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From Market Power to Financial Resilience: The Role of Institutional Governance in the MENA Region

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Abstract

We analyze the complex relationship between market competition, institutional governance, and financial resilience across sample of 110 banks from the MENA region over the period 2007–2024 and accounting for the role of Islamic banks, the moderating role of ownership structure, degree of concentration, and structural shocks using the Panel corrected standard error (PCSE) and generalized method of moments (GMM) methodologies. The results provide strong support for the competition-fragility hypothesis. High market power decreases financial resilience and increases non-performing loans, and market concentration increases resilience through a more efficient monitoring system, economies of scale, and relationship lending. Whereas Institutional governance strengthens resilience and reduces risk, it simultaneously increases competitive pressure, consistent with the market competition-discipline-risk channel. Ownership structure and concentration further influence the stability-risk relationship, with foreign and more concentrated banks being more resilient than state-owned banks and more concentrated than domestic-foreign entities. Structural shocks amplified the destabilizing effect of market competition but were mitigated by increases in concentration. Our findings highlight the interactions of market structure, governance, ownership, and shocks and provide policy implications to further stabilize banking systems in developing, politically complex contexts.

1. Introduction

In light of the repercussions from the 2008–2009 global financial crisis, banks are increasingly subject to challenges associated with resilience. In recent years, banking systems in the MENA region have experienced greater challenges related to resilience, primarily because of prolonged periods of instability due to economic and geopolitical underpinnings (Rashed & Wu, 2025).

For example, instances of political unrest, armed conflict, and regime changes in the MENA region have all led to a deterioration of investor confidence and, ultimately, the ability of institutional structures to perennially engage with economic, political, and/or market failure.

Public revenues, government spending, and credit quality in oil-dependent economies have been strongly impacted by estimates of oil prices, which are crucial to many MENA economies. Currency devaluation, inflation, and increasing national debt have put more pressure on banking systems, particularly in weaker economies like Egypt, Lebanon, and Tunisia. Systematic risk has increased due to economic disruptions due by the COVID-19 pandemic, non-performing loans (NPLs), and lower profitability due to pre-existing poor regulatory frameworks in MENA countries and low financial inclusion. These issues demonstrably put the region at risk and excellently demonstrate the need for better regulation, risk management practices, and economic diversification urgently.

MENA is the most resource-rich rent-dependent region of the world. Compared to other countries, MENA countries and Arab countries receive 31% and 34% of their GDP, respectively, in total resource rents, while the average country receives 5% of GDP in total resource rents (Hakimi et al., 2025). Many economies in the MENA region face instability in their economies if world prices drop because the MENA region depends on oil, gas, and other natural resources as a significant source of revenue.

Changes in global prices could mean large swings in national income, resulting in challenges for borrowers' creditworthiness and for governments' ability to meet required fiscal expenditures. Additionally, if revenues from natural resources drop suddenly, banks in MENA economies will have to manage an increase in non-performing loans, decreases in profitability, and manage liquidity (Hakimi et al., 2025). The MENA region has undergone profound political, institutional, and financial transitions, yet existing studies fail to capture how market competition interacts with institutional reforms, ownership features, and major shocks to influence financial resilience.

Banks are essential as the primary source of financing in the MENA region, present over 50–60% of total financial assets, and are an important driver of economic growth (Buallay et al., 2020). Banks are essential as the primary source of financing in economies and an important driver of economic growth (Buallay et al., 2020). The banking sector presents over 50–60% of total financial assets, and instability can lead to market value declines of 15–25%, coupled with increases in non-performing loans by 5–10%, significantly constraining credit supply to households and firms (Hakimi et al., 2025). Empirical research shows that poor Institutional governance and higher country risk significantly weaken bank resilience, raising credit risk and reducing investor confidence (Abbas et al., 2025).

MENA economies are predominantly bank-based, making banks the primary channel for market competition, Institutional governance, and shock transmission. Banks also operate under stringent regulations, aligning closely with our research on governance and financial resilience. In addition, banks provide reliable, standardized, and comparable financial data across countries, unlike other financial intermediaries (e.g., financial intermediaries (insurance companies, microfinance institutions, and investment funds) with limited or inconsistent datasets. In order to support economic growth, the banking industry encourages investment and helps run a range of enterprises. The strength of a nation's financial sector can occasionally determine its resilience in an economy that is heavily leveraged. Because of this, it's important to comprehend the elements that improve financial resilience, such as Institutional governance and competitiveness.

Market competition is one of the factors assessed as a source of financial resilience. Nevertheless, there continue to be two contending hypotheses regarding the effect of competition on financial resilience: competition fragility and competition-resilience. In this fragile environment, the consideration of market competition is gaining importance. Researchers argue that intense market competition leads to instability by squeezing profit margins and encouraging excessive risk-taking (Albaity et al., 2019; Abou-El-Sood & Shahin, 2023; Desalegn et al., 2023), while others argue that market competition leads to resilience as a result of improved risk management and higher quality (Moyo & Sibindi, 2022; Wahinya et al., 2023; Nguyen et al., 2024). Furthermore, most of the existing research utilizes empirical observations of banks in the US or Europe. Yet, the recent crisis has heightened concerns regarding financial resilience in emerging markets (e.g., the MENA, etc.) from researchers and policymakers.

Institutional governance is an important component in economic performance and financial resilience, providing the legal, political, and economic structure that reduces uncertainty and enforces property rights (Azfar, 2006; Alexiou et al., 2020). Strong institutions promote resource allocation, innovation, and governance; whereas weak institutions encourage inefficiency, corruption, and financial fragility (Porta et al., 1998; Infante & Smirnova, 2009).In the banking industry, strong institutional frameworks reduce risk, enhance supervision, and promote financial resilience (Demirgüç-Kunt & Detragiache, 1998; Tran et al., 2023). The Institutional governance enhances the benefits of financial development and market concentration on financial resilience, while also weakening the detrimental impact of high market competition (Hou & Wang, 2016; Bermpei et al., 2018; Setianto et al., 2025). The key elements include political stability, rule of law, regulatory quality, and government effectiveness to create resilience and reduce shocks (Apergis et al., 2021).

We highlight four major gaps in existing literature. Firstly, lack of consensus on the competition–resilience relationship in MENA banks, with most studies focusing exclusively on market power or market concentration but not jointly examining both. Secondly, limited understanding of how Institutional governance moderates this relationship, despite the MENA region being characterized by heterogeneous governance structures. Thirdly, insufficient evidence on the role of ownership structure and ownership concentration (Top3) in shaping risk-taking under different competitive environments. Fourthly, the scarcity of empirical research integrating structural shocks (Arab Spring, COVID-19, Hamas–Israel conflict) into the competition–resilience nexus.

This study contributes to existing literature in several important ways. First, this study investigates the relationship between competition, institutional governance, and financial resilience in MENA banks over the period 2007-24. Second, this study is the first study to explore the moderating role of Institutional governance across 15 countries listed in the MENA region. Third, this study contributes to the literature by employing both accounting-based (ZROA), market-based (DD), and bank risks (NPL &SDR) indicators to assess financial resilience, offering a more comprehensive and robust evaluation than prior studies. Fourth, this study employs a range of robust econometric techniques, including panel corrected standard error (PCSE) and Generalized Method of Moments (GMM), and applies various measures of market competition and financial resilience to ensure consistency and validity of the results. Fifth, in robustness, we explored the role of ownership structure (state, foreign, domestic-foreign), and ownership concentration (Top3) on the association between the market competition-resilience relationship, in addition to examining the structural shocks (Arab Spring in 2011, pandemic crisis in 2019, Hamas-Israel conflict in 2022) on this relationship. Finally, we examined the effect of Institutional governance on the market competition and financial resilience across 30 Islamic banks in a robustness test.

Our analysis indicates a multifaceted interplay between market competition and financial resilience in MENA banks. A higher market power (Lerner) consistently decreases financial resilience and heightens NPLs, supporting the “quiet life” hypothesis. In contrast, market concentration (HHI) strengthens resilience through greater oversight and scale economies. Higher institutional governance (IG) improves resilience and decreases risk while increasing market competition, illustrating a “market competition–discipline–risk” channel.

Ownership structure and ownership concentration serve as additional determinants for banks within this schema; foreign or highly concentrated banks are likely to be more resilient under competitiveness, while both state-owned and domestic-foreign banks are likely to be more vulnerable under competitiveness. Islamic banks show that market competition reduces the financial resilience, while concentration enhances the resilience, which is moderated through institutional governance. Lastly, structural shocks, particularly the Arab Spring, Hamas-Israel conflict, and COVID-19 crisis, amplify the detrimental effects on market competition, but buffers resilience from concentration, which emphasizes the role of governance, market structure, and shocks.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature, while Section 3 outlines the methodological approach. Section 4 presents the empirical analysis, followed by robustness tests in Section 5. Additional analyses are provided in Section 6, and Section 7 discusses the findings. Finally, Section 8 concludes the study, highlighting the key implications.”

2. Theoretical background and literature review

2.1. Market competition and financial resilience

Market competition is an important factor contributing to financial resilience. There are two camps of rivalry: The market competition-fragility hypothesis, which evaluates the impacts of market competition regarding fragility, posits that increased market competition can lead to financial instability. A competitive edge leads banks to increase their risk appetite, reduce risk management effectiveness, reduce profits, and thus reduce capital buffers. The market competition-resilience hypothesis argues that market competition promotes financial resilience through improved efficiencies, reduced moral hazards, and better risk management.

The charter value theory complements these perspectives by suggesting that market power may enhance resilience when banks safeguard their franchise value—but may also encourage complacency where oversight is weak. Elfeituri (2022) posits that firms with more market power will have lower incentives to monitor their borrowers, innovate, or be efficient. In the banking context, this will lead to poorer screening, less monitoring of borrowers, increased non-performing loans, and more instability. This framework is an important basis for understanding the destabilizing effect of the Lerner Index (LER) in banking contexts with high market concentration.

The logic behind the market competition-fragility hypothesis proposes that increased market competition simply reduces a bank's franchise value and, with that reduction, banks shift to riskier lending practices to salvage the profitability necessary to maintain their business models (Bahri & Hamza, 2020). Some empirical studies have found that a loss of market share, market competition, resolutions, or lack of market concentration generally weakens the risk mitigation potential of banking institutions, increasing their exposure to systemic risk (Albaity et al., 2019; Abou-El-Sood & Shahin, 2023; Desalegn et al., 2023).

The effects of market competition-fragility are heightened in regions of the world that have intense market competition, such as the European Union and East Asia. In those regions, excessive risk-taking behavior that can lead to financial instability has been observed (Phan et al., 2019a; Ferreira, 2023), and similarly in the Middle East and North Africa (MENA) region has been linked to risk-taking behavior related to increased insolvency risk in Islamic banks (Albaity et al., 2019; Moudud-Ul-Huq et al., 2022).

The empirical evidence demonstrated that increased market competition can weaken lending standards, increase the incidence of non-performing loans, and raise systemic risks (Tongurai & Vithessonthi, 2020; Zhang & Yang, 2020). To mitigate these risks, policymakers may use regulatory tools such as capital requirements and deposit insurance; however, these regulations can exacerbate moral hazard behaviors, then introducing further risk to financial resilience (Nguyen, 2021).

Proponents of the market competition resilience hypothesis, however, argue that greater market competition also increases stability by creating disciplined risk management, improving credit allocation, and removing monopolistic inefficiencies. Some studies have shown that market concentration can lead to financial distress, due to encouraging excessive risk-taking behavior, especially for large banks with government guarantees (Berger et al., 2020; Andersen & Jensen, 2022).

In contrast, Tran et al. (2023) discovered a positive relationship between market concentration and bank stability in the 133 developing and emerging economies they examined for 2002–2020, using the GMM method. In their analysis, banks in concentrated markets tend to be more resilient. Similarly, Nguyen (2023) shows that banks operating in highly concentrated markets tend to exhibit higher stability compared to those in less concentrated markets, supporting the concentration-stability hypothesis. In addition to market concentration enhancing bank stability up to a certain threshold, it suggests a potential inverted U-shaped relationship across 80 banks in the ASEAN 4 countries from 2006 to 2019.

The "too big to fail" phenomenon exacerbates systemic risks, as large banks assume they will receive state support in times of crisis (Calice et al., 2021). Some studies conducted in Vietnam and Sub-Saharan Africa indicate that increased market competition strengthens financial stability by encouraging banks to implement robust risk-monitoring mechanisms (Moyo & Sibindi, 2022; Wahinya et al., 2023; Nguyen et al., 2024). According to the above debate, we suggest the first hypothesis as follows:

H_1:Market competition significantly affects financial resilience

2.2. Institutional governance and financial resilience

Alexiou et al. (2020) showed that institutions are cohesive social systems or regulations that serve as the foundation for social, political, and economic interaction frameworks, hence lowering economic risk and uncertainty. The economy of a nation depends heavily on the quality of its institutions. Institutions can be categorized as political, legal, or economic (Azfar, 2006). Political institutions reduce uncertainty by creating laws, rules, and regulations, defending property rights, and promoting societal welfare, while economic institutions support the effective allocation of resources through innovation, technology, human capital, and physical capital. The laws, rules, and regulations set forth by political institutions are upheld by legal institutions. Weak institutions can result in poor law enforcement, inefficient resource allocation, and ineffective policymaking, all of which can impede economic development (Infante & Smirnova, 2009).

Institutional governance plays an even greater role during a financial crisis (Klomp & De Haan, 2014). Numerous studies show the significance of Institutional governance in enhancing financial development and long-run economic development (Bayraktar et al., 2023; Doré & Teixeira, 2023; Setianto et al., 2025). Additionally, financial development has a positive impact on economic growth (Fengju & Wubishet, 2024). This effect is significantly amplified in countries with strong institutional frameworks, indicating that strong institutions serve as catalysts for the positive benefits of financial development on economic expansion.

Institutional governance is shaped by several important aspects, like the prevention of voice and accountability, political stability, the absence of violence, control of corruption, regulatory quality, government efficacy, and the rule of law. These aspects are an important vital to fostering economic growth, boosting productivity, guaranteeing sustainability, and attaining macroeconomic stability (Apergis et al., 2021; Azam et al., 2021; Boulanouar et al., 2021; Ahmed et al., 2022; Tran et al., 2023). Compared to nations with poor Institutional governance, those with great Institutional governance are better able to create policies to deal with negative shocks.

Due to corruption, insufficient law enforcement, and inefficient regulation, countries with poor legal systems and governance, institutional setups may have more failing banks (Porta et al., 1998). Additionally, Institutional governance mitigates information asymmetry issues and reduces transaction costs, both of which have a major influence on business practices and economic performance (Setianto et al., 2025).

In the banking system, Demirgüç-Kunt and Detragiache (1998) showed that poor institutions are typically the cause of financial fragility. Some studies argued that countries with strong institutional characteristics can monitor their financial institutions (Hoque et al., 2015) and assist supervision (Anginer et al., 2014). Similarly, some scholars indicate that financial resilience can be significantly impacted by the institutional environment (Klomp & De Haan, 2012).

According to recent studies, Elfeituri (2022) shows that Institutional governance has a good effect on bank stability. Additionally, Tran et al. (2023) suggest that Institutional governance plays a vital role in strengthening bank stability across 133 developing and emerging economies within the period 2002–2020 using the GMM method. In the same vein, Van Duuren et al. (2020) concluded that prior research indicates that financial stability is enhanced by financial transparency across 110 countries between 2000–2011. Their results showed that financial openness only has a negative correlation with bad loans from banks with poor Institutional governance. We suggest the second hypothesis as follows:

H_2: Institutional governance positively affects financial resilience.

2.3. The Moderating Role of Institutional Governance

Institutional governance plays a moderating role in enhancing financial resilience. In Chinese banks, Hou and Wang (2016) argued that enhancing Institutional governance can lessen the detrimental effects of bank marketization on bank stability. In developing and emerging economies, Bermpei et al. (2018) show that political stability amplifies the beneficial impacts of capital regulation and activity limits on bank stability across 1,050 commercial banks within the period 2004–2013. Uddin et al. (2020) discovered that government efficacy, anti-corruption measures, agent trust, and adherence to the law contribute to reducing bank risk and fostering bank stability across 730 banks in 19 emerging nations. Similarly, Tran et al (2022) find that Institutional governance moderates the relationship between market concentration and bank stability. Their results showed that higher Institutional governance amplifies the positive effect of concentration on financial stability.

Nguyen (2023) suggests that Institutional governance might mitigate the influence of market concentration on bank stability. When market concentration reaches a specific threshold, optimal bank stability is observed, and higher Institutional governance contributes to improved bank stability in ASEAN banks. Setianto et al. (2025) demonstrated that enhancing Institutional governance may increase the stability advantages of increasing financial inclusion across 11,209 bank-level data observations from 78 developed and developing nations for the period 2004–2022 via the dynamic panel threshold estimate technique.

In the European Union (EU), Tizaoui et al. (2025) showed that opportunistic earnings management rises in a market with intense market competition; in addition to market competition can serve as an external governance mechanism in nations with greater Institutional governance across 114 banks from 2006 to 2019 via quantile regression. From Asian nations, Nugrohowati and ShidIGie (2025) analyzed the effect of both financial inclusion and Institutional governance on stability based on income categories. They found that bank stability is negatively impacted by Institutional governance in lower-middle-income nations, but not in upper-middle-income or high-income nations. In addition, financial inclusion enhances stability in lower and upper-middle-income but not in high-income nations. Similarly, Ofoeda et al. (2024) find that both Institutional governance and financial inclusion enhance bank stability, suggesting that institutions reduce transaction costs and help solve asymmetric information issues across 48 countries in sub-Saharan Africa within the period 2002–2021 via Prais-Winsten and Hansen threshold techniques.

Institutions shape the competitive environment by influencing information transparency, contract enforcement, regulatory quality, and supervisory strength. Under the institutional governance theory, strong institutions constrain opportunistic behavior, improve creditor protection, enhance regulatory capacity, and reduce moral hazard. As a result, high Institutional governance is associated with stronger monitoring, lower credit risk, and increased resilience. However, stronger institutions may also amplify competitive discipline, pushing banks to take more calculated risks—aligning with the market competition–discipline–risk channel. This dual role underscores the need to examine Institutional governance as a moderating factor. Based on the recent debate above, we propose the third hypothesis:

H_3: Institutional governance impacts the effect of market competition on financial resilience.

Figure (1) shows the research model as follows:

3. Research Methodology

3.1. Sample

The sample involved 110 commercial banks from 15 MENA countries over the period of 2007–2024; the sample excluded Islamic banks and politically unstable countries. For example, countries like Syria, Yemen, Libya, and Iran had political and economic instability, as well as institutional paralysis, in addition to data unavailable in these countries within the sample period of 2007–2024. We excluded Islamic banks because they have different goals compared to conventional banks, but we conducted the role of Islamic banks in robustness analysis; thus, the final sample consists of 1980 bank-year observations after excluding all banks with missing financial data, mergers, and acquisition operations during the sample period. Data was obtained from Bankscope, the global economy database, and the World Bank.

We start in 2007 because MENA banks adopted IFRS and Basel II standards, ensuring consistent and comparable data. This period also marks modern financial reforms, including market liberalization and the rise of Islamic banking, capturing market competition dynamics. Additionally, it provides a pre-crisis baseline to study the effects of the Global Financial Crisis and subsequent regional shocks on financial resilience.

Table 1 shows that the dataset consists of 110 banks from 15 MENA countries with a total of 1980 observations. The sample provides comprehensive regional coverage of the MENA banking sector, capturing structural heterogeneity across sub-regions. Gulf Cooperation Council (GCC) countries—Saudi Arabia, UAE, Qatar, Kuwait, Oman, and Bahrain—account for 39.1% of total observations, reflecting oil-dependent, financially deep systems with strong sovereign–bank linkages. North African economies (Egypt, Tunisia, Algeria, Morocco) contribute 30.9%, representing more bank-based systems operating under weaker institutional environments and higher political risk exposure. Levant countries (Jordan, Lebanon, Iraq, Israel, Palestine) comprise 30.0%, characterized by heightened geopolitical tensions and institutional fragility. This balanced sub-regional distribution strengthens the study's ability to identify how geopolitical risk transmits differently across diverse institutional and economic settings within the MENA region.

Table 1
Sample distribution of countries in MENA banks

Country	Number of banks	Freq	Percent
Saudi Arabia (SA)	10	180	9.09
United Arab Emirates (UAE)	13	234	11.82
Qatar (QA)	6	108	5.45
Egypt (EG)	8	144	7.27
Tunisia (TN)	10	180	9.09
Algeria (ALG)	10	180	9.09
Morocco (MO)	6	108	5.45
Bahrain (BA)	4	72	3.64
Jordan (JO)	10	180	9.09
Iraq (IG)	7	126	6.36
Lebanon (LB)	6	108	5.45
Israel (IS)	8	144	7.27
Kuwait (KW)	5	90	4.55
Oman (OM)	5	90	4.55
Palestinian Territory (PS)	2	36	1.82
Total	110	1980	100

3.2. Model specification

We examine the moderating role of Institutional governance (IG) on the association between market competition (BC) and financial resilience (FR). We employed panel-corrected standard error (PCSE) to address heteroskedasticity and panel-specific autocorrelation in MENA bank-level data. It provides robust, efficient estimates for large panels and allows clear interpretation of the direct effects of market competition, Institutional governance, and ownership on financial resilience. Also, we used GMM to address potential endogeneity, dynamic panel bias, and simultaneity between market competition, market power, and financial resilience. While PCSE captures static relationships, GMM validates causal and dynamic effects, ensuring results are robust to omitted variable and simultaneity concerns.

We used the lagged dependent variables in the GMM approach as instrument variables in our models. The two-step GMM ameliorates the endogeneity problem by employing the lagged differences of the regressors as instruments, since some of the explanatory variables may be weakly or strictly endogenous. The Arellano and Bond (AR) test is used to test for second-order autocorrelation in order to more accurately gauge its intended purpose in the dynamic panel GMM specifications. The over-identifying restrictions have been examined using the Hansen test, and the difference in Hansen to evaluate the instruments (Hansen, 1982). The Sargan over-identifying test has been utilized to test for the endogenous nature of variables. We explore the relationship between market competition and financial resilience via PCSE and GMM via the following equation:

$$FR_{it} = \beta_0 + \beta_1 MC_{it} + \beta_2 BS_{it} + \beta_3 CAR_{it} + \beta_4 AG_{it} + \beta_5 LG_{it} + \beta_6 INF_{it} + \alpha_7 GDP_{it} + YearFE + CountryFE + \varepsilon \text{ Eq (1)}$$

We examine the relationship between institutional governance and financial resilience as the second following equation:

$$FR_{it} = \lambda_0 + \delta_1 IG_{it} + \lambda_2 BS_{it} + \lambda_3 CAR_{it} + \lambda_4 AG_{it} + \lambda_5 LG_{it} + \lambda_6 INF_{it} + \lambda_7 GDP_{it} + YearFE + CountryFE + \varepsilon_{it} \text{ Eq. (2)}$$

Finally, we investigate the moderating effect of institutional governance on the relationship between market competition and financial resilience as the third following equation:

$$FR_{it} = \gamma_0 + \gamma_1 MC_{it} + \gamma_2 IG_{it} + \gamma_3 MC_{it} * IG_{it} + \gamma_4 BS_{it} + \gamma_5 CAR_{it} + \gamma_6 AG_{it} + \gamma_7 LG_{it} + \gamma_8 INF_{it} + \gamma_9 GDP_{it} + YearFE + CountryFE + \varepsilon_{it} Eq(3)$$

3.3. Variables measurement

Financial resilience is measured using ZROA and NPL. ZROA is measured by the sum of the ROA and the capital ratio scaled by the standard deviations of ROA (Ahmed et al., 2022; Elfeituri, 2022; Ha & Nguyen, 2023; Tran et al., 2023; Ofoeda et al., 2024; Hakimi et al., 2025; Setianto et al., 2025). We measure ZROA using the logarithm of the Z-score to address highly skewed and smooth values. A higher ZROA means lower bank risk and higher financial resilience. NPL is measured by the ratio of non-performing loans to total loans. A higher NPL implies lower financial resilience and more bank risks (Ha & Nguyen, 2023). In robustness, we used default to distance (DD) and standard deviation of return on assets (SDR) as alternative measures of resilience. SDR is measured by the standard deviation of return on assets to reflect the volatility of return on assets, while DD is measured by subtracting the bank's default point (short-term debt plus half long-term debt) from the estimated market value of its assets, and dividing the result by the volatility of those assets (Verma & Chakarwarty, 2024).

Figure 2 shows ZROA shows a noticeable dip during the global financial crisis (GFC), indicating a decline in bank profitability. Similarly, DD exhibits a mild reduction, reflecting increased vulnerability and lower distance-to-default for banks. In contrast, SDR rises slightly, signaling higher volatility in bank returns during the crisis, while non-performing loans (NPL) increase during crisis periods (GFC and Arab Spring), highlighting stress on asset quality. Measures of financial resilience reflect the evolving intervals of risk and resiliency, supporting the notion that financial resilience is a dynamic concept over time in MENA banks.

We used market power (Lerner index) and market concentration (HHI) as measures of market competition. The Herfindahl-Hirschman Index (HHI) measured by the ratio of the bank's total deposits to the total deposits of all banks (Moudud-Ul-Huq, 2021; Elfeituri, 2022; Mateev et al., 2022; Ferreira, 2023; Mateev et al., 2023; Wahinya et al., 2023), while Lerner index measure by the difference between a bank's pricing and its marginal cost (Phan et al., 2019b; Moudud-Ul-Huq, 2021; Elfeituri, 2022; Mateev et al., 2022; Wahinya et al., 2023; Ishu & Mallik, 2024). Both the HHI and Lerner index methods highlight different aspects of market competition and market structure in the banking sector. We used market competition metrics such as the Lerner Index and HHI, which are specifically developed for banking markets, ensuring methodological accuracy and theoretical alignment.

For most of the period in Table 3, both HHI and the Lerner index move within moderate ranges, indicating a relatively competitive market. However, post 2020, the HHI increases sharply, indicating that the market has become more concentrated as fewer banks have a larger share of market activity. Similarly, the Lerner index sees a notable increase, indicating that banks are taking on greater pricing power. This simultaneous increase in concentration and market power points to a clear shift toward a less competitive banking environment in the most recent years.

We used Institutional governance with six measures by rule of law (RLE), government effectiveness (GEE), control of corruption (CCE), regulatory quality (RQE), voice and accountability (VEA), and political stability (PVE), which range from 2.5 (weak) to 2.5 (strong) (Bayraktar et al., 2023; Ha & Nguyen, 2023; Nguyen, 2023; Ofoeda et al., 2024; Nugrohowati & ShidIGie, 2025; Setianto et al., 2025). We conducted the Institutional Governance Index (IG) through principal component analysis (PCA). The PCA findings show strong statistical evidence for a single, coherent Institutional governance index, as shown in Table 2. The Bartlett test is statistically highly significant ($\chi^2 = 18{,}130.83$; $p < 0.001$), and the KMO value of 0.883 indicates excellent sampling adequacy. This indicates that institutional variables share enough commonality to be reduced dimensionally. All variables load positively and strongly on this component, especially RLE (0.437), CCE (0.444), and GEE (0.441), highlighting their central role in shaping Institutional governance. These results confirm that a composite index of Institutional governance can be extracted that summarizes the shared variance across the measures of governance, resilience, regulatory quality, and accountability. Based on this result, we built an Institutional governance index as the following equation:

$$IG_{it} = 0.437 * RLE + 0.441 * GEE + 0.444 * CCE + 0.434 * RQE + 0.251 * VEA + 0.408 * PVE \quad \text{Eq (4)}$$

Table 2
Principal component analysis results

Panel A: Bartlett test and KMO				
Bartlett test			Kaiser-Meyer-Olkin (KMO)	
Chi-square	Degrees of freedom	p-value	Coefficient	
18130.83	15	0.000	0.883	
Panel B: Total variance explained.				
Var	Component	Eigenvalue	Proportion	Cumulative
RLE	0.437	4.846	0.808	0.808
GEE	0.441	0.749	0.125	0.933
CCE	0.444	0.239	0.040	0.972
RQE	0.434	0.081	0.014	0.986
VEA	0.251	0.060	0.010	0.996
PVE	0.408	0.024	0.004	1.000
Notes: RLE = Rule of law; GEE = Government effectiveness; CCE = Control of corruption; RQE = Regulatory quality; VEA = Voice and accountability; PVE = Political stability.				

The six institutional indicators demonstrate a similar pattern of early decline followed by a gradual uptick over time (see Fig. 4). RLE, GEE, and CCE fell in the late 2000s, but began to steadily improve after 2015, indicating progressive improvements in forms of governance and rule enforcement. Also, PVE seems to recover from a sharp decline around 2014–2015, suggesting that a context of political stability returned. RQE shows a similar upward trend, indicating more transparent developments in regulatory quality. While VEA has more fluctuation, suggesting greater volatility in terms of participation and accountability, its trend remains reasonably consistent, indicating that participation and accountability may fluctuate but remain on a general upward trend when compared to the overall improvement trend in the institutional landscape.

Based on control variables, we used bank-specific variables, including bank size (BS), capital adequacy ratio (CAR), assets growth (AG), and loan growth (LG). Bank size (BS) is measured by the logarithm of total assets (Ha & Nguyen, 2023; Rashed & Wu, 2025; Setianto et al., 2025), while the capital adequacy ratio (CAR) is measured by the ratio of total equity to assets (Elfeituri, 2022; Hakimi et al., 2025; Rashed & Wu, 2025; Setianto et al., 2025). Larger banks benefit from economies of scale, have a more diversified portfolio, and can access more funding than smaller banks; thus, bank size has significant associations

with risk-taking and resilience. Capital ratio (CAR) reflects solvency, loss-absorption capacity, and compliance with Basel prudential requirements. It is a widely accepted determinant of resilience and is necessary to isolate the effects of market competition on resilience.

Additionally, we measured asset growth by the change of total assets (Boulanouar et al., 2021; Setianto et al., 2025), while loan growth was measured by the change of total loans (Rashed & Wu, 2025). Also, we measured macroeconomic variables via inflation rate and GDP growth (Van Duuren et al., 2020; Ha & Nguyen, 2023; Tran et al., 2023; Hakimi et al., 2025; Rashed & Wu, 2025; Setianto et al., 2025). We take into consideration both the year and country fixed effects to control for unobserved country-specific and temporal heterogeneity. Higher GDP growth typically improves bank performance and reduces default likelihood. Controlling GDP avoids attributing macroeconomic cycles to market competition effects. Inflation influences interest margins, monetary policy stance, and credit quality. Banks in high-inflation environments may face volatility in loan demand and repayment performance; therefore, inflation must be incorporated to avoid omitted-variable bias.

In the robustness, we explore the external shocks like Arab Spring (ASP) measured by dummy variable that equals 1 if the years are 2011, 2012, 2013 and 0 otherwise in addition to Hamas-IS conflict measured by dummy variable that equals 1 if the years are 2022, 2023, 2024, and 0 otherwise, while COVID-19 via dummy variable that equals 1 if the years are 2020, 2021, 20222, and 0 otherwise. Finally, we measured ownership structure via a binary variable that take (1) if the bank is state, (2) if the bank is foreign and (3) if the bank is domestic-foreign (Boulanouar et al., 2021), while measured ownership concentration through the total proportion of shares held by a bank's three largest shareholders (Jabbouri et al., 2023). Table 3 presents a list of variables with definitions and measurements.

Table 3
List of variables with definitions and measurements

Variable	Proxy	Measure	Data collected	Exp
Financial Resilience	ZROA	Return on assets (ROA) plus capital ratio, and dividing the result by the standard deviation of return on assets.	Bank scope and the Author's calculation	
	DD	Subtracting the bank's default point (short-term debt plus half long-term debt) from the estimated market value of its assets, and dividing the result by the volatility of those assets		
	NPL	The ratio of non-performing loans to total loans		
	SDR	Standard deviation of return on assets to reflect the volatility of return on assets		
Market power	LER	The difference between a bank's pricing and marginal cost	Bank scope and the Author's calculation	+/-
Market Concentrations	HHI	The ratio of the bank's total deposits to the total deposits of all banks.		+/-
Institutional governance	IG	Principal component analysis (PCA) from six measures of Institutional governance: rule of law, government effectiveness, control of corruption, regulatory quality, voice accountability, and political stability.	World Governance Indicators (WGIs)	+/-
Rule of law	RLE	Rule of law index ranges from 2.5 (weak) to 2.5 (strong)		+/-
Government effectiveness	GEE	Government effectiveness index ranges from 2.5 (weak) to 2.5 (strong)		+/-
Control of corruption	CCE	Control of corruption index ranges from 2.5 (weak) to 2.5 (strong)		+/-
Regulatory quality	RQE	Regulatory quality index ranges from 2.5 (weak) to 2.5 (strong)		+/-
Voice and accountability	VEA	Voice and accountability index ranges from 2.5 (weak) to 2.5 (strong)		+/-
Political stability	PVE	Political stability index ranges from 2.5 (weak) to 2.5 (strong)		+/-
Bank Size	BS	The logarithm of total assets	Bank scope and Author's calculation	+/-
Capital adequacy	CAR	The equity to total assets ratio		+/-
Assets growth	AG	The change in the total assets from the last year (t-1) to year (t).		+/-
Loan Growth	LG	The change in the total loans from the last year (t – 1) to year (t).		+/-
GDP	GDP	Annual GDP growth rate	World Bank (WB)	+/-
Inflation	INF	Annual inflation rate		+/-
Arab Spring	ASP	Dummy variable that equals 1 if the years are 2011, 2012, 2013, and 0 otherwise.	Author's calculation	+/-
Hamas-IS conflict	HAIS	Dummy variable that equals 1 if the years are 2022, 2023, 2024, and 0 otherwise.		+/-
COVID-19	COV	Dummy variable that equals 1 if the years are 2020, 2021, 20222, and 0 otherwise.		+/-
Ownership structure	OWN	A binary variable equals 1 if the bank is a state, 2 if the bank is foreign, and 3 if the bank is domestic foreign.	Bank scope and Author's Calculation	+/-
Ownership Concentration	Top3	The total proportion of shares held by a bank's three largest shareholders		+/-

Source: Author's literature review

4. Empirical analysis

4.1. Descriptive statistics and correlation matrix

Table 4 shows the descriptive statistics for the main variables within the period 2007–2024. Financial Resilience (ZROA) is relatively consistent, with a high mean of 3.921 and a low SD of 0.244, indicating limited variation in overall soundness. In contrast, the distance-to-default (DD) shows a moderate spread (mean 3.293, SD 0.436), while non-performing loans (NPL) and earnings volatility (SDR) exhibit much wider dispersion, CR averages 0.677 with SD 0.467, and SDR averages 0.161 with SD 0.422, reflecting significant differences in credit quality and risk-taking across banks. Market competition indicators show moderate dispersion: the Lerner index (M = 0.275, SD = 0.111) reflects heterogeneous pricing power across banks, while HHI (M = 0.920, SD 0.103) indicates meaningful differences in market concentration levels.

The measures of Institutional governance reveal even greater variability, with RLE (m= -0.372, SD = 0.726), GEE (M=-0.290, SD = 0.738), CCE (M= -0.378, SD = 0.710), RQE (M=-0.316, SD = 0.769), VEA (M=-0.994, SD = 0.526), PVE (M=-0.699, SD = 0.982) all indicating marked cross-country variation in governance,

regulatory ability, and political context. The Institutional Governance Index (IG) illustrates this variation as well (M = 0.131, SD = 0.201), illustrating robust variation in the institutional environment overall.

Among the bank-level controls, BS (M = 7.023, SD = 0.844) and CAR (M = 18.44, SD 3.223) indicate substantial variance on scale and capitalization, and AG (M = 0.156, SD = 0.123) and LG (M = 0.103, SD 0.099) indicate differentiated expansion strategies across banks. The macroeconomic indicators also have considerable dispersion with GDP growth (M = 3.755, SD 1.545) and inflation rate (M = 3.566, SD 2.702) capturing different economic environments. Structural shocks also present uneven incidence, COV, HIC, and ASP all have low means (0.111–0.167) but relatively high SDs (0.314–0.373), indicating that these shocks were not uniformly experienced across observations. Top3 shows marked variability (M = 0.356, SD = 0.256), suggesting substantial differences in governance structures. These patterns confirm a diverse empirical setting in which bank characteristics, macro conditions, shocks, and ownership features vary meaningfully, enabling rigorous investigation of their role in shaping bank performance and resilience.

Table 4
Descriptive analysis

Var	Obs	Mean	SDV	p1	p99
ZROA	1980	3.921	.244	3.23	4.33
SRD	1980	.161	.422	0.03	2.64
DD	1980	3.293	.436	2.11	4.286
NPL	1980	.677	.467	.28	1.9
LER	1980	.275	.111	.16	.55
HHI	1980	.92	.103	.77	1.43
IG	1980	0.131	0.201	-0.364	0.959
RLE	1980	− .372	.726	-2.1	.92
GEE	1980	− .29	.738	-2.36	1.5
CCE	1980	− .378	.71	-1.8	1.27
RQE	1980	− .316	.769	-2.25	1.1
VEA	1980	− .994	.526	-2.01	.77
PVE	1980	− .699	.982	-3	1.12
Top3	1980	.356	.256	.06	.902
BS	1980	7.023	.844	5.99	9.21
CAR	1980	18.44	3.223	10.26	27.23
AG	1980	.156	.123	.05	.45
LG	1980	.103	.099	.03	.36
INF	1980	3.566	2.702	.74	9.77
GDP	1980	3.755	1.545	.6	7.33
ASP	1980	.167	.373	0	1
HIC	1980	.111	.314	0	1
COV	1980	.111	.314	0	1

Notes: ZROA = Z-score based on ROA (financial resilience); SDR = Standard deviation of ROA (earnings volatility); NPL = non-performing loans; DD = Default to distance; LER = Lerner Index (market power); HHI = Herfindahl–Hirschman Index (market concentration); IG = Institutional governance composite index; RLE = Rule of law; GEE = Government effectiveness; CCE = Control of corruption; RQE = Regulatory quality; VEA = Voice and accountability; PVE = Political stability; Top3 = Ownership concentration; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate; ASP = Arab Spring dummy (2011–2013); COV = COVID-19 dummy (2020–2022); HIC = Hamas–Israel conflict dummy (2022–2024).

Table 5 presents the correlation matrix of all variables, indicating several economically meaningful relationships within financial resilience, risk, market competition, Institutional governance, ownership structure, and macroeconomic conditions. Financial resilience (ZROA) is strongly positively correlated with distance-to-default (r = 0.634, p-value < 0.05) and negatively correlated with both earnings volatility (SRD) (r= − 0.506, p-value < 0.05) and non-performing loans (NPL) (r= − 0.071, p-value < 0.05), which is consistent with more stable banks having less exposure to risk.

Market competition indicators show distinct patterns, market power (LER) correlates negatively with ZROA & DD (r= -0.044; − 0.092, p-value < 0.05) and positively with both earning volatility and credit risk (r = 0.130; 0.228, p-value < 0.05), while market concentration (HHI) has a strong positive relationship with both ZROA and DD (r = 0.127; 0.273, p-value < 0.05) but a large negative correlation with both SDR and NPL (r= -0.058; − 0.517, p-value < 0.05), suggesting concentration may mitigate credit deterioration. The Institutional governance index (IG) displays small but statistically significant associations with several variables, including a weak positive link with both ZROA & DD (0.028; 0.014) and minor negative correlations with both SDR and NPL (r= -0.079; -0.036, p-

value < 0.05), consistent with the stabilizing role of stronger institutions. Ownership concentration (Top3) correlates positively with ZROA and DD (r = 0.107; 0.206, p-value < 0.05) but negatively with NPL and SRD (r= – 0.506; -0.048, p-value < 0.05), implying that more concentrated ownership may align incentives toward better risk control. Based on control variables, BS is highly correlated with ZROA & DD (r = 0.136; 0.271, p-value < 0.05), while CAR is positively related to resilience (r = 0.269; 0.173, p-value < 0.05). Also, inflation is associated with increased resilience (r = 0.177, p-value < 0.05), whereas GDP exhibits modest negative associations with resilience (r= -0.120, p-value < 0.05). The correlations indicate coherent patterns; healthier banks operate in stronger institutional environments, face lower risk, and benefit from governance structures that mitigate instability.

Table 5
Correlation analysis

VAR	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) ZROA	1.000													
(2) SRD	-0.506*	1.000												
	(0.000)													
(3) DD	0.634*	0.189*	1.000											
	(0.031)	(0.000)												
(4) NPL	-0.071*	-0.031	-0.223*	1.000										
	(-0.002)	(0.166)	(0.000)											
(5) LER	-0.044*	0.130*	-0.092*	0.228*	1.000									
	(0.021)	(0.000)	(0.000)	(0.000)										
(6) HHI	0.127*	-0.058*	0.273*	-0.517*	-0.297*	1.000								
	(0.000)	(0.009)	(0.000)	(0.000)	(0.000)									
(7) IG	0.028*	-0.079*	0.014*	-0.036*	-0.009	-0.050*	1.000							
	(0.046)	(0.000)	(0.036)	(0.043)	(0.704)	(0.026)								
(8) Top3	0.107*	-0.048*	0.206*	-0.506*	0.215*	-0.468*	0.000	1.000						
	(0.000)	(0.033)	(0.000)	(0.000)	(0.000)	(0.000)	(0.990)							
(9) BS	0.136*	-0.066*	0.271*	-0.509*	-0.275*	0.997*	-0.058*	-0.449*	1.000					
	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.010)	(0.000)						
(10) CAR	0.269*	0.121*	0.173*	0.232*	0.149*	-0.327*	0.006	0.167*	-0.329*	1.000				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.789)	(0.000)	(0.000)					
(11) AG	0.038	-0.009	-0.108*	0.153*	0.103*	-0.315*	0.077*	0.288*	-0.315*	0.062*	1.000			
	(0.093)	(0.697)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.006)				
(12) LG	0.062*	-0.019	-0.143*	0.262*	0.229*	-0.473*	0.057*	0.384*	-0.464*	0.132*	0.364*	1.000		
	(0.006)	(0.408)	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)	(0.000)	(0.000)	(0.000)	(0.000)			
(13) INF	0.177*	-0.001	-0.090*	0.439*	0.088*	-0.362*	0.051*	0.599*	-0.368*	0.288*	0.354*	0.313*	1.000	
	(0.000)	(0.970)	(0.000)	(0.000)	(0.000)	(0.000)	(0.022)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
(14) GDP	-0.120*	0.130*	-0.015	-0.081*	0.036	-0.083*	0.005	-0.125*	-0.078*	-0.069*	0.270*	0.069*	-0.140*	1.000
	(0.000)	(0.000)	(0.492)	(0.000)	(0.112)	(0.000)	(0.835)	(0.000)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	

Note: * p < 0.05.

Notes: ZROA = Z-score based on ROA (financial resilience); SDR = Standard deviation of ROA (earnings volatility); NPL = non-performing loans; DD = Default to distance; LER = Lerner Index (market power); HHI = Herfindahl–Hirschman Index (market concentration); IG = Institutional governance composite index; Top3 = Ownership concentration; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

4.2. Main effects

Our findings in Table 6 show that higher LER (market power) significantly reduces resilience (β = − 0.178, p < 0.01; − 0.258, p < 0.05) for ZROA in both PCSE and GMM, while raising NPLs (β = 0.213; 0.759, p < 0.01). In contrast, market concentration (HHI) strongly enhances financial resilience. The coefficients of HHI show a positive effect on ZROA (β = 2.140, p < 0.01; 2.462 (p < 0.05) in both PCSE and GMM, revealing that more concentrated banking environments are associated with more stable banks. Market concentration (HHI) also significantly reduces NPLs (β = − 3.059; − 2.249, p < 0.01) in both PCSE and GMM. The economic size of these effects suggests that concentrated markets in MENA allow banks to benefit from scale economies, stronger relationship lending, and better screening technologies, leading to safer loan portfolios.

Lagged ZROA remains strongly positive (β = 0.594; 0.123, p < 0.01), indicating that once a bank is stable, stability tends to continue. Similarly, lagged NPL exhibits strong persistence (β = 0.325; 0.385, p < 0.01), highlighting slow adjustment of credit portfolios and prolonged risk accumulation in the region's banking systems. Bank size affects resilience in mixed ways, with significant coefficients (β = 0.256; 0.464, p < 0.01) on both ZROA and NPL, suggesting that while large banks may earn more stable profits, they can also take more risks ("too-big-to-fail"). Capital adequacy always stabilizes banks.

CAR contributes positively to the increase in ZROA (β = 0.005–0.015, p < 0.05) and negatively to NPLs (β= -0.004; -0.008, p < 0.01), thus supporting its role as a buffer against risk. The impact of inflation is mixed—it increases profitability (β = 0.009–0.029, p < 0.01) but tends to negatively impact credit quality (χβ= -0.007; p < 0.01). In contrast, growth in GDP leads to a small decline in profitability (β=-0.007; -0.016, p < 0.05), as evidence of margin compression in growth phases.

Table 6
The effect of market competition on financial resilience

VAR	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	ZROA	ZROA	ZROA	ZROA	NPL	NPL	NPL	NPL
L.ZROA		0.594***		0.123***				
		(6.244)		(4.573)				
L.NPL						0.325***		0.385***
						(7.790)		(5.221)
LER	-0.178***	-0.258**			0.213***	0.759***		
	(-3.636)	(-2.011)			(3.198)	(5.003)		
HHI			2.140***	2.462**			-3.059***	-2.249***
			(4.231)	(2.064)			(-4.274)	(-3.103)
BS	0.036***	0.256***	-0.288***	-0.311	-0.134***	-0.109**	0.464***	0.087
	(3.409)	(3.641)	(-3.871)	(-1.374)	(-3.493)	(-2.263)	(4.256)	(0.759)
CAR	0.007***	0.005**	0.007***	0.015**	-0.007***	-0.008***	-0.004***	-0.005***
	(4.427)	(2.184)	(4.489)	(2.537)	(-3.838)	(-7.497)	(-2.639)	(-3.648)
AG	0.028	-0.093	-0.009	-0.700***	-0.241***	-0.366***	-0.124	-0.253***
	(0.402)	(-1.262)	(-0.117)	(-7.826)	(-3.971)	(-5.293)	(-1.506)	(-6.908)
LG	0.077	-0.237**	0.054	-0.375***	0.115	-0.432***	-0.133	-0.250***
	(0.713)	(-2.565)	(0.471)	(-4.833)	(0.922)	(-15.001)	(-0.924)	(-9.855)
INF	0.009***	0.029***	0.008***	0.017***	0.023***	-0.007***	0.016**	-0.015***
	(2.874)	(7.211)	(2.834)	(2.975)	(6.464)	(-3.785)	(2.126)	(-7.614)
GDP	-0.014***	-0.007**	-0.013***	-0.016***	0.008	0.001	-0.001	0.002
	(-3.003)	(-2.533)	(-2.577)	(-2.855)	(1.211)	(0.493)	(-0.376)	(1.195)
Year FE	Included	Included	Included	Included	Included	Included	Included	Included
Country FE	Included	Included	Included	Included	Included	Included	Included	Included
Constant	1.617***	-0.138	1.686***	1.592**	1.488***	1.159***	0.275***	1.349***
	(5.509)	(-0.283)	(4.312)	(2.343)	(6.520)	(3.792)	(2.995)	(5.988)
N	1,980	1,870	1,980	1,870	1,980	1,870	1,980	1,870
R-sq	0.430		0.322		0.512		0.605	
Wald chi2	2253.5	31546.1	2911.4	30141.5	2735.9	54544.8	6801.1	19579.4
AR1 (p-v)		0.002		0.000		0.000		0.001
AR2 (p-v)		0.112		0.188		0.143		0.289
Sargan (p-v)		0.321		0.387		0.523		0.455
Hansen (p-v)		0.134		0.176		0.324		0.208
Diff in H (p-v)		0.167		0.203		0.402		0.247
N. of banks	110	110	110	110	110	110	110	110
N. of Inst		90		90		90		90

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: ZROA = Z-score based on ROA (financial resilience); NPL = non-performing loans; DD = Default to distance; LER = Lerner Index (market power); HHI = Herfindahl–Hirschman Index (market concentration); BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

The results in Table 7 show that institutional governance (IG) plays a crucial stabilizing role in the banking sector. IG is significantly statistically strong with financial resilience (ZROA) ($\beta = 0.004$, $p < 0.05$; $\beta = 0.056$, $p < 0.01$) in both PCSE and GMM. This suggests that increased bank resilience is closely correlated with improvements in the rule of law, regulatory quality, corruption prevention, and political stability. In contrast, IG reduces NPLs ($\beta = -0.006$, $p < 0.05$; $\beta = -0.005$, $p < 0.01$) in both PCSE and GMM, confirming that stronger institutions lower default behavior and enhance credit screening.

Lagged ZROA positively predicts current resilience (β = 0.487, p < 0.01), while lagged NPL strongly increases present NPLs (β = 0.549, p < 0.01). According to control variables, larger banks exhibit higher ZROA (β = 0.019; 0.180, p < 0.10), and lower NPL (β = − 0.184; − 0.376, p < 0.01), and higher capital buffers promote ZROA (β = 0.010, p < 0.01) and lower NPL (β = -0.004, p < 0.01). Results show that higher inflation raises both resilience and risk (β = 0.012; 0.028, p < 0.01) in both PCSE and GMM, while GDP growth modestly strengthens resilience (β = 0.003, p < 0.01) and reduces NPL (β = -0.003, p < 0.01).

Table 7
The effect of Institutional governance on financial resilience

	[1]	[2]	[3]	[4]
VAR	ZROA	ZROA	NPL	NPL
L.ZROA		0.487***		
		(4.845)		
L.NPL				0.549***
				(8.734)
IG	0.004**	0.056***	-0.006**	-0.005***
	(1.993)	(6.299)	(-1.998)	(-5.780)
BS	0.019*	0.180*	-0.184***	-0.376***
	(1.671)	(1.875)	(-5.321)	(-4.197)
CAR	0.010***	0.004	0.003	-0.004***
	(7.385)	(1.258)	(0.174)	(-7.802)
AG	0.032	0.430***	-0.267***	-0.323***
	(0.406)	(6.752)	(-4.555)	(-6.541)
LG	0.022	-0.094***	0.280	-0.354***
	(0.196)	(-2.610)	(1.467)	(-21.244)
INF	0.012***	0.028***	0.044	0.001
	(4.227)	(9.663)	(1.581)	(1.159)
GDP	0.019***	0.001	-0.004	-0.003***
	(3.450)	(0.210)	(-0.357)	(-3.906)
Year FE	Included	Included	Included	Included
Country FE	Included	Included	Included	Included
Constant	1.847***	0.019*	1.711***	1.985***
	(3.095)	(1.930)	(6.681)	(5.146)
N	1,980	1,870	1,980	1,870
R-squared	0.459		0.313	
Wald chi2	4679.1***	79369.7***	75082.2***	76669.5***
AR1 (p-v)		0.000		0.001
AR2 (p-v)		0.156		0.231
Sargan (p-v)		0.554		0.477
Hansen (p-v)		0.190		0.348
Diff in H (p-v)		0.231		0.507
N. of banks	110	110	110	110
N. of Inst		90		90

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: ZROA = Z-score based on ROA (financial resilience); NPL = non-performing loans; DD = Default to distance; LER = Lerner Index (market power); HHI = Herfindahl–Hirschman Index (market concentration); IG = Institutional governance composite index; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

Results in Table 8 show that Rule of Law (RLE) has a significant stabilizing effect (β = 0.015, p < 0.05), indicating that predictable legal enforcement improves bank performance. Government Effectiveness (GEE) also improves resilience (β = 0.013, p < 0.05), emphasizing the significance of administrative skill and

public sector excellence. Additionally, voice and accountability (VEA) has a beneficial effect ($\beta = 0.015$, $p < 0.10$), indicating that opportunistic conduct is decreased and transparency is increased through participatory governance.

Both Control of Corruption (CCE) ($\beta = 0.012$, $p < 0.05$) and Regulatory Quality (RQE) ($\beta = 0.008$, $p < 0.10$) strongly support resilience, indicating enhanced supervisory confidence and less rent-seeking. Additionally, Political Stability (PVE) makes a positive contribution ($\beta = 0.008$, $p < 0.05$). According to control variables, more capital (CAR) buffers boost resilience ($\beta = 0.010$, $p < 0.01$), inflation pushes returns upward ($\beta = 0.012$, $p < 0.01$), and GDP growth lowers ZROA ($\beta = -0.018$, $p < 0.01$). In certain assumptions, bank size exhibits minor negative coefficients ($\beta = -0.018$, $p < 0.10$), indicating that larger banks can experience scale-related inefficiencies.

Table 8
The effect of Institutional governance measures on financial resilience

	[1]	[2]	[3]	[4]	[5]	[6]
VAR	ZROA	ZROA	ZROA	ZROA	ZROA	ZROA
RLE	0.015**					
	(2.424)					
GEE		0.013**				
		(2.125)				
VEA			0.015*			
			(1.701)			
RQE				0.008*		
				(1.805)		
CCE					0.012**	
					(2.085)	
PVE						0.008**
						(2.076)
BS	-0.019*	-0.018*	-0.019	0.006	-0.009	-0.018*
	(-1.694)	(-1.671)	(-1.642)	(0.710)	(-0.920)	(-1.660)
CAR	0.010***	0.010***	0.010***	0.007***	0.008***	0.010***
	(7.551)	(7.349)	(7.326)	(4.988)	(6.992)	(7.500)
AG	0.030	0.030	0.039	0.021	0.041	0.031
	(0.381)	(0.389)	(0.494)	(0.276)	(0.526)	(0.403)
LG	0.021	0.022	0.028	-0.001	-0.021	0.023
	(0.183)	(0.193)	(0.240)	(-0.010)	(-0.185)	(0.205)
INF	0.012***	0.012***	0.012***	0.012***	0.005**	0.012***
	(4.246)	(4.266)	(4.113)	(4.241)	(2.286)	(4.206)
GDP	-0.018***	-0.019***	-0.019***	-0.014***	-0.018***	-0.018***
	(-3.434)	(-3.450)	(-3.479)	(-2.730)	(-3.377)	(-3.444)
Year FE	Included	Included	Included	Included	Included	Included
Country FE	Included	Included	Included	Included	Included	Included
Constant	1.852***	1.798***	1.862***	1.667***	1.825***	1.852***
	(5.161)	(5.146)	(5.457)	(5.982)	(4.933)	(4.261)
N	1,980	1,980	1,980	1,980	1,980	1,980
R-sq	0.460	0.459	0.459	0.443	0.430	0.471
Wald Chi2	4774.3***	4639.9***	4565.1***	1860.4***	1293.2***	4984.9***
N of Banks	110	110	110	110	110	110

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: ZROA = Z-score based on ROA (financial resilience); RLE = Rule of law; GEE = Government effectiveness; CCE = Control of corruption; RQE = Regulatory quality; VEA = Voice and accountability; PVE = Political stability; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

The Lerner index is negative and statistically significant in all models (β = − 0.134; − 0.361, p < 0.01), indicating that more market power (higher level of market competition) negatively affects financial resilience, providing support for the market competition–fragility hypothesis (see Table 9). The Institutional governance measures positively influences financial resilience; IG (β = 0.097, p < 0.01), RLE (β = 0.291, p < 0.01), GEE (β = 0.284, p < 0.01), VEA (β = 0.535, p < 0.01), RQE (β = 0.223, p < 0.01), CCE (β = 0.241, p < 0.01), and, somewhat surprisingly, PVE (β = 0.174, p < 0.01).

These findings indicate that stronger banks, stronger government, and stronger efficiency dimensions have a positive effect on financial resilience. However, all interaction terms between Lerner and Institutional governance are negative and strongly significant, showing that institutional improvements intensify the

destabilizing impact of market competition—LER*IG (β = − 0.042, p < 0.01), LER*RLE (β = − 0.064, p < 0.01), LER*GEE (β = − 0.066, p < 0.01), LER*VEA (β = − 0.129, p < 0.01), LER*RQE (β = − 0.061, p < 0.01), LER*CCE (β = − 0.054, p < 0.01), and LER*PVE (β = − 0.037, p < 0.01).

Results show that bank size typically weakens resilience (β= − 0.026, p < 0.05), capital adequacy consistently strengthens it (β = 0.008–0.015, p < 0.01), while inflation increases financial resilience, and GDP growth moderately reduces it.

Table 9
The role of Institutional governance on the market power-resilience relationship

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
VAR	ZROA	ZROA	ZROA	ZROA	ZROA	ZROA	ZROA
LER	-0.246***	-0.134**	-0.137**	-0.361***	-0.123**	-0.236***	-0.148***
	(-4.875)	(-2.359)	(-2.546)	(-3.355)	(-2.293)	(-3.894)	(-2.606)
IG	0.097***						
	(3.653)						
LER*IG	-0.042***						
	(-4.006)						
RLE		0.291***					
		(3.724)					
LER*RLE		-0.064***					
		(-4.060)					
GEE			0.284***				
			(4.489)				
LER*GEE			-0.066***				
			(-3.781)				
VEA				0.535***			
				(4.164)			
LER*VEA				-0.129***			
				(-5.346)			
RQE					0.223***		
					(3.899)		
LER*RQE					-0.061***		
					(-4.004)		
CCE						0.241***	
						(3.864)	
LER*CCE						-0.054***	
						(-3.230)	
PVE							0.174***
							(4.035)
LER*PVE							-0.037***
							(-3.392)
BS	-0.027**	-0.026**	-0.022**	-0.028***	0.028**	-0.017*	-0.005
	(-2.458)	(-2.449)	(-2.076)	(-2.742)	(2.547)	(-1.770)	(-0.382)
CAR	0.010***	0.011***	0.010***	0.015***	0.008***	0.009***	0.008***
	(7.396)	(7.614)	(7.574)	(6.556)	(5.863)	(7.515)	(7.028)
AG	0.042	0.041	0.020	0.031	-0.034	0.036	-0.006
	(0.542)	(0.534)	(0.266)	(0.432)	(-0.467)	(0.479)	(-0.074)
LG	0.071	0.067	0.051	0.148	0.061	0.034	0.047
	(0.612)	(0.582)	(0.446)	(1.330)	(0.564)	(0.302)	(0.411)
INF	0.012***	0.012***	0.011***	0.015***	0.008***	0.005**	0.008***
	(4.114)	(4.061)	(3.904)	(6.094)	(2.821)	(2.191)	(2.833)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
GDP	-0.019***	-0.019***	-0.018***	-0.016***	-0.004	-0.017***	-0.013**
	(-3.727)	(-3.738)	(-3.499)	(-3.285)	(-0.838)	(-3.458)	(-2.366)
Constant	1.955***	1.923***	1.905***	0.699***	0.576***	0.919***	0.814***
	(4.690)	(4.000)	(4.404)	(3.523)	(3.159)	(4.811)	(3.663)
N	1,980	1,980	1,980	1,980	1,980	1,980	1,980
R-sq	0.365	0.345	0.472	0.336	0.409	0.348	0.462
Wald Chi2	2031.7***	2046.2***	5204.5***	1365.8***	2403.4***	1486.2***	4846.8***
N of banks	110	110	110	110	110	110	110

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: ZROA = Z-score based on ROA (financial resilience); LER = Lerner Index (market power); IG = Institutional governance composite index; RLE = Rule of law; GEE = Government effectiveness; CCE = Control of corruption; RQE = Regulatory quality; VEA = Voice and accountability; PVE = Political stability; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

Table 10 indicates that HHI is a positive and significantly large coefficient (β = 1.017; 1.994, p < 0.01), demonstrating that more concentrated banking markets are consistently associated with greater resilience. This result strongly aligns with the concentration–resilience view, as banks in less competitive environments enjoy higher margins, which can be used to buffer risk. All institutional governance indicators display positive and significant direct effects on financial resilience (β = 0.062, p < 0.01), rule of law (RLE) (β = 0.207, p < 0.01), government effectiveness (GEE) (β = 0.190, p < 0.01), voice and accountability (VEA) (β = 0.158, p < 0.10), regulatory quality (RQE) (β = 0.204, p < 0.01), control of corruption (CCE) (β = 0.187, p < 0.01), and political stability (PVE) (β = 0.090, p < 0.05).

However, all interactions between HHI and Institutional governance measures are negative and statistically significant. Specifically, HHI*IG (β = − 0.060, p < 0.01), HHI*RLE (β = − 0.197, p < 0.01), HHI*GEE (β = − 0.183, p < 0.01), HHI*VEA (β = − 0.156, p < 0.10), HHI*RQE (β = − 0.210, p < 0.01), HHI*CCE (β = − 0.183, p < 0.01), and HHI*PVE (β = − 0.086, p < 0.05) all interactions show that Institutional governance systematically weakens the stabilizing effect of market concentration. Bank size consistently reduces resilience (β =−0.328; − 0.673, p < 0.01), while capital adequacy increases resilience (β = 0.008; 0.014, p < 0.01). Inflation shows a positive, significant effect, and GDP growth shows a negative impact on ZROA in most models.

Table 10
Institutional governance on the market concentration-resilience relationship

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
VAR	ZROA	ZROA	ZROA	ZROA	ZROA	ZROA	ZROA
HHI	1.017***	1.994***	1.830***	1.933***	1.344***	1.391***	1.147***
	(5.883)	(5.934)	(5.605)	(3.880)	(5.074)	(7.617)	(6.124)
IG	0.062***						
	(3.790)						
HI*IG	-0.060***						
	(-3.717)						
RLE		0.207***					
		(4.232)					
HHI*RLE		-0.197***					
		(-4.120)					
GEE			0.190***				
			(3.848)				
HHI*GEE			-0.183***				
			(-3.756)				
VEA				0.158*			
				(1.663)			
HHI* VEA				-0.156*			
				(-1.821)			
RQE					0.204***		
					(4.462)		
HHI*RQE					-0.210***		
					(-4.493)		
CCE						0.187***	
						(3.840)	
HHI*CCE						-0.183***	
						(-3.830)	
PVE							0.090**
							(2.520)
HHI*PVE							-0.086**
							(-2.473)
BS	-0.481***	-0.489***	-0.456***	-0.337***	-0.328***	-0.673***	-0.489***
	(-6.268)	(-6.472)	(-6.087)	(-4.631)	(-4.886)	(-7.972)	(-6.322)
CAR	0.010***	0.010***	0.011***	0.014***	0.008***	0.009***	0.008***
	(7.415)	(7.678)	(7.665)	(12.261)	(5.550)	(7.459)	(7.023)
AG	0.043	0.036	0.016	0.013	-0.018	0.042	-0.011
	(0.538)	(0.451)	(0.232)	(0.443)	(-0.245)	(0.550)	(-0.142)
LG	0.069	0.062	0.049	0.149	0.083	0.033	0.030
	(0.589)	(0.534)	(0.429)	(1.291)	(0.749)	(0.294)	(0.260)
INF	0.011***	0.011***	0.010***	0.014***	0.007**	0.006**	0.007**
	(3.841)	(3.914)	(3.574)	(5.513)	(2.359)	(2.519)	(2.424)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
GDP	-0.019***	-0.018***	-0.018***	-0.015***	-0.004	-0.018***	-0.012**
	(-3.577)	(-3.512)	(-3.415)	(-3.078)	(-0.739)	(-3.694)	(-2.307)
Year FE	Included	Included	Included	Included	Included	Included	Included
Country FE	Included	Included	Included	Included	Included	Included	Included
Constant	1.020***	1.092***	1.046***	0.996***	0.669***	1.007***	0.979***
	(4.079)	(4.424)	(4.581)	(3.131)	(3.324)	(4.779)	(3.895)
N	1,980	1,980	1,980	1,980	1,980	1,980	1,980
Wald Chi2	2308.4***	2384.3***	5599.2***	1638.9***	2824.2***	1488.6***	5278.5***
R-sq	0.563	0.564	0.471	0.528	0.611	0.551	0.560
N of Banks	110	110	110	110	110	110	110

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: ZROA = Z-score based on ROA (financial resilience); HHI = Herfindahl–Hirschman Index (market concentration); IG = Institutional governance composite index; RLE = Rule of law; GEE = Government effectiveness; CCE = Control of corruption; RQE = Regulatory quality; VEA = Voice and accountability; PVE = Political stability; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

5. Robustness Check

We utilize the distance-to-default (DD) as a stringent, well-established market-based indicator for financial resilience, indicating the buffer that exists between the market value of a bank's assets and the book value of its liabilities, scaled by the volatility of its asset returns, thereby capturing the likelihood of insolvency from a structural-risk perspective. We also included the standard deviation of return on assets (SDR) as an accounting-based operational measure of financial resilience. SDR reflects the volatility of bank profitability; furthermore, it reveals the bank's risk exposure and performance stickiness over time.

The robustness analysis presented in Table 11 indicates that market competition exerts a destabilizing effect on banks while concentration has a stabilizing effect, in the robustness assessments of banks' risk-taking behavior, evidenced by lower safety buffers and reduced distance-to-default in low market-power settings, indicated by negative coefficients on the Lerner index ($\beta = -0.233; -0.385$, $p < 0.05$). The Lerner index has strong positive effects on SDR ($\beta = 0.553; 0.946$, $p < 0.01$), which further illustrates this fragility. Market competition also increases risk-taking behavior.

In contrast, within concentrated markets, higher HHI consistently increases distance-to-default ($\beta = 1.348; 2.035$, $p < 0.01$) and decreases earnings volatility ($\beta = -1.934; -2.706$, $p < 0.05$), indicating that banks in lower-market competition environments maintain stronger capital cushions and more consistent earnings than banks in competitive settings.

Additionally, both resilience and risk-taking are persistent over time, evidenced by highly significant lagged distance-to-default and SDR replicates, which provide additional strength to the findings, while diagnostic tests similarly support the validity of the models. These findings present a coherent and robust statistical argument; competitive pressures compel banks to take on riskier positions, and market concentration provides banks with increased capacities to preserve resilience, and the findings most wholly support the market competition–fragility hypothesis across alternative measures of financial resilience.

Table 11
Robustness of the market competition-bank resilience relationship

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
VAR	DD	DD	DD	DD	SDR	SDR	SDR	SDR
L.DD		0.862***		0.459***				
		(5.107)		(4.207)				
L.SDR						0.508***		0.404***
						(6.332)		(5.220)
LER	-0.233**	-0.385***			0.553***	0.946***		
	(-2.001)	(-14.033)			(6.049)	(5.241)		
HHI			1.348***	2.035***			-1.934***	-2.706**
			(6.653)	(8.114)			(-5.199)	(-2.070)
BS	0.158***	-0.274***	0.522**	0.688**	0.020	-0.141***	0.820***	0.414*
	(6.916)	(-4.240)	(1.978)	(2.444)	(1.321)	(-5.185)	(6.064)	(1.901)
CAR	0.026***	-0.007***	0.029***	-0.008	0.016***	-0.006**	0.015***	-0.003
	(4.173)	(-6.900)	(6.334)	(-0.861)	(6.636)	(-1.963)	(5.654)	(-1.191)
AG	-0.023	0.318***	0.037	0.169**	-0.153	-0.226***	-0.206	-0.133
	(-0.090)	(6.053)	(0.314)	(2.329)	(-0.815)	(-4.579)	(-1.127)	(-1.345)
LG	-0.163	0.130***	-0.182	-0.153***	-0.109	-0.511***	-0.040	-0.064
	(-0.421)	(7.525)	(-1.129)	(-3.008)	(-0.431)	(-5.494)	(-0.163)	(-0.323)
INF	-0.009*	-0.001	-0.008***	-0.013**	0.007	-0.035***	0.004	-0.015***
	(-1.810)	(-0.805)	(-2.784)	(-2.293)	(1.171)	(-9.930)	(1.036)	(-3.353)
GDP	-0.004	-0.009***	0.003	-0.039***	0.023***	0.042***	0.039***	0.045***
	(-0.326)	(-6.187)	(0.424)	(-6.101)	(2.652)	(8.964)	(4.408)	(8.324)
Year FE	Included	Included	Included	Included	Included	Included	Included	Included
Country FE	Included	Included	Included	Included	Included	Included	Included	Included
Constant	1.915***	2.438***	1.255***	0.106*	-0.494***	-0.944***	-0.899***	-0.170*
	(5.199)	(5.956)	(4.694)	(1.830)	(-3.912)	(-4.416)	(-5.556)	(-1.759)
N	1,980	1,870	1,980	1,870	1,980	1,870	1,980	1,870
R-sq	0.400		0.453		0.656		0.582	
Wald chi2	1225.1***	28856.6***	513.6***	33816.2***	674.6***	33007.8***	971.1***	10921.3***
AR1 (p-v)		0.000		0.000		0.000		0.000
AR2 (p-v)		0.167		0.177		0.152		0.133
Sargan (p-v)		0.442		0.611		0.523		0.553
Hansen (p-v)		0.199		0.389		0.246		0.299
Diff in H (p-v)		0.221		0.412		0.283		0.323
N. of banks	110	110	110	110	110	110	110	110
N. of Inst		90		90		90		90

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: SDR = Standard deviation of ROA (earnings volatility); DD = Default to distance; LER = Lerner Index (market power); HHI = Herfindahl–Hirschman Index (market concentration); BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

Table 12 offers a robust narrative indicating that Institutional governance continues to serve as a strong stabilizing influence even when considered with some alternative measures of financial resilience. Across the baseline models, the Institutional Governance Index (IG) significantly enhances financial resilience. IG positively increases distance-to-default (β = 0.004–0.023, p < 0.05) while controlling volatility in earnings (β = -0.011 to -0.010, p < 0.05). Thus, banks operating in stronger institutional environments are less likely to become insolvent and have volatility in earnings. When the six institutional

dimensions are included in the model separately, the same findings are consistent across all models. The positive coefficients of rule of law ($\beta = 0.014$, $p < 0.10$), government effectiveness ($\beta = 0.022$, $p < 0.05$), voice and accountability ($\beta = 0.029$, $p < 0.10$), regulatory quality ($\beta = 0.008$, $p < 0.10$), control of corruption ($\beta = 0.020$, $p < 0.10$), and political stability ($\beta = 0.005$, $p < 0.10$) positively and statistically significantly with financial resilience.

The control variables suggest that banks are relatively more stable under high capital ratios ($\beta = 0.027–0.028$, $p < 0.01$), but the inflation and GDP effects are sensitive and capture macroeconomic sensitivity. The findings show that governance quality is a conditional factor of resilience in the MENA banking system and is crucial for financial resilience rather than just background conditions.

Table 12
Robustness of the effect of Institutional governance on resilience (DD)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
VAR	DD	DD	SDR	SDR	DD	DD	DD	DD	DD	DD
L.DD		0.818***								
		(5.790)								
L.SDR				0.417***						
				(4.608)						
IG	0.004**	0.023***	-0.011**	-0.010**						
	(1.972)	(3.722)	(-2.197)	(-2.237)						
RLE					0.014*					
					(1.931)					
GEE						0.022**				
						(1.996)				
VEA							0.029*			
							(1.822)			
RQE								0.008*		
								(1.847)		
CCE									0.020*	
									(1.769)	
PVE										0.005*
										(1.752)
BS	0.200***	-0.305**	0.037*	0.017	0.200***	0.201***	0.200***	0.203***	0.187***	0.200***
	(7.843)	(-1.965)	(1.906)	(0.423)	(7.827)	(7.814)	(7.867)	(8.550)	(10.095)	(7.859)
CAR	0.027***	-0.009**	0.017***	0.003	0.028***	0.027***	0.028***	0.028***	0.026***	0.028***
	(9.817)	(-2.271)	(6.856)	(0.547)	(9.833)	(9.767)	(9.904)	(9.828)	(9.858)	(9.835)
AG	0.031*	0.196***	-0.045*	-0.196*	-0.033	-0.038	-0.028	-0.079	-0.099	-0.029
	(1.911)	(5.845)	(-1.855)	(-1.942)	(-0.115)	(-0.132)	(-0.098)	(-0.279)	(-0.363)	(-0.101)
LG	0.047*	0.098***	-0.013	-0.023	-0.049	-0.051	-0.048	-0.002	-0.044	-0.045
	(1.717)	(7.911)	(-0.501)	(-0.611)	(-0.120)	(-0.125)	(-0.117)	(-0.006)	(-0.113)	(-0.112)
INF	-0.007	-0.001	0.007**	-0.019**	-0.007	-0.007	-0.006	-0.012**	-0.018**	-0.007
	(-1.353)	(-0.421)	(2.062)	(-2.158)	(-1.346)	(-1.343)	(-1.221)	(-2.070)	(-2.074)	(-1.348)
GDP	-0.008	-0.007**	0.043***	0.035***	-0.008	-0.008	-0.008	0.011	0.009	-0.008
	(-0.656)	(-2.082)	(4.889)	(4.707)	(-0.648)	(-0.656)	(-0.648)	(0.953)	(0.805)	(-0.654)
Year FE	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Country FE	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Constant	1.610***	1.850***	-0.595**	-0.197*	1.614***	1.619***	1.574***	1.486***	1.713***	1.612***
	(6.552)	(7.985)	(-2.184)	(-1.696)	(5.567)	(5.577)	(5.215)	(4.216)	(5.263)	(5.545)
N	1,980	1,870	1,980	1,870	1,980	1,980	1,980	1,980	1,980	1,980
R-sq	0.600		0.421		0.523	0.501	0.541	0.584	0.590	0.600
Wald chi2	1177.1***	58508.8***	597.8***	1420.4***	1174.4***	1168.9***	1195.7***	1944.7***	376.2***	1164.8***
AR1 (p-v)		0.001		0.000						
AR2 (p-v)		0.178		0.104						

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Sargan (p-v)		0.276		0.485						
Hans (p-v)		0.112		0.185						
Diff H (p-v)		0.125		0.314						
N. banks	110	110	110	110	110	110	110	110	110	110
N. Inst		90		90						

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: SDR = Standard deviation of ROA (earnings volatility); DD = Default to distance; IG = Institutional governance composite index; RLE = Rule of law; GEE = Government effectiveness; CCE = Control of corruption; RQE = Regulatory quality; VEA = Voice and accountability; PVE = Political stability; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

The analysis presented in Table 13 shows evidence that market power decreases financial resilience, but with stable, well-functioning institutions, the destabilizing factors of market power are greatly diminished. Lerner index (LER) has a significant effect on distance-to-default (DD) (β =–0.033; – 0.376, p < 0.05) - higher market power is consistently associated with a lower distance-to-default. This supports the market competition-resilience tribal sequence, as banks with lower market competition inherently tend to have fragile characteristics. However, the Institutional governance (IG) directly supports financial resilience (β = 0.004, p < 0.05), but the interaction term with market power is negative and significant (LER*IG β = – 0.001, p < 0.05). This finding illustrates further that IG produces more severe negative consequences of market power in the presence of strong governance because stricter regulatory constraints are placed and expose inefficiencies under the shield of market power.

These several dimensions of the six dimensions offer more clarity because of their comparative analysis, taking into consideration each governance dimension of IG independently. The rule of law (β = 0.047, p < 0.05); government effectiveness (β = 0.032, p < 0.05); regulatory quality (β = 0.016, p < 0.10); control of corruption (β = 0.027, p < 0.05); and political stability (β = 0.055, p < 0.05) independently lend themselves to enhancing financial resilience However, these dimensions' interactions with LER are negative and statistically significant on DD (e.g., LER*RLE β = – 0.128, p < 0.05; LER*CCE β = – 0.016, p < 0.05; LER*PVE β = – 0.173, p < 0.10). The findings demonstrate that market power does contribute to reducing financial resilience, but higher-quality institutions act as structural shock absorbers to ensure market power does not convert into hidden fragility.

When institutions are strong, banks cannot use market power to take on risk; instead, there is institutional discipline that promotes enhanced transparency, tighter supervision, and stronger market discipline. Larger banks (β = 0.184–0.210, p < 0.01) and well-capitalized banks (β = 0.024–0.029, p < 0.01) remain consistently more stable, confirming size-based diversification and capital-buffer effects.

Table 13
Robustness for the Institutional governance on market power- resilience

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
VAR	DD	DD	DD	DD	DD	DD	DD
LER	-0.033**	-0.232**	-0.197**	-0.376**	-0.196**	-0.152**	-0.270**
	(-2.282)	(-2.034)	(-2.248)	(-2.119)	(-2.318)	(-1.970)	(-2.100)
IG	0.004**						
	(2.358)						
LER*IG	-0.001**						
	(-2.035)						
RLE		0.047**					
		(2.081)					
LER*RLE		-0.128**					
		(-2.119)					
GEE			0.032**				
			(1.980)				
LER*GEE			-0.053*				
			(-1.748)				
VEA				-0.001*			
				(-1.923)			
LER*VEA				-0.113*			
				(-1.787)			
RQE					0.016*		
					(1.930)		
LER*RQE					-0.012**		
					(-2.106)		
CCE						0.027**	
						(1.978)	
LER*CCE						-0.016**	
						(-2.130)	
PVE							0.055**
							(2.382)
LER*PVE							-0.173*
							(-1.886)
BS	0.200***	0.210***	0.210***	0.184***	0.196***	0.208***	0.210***
	(7.990)	(8.524)	(8.549)	(8.690)	(9.376)	(9.677)	(9.860)
CAR	0.028***	0.025***	0.025***	0.029***	0.029***	0.024***	0.024***
	(9.750)	(8.998)	(9.001)	(15.434)	(11.931)	(12.764)	(13.014)
AG	-0.032	0.002	-0.003	0.028	-0.003	-0.061	-0.042
	(-0.113)	(0.008)	(-0.010)	(0.088)	(-0.024)	(-0.213)	(-0.148)
LG	-0.044	0.117	0.117	-0.024	0.027	0.016	0.017
	(-0.107)	(0.268)	(0.267)	(-0.062)	(0.064)	(0.039)	(0.042)
INF	-0.007	-0.004	-0.005	-0.010*	-0.006	-0.005	-0.005
	(-1.335)	(-0.852)	(-0.858)	(-1.712)	(-1.111)	(-0.910)	(-0.931)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
GDP	-0.008	0.017	0.017	0.006	0.010	0.012	0.011
	(-0.652)	(1.313)	(1.312)	(0.406)	(0.800)	(0.926)	(0.850)
Constant	1.621***	1.407***	1.391***	1.605***	1.434***	1.421***	1.417***
	(6.951)	(7.228)	(7.097)	(6.157)	(7.388)	(7.633)	(7.749)
N	1,980	1,980	1,980	1,980	1,980	1,980	1,980
R-sq	0.300	0.477	0.312	0.351	3.261	0.369	0.375
Wald Chi2	803.2***	1572.8***	1590.7***	576.5***	2074.6***	1115.8***	1168.7***
N of Banks	110	110	110	110	110	110	110

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: SDR = Standard deviation of ROA (earnings volatility); DD = Default to distance; LER = Lerner Index (market power); IG = Institutional governance composite index; RLE = Rule of law; GEE = Government effectiveness; CCE = Control of corruption; RQE = Regulatory quality; VEA = Voice and accountability; PVE = Political stability; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

Table 14 confirms that market concentration (HHI) enhances financial resilience, but this stabilizing effect weakens significantly when Institutional governance is strong. Across all models, the baseline coefficient of HHI is positive and significant (β = 0.026; 0.425, p < 0.05), showing that more concentrated banking markets are associated with higher distance-to-default. This supports the concentration–resilience hypothesis. However, Institutional governance strengthens resilience (β = 0.067, p < 0.05). Yet, the interaction term HHI*IG (β = − 0.064, p < 0.05) reverses part of the concentration's stabilizing effect. In stronger institutional environments, where there is good governance, supervisory capacity, and transparency, banks in concentrated markets cannot abuse their market power to extract excess rents or risk-shift.

These findings become even more compelling when examining individual institutional dimensions, for example, rule of law (β = 0.177, p < 0.05), government effectiveness (β = 0.110, p < 0.05), which exhibit positive direct effects on financial resilience. Yet every interaction term is negative and statistically significant—for example: HHI*RLE (β = − 0.166, p < 0.05), HHI*GEE (β = − 0.089, p < 0.05), HHI*VEA (β = − 0.334, p < 0.01), suggesting that higher institution quality decreases the effect of concentration on financial resilience. The evidence shows that while concentrated markets may seem safer to start with, Institutional governance consistently reduces and dampens the effect of concentration on safety, ensuring that safety comes from institutional governance rather than market concentration.

Table 14
Robustness for Institutional governance on concentration-resilience. (DD)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
VAR	DD	DD	DD	DD	DD	DD	DD
HHI	0.031**	0.026**	0.041**	0.034**	0.244**	0.090**	0.425**
	(2.027)	(1.984)	(1.993)	(2.029)	(1.973)	(2.079)	(2.418)
IG	0.067**						
	(2.422)						
HHI*IG	-0.064**						
	(-2.417)						
RLE		0.177**					
		(2.266)					
HHI*RLE		-0.166**					
		(-2.206)					
GEE			0.110**				
			(1.974)				
HHI*GEE			-0.089**				
			(-2.135)				
VEA				0.302***			
				(2.625)			
HHI*VEA				-0.334***			
				(-2.991)			
RQE					0.155**		
					(2.149)		
HHI*RQE					-0.145**		
					(-2.104)		
CCE						0.075**	
						(2.059)	
HHI*CCE						-0.057**	
						(-2.476)	
PVE							0.131**
							(1.985)
HHI*PVE							-0.127**
							(-1.972)
BS	0.205*	0.189*	0.191*	0.141*	0.004*	0.170	0.146
	(1.928)	(1.678)	(1.791)	(1.860)	(1.721)	(1.005)	(0.945)
CAR	0.028***	0.028***	0.027***	0.028***	0.029***	0.026***	0.024***
	(9.889)	(9.908)	(9.949)	(14.883)	(12.242)	(10.006)	(8.698)
AG	0.026*	0.033*	-0.036	-0.027	-0.053	-0.098	-0.068
	(1.912)	(1.823)	(-0.126)	(-0.322)	(-0.193)	(-0.360)	(-0.241)
LG	0.040*	0.047*	-0.048	0.036	-0.026	-0.042	-0.075
	(1.799)	(1.671)	(-0.117)	(0.095)	(-0.066)	(-0.106)	(-0.184)
INF	-0.007*	-0.004*	-0.007	-0.007	-0.009*	-0.018***	-0.012**
	(-1.833)	(-1.720)	(-1.331)	(-1.605)	(-1.673)	(-3.579)	(-2.337)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
GDP	-0.008*	-0.007*	-0.008	0.002	0.004	0.009	-0.001
	(-1.684)	(-1.709)	(-0.652)	(0.163)	(0.364)	(0.807)	(-0.063)
Constant	1.604***	1.670***	1.646***	1.540***	1.616***	1.735***	1.597***
	(9.044)	(8.994)	(9.197)	(7.783)	(9.223)	(8.332)	(7.591)
N	1,980	1,980	1,980	1,980	1,980	1,980	1,980
R-sq	0.302	0.357	0.402	0.392	0.441	0.410	0.395
Wald Chi2	880.5***	909.6***	1192.4***	988.4***	1687.1***	456.3***	1269.5***
N of banks	110	110	110	110	110	110	110

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: SDR = Standard deviation of ROA (earnings volatility); DD = Default to distance; HHI = Herfindahl–Hirschman Index (market concentration); IG = Institutional governance composite index; RLE = Rule of law; GEE = Government effectiveness; CCE = Control of corruption; RQE = Regulatory quality; VEA = Voice and accountability; PVE = Political stability; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

6. Additional investigation

Ownership structure shapes manager incentives and risk propensity. Agency theory suggests that a concentrated ownership structure improves monitoring capacity, lowers information asymmetry, and aligns managers with shareholders' expectations of prudent behavior. Foreign ownership facilitated by good governance structures will enhance oversight and reduce the likelihood of high-risk behaviors. On the other hand, state ownership can weaken efficiency incentives because of political influence. Domestic-foreign banks raise additional incentives for politically driven behavior. These distinctions warrant examination of ownership structure and ownership concentration (Top3) as moderators of the market competition– financial resilience. Relationship.

Also, episodes like the Arab Spring, COVID-19, and Hamas-Israel conflicts in the MENA region put pressure on banking, according to a non-linear shock-transmission framework. Shocks may disrupt credit markets, reduce the quality of assets, enhance liquidity challenges, and change the competitive landscape of banking. Theoretical models imply that when uncertainty is high, concentrated markets will provide a degree of financial resilience, but market competition will provide additional volatility and fragility. This rationalizes why structural shocks should be included in this empirical analysis.

6.1. The role of ownership structure

In this section, we analyzed the role of ownership structure on the market competition- financial resilience. Link. We measured ownership structure by a binary variable that equals 1 if the bank is a state, 2 if the bank is foreign, and 3 if the bank is a domestic foreign ownership. We find evidence that ownership significantly moderates the relationship between market competition and financial resilience. High market power (LER) decreases resilience for both state-owned banks ($\beta = -0.114$, $p < 0.01$) and domestic-foreign banks ($\beta = -0.050$, $p < 0.1$). These results are consistent with the "Quiet life" hypothesis that non-competitive markets result in inefficiency among those with the weaker ownership structures.

In contrast, the foreign banks experience a weaker positive moderating effect of market competition ($\beta = 0.013$, $p < 0.1$), supporting agency theory. Foreign banks have implemented a stronger governance mechanism, which mitigates risk perceptions under competitive pressure. Market concentration (HHI) supports resilience (e.g., $\beta = 2.149$, $p < 0.01$), but this effect is nuanced by ownership. Market concentration (HHI) is slightly destabilizing for state-owned ($\beta = -0.026$, $p < 0.1$) and domestic-foreign banks ($\beta = -0.045$, $p < 0.1$); however, a stronger positive moderating effect was found with foreign banks ($\beta = 0.014$, $p < 0.1$). These findings imply that state banks may compound vulnerability, whereas foreign banks offer structural defenses, thus indicating that ownership-specific governance mechanisms matter for the market competition–resilience nexus. BS and CAR are positively associated with resilience, reflecting the stabilizing role of scale and capitalization.

Table 15
The role of ownership structure on the market competition-resilience relationship

	[1]	[2]	[3]	[4]	[5]	[6]
VAR	ZROA	ZROA	ZROA	ZROA	ZROA	ZROA
LER	-0.049**	-0.164***	-0.263***			
	(-2.078)	(-2.676)	(-2.871)			
ST	-0.066***			-0.062**		
	(-3.799)			(-2.436)		
FOR		0.039***			0.038***	
		(2.998)			(2.935)	
DF			-0.031*			-0.081***
			(-1.741)			(-3.332)
LER*ST	-0.114***					
	(-3.367)					
LER*FOR		0.013*				
		(1.815)				
LER*DF			-0.050*			
			(-1.942)			
HHI				2.149***	2.092***	2.014***
				(3.478)	(3.388)	(3.239)
HHI*ST				-0.026*		
				(-1.899)		
HHI*FOR					0.014*	
					(1.913)	
HHI*DF						-0.045*
						(-1.784)
BS	0.028***	0.024**	0.025**	-0.287***	-0.286***	-0.285***
	(2.810)	(2.449)	(2.448)	(-3.053)	(-3.052)	(-3.032)
CAR	0.006***	0.006***	0.006***	0.007***	0.007***	0.007***
	(4.630)	(4.615)	(4.775)	(5.084)	(5.121)	(5.192)
AG	0.017	0.010	0.010	-0.004	-0.002	-0.004
	(0.221)	(0.129)	(0.129)	(-0.002)	(-0.030)	(-0.055)
LG	0.083	0.077	0.088	0.059	0.053	0.049
	(0.726)	(0.671)	(0.761)	(0.519)	(0.468)	(0.431)
INF	0.008*	0.006*	0.008*	0.009*	0.004*	0.005*
	(1.770)	(1.772)	(1.769)	(1.762)	(1.744)	(1.720)
GDP	-0.012**	-0.012**	-0.012**	-0.013**	-0.012**	-0.012**
	(-2.198)	(-2.196)	(-2.224)	(-2.393)	(-2.338)	(-2.268)
Constant	1.516***	1.510***	1.517***	1.548***	1.511***	1.537***
	(4.908)	(4.125)	(3.579)	(3.897)	(3.421)	(3.451)
N	972	666	342	972	666	342
R-sq	0.327	0.320	0.329	0.321	0.332	0.230
Wald Chi2	3588.2***	3432.7***	5638.9***	5176.5***	3605.3***	3814.5***
N of banks	54	37	19	54	37	19

	[1]	[2]	[3]	[4]	[5]	[6]

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: ZROA = Z-score based on ROA (financial resilience); LER = Lerner Index (market power); HHI = Herfindahl–Hirschman Index (market concentration); ST = state ownership; FOR = Foreign ownership; DF= Domestic–foreign ownership; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

6.2. The role of ownership concentration

This section explores the role of ownership concentration in shaping the relationship between market competition and financial resilience in the MENA region. We measured ownership concentration using the total proportion of shares held by a bank's three largest shareholders. Table 16 shows that banks with higher Top3 are more stable (β = 0.122–0.514, p < 0.05) and less risky (β = -0.467 to -0.688, p < 0.05), consistent with agency theory, which concentrated ownership strengthens monitoring, reduces managerial risk-taking, and improves resilience. Higher (Lerner) reduces resilience. (β = -0.169, p < 0.05) but increases risk (β = 0.365, p < 0.01), consistent with the “quiet life” hypothesis, where more market power allows banks with concentrated ownership to take greater risk. Market concentration (HHI) positively affects financial resilience. (β = 2.749, p < 0.01) but negatively affects risk (β = -4.715, p < 0.01), suggesting that concentrated markets encourage stability while discouraging volatility.

Interaction terms show that ownership concentration amplifies the impact of market competition, LER*Top3 is negative for ZROA (β = -0.535, p < 0.01) but positive for SDR (β = 1.368, p < 0.01), indicating that in more concentrated banks, competitive pressures reduce resilience and increase risk. HHI*Top3 is positive for ZROA (β = 0.479, p < 0.05) and negative for SDR (β = -0.842, p < 0.05), suggesting that in concentrated banks, market concentration reinforces resilience and reduces risk.

Table 16
The role of ownership concentration on the market competition-resilience relationship

	(1)	(2)	(3)	(4)
VAR	ZROA	ZROA	SDROA	SDROA
LER	-0.169**		0.365***	
	(-2.097)		(2.696)	
HHI		2.749***		-4.715***
		(4.381)		(-4.167)
Top3	0.122**	0.514**	-0.467***	-0.688**
	(2.172)	(2.532)	(-5.082)	(-2.106)
LER*Top3	-0.535***		1.368***	
	(-2.774)		(4.451)	
HHI*Top3		0.479**		-0.842**
		(2.357)		(-2.268)
BS	-0.040***	-0.418***	0.127***	0.772***
	(-3.326)	(-4.473)	(7.184)	(4.722)
CAR	0.006***	0.008***	0.017***	0.015***
	(4.371)	(5.211)	(8.082)	(6.549)
AG	0.007	-0.006	-0.130	-0.070
	(0.097)	(-0.076)	(-0.735)	(-0.392)
LG	0.069	0.073	-0.016	0.039
	(0.606)	(0.665)	(-0.069)	(0.164)
INF	0.010***	0.012***	0.004	0.003
	(3.576)	(3.743)	(0.654)	(0.487)
GDP	-0.014***	-0.012**	0.037***	0.028***
	(-2.984)	(-2.383)	(4.453)	(3.065)
Year FE	Included	Included	Included	Included
Country FE	Included	Included	Included	Included
Constant	1.067***	1.899***	-1.113***	-0.753***
	(3.287)	(4.861)	(-5.163)	(-4.513)
N	1,980	1,980	1,980	1,980
R-sq	0.475	0.501	0.528	0.447
Wald Chi2	5381.3***	1757.8***	184.2***	601.1***
N of banks	110	110	110	110

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Notes: ZROA = Z-score based on ROA (financial resilience); LER = Lerner Index (market power); HHI = Herfindahl–Hirschman Index (market concentration); Top3 = Ownership concentration; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

6.3. The role of Islamic banks

We investigate the influence of Institutional governance on the market competition-sustainability relation amongst 30 Islamic banks operating in the MENA region. Table 17 presents a clear narrative on how market competition shapes the stability of Islamic banks. The results initially suggest that market power (LER) has a strong, positive effect on resilience (β = 0.362; 0.592, p < 0.01). The impact of market power is also significant in reducing earnings volatility (β = −0.814, p < 0.01) and lowering NPLs (β = −0.48, p < 0.01). Therefore, these results support the market competition–fragility hypothesis that greater market power increases franchise value and discourages excessive risk-taking behavior; hence, resilience improves. However, higher HHI reduces resilience (β = −1.391, p < 0.01; β = −1.007, p < 0.05), while significantly raising volatility (β = 1.219, p < 0.01) and increasing NPLs (β = 1.475, p < 0.01). The results are consistent with the quiet-life hypothesis, suggesting that concentrated markets diminish competitive pressures, diminish managerial discipline, and encourage inefficiency or risky lending in their loan portfolios.

IG is statistically significant across all models—for example, IG reduces instability (β = −0.045;−0.072, p < 0.05) and market-based resilience (DD) and increases earnings volatility and NPLs consistent with better risk identification. Furthermore, IG interacts significantly with market competition. The interaction of LER*IG reinforces the stabilizing impact of market power (e.g., β = 0.020; 0.032, p < 0.01) for both ZROA &DD measures, and HHI*IG increases the effect of concentration on bank stability (e.g., β = 0.072; 0.052, p < 0.01). This interaction supports information asymmetry theory, which suggests that increased transparency strengthens monitoring capabilities, disciplines risk-taking behavior, and moderates the downsides of concentration.

Table 17
The effect of market competition on stability in Islamic banks

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
VAR	ZROA	ZROA	DD	DD	SDR	SDR	NPL	NPL
LER	0.362***		0.592***		-0.814***		-0.484***	
	(6.444)		(7.428)		(-8.409)		(-7.036)	
HHI		-1.391***		-1.007**		1.219***		1.475***
		(-2.019)		(-1.994)		(3.422)		(3.982)
IG	-0.045**	-0.072**	-0.033**	-0.053**	0.182**	0.120**	0.211**	0.133**
	(-2.329)	(-2.451)	(-2.308)	(-1.970)	(2.062)	(2.086)	(1.975)	(2.371)
LER*IG	0.020***		0.032***		-0.061***		-0.007*	
	(2.739)		(3.754)		(-4.277)		(-1.834)	
HHI*IG		0.072***		0.051**		-0.116***		-0.139***
		(4.337)		(1.969)		(-2.826)		(-5.901)
BS	-0.033**	-0.535***	-0.084***	-0.142	0.118***	0.537***	-0.235***	0.884***
	(-2.570)	(-6.484)	(-7.955)	(-0.952)	(6.090)	(4.032)	(-22.205)	(5.613)
CAR	0.006***	0.006***	0.023***	0.027***	0.018***	0.015***	0.095***	0.000
	(4.224)	(3.883)	(22.062)	(13.538)	(8.395)	(4.653)	(3.662)	(0.256)
AG	-0.017	-0.007	-0.091	-0.026	-0.127	-0.155	-0.172**	-0.249***
	(-0.233)	(-0.098)	(-1.196)	(-0.096)	(-0.715)	(-0.867)	(-2.296)	(-2.593)
LG	0.031	0.043	0.329***	-0.121	-0.023	0.088	0.010	-0.124
	(0.283)	(0.383)	(2.949)	(-0.298)	(-0.101)	(0.378)	(0.070)	(-0.902)
INF	0.010***	0.008***	-0.026***	-0.010**	0.002	0.001	0.042***	0.049***
	(3.707)	(3.284)	(-7.599)	(-2.154)	(0.288)	(0.188)	(9.758)	(13.096)
GDP	-0.014***	-0.014***	0.050***	-0.002	0.038***	0.029***	-0.020***	-0.020**
	(-2.983)	(-2.742)	(3.600)	(-0.187)	(4.639)	(3.711)	(-2.623)	(-2.403)
Year FE	Included	Included	Included	Included	Included	Included	Included	Included
Country FE	Included	Included	Included	Included	Included	Included	Included	Included
Constant	1.078***	1.072***	1.602***	1.903***	-1.224***	-0.658***	1.965***	1.886***
	(4.773)	(4.376)	(5.469)	(4.478)	(-4.226)	(-4.145)	(5.721)	(5.783)
N	540	540	540	540	540	540	540	540
R-sq	0.475	0.375	0.508	0.496	0.326	0.548	0.421	0.385
Wald Chi2	2575.3***	3916.2***	5150.4***	1042.7***	1220.4***	402.9***	5697.4***	2753.6***
N of Banks	30	30	30	30	30	30	30	30

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Note: ZROA = Z-score based on ROA (financial resilience); SDR = Standard deviation of ROA (earnings volatility); NPL = non-performing loans; DD = Default to distance; LER = Lerner Index (market power); HHI = Herfindahl–Hirschman Index (market concentration); IG = Institutional governance composite index; BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate.

6.4. Structural Shocks

In this section, we explore various structural shocks, including the Arab Spring (ASP), the Hamas-Israel conflict (HIS), and the COVID-19 pandemic (COV). The Arab Spring (ASP) is measured as a dummy variable equal to one for the years of upheaval and instability (2011–2013), and zero otherwise; the Hamas-Israel

conflict (HIS) is measured as a dummy variable equal to one for the years 2022–2024 and zero otherwise. Meanwhile, whenever we calculate the COVID-19 pandemic (COV) variable, it is also a dummy variable equal to one for the years of the COVID-19 pandemic (2010–2022) and zero otherwise.

Table 18 illustrates that the financial shocks are measured with dummy variables for significant events: the Arab Spring (2011–2013), the Hamas-Israel conflict (2022–2024), and the COVID-19 pandemic (2020–2022). These shocks provide a way for us to observe how market competition interacts with systemic stress periods. The results indicate that during the Arab Spring (ASP), heightened market competition (low Lerner) aggravates instability ($\beta = -0.310$, $p < 0.05$). In contrast, market concentration ($\beta = 0.555$, $p < 0.01$) mitigates shocks for banks, highlighting the importance of buffers and coordinated risk management. On the contrary, the Hamas-Israel conflict (2022–2024) and the financial crisis period (2007–2009), which had modest moderation effects with most interaction variables either insignificant or limited, suggesting that not all shocks disrupt the extent market competition leads to instability.

Table 18
The role of financial shocks on the market competition-resilience relationship

	[1]	[2]	[3]	[4]	[5]	[6]
VAR	ZROA	ZROA	ZROA	ZROA	ZROA	ZROA
LER	-0.309***	-0.170***	-0.335***			
	(-5.053)	(-3.260)	(-5.394)			
HHI				3.520***	2.087***	3.262***
				(6.231)	(3.370)	(6.490)
COV			-0.103***			-0.079**
			(-2.803)			(-2.426)
LER*COV			0.217			
			(1.617)			
HIC		-0.038*			-0.013*	
		(-1.709)			(-1.697)	
LER*HIC		0.175				
		(1.071)				
ASP	0.101**			-0.537***		
	(2.365)			(-3.585)		
HHI*ASP				0.555***		
				(3.689)		
HHI*HIC					0.022	
					(0.795)	
LER*ASP	-0.310**					
	(-2.263)					
HHI*COV						0.094
						(0.502)
BS	-0.037***	0.028***	-0.019	-0.570***	-0.282***	-0.509***
	(-2.862)	(2.837)	(-1.508)	(-6.801)	(-2.989)	(-7.060)
CAE	0.006***	0.007***	0.013***	0.008***	0.007***	0.013***
	(4.025)	(4.911)	(8.637)	(3.774)	(5.345)	(8.114)
AG	-0.003	0.001	0.162**	-0.001	-0.001	0.015
	(-0.045)	(0.015)	(2.238)	(-0.011)	(-0.011)	(0.186)
LG	0.039	0.081	-0.026	0.055	0.076	0.043
	(0.358)	(0.685)	(-0.211)	(0.492)	(0.669)	(0.370)
INF	0.010***	0.006	0.008***	0.008***	0.007*	0.007***
	(3.697)	(1.482)	(3.498)	(3.235)	(1.660)	(2.992)
GDP	-0.017***	-0.013**	-0.016***	-0.015***	-0.013**	-0.018***
	(-3.300)	(-2.395)	(-3.870)	(-3.034)	(-2.342)	(-3.608)
Constant	1.094***	1.493***	1.858***	1.186***	1.485***	1.917***
	(3.750)	(4.104)	(3.261)	(4.460)	(3.491)	(3.108)
N	1,980	1,980	1,980	1,980	1,980	1,980
R-sq	0.372	0.323	0.333	0.476	0.424	0.504
N of Banks	110	110	110	110	110	110

Note: Z-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

	[1]	[2]	[3]	[4]	[5]	[6]

Note: ZROA = Z-score based on ROA (financial resilience); LER = Lerner Index (market power); HHI = Herfindahl–Hirschman Index (market concentration); BS = Bank size; CAR = Capital adequacy ratio; AG = Assets growth, LG = Loan growth; GDP = Gross domestic product growth, INF = Inflation rate; ASP = Arab Spring dummy (2011–2013); COV = COVID-19 dummy (2020–2022); HIC = Hamas–Israel conflict dummy (2022–2024).

7. Discussion

Our findings provide strong empirical support for the market competition–fragility hypothesis, which argues that greater market competition enhances financial resilience, whereas market power increases fragility. This means that when banks enjoy more pricing power, they engage in poorer screening and monitoring borrowers, increasing their vulnerability, and supporting the “quiet life” hypothesis where monopolistic power lowers managerial discipline. In contrast, market concentration (HHI) is strongly enhanced by financial resilience. The economic size of these effects suggests that concentrated markets in MENA allow banks to benefit from scale economies, stronger relationship lending, and better screening technologies, leading to safer loan portfolios.

Market power destabilizes banks (ZROA) but is positive on NPL, while market concentration strengthens financial resilience (ZROA) but is negative on NPL. This duality reflects the unique MENA banking structure. Concentrated markets can enhance monitoring and resilience, whereas individual banks with strong market power may exploit their dominance at the cost of resilience. This result is consistent with the findings of previous studies in the MENA region (Albaity et al., 2019; Abou-El-Sood & Shahin, 2023; Desalegn et al., 2023); thus, we accept the hypothesis (H_1).

Our findings provide strong evidence that better institutional environments significantly reinforce financial resilience and reduce non-performing loans. The positive influence of IG on ZROA and its negative influence on NPLs show that banks operating under stronger legal systems, effective governments, and more predictable regulatory frameworks are more resilient, less exposed to defaults, and more capable of managing shocks. This result is consistent with the findings of previous studies in the MENA region (Elfeituri, 2022; Hakimi et al., 2025), emerging markets (Tran et al., 2023), and international markets (Setianto et al., 2025); thus, we accept the second hypothesis (H_2). The results highlight Institutional governance as a fundamental pillar of financial resilience in emerging markets.

The institutional governance indicators consistently demonstrate a positive and statistically significant impact on resilience, confirming that stronger institutional frameworks foster more resilient banking systems. The operational environment of banks is strengthened by reduced political risk and fewer disruptions. Our findings offer solid proof that every significant aspect of Institutional governance consistently improves financial resilience in the MENA area. The coefficients' consistency across models emphasizes how important institutional governance is in creating banking systems that are safer and more resilient, particularly in developing and politically complicated countries.

Our results indicate that stronger institutional frameworks lead to a destabilizing influence of market competition, suggesting that governance improvements, regulatory quality, rule of law, political stability, and corruption control, for example, push competitive discipline, increasing banks' risk-taking behavior. While better institutions have a direct positive effect on financial resilience, they positively amplify the adverse influence of market competition, supporting a somewhat nuanced market competition– financial resilience nexus in MENA banking systems. Thus, we accept the third hypothesis (H3). In other words, banks become stronger and more transparent, competitive pressures intensify, pushing banks toward higher risk-taking and reducing their financial resilience —a mechanism consistent with the "market competition–discipline–risk" channel.

These findings show that improved governance, more stable political situations, and more robust legislative frameworks directly improve the health of the financial system. When institutions are weak, banks in concentrated markets rely heavily on market power and wider margins to maintain financial resilience. But as institutions improve through better governance, stronger rule of law, more effective regulation, and reduced corruption, the stabilizing advantage of concentration declines. In well-governed environments, stronger regulatory enforcement, higher transparency, and improved monitoring reduce the reliance on market concentration for financial resilience, increasing competitive discipline and reducing excess market protection. The results support a conditional concentration– financial resilience hypothesis. Market concentration enhances resilience, but its stabilizing role weakens as Institutional governance strengthens. Thus, high-quality institutions substitute for market structure in promoting financial resilience.

Our analysis shows that ownership structure plays a meaningful moderating role in the market competition–financial resilience relationship. State-owned and domestic–foreign banks become less stable as market power (LER) increases, supporting the “quiet life” hypothesis whereby weaker governance leads to inefficiency in less competitive environments. In contrast, foreign banks exhibit a positive moderating effect, consistent with agency theory, as their stronger governance frameworks reduce risk under competitive pressure. While market concentration generally supports financial resilience, its effect varies across ownership types—destabilizing for state and domestic–foreign banks but strengthening resilience for foreign banks. These patterns suggest that ownership-specific governance quality shapes how banks absorb competitive and structural pressures, with larger size and stronger capitalization further enhancing financial resilience.

Concentrated ownership plays a dual role in the market competition– financial resilience nexus. While it strengthens monitoring and reduces risk in stable environments, it can amplify the destabilizing effects of market competition under high market power. These results align with agency theory and the “quiet life” hypothesis, emphasizing that ownership concentration shapes banks’ risk-taking and financial resilience responses to competitive pressures.

In Islamic banks, market power acts to stabilize, while market concentration destabilizes it. The results are consistent with the quiet-life hypothesis, suggesting that concentrated markets diminish competitive pressures, diminish managerial discipline, and encourage inefficiency or risky lending in their loan portfolios. Islamic banks are stable at low behavioral market competition (high market power), but unstable at high structural concentration, suggesting that Institutional governance is a key mechanism in facilitating the market competition-definition financial resilience relationship. This suggests that regulators should not only focus on market structure but also consider enhancing the disclosure and transparency regime in Islamic banking markets.

Our results show that during the Arab Spring, heightened market competition (low Lerner) significantly increased instability, whereas market concentration provided a stabilizing effect, emphasizing the role of buffers and coordinated risk management. In contrast, the Hamas-Israel conflict and the Global Financial Crisis (2007–2009) exhibited limited or insignificant moderation effects, suggesting that not all shocks amplify the destabilizing influence of market competition. These findings highlight that the interaction between market competition and financial resilience is context-dependent and sensitive to the nature and intensity of structural shocks.

8. Conclusion

We provide empirical evidence regarding the multifaceted relationship between market competition, Institutional governance, ownership type, and financial resilience. Using PCSE and GMM models based on a comprehensive dataset from 110 banks in 15 MENA countries. Our findings reinforce the market competition-fragility hypothesis by showing that higher market power (Lerner index) decreases resilience and increases non-performing loans in a manner consistent with the quiet life hypothesis, while market concentration (HHI) boosts resilience through scale economies, enhanced monitoring, and relationship lending. In addition, we find that institutional features strengthen resilience and decrease risk as they decrease non-performing loans, while simultaneously exacerbating market competition pressures stemming from a market competition-discipline-risk mechanism. In higher institutional settings, the stabilizing influence of concentration disappears, and the negative influence of market power intensifies— banks under discipline react to increasing market competition.

Our analysis exhibits that domestic private banks are more vulnerable to market power than state-owned banks or domestic-foreign banks, whereas foreign banks appear to weather competitive pressures, demonstrating higher governance levels and risk management. Ownership concentration, however, also leads to higher resilience and lower non-performing loans, strengthening both monopoly-like features and agency theory. In higher concentration banks, increased market power led to less resilience, while concentration continues to empower resilience by the bank. This duality indicates that the contrasting effects of market concentration and ownership concentration jointly influence or determine banks' ability to function under increased market competition.

Islamic banks follow a similar pattern, with market competition decreasing financial resilience and concentration increasing resilience. The interaction with Institutional governance shows that, while well-governed Islamic banks are still more resilient, market competition can nonetheless push Islamic banks into greater risk-taking, confirming the “market competition–discipline–risk” channel seen for conventional banks.

During the Arab Spring, market competition significantly reduced resilience, while concentration buffers banks against shocks. In contrast, the Hamas-Israel conflict and the COVID-19 crisis period show limited moderating effects, with most interactions insignificant, suggesting that not all crises affect the market competition–resilience link equally. These results underscore that systemic shocks amplify vulnerabilities in competitive environments, particularly where governance is strong, and banks respond aggressively to market discipline.

Theoretical and Managerial Implications

1. Theoretical Implications

Our study extends the market competition– resilience literature by demonstrating how Institutional governance moderates the effect of market power (LER) and concentration (HHI) on bank resilience, offering a nuanced view of the market competition–discipline–risk channel.

The findings provide evidence that ownership structure and ownership concentration further shape the competitive dynamics, offering support for both agency theory and the quiet-life hypothesis in emerging markets. We integrate the role of structural shocks (Arab Spring, COVID-19, Hamas–Israel conflict) into the market competition–resilience framework, providing a novel contribution to shock-transmission theory in banking research.

2. Practical / Managerial Implications

From a policy perspective, regulators should focus on improving governance, enforcing the rule of law, improving the regulatory quality, and reducing corruption to strengthen financial resilience and reduce risk-taking under competitive pressure. Policymakers should limit excessive market power in individual banks, as dominance may reduce borrower screening and managerial discipline. Further, moderate market concentration could lead to increased resilience in banking sectors; however, policymakers need to continue with efforts towards meaningful competitive discipline to avoid complacency and moral hazard. Regulatory frameworks should account for bank ownership, providing additional oversight for state-owned and domestic-foreign banks, while leveraging the governance strengths of foreign banks.

We recommend conducting future studies could explore the role of digital banking, green finance, and fintech integration in shaping the market competition–resilience nexus in MENA and other emerging markets. Additionally, exploring dynamic relationships between macroeconomic shocks, geopolitical risks, and bank governance would offer more insight into resilience under extreme stress.

Declarations

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The authors declare no conflicts of interest.

Ethical Approval:

This paper does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent:

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Author Contribution

A.R. and D.W.; methodology, A.R. and D.W.; software, A.R. and M.O.; validation, M.A. and D.M.; formal analysis, M.O. and M.A.; investigation, A.R. and D.W.; resources, M.O. and M.A.; data curation, M.O. and D.M.; writing—original draft preparation, A.R. and D.W.; writing—review and editing, M.O. and D.M..; visualization, A.R. and D.W.; supervision, A.R. and D.W.; project administration, M.A. and D.W.; funding acquisition, M.A. and D.W.; All authors have read and agreed to the published version of the manuscript.

Data Availability

The data are available from the corresponding author upon reasonable request.

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Figures

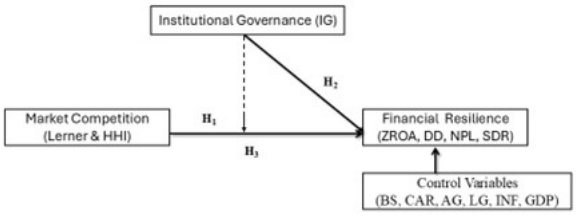

Figure 1

The research Model

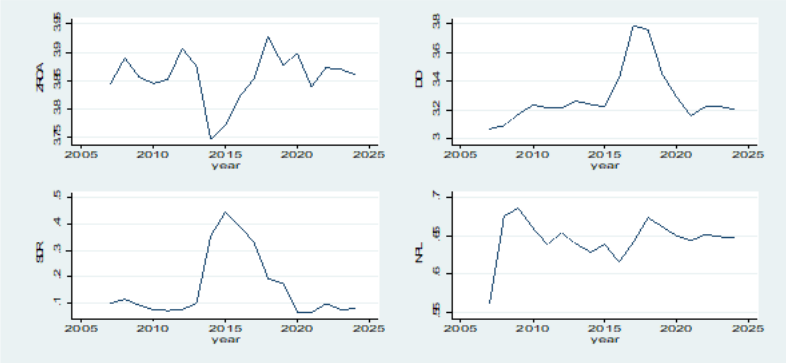

Figure 2

The research Model

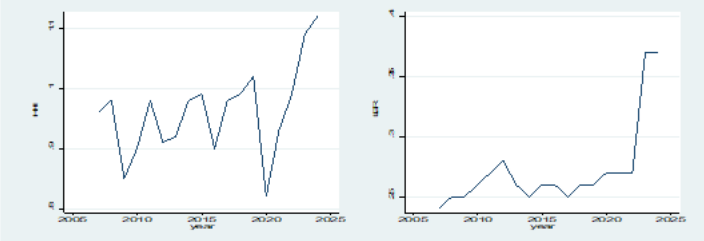

Figure 3

Market power and market concentration from 2007-24

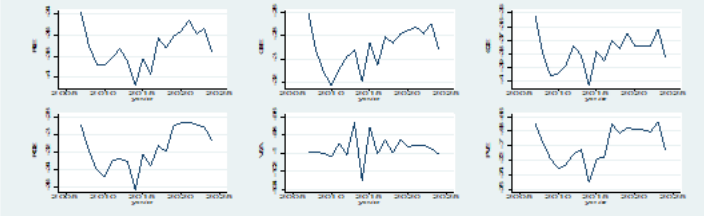

Figure 4

Institutional governance measures from 2007-24