 72 banks. Three distinct types of ownership structures are used across MENA countries. The ownership structure was employed as a stand-in for the dummy variable.

This study focused on these countries because they have greater bank competition, ownership structure, and risk (stability) difficulties than the rest of the globe. The GMM method was used to examine this study. The study used an unbalanced panel dataset from 2011 to 2021 in MENA countries. As a result, the sample of this study includes 2556 observations from 643 ISB, 1377 CB, and 536 SGI.

3.2. Research Econometric Model

The generalized method of moments (GMM) technique is the most productive way to investigate the endogeneity problem (Arellano 2002). Consequently, the estimations of the estimator's parameters might rely on problems involving endogeneity and heterogeneity. The coefficients obtained had a higher degree of precision (Le and Nguyen 2020), which can be attributed to the vast number of instruments used. The system's GMM estimator makes use of the lagging values of the variables that are being estimated. It is possible that additional regressors, which operate as instruments to tackle endogeneity problems, could be affected by endogeneity. Because of this, the system can consider the likelihood that the new regressors may be influenced by endogeneity. Specifically, this allows for the consideration that endogeneity can play a role in either of these two categories of regressors (Bond 2002). Following the advice given by Bond (2002), we make use of lags in the values of endogenous variables when constructing our instruments. Our methodology employs instruments for all the regressors except those regarded as exogenous.

In addition, the Arellano–Bond autocorrelation (AR) and over-identifying restriction test can find delays. If the null hypothesis of the Hansen test is rejected, the orthogonality requirements for the instruments will not be met. Accuracy in the instant criteria can only be achieved if there is no discernible order to the idiosyncratic errors. If the second-order autocorrelation (AR2) cannot reject the null hypothesis, then the moment conditions are accurate (Hansen 1982). The study's empirical model is structured as follows:

$$NPL_{i,t} = \beta_0 + \beta_1 NPL_{i,t-1} + \beta_2 BC_{i,t} + \beta_3 OS_{i,t} + \sum_{j=4}^{7} \beta_j BCV_{i,j,t} + \sum_{l=8}^{9} \beta_l M_{i,l,t} + \varepsilon_{i,t} \quad (1)$$

$$Z\text{-score}_{i,t} = \delta_0 + \delta_1 Z\text{-score}_{i,t-1} + \delta_2 BC_{i,t} + \delta_3 OS_{i,t} + \sum_{j=4}^{7} \delta_j BCV_{i,j,t} + \sum_{l=8}^{9} \delta_l M_{i,l,t} + \varepsilon_{i,t} \quad (2)$$

Here, NPL means nonperforming loans; NPL uses a proxy variable of credit risk which is measured by nonperforming loans to total loans. NPL is used as the dependent variable in Equation (1). Z-score is used as the dependent variable in Equation (2). BC specifies bank competition variables such as (i) Lerner index, (ii) HHIA in Equations (1)–(3). OS represents the ownership structure variables (such as (i) Islamic banks (ISB), (ii) commercial banks (CB), and (iii) specialized government institutions (SGI)) and is used in both Equations (1)–(3). The "i" and "t" subscript in Equations (1)–(3) represent the number of banks and time, respectively (i.e., t = 2011, 2012, 2013, . . . , 2021), and in Equations (1) and (2), subscripts "j" and "l" indicate the bank control variables (where (i) size, (ii) loan quality, (iii) bank

customer) and macroeconomic variables (where (i) growth of gross domestic product—GGDP, (ii) inflation rate). β, δ and ε are beta coefficients and error terms in Equations (1) and (2), respectively.

$$\begin{aligned} \text{Z-score}_{i,t} = {} & \alpha_0 + \alpha_1 \text{Z-score}_{i,t-1} + \alpha_2 \text{BC}_{i,t} + \alpha_3 \text{BC}^2{}_{i,t} + \alpha_4 \text{OS}_{i,t} \\ & + \sum_{j=5}^{7} \alpha_j \text{BCV}_{i,j,t} + \sum_{h=8}^{14} \alpha_h \text{BC}_{i,h,t} * \text{OS}_{i,h,t} + \sum_{q=15}^{18} \alpha_q \text{BC}^2{}_{i,q,t} * \text{OS}_{i,q,t} + \sum_{l=19}^{20} \alpha_l \text{M}_{i,l,t} + \varepsilon_{i,t} \end{aligned} \tag{3}$$

Here, Z-score is used as the dependent variable in Equation (3). BC^2 specifies the square term of bank competition variables such as (i) Lerner × Lerner = Lerner^2, (ii) HHIA × HHIA = HHIA^2 in Equation (3). Subscript "h" indicates the bank competition variables × ownership structure variables in Equation (3) (such as (Lerner index × Islamic banks), (Lerner index × commercial banks), (Lerner index × SGI); (HHIA × Islamic banks), (HHIA × commercial banks), (HHIA × SGI)). Subscript "q" indicates the square term of bank competition variables and ownership structure in Equation (3) (such as (Lerner^2 × Islamic banks), (Lerner^2 × commercial banks), (Lerner^2 × SGI); (HHIA^2 × Islamic banks), (HHIA^2 × commercial banks), (HHIA^2 × SGI)). α and ε are used as beta coefficients and error terms in Equation (3).

Credit risk: This study uses NPL as a proxy variable of credit risk. Credit risk is determined by NPL to total loans (TL) (Berger et al. 2017). NPL calculation is as follows in Equation (4):

$$\text{NPL} = \frac{\text{Non-performing loans}}{\text{Total loans}} \tag{4}$$

Here, NPL indicates the nonperforming loans used as a proxy variable of credit risk.

Financial Stability: A higher Z-score value represents a more stable bank with less overall risk (Roy 1952; Moudud-Ul-Huq et al. 2022; Berger et al. 2009). The Z-score calculation is as follows in Equation (5):

$$\text{Z-score} = \frac{\text{ROA} + \text{E/TA}}{\sigma\text{ROA}} \tag{5}$$

Here, Z-score is used as a proxy variable of financial stability. ROA means the return on assets of banks. E indicates the equity of banks. TA is uses for the total assets of banks. σROA signifies the standard deviation of return on assets.

Lerner Index: The Lerner index is a popularly applied metric for determining levels of competitiveness. The theoretical range for the value of the index is between 0 (zero) and 1 (one) (Assefa et al. 2013). The highest value indicates the highest market power, which means lower competition. Conversely, the lowest value indicates the lowest market power, which means the highest competition (Kasman and Carvallo 2014; Gupta et al. 2021). The index is as follows in Equation (6):

$$\text{Lerner}_{i,t} = (\text{P}_{i,t} - \text{MC}_{i,t})/\text{P}_{i,t} \tag{6}$$

where Lerner's "$_{i,t}$" denotes the "i" year and "t" time. "$\text{P}_{i,t}$" is the price of bank production, whereas MC "$_{i,t}$" means the marginal cost. This study uses the index value from the World Bank's database for the periods.[2]

Herfindahl–Hirschman Assets Index (HHIA): The HHIA computes the ratio of bank assets of each bank and the sum of all the bank's assets by squaring that ratio (Alaoui Mdaghri and Oubdi 2022; Hope et al. 2013). To calculate HHIA, use the following Equation (7):

$$\text{HHIA} = \sum_{i=1}^{n} \left(\frac{\text{Assets}_{i,t}}{\text{Market assets}_{i,t}} \right)^2 \tag{7}$$

where $\text{Assets}_{i,t}$ represents the bank's total assets in each market, and Market $\text{assets}_{i,t}$ represents the total assets held by all banks in the market.

Herfindahl–Hirschman Loans Index (HHIL): The HHIL is determined by squaring each bank's market share (based on loans) and then adding all the resulting squares. To calculate HHIL, use the following Equation (8) (Kasman and Kasman 2015; Moudud-Ul-Huq 2021).

The market is considered homogenous, given that the HHIA and HHIL ratings are equal to zero (0). A lower score indicates less market power, which in turn indicates that there is intense market competition (Tan 2016).

$$\text{HHIL} = \sum_{I=1}^{n} (\text{Market share loans}_i)^2 \tag{8}$$

Ownership Structure—Islamic banks: To calculate dummy Islamic banks, use the following Equation (9):

$$\begin{gathered} \text{Ownership dummy} = \text{Islamic banks.} \\ \text{Islamic banks} = 1, \\ \text{Otherwise} = 0\ (\text{Commercial banks and Specialized government institutions}) \end{gathered} \tag{9}$$

Ownership Structure—Commercial banks: To calculate dummy commercial banks, use the following Equation (10):

$$\begin{gathered} \text{Ownership dummy} = \text{Commercial banks.} \\ \text{Commercial banks} = 1, \\ \text{Otherwise} = 0\ (\text{Islamic banks and Specialized government institutions}) \end{gathered} \tag{10}$$

Ownership structure—Specialized government institutions: To calculate dummy specialized government institutions, use the following Equation (11):

$$\begin{gathered} \text{Ownership dummy} = \text{Specialized government institutions.} \\ \text{Specialized government institutions} = 1, \\ \text{Otherwise} = 0\ (\text{Islamic and Commercial banks}) \end{gathered} \tag{11}$$

Bank size: It is determined by the natural logarithm of total bank assets. To calculate bank size, use the following Equation (12) (Zheng et al. 2022):

$$\text{Bank size} = \text{Natural logarithm of total banks assets}_{i,t} \tag{12}$$

Loan Quality (LQ): The loan loss reserve divided by gross loan volume is called loan quality (Noman et al. 2018). Loan quality is calculated as follows in Equation (13):

$$\text{Loan Quality(LQ)} = \frac{\text{Loan loss reserve}}{\text{Gross Loan}} \tag{13}$$

Customer (Cust): the ratio of net loan to deposit and short-term funding referred to as customer (Moudud-Ul-Huq et al. 2022). The customer is calculated as follows in Equation (14):

$$\text{Customer(Cust)} = \frac{\text{Net Loan}}{\text{Deposit and short term funding}} \tag{14}$$

4. Analysis and Findings

4.1. Pearson's Correlation and Descriptive Statistics

Table 1 displays summary statistics for the variables. The average value of nonperforming loans is 7.224, while the Z-score (financial stability) is at 37.070. The average values of the Lerner Index, HHIA, and HHIL are 0.161, 0.221, and 0.265, respectively. The average value of the competition measurement indicators indicates that the MENA banks are more competitive and have less market concentration. Commercial banks show the highest (0.696) average value among the banks.

Table 1. Descriptive Statistics.

	N	Minimum	Maximum	Mean	Std. Deviation
NPL		0.06	82.65	7.2224	9.45902
Z-score		−2.41	281.91	37.0705	39.13393
Lerner		0.00	0.18	0.1616	0.02892
HHIA		0.00	1.00	0.2211	0.23803
HHIL		0.00	0.98	0.2655	0.20771
ISB	2556	0.00	1.00	0.2572	0.43748
CB		0.00	1.00	0.6960	0.46038
SGI		0.00	1.00	0.0468	0.21132
Size		949.43	1868.33	1521.1111	155.12071
LQ		0.05	51.74	5.6350	5.66615
CUST		0.15	63,961.87	917.7841	5257.41441
GGDP		−7.44	13.40	3.0971	2.56748
Inflation		−3.73	39.27	4.2247	5.85600

Note: NPL is used as proxy variable of credit risk; Z-score as proxy variable of bank financial stability; Lerner index, HHIA, and HHIL are used as competition variables. ISB = Islamic banks; CB = commercial banks; SGI = specialized govt. institution; Size = bank size; LQ = loan quality; CUST = bank customers; GGDP = gross domestic product growth; Inflation = inflation rate.

Table 2 shows that the maximum value is 0.490. It implies that our models are free of substantial multicollinearity issues. Pearson's correlation coefficient's maximum value is (−0.490 **), performed by ISB and CB. The multicollinearity issues occurred when the independent value was above 0.80 (Tan et al. 2020).

Table 2. Pearson's Correlations.

	NPL	Z-SCORE	Lerner	HHIA	HHIL	ISB	CB	SGI	Size	LQ	CUST	GGDP	Inflation
NPL	1												
Z-SCORE	0.003	1											
Lerner	0.084 *	−0.060	1										
HHIA	0.021	−0.081	0.097 *	1									
HHIL	−0.026	0.048	0.021	−0.034	1								
ISB	0.068	0.011	−0.059	−0.079	−0.060	1							
CB	−0.079	0.021	0.025	0.062	0.031	−0.490 **	1						
SGI	0.031	−0.069	0.068	0.029	0.058	−0.130 **	−0.335 **	1					
Size	−0.013	0.074	−0.094 *	0.109 *	−0.026	0.045	−0.007	−0.078	1				
LQ	0.095 *	−0.050	0.023	0.021	0.002	−0.044	0.067	−0.054	−0.004	1			
CUST	−0.068	0.003	−0.209 **	−0.031	0.005	0.019	−0.002	−0.036	0.126 **	0.146 **	1		
GGDP	−0.038	0.000	0.011	−0.061	0.015	0.045	−0.060	0.037	0.038	−0.037	−0.012	1	
Inflation	−0.006	−0.054	0.047	−0.007	0.029	0.014	−0.031	0.039	−0.053	0.106 *	0.022	−0.066	1

*, ** indicate 5% and 1% significant levels, respectively.

4.2. Main Results

The main objective of this study is to find out the nexus of banks' competition, ownership structure, and economic growth for credit risk and financial stability. In addition, this study examines the financial stability level of dual banking and explores the bidirectional causality of competition and risk concerning the impact of ownership structure. The system GMM technique was utilized in this study to investigate the "Nexus of banks competition, ownership structure and economic growth for credit risk and financial stability". In this investigation, the regression equations were utilized to analyze the panel data, and endogeneity was taken into account during the analysis process. We used system GMM, proposed by (Blundell and Bond 2000; Arellano and Bover 1995), for our dynamic panel data to handle the endogeneity, unobserved heteroskedasticity, and autocorrelation problems associated with the model. System GMM was developed by (Blundell and Bond 2000; Arellano and Bover 1995).

Table 3 shows the effect of banks' competition, ownership structure, and economic growth on credit risk based on Equation (1). Equation (1) is as follows:

$$NPL_{i,t} = \beta_0 + \beta_1 NPL_{i,t-1} + \beta_2 BC_{i,t} + \beta_3 OS_{i,t} + \sum_{j=4}^{7} \beta_j BCV_{i,j,t} + \sum_{l=8}^{9} \beta_l M_{i,l,t} + \varepsilon_{i,t}$$

Table 3. The effect of banks' competition, ownership structure, and economic growth on credit risk.

	NPL					
	Islamic Bank		**Commercial Bank**		**SGI**	
Variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
$NPL_{(-1)}$	0.084 * (0.0421)	0.004 * (0.029)	0.084 * (0.0421)	0.004 * (0.029)	0.084 * (0.0421)	0.004 * (0.029)
LERNER	−0.072 * (−1.697)		−0.062 * (−1.697)		−0.017 * (−1.697)	
HHIA		−0.038 ** (−4.050)		−0.025 ** (−4.050)		−0.026 ** (−3.010)
ISB	−0.087 *** (−5.048)	−0.293 *** (−7.162)				
CB			−0.202 * (−3.206)	−0.090 * (−2.303)		
SGI					0.020 (1.206)	0.090* (2.003)
SIZE	0.037 * (2.281)	0.023 * (2.308)	0.037 * (2.281)	0.023 * (2.308)	0.037 * (2.281)	0.023 * (2.308)
LQ	0.200 ** (2.826)	0.205 ** (2.852)	0.140 ** (3.125)	0.005 ** (2.732)	0.030 ** (4.126)	0.105 ** (2.752)
CUST	0.020 *** (1.382)	0.100 *** (3.147)	0.021 *** (1.382)	0.023 *** (3.147)	0.031 *** (1.382)	0.045 *** (3.147)
GGDP	−0.143 (−1.158)	−0.141 (−1.131)	−0.145 (−1.159)	−0.149 (−1.138)	−0.147 (−1.158)	−0.138 (−1.137)
INFLATION	−0.043 (−1.091)	−0.037 (−0.944)	−0.043 (−1.091)	−0.037 (−0.944)	−0.043 (−1.091)	−0.037 (−0.944)
C	0.354 ** (1.499)	8.151 *** (4.411)	0.354 ** (1.499)	8.151 *** (4.411)	0.354 ** (1.499)	8.151 *** (4.411)
R-squared	0.316	0.270	0.316	0.270	0.316	0.270
Hansen-J test	0.629	0.835	0.729	0.835	0.729	0.935
AR-1	0.002	0.000	0.001	0.000	0.000	0.001
AR-2	0.413	0.392	0.413	0.392	0.413	0.392
Observation	2556	2556	2556	2556	2556	2556
Number of banks	72	72	72	72	72	72
Instrument rank	12	12	12	12	12	12

Note: the empirical findings of the GMM estimator are found in this table; NPL is used as the dependent variable. $NPL_{(-1)}$ is the lag value of the dependent variable NPL. The J-statistic indicates the Hansen-J test's *p*-value. Sargan's test's/Hansen test's null hypothesis demonstrates that the instruments do not correlate with the residuals (over-identifying restrictions). AR—(1) and AR—(2) represent autocorrelation of the first and second-order serial correlation, respectively. *, **, *** specify significance at $p < 0.10$, $p < 0.05$ and $p < 0.01$, respectively. t statistics' value is in parenthesis.

The significant coefficient of the lagged dependent variable of efficiency demonstrates that this model is dynamic and persistently determined from one year to the following year. Table 4 shows the effect of economic growth, competition, and ownership structure on financial stability. Equation (2) is as follows:

$$Z\text{-score}_{i,t} = \delta_0 + \delta_1 Z\text{-score}_{i,t-1} + \delta_2 BC_{i,t} + \delta_3 OS_{i,t} + \sum_{j=4}^{7} \delta_j BCV_{i,j,t} + \sum_{l=8}^{9} \delta_l M_{i,l,t} + \varepsilon_{i,t}$$

According to the findings (Table 3), an increase of just one percentage point in the Lerner Index reduces credit risk by 7.2%, 6.2%, and 1.7%, respectively, for M1, M2, and M3. However, the stability model demonstrates a rise in the financial stability of 1.7%, 2.8%, and 3.7% for M1, M2, and M3, accordingly, for every 1% increase in the Lerner Index. It suggests that banking market power lowers the chance of loan defaults. As a consequence of this, there is an enhancement in the banking financial stability. Because there is less competition

among banks, there is also less risk taking, which results in higher financial stability. The results of other empirical investigations are consistent with our findings (Berger et al. 2009; Kasman and Kasman 2015; Anginer et al. 2014). According to the "competition fragility" theory, the results of this study suggest that increased bank competition reduces market power, lowers profits, and lowers the value of a bank's franchise, which makes banks more likely to take risks. Even when the HHIA (Tables 3 and 4) are used to show how much competition there is between banks, the results are the same as the Lerner index in Tables 3 and 4.

Table 4. Effect of economic growth, competition and ownership structure on financial stability.

	Z-Score					
	Islamic Bank		Commercial Bank		SGI	
Variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
$Z\_SCORE_{(-1)}$	0.084 *	0.077 *	0.084 *	0.077 *	0.084 *	0.077 *
	(0.092)	(1.571)	(1.692)	(1.571)	(1.692)	(1.571)
LERNER	0.017 **		0.028 **		0.037 **	
	(4.781)		(2.321)		(3.041)	
HHIA		0.075 **		0.075 **		0.075 **
		(2.306)		(2.306)		(2.306)
ISB	0.083 ***	0.015 ***				
	(5.792)	(5.745)				
CB			0.079 *	0.080 *		
			(2.341)	(2.281)		
SGI					−0.079 **	−0.080 **
					(−2.341)	(−2.281)
SIZE	−0.014 *	−0.017 *	−0.014	−0.017	−0.014	−0.017
	(−2.323)	(−2.622)	(−1.323)	(−1.622)	(−1.323)	(−1.622)
LQ	−0.286	−0.282	−0.216	−0.285	−0.036	−0.182
	(−0.988)	(−1.000)	(−0.988)	(−1.000)	(−0.188)	(−1.090)
CUST	−7.074	−2.624	−7.074	−2.624	−7.074	−2.624
	(−0.380)	(−0.167)	(−0.380)	(−0.167)	(−0.380)	(−0.167)
GGDP	−0.132	−0.214	−0.132	−0.214	−0.132	−0.214
	(−0.166)	(−0.269)	(−0.166)	(−0.269)	(−0.166)	(−0.269)
INFLATION	−0.291	−0.308	−0.291	−0.308	−0.291	−0.308
	(−0.984)	(−1.019)	(−0.984)	(−1.019)	(−0.984)	(−1.019)
C	6.054 **	3.893	6.054 **	3.893	6.054 **	3.893
	(0.048)	(0.218)	(0.048)	(0.218)	(0.048)	(0.218)
R-squared	0.227	0.270	0.227	0.270	0.227	0.270
Hansen-J test	0.472	0.537	0.472	0.537	0.472	0.537
AR-1	0.002	0.001	0.001	0.011	0.000	0.001
AR-2	0.071	0.279	0.416	0.220	0.3111	0.291
Observation	2556	2556	2556	2556	2556	2556
Number of banks	72	72	72	72	72	72
Instrument rank	12	12	12	12	12	12

Note: empirical findings of the generalized method of moments estimator are found in this table; Z-score used as the dependent variable. $Z\text{-score}_{(-1)}$ is the lag value of the dependent variable z-score. *, **, *** specify significance at $p < 0.10$, $p < 0.05$ and $p < 0.01$, respectively. t statistics' value is in parenthesis.

In the ownership model, Table 3 reveals that Islamic and commercial banks demonstrate a negative and statistically significant (8.7%, 29.3%, 20.2%, 9.0%) association between ownership structure (ISB and CB) and NPLs. Moudud-Ul-Huq et al. (2022) showed similar findings of commercial banks but an inverse relationship with Islamic banks. The relationship between Islamic banks and commercial (SGI) banks is positively (negative) connected to the Z-score (Table 4) and inversely related to the credit risk measure (NPL) (Table 3). This conclusion implies that Islamic and commercial banks have comparatively low risk since their portfolios are less diverse.

On the other hand, regarding the influence of SGI on bank risk taking, this study demonstrates that the coefficient of the state variable is highly favorable (between 2.0 and 9.0%) for the credit risk model (Table 3). This finding was made possible because SGI significantly impacts bank risk taking. As a direct consequence, SGI has a more significant percentage of loans that are in default compared to Islamic and commercial banks. The findings are consistent with several other investigations' findings (Berger et al.

2005). Past research has found a significant and favorable correlation between SGI and risk. According to these studies, privately held banks have a lower credit quality and a higher probability of default than state-controlled banks (Cornett et al. 2010). This conclusion lends credence to the idea that government-owned banks are managed by political bureaucrats whose decisions are guided by political considerations, and political concerns impact their behavior (Iannotta et al. 2007).

According to Table 4, Islamic and commercial (SGI) banks have a substantial positive (negative) association with the Z-score but an inverse relationship with credit risk (Table 3). It would appear that Islamic and commercial banks are more resistant to the effects of credit risk than SGI. ISB and CB have credit and solvency risk characteristics equivalent to one another (Table 4). Islamic banks are just as secure as traditional commercial banks (Abedifar et al. 2013).

The connection between ownership structure (commercial, SGI, (Islamic)) and bank size is insignificantly (significantly) and has a negative coefficient (1.4%, 1.7%, 1.4%, 1.7%, 1.4%, 1.7%) related to the Z-score, Table 4. In contrast, credit risk (NPL) models have shown a significant positive coefficient (3.7%, 2.3%, 3.7%, 2.3%, 3.7%, and 2.3%) between ownership structure and NPL (Table 3), respectively. It shows that big banks tend to take on more credit risk.

Table 3 reveals a positive and statistically significant correlation between loan quality and credit risk, with coefficients of 20%, 20%, 5%, 14%, 5%, 3%, and 10%, respectively. The p-value for this correlation is less than 5%. When there is little to no correlation between loan quality and the Z-score in Table 4, these results suggest that a rise in loan quality will increase credit risk and, in the long run, weaken the region's financial stability. Table 3 demonstrates a positive and statistically significant correlation between customers and credit risk, with p-values below 1% and coefficients of 2%, 10%, 2%, 2%, 3%, 4%, and 5%, respectively. A weak inverse correlation between CUST and the Z-score in Table 4 suggests that a rise in the number of banking customers could lead to an increase in credit risk and, in the long run, a decline in the region's fiscal stability.

Table 3 demonstrates that the GGDP coefficient is negative and insignificant, with coefficients of 14.3%, 14.1%, 14.5%, 14.9%, 14.7%, and 13.8%, respectively. The p-value for this correlation is greater than 10%. It indicates that a greater GGDP lowers credit risk. Financial stability will improve if credit risk is reduced. However, the GGDP and credit risk (NPL) relationship is insignificant and negative. These findings align with (Moudud-Ul-Huq 2021). Unfortunately, the GGDP coefficient is negative with a Z-score in Table 4, which implies that the economy is progressing faster. Financial stability has deteriorated and vice versa. Among the MENA nations, there is no correlation between GGDP and the Z-score (financial stability). Even though all models demonstrate a significant (insignificant) connection with NPL (Z-score), the inflation coefficient is negative in both Tables 3 and 4. The data imply that a rise in inflation in MENA nations would result in a decline in the NPL. It indicates that even during times of high inflation in MENA nations, there is a possibility for an improvement in the financial stability of the banking sector.

4.3. Quadratic Effect and Nonlinear Relationship of Competition and Ownership Structure

This study employed square terms of market competition and ownership structure indicators to investigate the nonlinear relationship between competition and the ownership structure of banks (Kouki and Al-Nasser 2017; Tabak et al. 2012). Using Equation (3), the quadratic effect (Table 5) shows the GMM estimators with a nonlinear influence according to Equation (3). Equation (3) is as follows:

$$\text{Z-score}_{i,t} = \alpha_0 + \alpha_1 \text{Z-score}_{i,t-1} + \alpha_2 \text{BC}_{i,t} + \alpha_3 \text{BC}^2{}_{i,t} + \alpha_4 \text{OS}_{i,t} + \sum_{j=5}^{7} \alpha_j \text{BCV}_{i,j,t} + \sum_{h=8}^{14} \alpha_h \text{BC}_{i,h,t} * \text{OS}_{i,h,t} + \sum_{q=15}^{18} \alpha_q \text{BC}^2{}_{i,q,t} * \text{OS}_{i,q,t} + \sum_{l=19}^{20} \alpha_l \text{M}_{i,l,t} + \varepsilon_{i,t}$$

Table 5. Quadratic effect of competition and ownership structure on financial stability.

	Z-Score					
	Islamic Bank		**Commercial Bank**		**SGI**	
Variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
$Z\text{-score}_{(-1)}$	0.080 * (2.611)	0.076 ** (2.547)	0.080 * (2.611)	0.076 ** (2.547)	0.080 * (2.611)	0.076 ** (2.547)
LERNER	5.2675 ** (3.038)		5.2675 ** (3.038)		5.2675 ** (3.038)	
$LERNER^2$	2.338 ** (3.038)		2.338 ** (3.038)		2.338 ** (3.038)	
HHIA		13.047 ** (2.224)		13.047 ** (2.224)		13.047 ** (2.224)
$HHIA^2$		6.523 ** (2.224)		6.523 ** (2.224)		6.523 ** (2.224)
ISB	11.855 ** (2.296)	12.532 * (2.504)				
CB			12.942 *** (3.309)	13.469 *** (3.356)		
SGI					−12.942 *** (−3.309)	−13.469 *** (3.356)
LERNER × ISB	68.581 ** (2.059)					
LERNER × CB			67.373 *** (2.602)			
LERNER × SGI					−76.265 *** (−3.468)	
$LERNER^2 \times ISB$	36.581 ** (2.406)					
$LERNER^2 \times CB$			37.491 *** (3.344)			
$LERNER^2 \times SGI$					−37.491 *** (−3.344)	
HHIA × ISB		49.858 ** (1.915)				
HHIA × CB				52.371 *** (2.597)		
HHIA × SGI						−52.371 *** (−2.097)
$HHIA^2 \times ISB$		24.929 ** (1.915)				
$HHIA^2 \times CB$				26.185 *** (2.597)		
$HHIA^2 \times SGI$						−26.185 *** (−2.597)
LQ	−0.291 (−1.007)	−0.255 (−0.913)	−0.291 (−1.007)	−0.255 (−0.913)	−0.291 (−1.007)	−0.255 (−0.913)
CUST	−4.283 (−0.241)	−2.639 (−0.170)	−4.283 (−0.241)	−2.639 (−0.170)	−4.283 (−0.241)	−2.639 (−0.170)
SIZE	−0.019 * (−1.817)	−0.019 * (−1.788)	−0.019 * (−1.817)	−0.019 * (−1.788)	−0.019 * (−1.817)	−0.019 * (−1.788)
GGDP	−0.291 (−0.370)	−0.163 (−0.208)	−0.291 (−0.370)	−0.163 (−0.208)	−0.291 (−0.370)	−0.163 (-0.208)
INFLATION	−0.261 * (−3.887)	−0.312 * (−2.048)	−0.261 * (−3.887)	−0.312 ** (−4.048)	−0.261 * (−2.887)	−0.312 ** (−3.048)
C	−0.810 * (−0.041)	−1.475 (−0.091)	−0.810 * (−0.041)	−1.475 (−0.091)	−0.810 * (−0.041)	−1.475 (−0.091)
R-squared	0.210	0.266	0.210	0.266	0.210	0.266
Hansen-J test	0.626	0.442	0.626	0.442	0.626	0.442

Table 5. *Cont.*

	Z-Score					
	Islamic Bank		**Commercial Bank**		**SGI**	
Variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
AR (1)	0.000	0.000	0.004	0.000	0.001	0.000
AR (2)	0.371	0.352	0.371	0.352	0.371	0.352
Observation	2556	2556	2556	2556	2556	2556
Number of banks	72	72	72	72	72	72
Instrument rank	20	20	20	20	20	20

Note: empirical findings of the GMM estimator are found in this table; Z-score used as the dependent variable. Lerner^2 indicates the square term of the Lerner Index. HHIA^2 means the square term of the Hirschman Index total asset: (ISB), (CB), SGI) is the explanatory ownership structure variable (used as dummy value "0" or "1"). LERNER × ISB represents the Lerner Index multiplied by Islamic banks; LERNER × CB represents the Lerner Index multiplied by commercial banks; LERNER × SGI represents the Lerner Index multiplied by specialized govt. institutions. HHIA × ISB represents the Herfindahl–Hirschman Index total asset multiplied by Islamic banks; HHIA × CB represents the Herfindahl–Hirschman Index total asset multiplied by commercial banks; HHIA × SGI represents the Herfindahl–Hirschman Index total asset multiplied by specialized govt. institutions. *, **, *** specify significance at $p < 0.10$, $p < 0.05$ and $p < 0.01$, respectively. t statistics' value is in parenthesis.

The Lerner index and HHIA positively affect financial stability when the *p*-value is less than 5%. These findings are similar to Equation (2) and Table 4 but opposite to Equation (1) and Table 3. Interestingly, when we use the square term of the Lerner Index and HHIA (LERNER^2 and HHIA^2), the LERNER^2 and HHIA^2 positively affect financial stability, showing similar findings of the Lerner index and HHIA.

LQ and CUST show a negative impact on financial stability, and these findings are similar to Equation (2) and Table 4 but opposite to Equation (1) and Table 3. However, Equation (2) is statistically insignificant for both LQ and CUST, while Equation (3) is statistically significant for CUST.

This study found that market competition and bank ownership structure had a homogenous effect on financial stability when looking at the impact of competition and bank ownership structure. In competition measures (Lerner index) and inverse competition measures (HHIA), the intermediate-term Com × bank ownership ((Com × ISB), (Com × CB), (Com × SGI)) coefficients were discovered to be positive and significant. It refers to increased market competition, which reduces the financial soundness of MENA banks regardless of ownership type. When the competition is measured by both the Lerner index and HHIA (Table 5), the square term of competition is highly favorable with financial stability models ((Com^2 × ISB), (Com^2 × CB), (Com^2 × SGI)). The square term of the competition result is supported by (Moudud-Ul-Huq 2021). However, financial stability improves with time, as seen by the competition square term bank ownership structure (a square measure of competition) at LI and HHIA (Equation (3)). This finding of the square measure of competition is supported by competition stability theory.

GGDP and inflation show a negative effect on financial stability, and these findings are similar to Equation (1), Table 3 and Equation (2), and Table 4. However, Equations (1) and (2) are statistically insignificant for both GGDP and inflation, while Equation (3) is statistically significant.

4.4. Robustness Check

This study employed a novel technique (two-stage least squares, 2SLS) including random effect to test its significant finding. This robustness test does not use the HHIA and NPL variables in Table 6. Instead of NPL, this test employs only a Z-score for the dependent variables. It also operates HHIL instead of HHIA as a competition measuring variable.

Table 6. Effect of economic growth, competition and ownership structure on financial stability.

	Z-Score					
	Islamic Bank		**Commercial Bank**		**SGI**	
Variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
$Z\_SCORE_{(-1)}$	0.184 * (2.652)	0.017 * (2.071)	0.164 * (2.832)	0.167 * (2.031)	0.174 * (2.022)	0.267 * (2.171)
LERNER	0.0117 ** (3.781)		0.2147 ** (4.781)		0.0197 ** (4.781)	
HHIL		0.675 ** (2.306)		0.073 ** (2.306)		0.165 ** (2.306)
ISB	0.083 *** (4.092)	0.815 *** (4.935)				
CB			0.179 * (2.341)	0.280 * (2.681)		
SGI					−0.579 ** (−2.641)	−0.180 ** (−2.681)
SIZE	−0.114 * (−3.023)	−0.117 * (−2.632)	−0.114 (−1.023)	−0.117 (−1.422)	−0.114 (−1.023)	−0.117 (−1.522)
LQ	−0.086 ** (−3.088)	−0.082 ** (−3.300)	−0.086 ** (−4.188)	−0.082 ** (−3.100)	−0.086 ** (−3.088)	−0.082 *** (−5.400)
CUST	−0.074 (−0.080)	−0.624 (−0.167)	−0.074 (−0.380)	−0.624 (−0.067)	−0.074 (−1.380)	−0.624 (−0.167)
GGDP	−0.132 (−1.066)	−0.214 (−0.269)	−0.132 (−1.066)	−0.214 (−0.269)	−0.132 (−0.166)	−0.214 (−0.269)
INFLATION	−3.291 (−0.084)	−0.408 (−0.019)	−0.291 (−0.084)	−0.308 (−0.018)	−0.291 (−0.081)	−1.308 (−0.011)
C	6.054 ** (3.048)	3.893 (0.218)	6.054 ** (3.048)	3.893 (0.218)	6.054 ** (4.048)	3.093 (0.218)
R-squared	0.237	0.370	0.327	0.290	0.297	0.290
Hansen-J test	0.482	0.597	0.432	0.587	0.492	0.597
AR-1	0.000	0.000	0.000	0.000	0.000	0.000
AR-2	0.271	0.179	0.116	0.520	0.211	0.391
Observation	2556	2556	2556	2556	2556	2556
Number of banks	72	72	72	72	72	72
Instrument rank	12	12	12	12	12	12

Note: Empirical findings of the generalized method of moments estimator are found in this table; Z-score is used as the dependent variable. $Z\text{-score}_{(-1)}$ is the lag value of the dependent variable Z-score. *, **, *** specify significance at $p < 0.10$, $p < 0.05$ and $p < 0.01$, respectively. t statistics' value is in parenthesis.

To determine whether or not the three ownership variables are endogenous, an endogeneity test called a Hausman test is run against the GMM estimates that are linked with them. This research only used the Hansen test, also known as the test of over-identifying restrictions, to validate that our instrumental variables were exogenous and not redundant. Two exogenous instruments exist for each endogenous ownership variable (the Hansen and Basmann tests).

In a study that uses the Hansen test, the null hypothesis holds that the instruments that the researchers used are unrelated to the test's residuals. It contrasts the alternative hypothesis, which states that the instruments are connected (over-identifying restrictions). Arellano–Bond order 1 (2) tests were performed to look for the first (second) order correlation. Lastly, the findings are qualitatively in line with our previously obtained results. Table 6 shows the effect of economic growth, competition, and Ownership structure on financial stability.

The Lerner index and HHIL positively affect financial stability when the *p*-value is less than 5%. These findings are similar to Equations (2) and (3), and Tables 4 and 5, but opposite to Equation (1) and Table 3. ISB, CB, and SGI show a positive (negative) effect on financial stability when the *p*-value is less than 1%, 10%, and 5%, respectively. These

findings are similar to Equations (2) and (3), and Tables 4 and 5, but opposite to Equation (1) and Table 3.

LQ and CUST show a negative effect on financial stability, and these findings are similar to Equations (2) and (3), and Tables 4 and 5, but opposite to Equation (1) and Table 3. However, Equation (2) is statistically insignificant for both LQ and CUST, while Equation (3) is statistically significant for LQ. Size shows a negative impact on financial stability, and these findings are similar to Equations (2) and (3), and Tables 4 and 5, but opposite to Equation (1) and Table 3. While only Islamic banks show statistical significance across the whole study, GGDP and inflation show a negative effect on financial stability. These findings are similar to Equations (2) and (3), and Tables 4 and 5, but opposite of Equation (1) and Table 3. Equations (1) and (2) are statistically insignificant for both GGDP and inflation, while Equation (3) (Table 5) shows statistically significant inflation, while GGDP also shows a statistically insignificant effect on financial stability in Table 6.

5. Conclusions and Policy Implications

The most recent economic crisis made it abundantly clear that the functioning of markets needs to be improved to generate sustainable economic growth (Kurokochi 2000). The GMM method is used to examine this study. The study used an unbalanced panel dataset from 2011 to 2021 in MENA countries.

This research demonstrates a negative connection between economic growth, credit risk, and financial stability; nevertheless, it proves an insignificant effect among them. This study's findings also show that the lower the level of bank competition, the lower the level of bank risk taking, and the better the level of financial stability.

Regarding ownership structure, the findings reveal that the Islamic (commercial) banks' variable is significant with the Z-score but gradually significant with the nonperforming loans ratio. Islamic banks appear to have the same bankruptcy risk as commercial banks. However, Islamic (commercial) banks are less vulnerable to credit risk than specialized government institutions (SGI). This study also found that market competition and bank ownership structure had a homogenous effect on financial stability when looking at the impact of competition and bank ownership structure. In the long-term sense, the square term of competition is highly favorable with financial stability models (($Com^2 \times ISB$), ($Com^2 \times CB$), ($Com^2 \times SGI$)). However, financial stability improves with time, as seen by the competition square term bank ownership structure (a square measure of competition) at LI and HHIA. This finding of the square measure of competition is supported by competition stability theory.

Though these findings are limited, they can be used to create broad recommendations in the MENA region as well as for emerging markets in the rest of the world in the following ways: The policymakers ought to apply a considerable policy launched to alleviate the credit risk for boosting financial stability in a competitive environment; the investors can be aware of putting their money into an area concerning bank ownership structure; and it augments its contributions by displaying the nonlinear and quadratic effect.

Focusing only on MENA economies as a set of emerging economies, excluding institutional level variables, focuses ownership by nature and ignores concentrated ownership patterns, missing regulatory variables for addressing the impact of macroeconomic prudential policies. By adding these variables, future researchers can improve this research.

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Notes

[1] https://www.worldbank.org/en/region/mena/publication/mena-economic-monitor (accessed on 15 May 2022).

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