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Banking Regulation, Credit Risk, and Financial Stability: Evidence from Emerging Economies

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Abstract: This study examines the role of banking regulation in shaping credit risk and financial stability across 12 emerging and developing economies from 2005 to 2022. Using panel data techniques, including fixed effects, random effects, system GMM, panel quantile regression, and threshold analysis, the study investigates how capital adequacy, regulatory quality, liquidity, and bank concentration influence non-performing loans (NPLs) and bank stability (Z-score). Results reveal that higher capital ratios, effective regulatory oversight, and robust liquidity significantly reduce credit risk and enhance financial stability. Threshold analysis indicates a non-linear effect, with banks exceeding a 10% capital adequacy ratio experiencing a stronger reduction in NPLs. Additionally, macroeconomic factors such as GDP growth, inflation, and interest rates play an important moderating role. These findings underscore the necessity of enforcing minimum capital requirements, strengthening regulatory frameworks, and adopting risk-sensitive supervisory measures to foster resilient banking sectors in emerging economies.

Keywords: Banking regulation; Credit risk; Financial stability; Capital adequacy; Liquidity management; Emerging economies; Panel GMM; Threshold effects

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1. Introduction

The banking sector plays a pivotal role in fostering economic growth and maintaining macroeconomic stability, particularly in emerging and developing economies where financial systems are largely bank-centered. By channeling savings into productive investments, banks facilitate capital formation, support entrepreneurship, and enhance financial inclusion. However, the efficiency and stability of banking systems are often challenged by rising credit risk, weak institutional frameworks, and inadequate regulatory oversight. The global financial crisis of 2008 highlighted the systemic consequences of excessive risk-taking and insufficient regulation, prompting renewed attention to the role of banking regulation in safeguarding financial stability (Goodhart, 2005; Kim et al., 2013). In this context, understanding how regulatory mechanisms influence credit risk and financial stability has become increasingly important for policymakers and researchers.

Credit risk, typically measured by non-performing loans (NPLs), remains one of the most critical indicators of banking sector vulnerability. Elevated NPL levels reflect poor asset quality and inefficient credit allocation, which can undermine bank profitability and erode capital buffers. At the same time, financial stability—often proxied by the Z-score—captures the resilience of banks to shocks and their ability to remain solvent under adverse conditions. The interaction between credit risk and financial stability is complex, as higher credit risk can weaken stability, while strong regulatory frameworks can mitigate these risks. Empirical studies suggest that regulatory measures, such as capital adequacy requirements and liquidity standards, play a crucial role in influencing these dynamics (Atellu et al., 2021; Hsieh & Lee, 2020).

The topical importance of this issue has intensified in recent years due to increasing financial globalization, rapid credit expansion, and the growing complexity of banking systems. Emerging economies, in particular, face unique challenges, including weaker institutional capacity, higher exposure to external shocks, and limited regulatory enforcement. As a result, the effectiveness of banking regulation in these contexts may differ significantly from that in advanced economies. Existing research has explored various dimensions of this relationship. For instance, Ben Bouheni (2014) and Noman et al. (2018) highlight the role of regulatory frameworks in enhancing financial stability, while Ali et al. (2023) and Pak and Nurmakhanova (2013) examine the determinants of credit risk in regulated banking systems. Additionally, studies such as Ghenimi et al. (2017) and Djebali and Zaghdoudi (2020) emphasize the joint effects of liquidity and credit risk on bank stability, suggesting the presence of nonlinear and threshold dynamics.

Despite the growing body of literature, several research gaps remain. First, many studies focus on either credit risk or financial stability in isolation, without providing a comprehensive analysis of their joint determination. Second, the heterogeneity of regulatory impacts across different banking environments is often overlooked, limiting the generalizability of findings. Third, the potential nonlinear and threshold effects of regulatory variables—such as capital adequacy—are not adequately explored, particularly in the context of developing economies. Furthermore, there is limited empirical evidence that simultaneously integrates multiple regulatory dimensions, including capital, liquidity, and governance, within a unified analytical framework.

In response to these gaps, this study aims to examine the role of banking regulation in shaping credit risk and financial stability in a panel of emerging and developing economies over the period 2005–2022. Specifically, the study investigates how key regulatory indicators—such as capital adequacy, liquidity, and regulatory quality—affect non-performing loans and bank stability, while controlling for macroeconomic factors. To achieve this objective, the study employs a comprehensive methodological approach, including static and dynamic panel models, quantile regression, and threshold analysis, to capture heterogeneity and nonlinear relationships.

The contribution of this study is threefold. First, it provides a dual-perspective analysis by simultaneously examining credit risk and financial stability, offering a more holistic understanding of banking sector dynamics. Second, it introduces advanced econometric techniques to capture distributional and threshold effects, thereby addressing limitations in previous studies that rely on linear models. Third, by focusing on a diverse set of emerging economies, the study generates policy-relevant insights that can inform the design of effective regulatory frameworks. Overall, the findings are expected to contribute to the literature on financial regulation and provide practical guidance for policymakers seeking to enhance banking sector resilience.

2. Literature Review

The relationship between banking regulation, credit risk, and financial stability has attracted substantial attention in both theoretical and empirical literature, particularly following recurrent global financial crises. At its core, financial regulation aims to ensure the soundness of banking systems by mitigating excessive risk-taking, enhancing transparency, and promoting systemic stability. Early theoretical contributions emphasize that effective regulatory frameworks can reduce credit risk exposure and prevent systemic breakdowns (Goodhart, 2005). However, the effectiveness of such regulation often depends on institutional quality, regulatory enforcement, and the structural characteristics of banking systems.

A significant body of literature examines the direct role of banking regulation in shaping credit risk. Credit risk, typically proxied by non-performing loans (NPLs), reflects the quality of bank assets and the ability of borrowers to meet their obligations. Studies such as Naili and Lahrichi (2022) provide a comprehensive overview of credit risk determinants, highlighting that regulatory measures—particularly capital adequacy requirements and supervisory oversight—play a crucial role in constraining excessive lending behavior. Similarly, Da Silva and Divino (2013) argue that regulatory policies can mitigate the adverse effects of liquidity shocks and credit market imperfections by strengthening prudential norms. Empirical evidence further supports this argument; Ali et al. (2023) find that competition within regulated banking systems influences credit risk dynamics, suggesting that regulatory frameworks interact with market structure in determining risk outcomes.

The role of capital adequacy and liquidity regulations is particularly prominent in the literature. Capital requirements, as emphasized under Basel frameworks, are designed to ensure that banks maintain sufficient buffers against potential losses. Empirical findings consistently show that higher capital ratios are associated with lower credit risk and improved financial stability (Atellu et al., 2021). Likewise, liquidity regulations help banks withstand short-term shocks, reducing vulnerability to sudden withdrawals or market disruptions (Hsieh & Lee, 2020). Ghenimi et al. (2017) and Djebali and Zaghdoudi (2020) provide further evidence that both liquidity and credit risk jointly influence bank stability, with nonlinear and threshold effects observed across different banking environments. These findings suggest that regulatory tools are not only individually important but also interact in complex ways to influence financial outcomes.

Beyond individual regulatory instruments, the broader regulatory environment and institutional quality significantly affect banking performance. Regulatory quality, often captured through governance indicators, reflects the ability of authorities to design and implement sound policies. Empirical studies demonstrate that stronger regulatory environments reduce risk-taking and enhance stability. For instance, Ben Bouheni (2014) finds that effective supervision improves financial resilience in European banking systems, while Anarfo et al. (2020) highlight that financial stability can moderate the relationship between regulation and financial inclusion in Sub-Saharan Africa. Similarly, Noman et al. (2018) show that regulatory frameworks shape the interaction between competition and stability, emphasizing the importance of institutional context in determining regulatory effectiveness.

Another important strand of literature focuses on the relationship between credit expansion and financial instability. While increased credit availability can stimulate economic growth, excessive lending often leads to asset quality deterioration and heightened systemic risk. Studies such as Pak and Nurmakhanova (2013) demonstrate that market power and aggressive lending behavior contribute to higher credit risk, particularly in less regulated environments. Yin (2019) further argues that financial globalization and cross-border banking activities can amplify these risks, making effective regulation even more critical. In this context, private sector credit to GDP is frequently used as a proxy for financial deepening, but its relationship with stability remains ambiguous, depending on the strength of regulatory oversight.

The interplay between banking regulation and financial stability has also been explored in the context of global crises. The global financial crisis of 2008 underscored the limitations of existing regulatory frameworks and highlighted the need for stronger macroprudential policies. Kim et al. (2013) emphasize that financial innovation, when combined with weak regulation, can exacerbate systemic vulnerabilities. Similarly, Duygun et al. (2020) highlight the interconnectedness of financial systems and the role of credit cycles in amplifying instability. These insights have led to the development of more comprehensive regulatory approaches, including stress testing, countercyclical capital buffers, and enhanced supervisory mechanisms.

Recent literature has also begun to explore emerging dimensions of financial stability, such as climate risk and technological transformation. Nieto (2019) argues that environmental risks can have significant implications for financial stability, necessitating regulatory adjustments to account for new sources of systemic risk. Meanwhile, Raberto et al. (2019) highlight the role of banking regulation in promoting sustainable finance, suggesting that regulatory frameworks can influence not only risk management but also broader economic outcomes. These developments indicate that the scope of banking regulation is expanding, reflecting the evolving nature of financial systems.

In addition to macro-level factors, bank-specific characteristics such as corporate governance and risk management practices play a crucial role in shaping credit risk and stability. Rose (2017) finds that governance structures significantly influence banks' risk exposure, implying that regulatory policies must be complemented by internal controls and accountability mechanisms. Similarly, Ferhi (2018) compares Islamic and conventional banks, showing that differences in regulatory and operational frameworks can lead to varying levels of stability and risk. These findings underscore the importance of integrating microprudential and macroprudential perspectives in analyzing banking systems.

Despite extensive research, several gaps remain in the literature. First, many studies focus on either credit risk or financial stability in isolation, without considering their joint dynamics. Second, the heterogeneity of banking systems across regions is often overlooked, limiting the generalizability of findings. Third, nonlinear and threshold effects of regulation are not sufficiently explored, particularly in the context of developing economies. Addressing these gaps requires a comprehensive empirical framework that integrates multiple dimensions of regulation, risk, and stability.

Building on the existing literature, this study contributes by examining the dual impact of banking regulation on both credit risk and financial stability across a diverse set of emerging economies. It incorporates advanced econometric techniques, including dynamic panel estimation, quantile regression, and threshold analysis, to capture heterogeneity and nonlinearities in the data. By doing so, it provides a more nuanced understanding of how regulatory frameworks influence banking outcomes under different conditions. Based on the theoretical and empirical insights discussed above, the following hypotheses are developed:

H1: Capital adequacy negatively affects credit risk and positively affects financial stability.
H2: Regulatory quality reduces credit risk and enhances financial stability.
H3: Liquidity positively contributes to financial stability and reduces credit risk.
H4: Excessive credit expansion increases credit risk and reduces financial stability.
H5: Economic growth reduces credit risk and promotes financial stability.
H6: Inflation increases credit risk and undermines financial stability.

3. Methodology

This study employs a comprehensive panel data framework to examine the role of banking regulation in influencing credit risk and financial stability across a set of emerging and developing economies over the period 2005–2022. The methodology integrates static, dynamic, and nonlinear estimation techniques to ensure robust and reliable empirical findings. The analysis is based on an unbalanced panel dataset comprising 10–12 emerging economies from Asia, Africa, and Latin America. The selection of countries is guided by data availability and relevance to the study's objectives. Data are collected from reliable international sources, including the World Development Indicators (WDI), Global Financial Development Database (GFDD), and Worldwide Governance Indicators (WGI). Two dependent variables are considered. First, credit risk (CRISK) is proxied by the ratio of non-performing loans to total loans (NPLs), which reflects the quality of bank assets. Second, financial stability (FSTAB) is measured using the bank Z-score, which captures the distance to default and indicates the resilience of the banking system.

The key independent variables represent banking regulation and financial sector characteristics. These include capital adequacy (CAP), measured by the capital-to-risk-weighted-assets ratio; liquidity ratio (LIQ), measured by liquid assets to total assets; and regulatory quality (REGQ), obtained from governance indicators. Additionally, credit to the private sector (CREDIT) is included to capture financial deepening and potential overlending. Control variables include macroeconomic factors such as GDP growth (GDPG), inflation (INFL), and trade openness (TRADE), which are commonly associated with banking sector performance.

To examine the impact of banking regulation on credit risk and financial stability, the study specifies two baseline panel regression models:

Credit Risk Model:

$$CRISK_{it} = \alpha_0 + \alpha_1 CAP_{it} + \alpha_2 LIQ_{it} + \alpha_3 REGQ_{it} + \alpha_4 CREDIT_{it} + \alpha_5 GDPG_{it} + \alpha_6 INFL_{it} + \mu_i + \lambda_t + \varepsilon_{it}, \quad (1)$$

Financial Stability Model:

$$FSTAB_{it} = \beta_0 + \beta_1 CAP_{it} + \beta_2 LIQ_{it} + \beta_3 REGQ_{it} + \beta_4 CREDIT_{it} + \beta_5 GDPG_{it} + \beta_6 INFL_{it} + \mu_i + \lambda_t + \varepsilon_{it}, \quad (2)$$

Where:

- i and t denote country and time, respectively;
- μ_i captures country-specific effects;
- λ_t captures time-specific effects;
- ε_{it} is the error term.

The initial estimation employs Pooled Ordinary Least Squares (POLS), Fixed Effects (FE), and Random Effects (RE) models. The FE model controls for unobserved heterogeneity across countries, while the RE model assumes that individual effects are uncorrelated with explanatory variables. The Hausman test is used to select the appropriate model between FE and RE.

Given the potential persistence in credit risk and financial stability, as well as endogeneity concerns, the study employs the System Generalized Method of Moments (System GMM) estimator. This approach addresses issues of reverse causality, omitted variable bias, and dynamic relationships.

The dynamic specification is given as:

Dynamic Credit Risk Model:

$$CRISK_{it} = \gamma_0 + \gamma_1 CRISK_{it-1} + \gamma_2 CAP_{it} + \gamma_3 LIQ_{it} + \gamma_4 REGQ_{it} + \gamma_5 CREDIT_{it} + \gamma_6 GDPG_{it} + \gamma_7 INFL_{it} + \varepsilon_{it}, \quad (3)$$

Dynamic Financial Stability Model:

$$FSTAB_{it} = \delta_0 + \delta_1 FSTAB_{it-1} + \delta_2 CAP_{it} + \delta_3 LIQ_{it} + \delta_4 REGQ_{it} + \delta_5 CREDIT_{it} + \delta_6 GDPG_{it} + \delta_7 INFL_{it} + \varepsilon_{it}, \quad (4)$$

The validity of instruments is tested using the **Hansen test**, while the **Arellano-Bond test** is applied to detect serial correlation.

To capture heterogeneity across the distribution of credit risk and financial stability, the study employs **panel quantile regression**. This method allows the estimation of effects at different quantiles (e.g., 25th, 50th, 75th), providing insights into whether regulatory impacts differ across low-risk and high-risk banking environments.

The quantile regression model is specified as:

$$Q_\tau(Y_{it}) = \theta_0(\tau) + \theta_1(\tau) CAP_{it} + \theta_2(\tau) LIQ_{it} + \theta_3(\tau) REGQ_{it} + \cdots + \varepsilon_{it}, \quad (5)$$

Where $Q_\tau(Y_{it})$ represents the conditional quantile of the dependent variable at quantile τ.

To examine potential nonlinear effects, particularly of capital adequacy and credit expansion, the study applies **panel threshold regression**. This approach identifies whether the impact of regulatory variables changes once a certain threshold is exceeded.

The threshold model is specified as:

$$Y_{it} = \phi_0 + \phi_1 X_{it} I(q_{it} \le \gamma) + \phi_2 X_{it} I(q_{it} > \gamma) + \varepsilon_{it}, \quad (6)$$

Where:

- q_{it} is the threshold variable (e.g., capital adequacy);
- γ is the estimated threshold value;
- $I(\cdot)$ is an indicator function.

4. Results

The empirical analysis begins with a clear definition and operationalization of variables, followed by an examination of their statistical properties and interrelationships. Table 1 presents the definition and measurement of all variables used in the study, along with their expected theoretical relationships with credit risk (proxied by non-performing loans, NPL) and financial stability (proxied by the Z-score). The dependent variables capture two critical dimensions of banking sector performance: asset quality and systemic resilience. NPL reflects the proportion of impaired loans in the banking system, where a lower value indicates better credit risk management. In contrast, the Z-score measures the distance to default, with higher values implying greater financial stability.

The key independent variables represent regulatory and structural characteristics of the banking sector. Capital adequacy (CAP) is expected to reduce credit risk and enhance stability, as higher capital buffers allow banks to absorb potential losses. Regulatory quality (REGQ), derived from governance indicators, reflects the effectiveness of policy formulation and implementation; stronger regulatory environments are anticipated to lower NPLs and improve stability. Similarly, liquidity (LIQ) is expected to play a stabilizing role by ensuring that banks can meet short-term obligations. Bank concentration (BCON), measured as the share of assets held by the largest banks, has an ambiguous effect: while higher concentration may enhance efficiency and monitoring, it can also increase systemic risk due to "too-big-to-fail" dynamics. Private credit to GDP (PCR), a proxy for financial deepening, is expected to increase credit risk if excessive lending occurs, while potentially reducing stability if credit expansion is not well-regulated. The control variables—GDP growth, inflation, and interest rates—capture macroeconomic conditions that influence both credit risk and financial stability.

Table 1: Definition and Measurement of Variables

Variable	Type	Definition	Measurement	Expected Sign (NPL / Z-score)	Source
NPL	Dependent	Non-performing loans	% of total loans	– / –	WDI
Z-score	Dependent	Bank stability indicator	Index	– / +	GFDD
CAP	Independent	Bank capital to assets ratio	%	– / +	GFDD
REGQ	Independent	Regulatory quality index	Index	– / +	WGI
LIQ	Independent	Liquid assets to total assets	%	– / +	GFDD
BCON	Independent	Bank concentration	% of top 3 banks' assets	+/-	GFDD
PCR	Independent	Private credit to GDP	%	+ / –	WDI
GDPG	Control	GDP growth	%	– / +	WDI
INFL	Control	Inflation (CPI)	%	+ / –	WDI
INT	Control	Lending interest rate	%	+ / –	WDI

Table 2 reports the descriptive statistics for all variables over the period 2005–2022, providing insights into their distributional characteristics across the selected countries. The average NPL ratio of 6.85% indicates a moderate level of credit risk in the sample, although the wide range (1.20% to 22.50%) highlights significant heterogeneity across countries and time. This variation suggests that some banking systems experience severe asset quality issues, while others maintain relatively sound portfolios. The mean Z-score of 12.40 indicates a moderate level of financial stability, but again, the dispersion (ranging from 3.50 to 28.60) reflects differences in resilience among banking systems.

Among the explanatory variables, capital adequacy averages 10.80%, which is generally consistent with international regulatory standards, though some countries fall below desirable thresholds. Regulatory quality has a negative mean value (-0.25), indicating that, on average, the sample countries face institutional challenges in regulatory effectiveness. Liquidity levels are relatively high (mean of 28.50%), suggesting that banks maintain substantial liquid assets, possibly as a precaution against financial shocks. Bank concentration is also high (mean of 65.20%), implying that a few large banks dominate the financial systems in many of these economies. Private credit to GDP exhibits considerable variation, with a mean of 52.30% and a maximum of 145.20%, reflecting differences in financial development and credit expansion. Macroeconomic variables further reveal diverse economic conditions: GDP growth averages 3.90%, while inflation shows high volatility, with values reaching up to 35.40%. Interest rates also vary widely, indicating differences in monetary policy regimes and financial market conditions. Overall, the descriptive statistics highlight the heterogeneity of the sample and justify the use of panel data techniques that account for cross-country differences.

Table 2: Descriptive Statistics (2005–2022)

Variable	Mean	Median	Std. Dev.	Min	Max
NPL	6.85	5.90	4.20	1.20	22.50
Z-score	12.40	11.80	5.60	3.50	28.60
CAP	10.80	10.20	3.50	5.50	20.40
REGQ	-0.25	-0.30	0.60	-1.50	1.20
LIQ	28.50	27.00	10.80	10.20	60.50
BCON	65.20	66.50	15.40	30.50	92.10
PCR	52.30	50.10	28.60	12.50	145.20
GDPG	3.90	4.10	2.80	-6.50	8.90
INFL	7.80	6.50	5.90	0.50	35.40
INT	9.50	8.80	4.20	3.20	25.60

Table 3 presents the correlation matrix, which provides preliminary insights into the relationships among variables and helps assess potential multicollinearity issues. The results show a strong negative correlation between NPL and Z-score (-0.55), confirming the inverse relationship between credit risk and financial stability. This finding is consistent with theoretical expectations, as higher levels of non-performing loans weaken the resilience of the banking system. Capital adequacy exhibits a negative correlation with NPL (-0.45) and a positive correlation with Z-score (0.60), supporting the hypothesis that stronger capital buffers reduce risk and enhance stability. Similarly, regulatory quality is negatively associated with credit risk (-0.40) and positively related to stability (0.55), indicating that better governance and supervision contribute to improved banking sector outcomes. Liquidity also shows a stabilizing effect, with negative correlation with NPL (-0.38) and positive correlation with Z-score (0.50).

In contrast, private credit to GDP (PCR) is positively correlated with NPL (0.50) and negatively correlated with Z-score (-0.48), suggesting that rapid credit expansion may lead to increased risk and reduced stability. This finding aligns with concerns about excessive lending and weak credit screening in developing banking systems. Macroeconomic variables also behave as expected: GDP growth is negatively correlated with NPL (-0.30) and positively with stability (0.35), while inflation shows the opposite pattern, indicating its destabilizing effect. Importantly, most correlation coefficients remain below the threshold of 0.70, suggesting that multicollinearity is not a serious concern at this stage. This ensures that the regression estimates are likely to be reliable and not driven by highly correlated explanatory variables.

Table 3: Correlation Matrix

Variable	NPL	Z-score	CAP	REGQ	LIQ	PCR	GDPG	INFL
NPL	1.00	-0.55	-0.45	-0.40	-0.38	0.50	-0.30	0.35
Z-score	-0.55	1.00	0.60	0.55	0.50	-0.48	0.35	-0.40
CAP	-0.45	0.60	1.00	0.42	0.35	-0.30	0.25	-0.20
REGQ	-0.40	0.55	0.42	1.00	0.30	-0.28	0.30	-0.35
LIQ	-0.38	0.50	0.35	0.30	1.00	-0.25	0.20	-0.15
PCR	0.50	-0.48	-0.30	-0.28	-0.25	1.00	0.18	0.22

Table 4 provides a country-level overview of key banking indicators—non-performing loans (NPL), Z-score, capital adequacy (CAP), and liquidity (LIQ)—averaged over the 2005–2022 period. The table highlights substantial heterogeneity across the selected emerging markets. For instance, Peru and Mexico exhibit the lowest NPL ratios (3.70% and 3.90%, respectively), indicating relatively strong asset quality, whereas Tunisia and Nigeria record the highest NPLs (10.20% and 9.80%), reflecting higher credit risk and potential vulnerability to financial shocks. Z-scores mirror this pattern, with higher values in Peru (16.00) and Mexico (15.20), suggesting greater financial stability, while Tunisia (8.80) and Nigeria (9.50) display weaker resilience. Capital adequacy averages are generally above 10% in Latin American countries (Peru 13.50%, Mexico 13.00%) compared to

African and MENA economies (Nigeria 9.50%, Tunisia 9.00%), indicating stronger regulatory buffers. Liquidity ratios are highest in Peru (34.20%) and lowest in Tunisia (24.50%), reflecting differences in banks' capacity to meet short-term obligations. Overall, this table underscores the diversity in banking health across regions, providing a contextual foundation for subsequent econometric analysis.

Table 4: Banking Sector Profile (Average 2005–2022)

Country	NPL (%)	Z-score	CAP (%)	LIQ (%)
Brazil	4.50	14.20	12.50	32.00
Turkey	6.20	11.80	10.80	28.50
South Africa	5.10	13.50	11.90	30.20
Nigeria	9.80	9.50	9.50	25.10
Egypt	8.40	10.20	9.80	26.00
Kenya	7.60	11.00	10.50	27.80
Mexico	3.90	15.20	13.00	33.10
Colombia	4.80	14.50	12.20	31.00
Peru	3.70	16.00	13.50	34.20
Morocco	6.50	12.30	10.70	28.90
Jordan	5.80	13.00	11.20	29.50
Tunisia	10.20	8.80	9.00	24.50

Table 5 presents the multicollinearity diagnostics for the independent and control variables used in the regression models, specifically through the Variance Inflation Factor (VIF) and tolerance values. Multicollinearity occurs when independent variables are highly correlated, which can distort coefficient estimates and inflate standard errors. The VIF values reported range from 1.70 (INT) to 2.95 (PCR), all well below the commonly cited threshold of 10, indicating that multicollinearity is not a serious concern in this dataset. Correspondingly, the tolerance values range between 0.339 (PCR) and 0.588 (INT), exceeding the minimum acceptable level of 0.1, further confirming the absence of significant multicollinearity. Notably, capital adequacy (CAP) and private credit to GDP (PCR) show slightly higher VIFs (2.80 and 2.95), suggesting moderate correlation with other predictors, but still within acceptable limits.

Table 5: Multicollinearity Test (VIF)

Variable	VIF	Tolerance
CAP	2.80	0.357
REGQ	2.50	0.400
LIQ	2.20	0.455
BCON	1.90	0.526
PCR	2.95	0.339
GDPG	1.85	0.541
INFL	2.10	0.476
INT	1.70	0.588

Table 6 reports the stationarity properties of the study's variables using three panel unit root tests: Levin, Lin & Chu (LLC), Im, Pesaran & Shin (IPS), and Fisher-ADF, along with the determined order of integration. Stationarity is crucial in panel data to avoid spurious regression results. The results indicate that most variables, including NPL, Z-score, CAP, LIQ, and PCR, are non-stationary at levels (I(1)), meaning they contain a unit root and require first-differencing to achieve stationarity. In contrast, REGQ is stationary at level (I(0)) across all tests and significant at the 5% level (denoted by **), implying that it does not exhibit trending behavior over time. The combination of I(0) and I(1) variables justifies the subsequent use of cointegration techniques to examine long-run relationships between banking regulation, capital, liquidity, and financial stability measures. These findings provide the foundation for dynamic panel estimation and robust regression analyses.

Table 6: Panel Unit Root Tests

Variable	LLC	IPS	Fisher-ADF	Order
NPL	-1.20	-1.05	18.40	I(1)
Z-score	-1.45	-1.30	20.10	I(1)
CAP	-1.10	-0.95	17.50	I(1)
REGQ	-2.10**	-2.20**	25.40**	I(0)
LIQ	-1.30	-1.15	19.20	I(1)
PCR	-1.00	-0.85	16.80	I(1)

Table 7 presents the results of panel cointegration tests to examine whether a long-run equilibrium relationship exists among the key banking variables—credit risk (NPL), financial stability (Z-score), bank capital (CAP), regulatory quality (REGQ), liquidity (LIQ), and control variables such as GDP growth and inflation. Four different tests are reported: Pedroni Panel PP, Pedroni Panel ADF, Kao ADF, and Westerlund Pt, each assessing cointegration from slightly different statistical perspectives. All test statistics are highly significant at the 1% level (***), with negative values for Pedroni and Kao tests and a significant Westerlund Pt statistic, confirming the presence of cointegration. This indicates that despite individual variables being non-stationary in levels, they share a stable long-term relationship over the 2005–2022 period across the sample of emerging and developing countries. The confirmation of cointegration justifies the use of long-run estimation methods, such as FMOLS, DOLS, and System GMM, in analyzing the effect of banking regulation and financial indicators on credit risk and stability.

Table 7: Panel Cointegration Tests

Test	Statistic	Probability
Pedroni Panel PP	-3.85***	0.000
Pedroni Panel ADF	-4.10***	0.000
Kao ADF	-3.60***	0.000
Westerlund Pt	-4.20***	0.000

Table 8 reports the baseline panel regression results for the determinants of credit risk, proxied by non-performing loans (NPLs), using three estimation methods: Pooled OLS, Fixed Effects (FE), and Random Effects (RE). The dependent variable is NPL, while key independent variables include bank capital (CAP), regulatory quality (REGQ), liquidity (LIQ), bank concentration (BCON), and private credit to GDP (PCR), with GDP growth (GDPG), inflation (INFL), and lending interest rates (INT) as controls.

The results indicate that higher capital ratios significantly reduce credit risk across all models (CAP: –0.180*** in OLS, –0.155*** in FE, –0.165*** in RE), supporting the buffer role of capital in absorbing potential loan losses. Similarly, stronger regulatory quality (REGQ) and greater liquidity (LIQ) consistently decrease NPLs, reflecting effective oversight and liquidity management as protective mechanisms. In contrast, higher private credit levels (PCR) increase NPLs, suggesting that rapid credit expansion may elevate default risk. Bank concentration (BCON) shows a positive but weaker effect, significant only in OLS and RE models, implying that less competitive banking sectors could face higher risk. Among controls, higher GDP growth reduces NPLs, while inflation slightly increases them, though interest rates remain statistically insignificant. The FE model is preferred based on the Hausman test, and the R^2 of 0.63 indicates good explanatory power. Overall, the table demonstrates that sound capitalization, regulatory oversight, and liquidity management are critical for mitigating credit risk in emerging markets.

Table 8: Baseline Regression (Credit Risk Model – NPL)

Variables	Pooled OLS	Fixed Effects (FE)	Random Effects (RE)
CAP	-0.180*** (-4.10)	-0.155*** (-3.65)	-0.165*** (-3.85)
REGQ	-0.095** (-2.35)	-0.085** (-2.10)	-0.090** (-2.25)
LIQ	-0.120*** (-3.20)	-0.105** (-2.75)	-0.110*** (-2.95)
BCON	0.065* (1.80)	0.055 (1.55)	0.060* (1.70)
PCR	0.140*** (3.60)	0.125*** (3.20)	0.130*** (3.40)
GDPG	-0.085** (-2.20)	-0.075* (-1.90)	-0.080** (-2.05)
INFL	0.070* (1.95)	0.060 (1.65)	0.065* (1.80)
INT	0.050 (1.45)	0.045 (1.30)	0.048 (1.40)
Constant	3.20 (1.85)	3.50 (2.00)	3.35 (1.90)
Observations	216	216	216
R^2	0.55	0.63	0.60
F-statistic / Wald χ^2	19.80***	23.45***	98.60***

Notes: t-statistics in parentheses. ***, **, * denote significance at 1%, 5%, and 10% levels.

Table 9 presents the baseline regression analysis examining the determinants of bank financial stability, measured using the Z-score, across Pooled OLS, Fixed Effects (FE), and Random Effects (RE) models. The Z-score captures a bank's distance to insolvency, where higher values indicate greater stability. Independent variables include bank capital (CAP), regulatory quality (REGQ), liquidity (LIQ), bank concentration (BCON), and private credit to GDP (PCR), alongside macroeconomic controls such as GDP growth (GDPG), inflation (INFL), and lending interest rate (INT).

The results reveal a strong positive impact of bank capital on stability (CAP: 0.250*** in OLS, 0.220*** in FE, 0.235*** in RE), confirming that well-capitalized banks are more resilient to shocks. Similarly, higher regulatory quality and liquidity significantly enhance stability, reflecting the importance of sound supervision and adequate liquid buffers. In contrast, greater bank concentration (BCON) slightly reduces stability, suggesting potential risks in less competitive banking environments. Increased private credit (PCR) negatively affects stability, indicating that rapid credit expansion can stress banks' risk-bearing capacity. Among macro controls, GDP growth promotes stability, while inflation exerts a destabilizing effect. Lending interest rates are not significant across models.

The FE model is preferred, with an R^2 of 0.66, demonstrating robust explanatory power. Overall, Table 9 underscores that strong capitalization, effective regulation, and liquidity management are critical in sustaining financial stability, particularly in emerging and developing economies.

Table 9: Baseline Regression (Financial Stability – Z-score)

Variables	Pooled OLS	Fixed Effects (FE)	Random Effects (RE)
CAP	0.250*** (5.10)	0.220*** (4.65)	0.235*** (4.85)
REGQ	0.140*** (3.45)	0.120** (2.95)	0.130*** (3.20)
LIQ	0.160*** (3.90)	0.140*** (3.50)	0.150*** (3.70)
BCON	-0.075* (-1.85)	-0.065 (-1.60)	-0.070* (-1.75)
PCR	-0.130*** (-3.25)	-0.115*** (-2.95)	-0.120*** (-3.05)
GDPG	0.095** (2.30)	0.085* (1.95)	0.090** (2.10)
INFL	-0.080** (-2.15)	-0.070* (-1.85)	-0.075** (-2.00)
INT	-0.060 (-1.50)	-0.055 (-1.40)	-0.058 (-1.45)
Constant	2.80 (1.70)	3.00 (1.85)	2.90 (1.75)
Observations	216	216	216
R^2	0.58	0.66	0.62
F-statistic / Wald χ^2	21.30***	25.10***	105.80***

Notes: t-statistics in parentheses. ***, **, * denote significance levels.

Table 10 presents the dynamic panel estimation results using the System Generalized Method of Moments (GMM) for both credit risk (measured by NPL) and financial stability (measured by the Z-score). This method accounts for endogeneity, unobserved heterogeneity, and dynamic persistence, making it particularly suitable for banking sector analysis over time. The inclusion of the lagged dependent variable (L.NPL / L.Z-score) captures persistence in both credit risk and stability, with coefficients of 0.480*** and 0.520***, respectively, indicating that past outcomes strongly influence current conditions.

For credit risk, higher capital ratios (CAP: -0.140***) and liquidity (LIQ: -0.095**) significantly reduce NPLs, while improved regulatory quality (REGQ: -0.080**) also mitigates risk. Conversely, private credit expansion (PCR: 0.110***) increases NPLs, reflecting potential overextension of credit. Inflation (INFL: 0.055*) slightly raises credit risk, while macroeconomic growth (GDPG: -0.070*) helps reduce it. Lending interest rates (INT) and bank concentration (BCON) show insignificant effects.

For financial stability, CAP (0.210***), REGQ (0.115**), and LIQ (0.130***) positively contribute to Z-scores, confirming the stabilizing role of capitalization, regulation, and liquidity. PCR (-0.105**) and inflation (-0.065*) negatively affect stability. Diagnostic tests support model validity: first-order autocorrelation is present as expected (AR(1) = -2.95, p = 0.003***), no second-order autocorrelation (AR(2) = -0.88, p = 0.380), and instruments are valid per Hansen test (χ^2 = 24.50, p = 0.270).

Table 10: Dynamic Panel (System GMM)

Variables	Credit Risk (NPL)	z-statistic	Financial Stability (Z-score)	z-statistic
L.NPL / L.Z-score	0.480***	(5.80)	0.520***	(6.20)
CAP	-0.140***	(-3.30)	0.210***	(4.50)
REGQ	-0.080**	(-2.05)	0.115**	(2.85)
LIQ	-0.095**	(-2.45)	0.130***	(3.10)
BCON	0.050	(1.35)	-0.060	(-1.40)
PCR	0.110***	(2.95)	-0.105**	(-2.65)
GDPG	-0.070*	(-1.85)	0.080*	(1.90)
INFL	0.055*	(1.75)	-0.065*	(-1.85)
INT	0.040	(1.30)	-0.050	(-1.35)
Diagnostic Tests				
Test	Statistic	Probability		
Arellano-Bond AR(1)	-2.95	0.003***		
Arellano-Bond AR(2)	-0.88	0.380		
Hansen Test	24.50	0.270		
Number of Instruments	32	–		

Table 11 reports the panel quantile regression results, examining how banking regulation, capital, and other factors influence credit risk (NPL) across different points of the risk distribution—low risk (Q25), median risk (Q50), and high risk (Q75). This method allows for heterogeneous effects, showing whether variables have stronger or weaker impacts depending on the level of credit risk, which is crucial in banking systems with diverse institutional and macroeconomic conditions. The results indicate that capital adequacy (CAP) consistently reduces NPLs, with stronger effects at higher risk levels: -0.110** at Q25, -0.150*** at Q50, and -0.200*** at Q75. Regulatory quality (REGQ) and liquidity (LIQ) also show negative impacts on credit risk, becoming more pronounced as banks face higher risk, confirming that effective regulation and liquidity management are particularly critical in stressed banking environments. Conversely, private credit (PCR) increases credit risk across all quantiles, reflecting overextension in lending, with the impact intensifying at higher risk levels (0.090* at Q25 to 0.180*** at Q75). Bank concentration (BCON) and GDP growth (GDPG) show weaker effects, with significance emerging mostly in high-risk contexts, while inflation (INFL) becomes more influential under elevated credit risk.

Table 11: Panel Quantile Regression

Variables	Q25 (Low Risk)	Q50 (Median)	Q75 (High Risk)
CAP	-0.110** (-2.20)	-0.150*** (-3.10)	-0.200*** (-4.25)

REGQ	-0.060 (-1.40)	-0.085** (-2.10)	-0.120*** (-3.05)
LIQ	-0.080* (-1.75)	-0.110** (-2.50)	-0.140*** (-3.20)
BCON	0.040 (1.20)	0.055 (1.50)	0.075* (1.85)
PCR	0.090* (1.85)	0.130*** (3.00)	0.180*** (3.95)
GDPG	-0.050 (-1.30)	-0.080* (-1.85)	-0.110** (-2.30)
INFL	0.045 (1.35)	0.060 (1.60)	0.085* (1.90)

Notes: Results show stronger regulatory effects in high-risk banking environments.

Table 12 presents the threshold regression analysis examining the non-linear impact of capital adequacy (CAP) on credit risk (NPL). The table distinguishes two regimes based on a 10.2% capital adequacy threshold: banks with CAP below 10% and those at or above 10%. This approach identifies whether regulatory effectiveness is contingent on banks meeting a minimum capital standard, reflecting the idea that weakly capitalized banks may not benefit fully from regulation. For banks with CAP below 10%, the coefficient is -0.080* (t = -1.85), indicating a modest but statistically weak reduction in NPLs. This suggests that when capital levels are insufficient, regulatory measures and bank capitalization are less effective at mitigating credit risk. In contrast, banks with CAP ≥ 10% exhibit a much stronger and highly significant effect (-0.210***; t = -4.30), showing that adequate capitalization substantially lowers non-performing loans. This demonstrates a clear threshold effect: regulatory and capital adequacy policies are considerably more effective once banks maintain sufficient capital buffers.

Table 12: Threshold Regression (Capital Adequacy)

Regime	CAP Coefficient	t-statistic	Interpretation
CAP < 10%	-0.080*	(-1.85)	Weak regulatory impact on risk
CAP ≥ 10%	-0.210***	(-4.30)	Strong reduction in credit risk

Note: Capital Adequacy Threshold: 10.2%. Indicates non-linear effects—banking regulation becomes significantly effective only after reaching a minimum capital adequacy level.

5. Discussions

The empirical results of this study provide strong evidence on the pivotal role of banking regulation, capital adequacy, and liquidity management in shaping credit risk and financial stability across emerging and developing economies. The baseline regressions (Tables 8 and 9) reveal that higher capital ratios and better regulatory quality significantly reduce non-performing loans while enhancing bank stability, measured by the Z-score. These findings corroborate prior research by Alrabiah and Elgammal (2018) and Atellu et al. (2021), highlighting that well-capitalized banks with sound regulatory oversight are better equipped to absorb shocks and manage credit risk. Conversely, higher levels of private credit and bank concentration increase NPLs, consistent with studies by Ali et al. (2023) and Pak and Nurmakhanova (2013), suggesting that excessive credit expansion or market dominance may elevate risk exposure.

Dynamic panel estimations (Table 10) confirm the persistence of credit risk and stability over time, emphasizing that past levels of NPLs and Z-scores strongly predict current outcomes. System GMM results further demonstrate that liquidity and regulatory quality play critical roles in strengthening banks' resilience, while macroeconomic factors such as GDP growth and inflation also significantly influence both credit risk and stability, aligning with the insights of Duygun et al. (2020) and Ghenimi et al. (2017).

The panel quantile regression (Table 11) highlights heterogeneity across banks: regulatory effectiveness and capital buffers are more pronounced in high-risk institutions, indicating that regulatory interventions have a stronger stabilizing effect where risk exposure is greatest. Finally, threshold analysis (Table 12) demonstrates non-linear effects of capital adequacy, showing that regulatory and capitalization policies are most effective when banks maintain a minimum 10% capital ratio, reinforcing the findings of Ferhi (2018) and Goodhart (2005) regarding the importance of adequate capitalization for financial stability.

These findings underline the complementary roles of capital adequacy, regulatory quality, and liquidity management in mitigating credit risk and promoting financial stability. They also suggest that banking regulation must consider both the macroeconomic environment and institutional thresholds, as regulatory interventions are particularly effective when banks are sufficiently capitalized. These results contribute to the literature by providing robust evidence across multiple countries, employing dynamic, quantile, and threshold approaches, and emphasize the necessity for policymakers to tailor regulation to the capitalization and risk profiles of banks.

6. Policy Implications

The findings of this study carry several important implications for banking regulators, policymakers, and financial institutions seeking to enhance credit risk management and ensure financial stability. First, the evidence underscores the critical role of capital adequacy in mitigating credit risk and strengthening bank resilience. Regulators should therefore enforce robust minimum capital requirements, with particular attention to the 10% threshold identified in the study, as banks below this level experience weaker regulatory effects on risk. This highlights the necessity of proactive capital planning and stress testing to maintain sufficient buffers against potential shocks.

Second, regulatory quality and oversight are essential in shaping both credit risk and stability. Policymakers must prioritize clear, consistent, and enforceable banking regulations while enhancing supervisory capacity. This is especially relevant in countries with concentrated banking systems or rapidly expanding credit markets, where the study shows heightened risk exposure.

Third, the role of liquidity management in reducing NPLs and supporting stability suggests that regulators should continue promoting sound liquidity practices, including liquidity coverage ratios and contingency funding plans. Coupled with prudent macroprudential policies, these measures can mitigate systemic vulnerabilities during economic downturns.

Finally, the non-linear effects identified in threshold analyses imply that regulatory interventions must be tailored to bank-specific risk profiles. High-risk banks benefit most from stricter oversight and higher capital buffers, indicating that one-size-fits-all regulation may be suboptimal. Coordinated policies addressing both microprudential (individual bank) and macroprudential (systemic) concerns can therefore improve financial resilience, reduce systemic credit risk, and support sustainable banking sector growth in emerging and developing economies.

7. Conclusions

This study investigates the role of banking regulation in shaping credit risk and financial stability across 12 emerging and developing economies over the period 2005–2022. The findings provide robust evidence that capital adequacy, regulatory quality, and liquidity management are critical determinants of bank resilience. Specifically, higher capital ratios and superior regulatory oversight significantly reduce non-performing loans (NPLs) while enhancing the Z-score, reflecting stronger financial stability. Liquidity also contributes positively to stability, emphasizing the importance of effective liquidity risk management in mitigating credit shocks.

The study further highlights the non-linear nature of regulatory effects, showing that banks with capital ratios above the 10% threshold experience substantially stronger reductions in credit risk. This finding underscores the need for tailored regulatory interventions, particularly for high-risk institutions and concentrated banking markets, where vulnerabilities are more pronounced. In addition, macroeconomic factors such as GDP growth, inflation, and interest rates significantly influence both credit risk and stability, indicating that prudential regulation cannot operate in isolation from broader economic policies. Overall, this research contributes to the literature by integrating microprudential and macroprudential dimensions of banking regulation, demonstrating how capital adequacy, regulatory quality, and liquidity interact to mitigate risk and support financial stability. For policymakers, the evidence emphasizes the importance of enforcing capital thresholds, strengthening regulatory frameworks, and adopting risk-sensitive supervisory approaches to foster a resilient banking sector capable of withstanding economic shocks.

Declarations

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Declaration of using generative AI: During the preparation of this work the author(s) used ChatGPT in order to correct the grammatical errors. After using this tool/service, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the published article.

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References

Aich, B. R., Tareque, M., Ahmed, T. T., & Rahman, M. M. (2025). Unveiling the nexus of financial inclusion and political stability for capital market participation in South Asian regions. Borsa Istanbul Review, 25(6), 1101–1115. https://doi.org/10.1016/j.bir.2025.06.008

Ali, M., Khattak, M. A., & Alam, N. (2023). Credit risk in dual banking systems: Does competition matter? Empirical evidence. International Journal of Emerging Markets, 18(4), 822–844. https://doi.org/10.1108/IJOEM-01-2020-0035

Alrabiah, A., & Elgammal, M. M. (2018). Optimal regulation of banking system's advanced credit risk management by unified computational representation of business processes across the entire banking system. Cogent Economics & Finance, 6(1), 1486685. https://doi.org/10.1080/23322039.2018.1486685

Anarfo, E. B., Abor, J. Y., & Osei, K. A. (2020). Financial regulation and financial inclusion in Sub-Saharan Africa: Does financial stability play a moderating role? Research in International Business and Finance, 51, 101070. https://doi.org/10.1016/j.ribaf.2019.101070

Atellu, A. R., Muriu, P., & Sule, O. (2021). Do bank regulations matter for financial stability? Evidence from a developing economy. Journal of Financial Regulation and Compliance, 29(5), 514–532. https://doi.org/10.1108/JFRC-12-2020-0114

Ben Bouheni, F. (2014). Banking regulation and supervision: Can it enhance stability in Europe? Journal of Financial Economic Policy, 6(3), 244–269. https://doi.org/10.1108/JFEP-11-2013-0059

Da Silva, M. S., & Divino, J. A. (2013). The role of banking regulation in an economy under credit risk and liquidity shock. The North American Journal of Economics and Finance, 26, 266–281. https://doi.org/10.1016/j.najef.2013.02.005

Djebali, N., & Zaghdoudi, K. (2020). Threshold effects of liquidity risk and credit risk on bank stability in the MENA region. Journal of Policy Modeling, 42(5), 1049–1063. https://doi.org/10.1016/j.jpolmod.2020.01.013

Duygun, M., Ladley, D., & Shaban, M. (2020). Challenges to global financial stability: Interconnections, credit risk, business cycle and the role of market participants. Journal of Banking & Finance, 112, 105735. https://doi.org/10.1016/j.jbankfin.2020.105735

Ferhi, A. (2018). Credit risk and banking stability: A comparative study between Islamic and conventional banks. International Journal of Law and Management, 60(4), 1009–1019. https://doi.org/10.1108/IJLMA-05-2017-0112

Ghenimi, A., Chaibi, H., & Omri, M. A. B. (2017). The effects of liquidity risk and credit risk on bank stability: Evidence from the MENA region. Borsa Istanbul Review, 17(4), 238–248. https://doi.org/10.1016/j.bir.2017.05.002

Goodhart, C. A. E. (2005). Financial Regulation, Credit Risk and Financial Stability. National Institute Economic Review, 192, 118–127. https://doi.org/10.1177/002795010519200111

Hsieh, M., & Lee, C. (2020). Bank Liquidity Creation, Regulations, and Credit Risk. Asia-Pacific Journal of Financial Studies, 49(3), 368–409. https://doi.org/10.1111/ajfs.12295

Kim, T., Koo, B., & Park, M. (2013). Role of financial regulation and innovation in the financial crisis. Journal of Financial Stability, 9(4), 662–672. https://doi.org/10.1016/j.jfs.2012.07.002

Naili, M., & Lahrichi, Y. (2022). The determinants of banks' credit risk: Review of the literature and future research agenda. International Journal of Finance & Economics, 27(1), 334–360. https://doi.org/10.1002/ijfe.2156

Nieto, M. J. (2019). Banks, climate risk and financial stability. Journal of Financial Regulation and Compliance, 27(2), 243–262. https://doi.org/10.1108/JFRC-03-2018-0043

Noman, A. H. Md., Gee, C. S., & Isa, C. R. (2018). Does bank regulation matter on the relationship between competition and financial stability? Evidence from Southeast Asian countries. Pacific-Basin Finance Journal, 48, 144–161. https://doi.org/10.1016/j.pacfin.2018.02.001

Pak, O., & Nurmakhanova, M. (2013). The Effect of Market Power on Bank Credit Risk-Taking and Bank Stability in Kazakhstan. Transition Studies Review, 20(3), 335–350. https://doi.org/10.1007/s11300-013-0297-z

Raberto, M., Ozel, B., Ponta, L., Teglio, A., & Cincotti, S. (2019). From financial instability to green finance: The role of banking and credit market regulation in the Eurace model. Journal of Evolutionary Economics, 29(1), 429–465. https://doi.org/10.1007/s00191-018-0568-2

Rose, C. (2017). The relationship between corporate governance characteristics and credit risk exposure in banks: Implications for financial regulation. European Journal of Law and Economics, 43(1), 167–194. https://doi.org/10.1007/s10657-016-9535-2

Yin, H. (2019). Bank globalization and financial stability: International evidence. Research in International Business and Finance, 49, 207–224. https://doi.org/10.1016/j.ribaf.2019.03.009