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The Role of Country Governance in Achieving the Banking Sector's Sustainability in Vulnerable Environments: New Insight from Emerging Economies

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Abstract: Extant literature suggests that the banking sector's sustainability is achievable by minimizing the risk factors, in particular, credit risk (CR). Despite prior studies, there are fewer attempts to considerably probe the role of country governance settings in managing CR and ultimately achieving sustainability. Therefore, this study aims to test this nexus for the banking sector operating in BRICS developing economies. Specifically, this research attempts to explore whether country governance has a moderator role between CR and the exposure of environments to risk factors. To achieve these objectives, we conduct panel data analysis using the quantile (QR) and fixed effects (FE) estimation methods. The results show that increasing liquidity, profitability, capital requirements, and income diversification lead to decreasing CR, whereas increasing inefficiency causes an increase in CR. In addition, the results reveal that a country's increasing vulnerability to a specific financial risk index (FRI), economic risk index (ERI), and political risk index (PRI); developing capital markets; increasing lending interest rates; and weakening country governance quality is significantly linked to increasing CR. Remarkably, the results underscore that country governance has a significant moderator role, and by enhancing the quality of country governance, the impact of country-specific FRI, ERI, and PRI on CR could be attenuated.

Keywords: banking sector sustainability; credit risk; financial risk; economic risk; political risk; governance; BRICS

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1. Introduction

The banking sector has an essential impact on a country's economic development, and maintaining the stability and the performance of the banking sector are essential responsibilities for policymakers for encouraging investments and enhancing economic growth [1]. Nevertheless, a detrimental effect is expected on economic development by the banking sector if the increases in operation risk, business risk, financial risk, and, in particular, CR (or asset quality deterioration) are not controlled. By increasing CR, the banking sector faces failure and instability, which in turn impedes economic expansion and leads to sluggish economic output [2]. Due to this importance, enhancing the banking sector's sustainability is an essential decision, and policymakers and bank executives using the various channels significantly attempt to minimize the banks' risk factors, particularly CR, to avert failures and instabilities. The role of CR became especially prominent in the sustainability of the banking sector after the worldwide financial mortgage crisis (2008–2009) and COVID-19, during which CR in both developing and advanced countries soared and the banking sector deteriorated.

Remarkably, numerous works, due to the significance of the banking sector's CR, have attempted to investigate the drivers that significantly lead to increasing or decreasing non-performing loans. Understanding the determinants of CR has an important role in averting bank failure and helps raise the sustainability of the banking sector in stimulating economic

development. By reviewing the literature, the factors can be grouped into internal and external. For the banking sector-specific factors, prior studies revealed that liquidity, profitability, inefficiency, size, capital adequacy, and income diversification are the important factors that impact CR. For instance, the work by [3] showed that capital requirements negatively impact the CR of banks. In addition, the works by [4,5] revealed that profitability negatively impacts banks' CR. Furthermore, the works by [6–8] underscored that CR is positively affected by inefficiency. The work by [9] found a positive nexus between liquidity risk and CR. Refs. [10–12] concluded that an increase in income diversification could decrease CR. Moreover, the works by [13–15] revealed that size positively impacts banks' CR.

Additionally, previous works highlighted the significant effect of country-level factors such as capital market development, lending interest rates, and macroeconomic modeling factors such as inflation and economic growth on CR. For instance, the works by [16,17] revealed that GDP growth negatively impacts CR. In addition, the works by [18,19] highlighted that interest rate positively affects CR. Likewise, the works by [20,21] showed that the inflation rate Granger-causes CR, and inflation positively impacts CR. In addition, prior works highlighted that domestic credit [22] and exchange rate [23,24] positively impact CR. Moreover, several works [12,25] found that rising political risk (e.g., by increasing corruption) significantly exacerbates CR.

Several studies indicated the significant effect of country governance on CR. For instance, ref. [26] indicated that enhancing governance quality could lead to decreasing banks' CR. Ref. [9] showed that country governance negatively impacts the CR in Greece and that improving country governance could be a possible approach to curb CR. Ref. [27] found that country governance has a significant role in decreasing the adverse impacts of macroeconomic cycles on the CR of banks operating in Emerging Asia. Ref. [28] uncovered that banks in better-governed environments involve greater risk management and disclosure practices relative to counterparts in MENA economies. Recently, ref. [29] underscored that the dimensions of country governance such as political stability and the absence of violence, regulatory quality, rule of law, and corruption negatively impact the CR of EU banks. Several studies also showed that corporate governance (e.g., board committees, ownership concentration, board independence) has an important role in managing CR.

What about the positive and negative determinants of the banking sector's CR in the context of emerging economies and, in particular, BRICS? BRICS contains the Brazil, Russia, India, China, and South Africa economies, which are five enormous and prominent developing countries of the world. This bloc could contribute enormously to the global economy; however, rising inflation, corruption, and weakening judicial systems are inevitable concerns in some BRICS countries [30,31]. Based on the World Bank DataBank (2004–2021), the banking sector operating in BRICS countries have some specific characteristics. Table 1 shows the average of the banking sector ratios during the period of 2004 to 2021. As illustrated in Table 1, the bank ownership concentration was the highest in South Africa, with an average of 79.944 and 99.191 for the three- and five-bank asset concentration ratios, respectively. Likewise, the bank deposit ratio (% GDP) was the highest in India, with an average of 66.864, whereas Russia had the lowest deposit ratio (% GDP), with an average of 40.210. Furthermore, the central bank asset ratio (% GDP) was the highest in Brazil, with an average of 19.599, whereas the bank Z-score was the highest in China, with an average of 20.068. Remarkably, Table 1 shows that Russia, on average, had the lowest bank deposit ratio (% GDP), central bank asset ratio (% GDP), and bank Z-score relative to other BRICS countries.

Moreover, based on the World Bank DataBank (2004–2021), the governance in the BRICS countries was relatively weak and the average score was −0.264 (out of 2.00). In a weak governance environment, the judicial system is not strengthened; the commitment to the rule of law, regulatory quality, and government effectiveness are relatively lower; and the corruption level is comparatively higher. The relatively weak governance settings in the BRICS countries lead to the banking sector being likely to feature excessively risky decisions made by executives at the expense of depositors. This mostly drives the credit quality to become

lower and CR to increase in such settings. Studies by [25,29] underscored that corruption significantly exacerbates banks' CR. Likewise, the works by [32–35] showed that rising government instability, lack of commitment to the rule of law, and high corruption are significant drivers for the increase in CR. Ref. [36] also revealed that weak judicial empowerment and low bureaucracy quality contribute to rising CR. Moreover, ref. [37] documented that CR can be decreased by enhancing the quality of bureaucracy, strengthening the judicial system, and improving legal enforcement. Furthermore, ref. [33] suggested that a strong commitment by the government to the rule of law leads to decreasing banks' CR.

Table 1. Average banking sector ratios in BRICS countries (2004–2021).

Banking Sector Ratios	Brazil	Russia	India	China	South Africa	BRICS
Bank concentration (%)	62.306	38.741	33.445	58.609	79.944	54.609
Five-bank asset concentration	72.712	48.200	43.760	69.328	99.191	66.638
Bank deposits (% GDP)	58.201	40.210	66.864	49.048	54.744	53.813
Central bank assets (% GDP)	19.599	0.668	4.358	2.633	0.937	5.639
Bank Z-score	16.279	7.338	16.630	20.068	14.427	14.949

Note: Bank concentration (%) is calculated as the assets of the three largest commercial banks as a share of total commercial banking assets; five-bank asset concentration is computed as the assets of the five largest banks as a share of total commercial banking assets; bank deposits (% GDP) is calculated as the total value of demand, time, and saving deposits at domestic deposit money banks as a share of GDP; central bank assets (% GDP) is calculated as the ratio of central bank assets to GDP; bank Z-score measures the possibility of default of a country's commercial banking system.

Considering these characteristics, the banking sector of BRICS countries is an interesting case to study. To the best of our knowledge, this may be the first study aiming to explore the determinants of the banking sector's CR in BRICS countries by considering specifically the role of country governance. The present work attempts to fill the gaps and shed light by answering the following research questions in the context of BRICS: (i) Which banking sector-specific factors impact CR? (ii) How do country governance and country risk influence CR? (iii) Does the country's governance have a moderator role between CR and the country's exposure to FRI, ERI, and PRI?

To achieve these objectives, this work contributes by compiling unique panel data for BRICS developing countries between 2004 and 2021. In particular, we use a unique measurement by the International Country Risk Guide (ICRG) for determining a country's vulnerability to FRI, ERI, and PRI. Based on prior studies [38–40], the ICRG index is comprehensive and precise for gauging countries' exposure to FRI, ERI, and PRI. Furthermore, despite the previous work by [27], which only tested the interaction effect of country governance and macroeconomic factors, this study significantly contributes by probing the interaction impact of country governance with country-specific FRI, ERI, and PRI to explore whether country governance has a moderator role in alleviating the adverse impact of country-specific risks on CR. Moreover, this work makes another contribution by using both the FE and QR panel data estimation approaches to probe this relationship. Compared with Ordinary Least Squares (OLS), the QR results are more reliable in the presence of non-normal errors, heterogeneity, and outliers [41]. QR helps investigate the nexus between factors across a broad spectrum and, in particular, probes whether the determinants influence CR distributions differently at numerous points.

The present work provides results as follows. First, the results show that increasing capital requirements, liquidity, profitability, and income diversification lead to decreased CR, whereas increasing inefficiency leads to increased CR. Second, the results reveal that a country's increased vulnerability to specific FRI, ERI, and PRI; developing capital markets; increasing lending interest rates; and weakening country governance quality are significantly linked to increasing CR. These findings imply that policymakers and bank managers should pay more attention to the significant internal and external factors to control CR, which ultimately helps improve financial stability, the banking sector's sustainability, and the economic activity of the environment. In particular, the results suggest that policymakers should be prepared for an environment with less exposure to FRI, ERI, and PRI by decreasing corruption, decreasing internal and external conflicts, increasing

government stability, decreasing inflation, increasing the budget balance and current account (% GDP), increasing exchange rate stability, and decreasing foreign debt (% GDP). Third, the results underscore that country governance has a significant moderator role and that by enhancing the quality of country governance, the impact of country-specific FRI, ERI, and PRI on CR could be attenuated. This finding suggests that policymakers should be more focused on enhancing country governance quality by strengthening factors such as government effectiveness, regulatory quality, rule of law, and voice and accountability to moderate the effect of country-specific FRI, ERI, and PRI on the banking sector's CR.

The rest of this research is organized as follows. Section 2 presents the materials and methods. Sections 3 and 4 discuss the empirical results, followed by a robustness check. Section 5 concludes the work.

2. Materials and Methods

2.1. Data and Variable Description

This work focused on the entire banking sector in BRICS emerging economies during the 2004–2021 period. The period of study was chosen due to data accessibility and to avert missing observations. In addition, this study followed the findings of the majority of studies, such as [12,17,21,25], and selected the variables presented in Table 2. This study gathered the annual data for the internal and external variables from the websites of the Central Bank and World Bank database. Furthermore, we obtained data for the FRI, ERI, and PRI from the PRS group website. Table 2 reveals the variable descriptions. Following the works by [12,42], this study classified the factors of CR as internal and external. It is noteworthy to mention that based on the PRS group country risk definition, a greater CRI score indicated a lower exposure for a country.

Table 2. Variable descriptions.

Factors	Explanations	Signs	Sources
Banking sector level			
Credit risk	Value of non-performing loans to total value of the loan portfolio ratio (CR)		World Bank
Liquidity	Ratio of bank liquid reserves to bank assets (%) (LIQ/TA)	−	
Capital regulation	Ratio of bank capital to total assets (%) (C/TA)	−	
Profitability	Bank return on assets (ROA)	−	World Bank,
Inefficiency	Bank cost-to-income ratio (%) (C/I)	+	Central Bank
Income diversification	Ratio of bank non-interest income to total income (%) (NI/TI)	−	
Country level			
Country risk	ICRG country risk index (CRI). A country's risk score is calculated based on the PRI, ERI, and FRI and is between 0 and 100, with 0 denoting the highest risk and 100 the lowest risk.	+/−	www.prsgroup.com (accessed on 10 February 2023)
Political risk	The ICRG PRI score is between 0 and 100, with 0 denoting the highest risk and 100 the lowest risk.	+/−	
Economic risk	The ICRG ERI score is between 0 and 50, with 0 showing the highest risk and 50 the lowest risk.	+/−	
Financial risk	The ICRG FRI score is between 0 and 50, with 0 denoting the highest risk and 50 the lowest risk.	+/−	
Capital market development	Ratio of domestic credit provided by the banking sector to GDP (%) (DC/GDP)	+	World Bank
Lending interest rate	The lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector (LIR).	+	
Country governance	World Governance Indicator score (WGI)	−	

Note: Table 2 shows the descriptions of the examined variables.

2.2. Model and Methodology

Before estimating Equation (2), we winsorized the examined factors for each year from the top and bottom 1% to avert the effect of outliers [43–45]. This work used the panel quantile (QR) method to estimate Equation (2) [46]. Using the panel data method helps decrease heterogeneity and multicollinearity issues and additionally increases the efficiency of estimations. More specifically, using the QR helps explain the relation at different points in the conditional distribution of the dependent factor for the estimation of the model. This distinctive characteristic of QR supplies the opportunity to investigate whether the determinants impact CR distributions differently at various points. Furthermore, QR

is superior to OLS because it offers a maximum specification of the data by allowing a covariate's effect on the complete distribution of y to be assessed rather than just its conditional mean. Moreover, the QR shows a complete analysis of the associations between factors across an extensive spectrum. According to the linear model ($y = \beta X' + \varepsilon$), the QR estimator for quantile q minimizes the objective function as:

$$Q\left(\beta_q\right) = \sum_{i:\, y_i \geq X_i'\beta}^{N} q\,|y_i - X_i'\beta_q| + \sum_{i:\, y_i < X_i'\beta}^{N} (1-q)|y_i - X_i'\beta_q| \quad (1)$$

Figure 1 shows the conceptual model of the factors of the CR.

The linear econometric model is presented in Equation (2). As shown, the left-hand side of Equation (2) is the dependent variable (CR) and the right-hand side includes the independent variables. Based on prior studies, the independent variables in this work were classified into banking sector level, namely, liquidity, capital regulation, profitability, inefficiency, and income diversification, and country level, namely, country risk, capital market development, lending interest rate, and country governance.

$$\begin{aligned} CR_{it} = {} & \alpha_0 + \alpha_1 LIQ/TA_{it} + \alpha_2 C/TA_{it} + \alpha_3 ROA_{it} + \alpha_4 C/I_{it} + \alpha_5 NI/TI_{it} \\ & + \alpha_6 CRI_{it} + \alpha_7 DC/GDP_{it} + \alpha_8 LIR_{it} + \alpha_9 WGI_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

where $_{it}$ represents country and time, ε_{it} is an independent error term, CR is credit risk, LIQ/TA is liquidity, C/TA is capital regulation, ROA is profitability, C/I is inefficiency, NI/TI is income diversification, CRI is country risk, DC/GDP is capital market development, LIR is lending interest rate, and WGI is country governance.

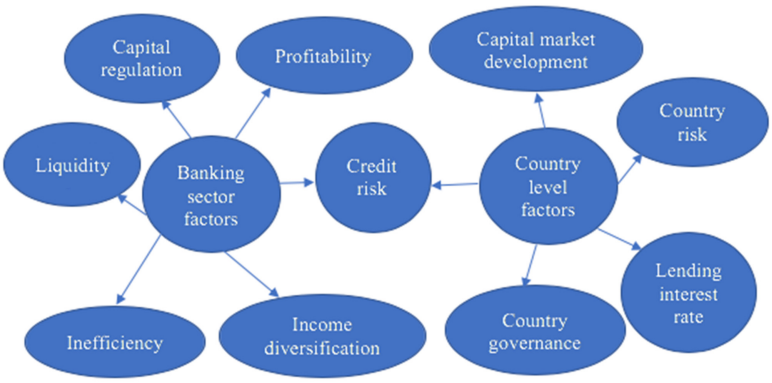

Figure 1. Conceptual model.

3. Results

3.1. Descriptive Summary

Table 3 displays the descriptive results of the variables and shows that China and Russia, with a median (average) of 1.779 (3.161) and 7.483 (6.797), respectively, had the lowest and highest CR, respectively. Likewise, Table 3 shows that Russia, with a median of 31.106, 11.143, 63.165, and 59.676, had the highest LIQ/TA, C/TA, C/I, and NI/TI, respectively. Table 3 also reveals that Russia and China had the lowest DC/GDP and LIR, with a median of 46.640 and 5.445, respectively. Furthermore, it shows that China, with a median of 74.334 (CRRI), was the least vulnerable country, whereas South Africa, with a median of 69.384, was the most vulnerable country. The median value of −0.738 for WGI also shows that Russia had the lowest quality of governance among the BRICS economies. Moreover, Table 3 indicates that South Africa, with a median of 66.542, had the least politically unstable environment. On the other hand, China, with a median of 40.002 and 47.475, had the least economically and financially unstable environment.

Table 3. Descriptive summary (2004–2021).

	NPL/TL		LIQ/TA		C/TA		ROA		C/I		NI/TI	
BRICS	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
Brazil	3.188	3.109	25.668	25.173	10.083	10.091	1.533	1.539	58.665	57.633	34.921	32.755
Russia	6.797	7.483	29.213	31.106	11.207	11.143	1.087	0.832	71.996	63.165	62.373	59.676
India	5.513	4.773	10.124	11.231	7.104	7.094	0.773	0.978	47.404	47.242	31.599	30.131
China	3.161	1.779	11.223	11.245	6.982	6.601	0.947	0.963	36.985	36.364	17.105	15.719
South Africa	3.564	3.685	10.435	9.420	7.711	7.900	1.149	1.159	57.713	57.909	46.156	46.216
Overall	4.444	3.483	12.920	8.941	8.617	8.311	1.098	1.004	54.553	54.866	38.431	35.909
	DC/GDP		**LIR**		**CRI**		**WGI**					
BRICS	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**				
Brazil	54.820	59.851	41.938	43.658	69.653	69.794	−0.084	−0.100				
Russia	45.561	46.640	10.531	10.493	71.778	71.943	−0.727	−0.738				
India	49.040	50.249	10.388	10.209	69.410	69.727	−0.221	−0.206				
China	137.505	131.617	5.322	5.445	74.671	74.334	−0.482	−0.551				
South Africa	69.091	67.912	10.194	10.104	69.685	69.384	0.195	0.189				
Overall	71.203	60.093	15.674	10.209	71.042	70.863	−0.264	−0.235				
	PRI				**ERI**				**FRI**			
BRICS	**Mean**		**Median**		**Mean**		**Median**		**Mean**		**Median**	
Brazil	65.717		66.206		35.186		35.793		38.414		38.935	
Russia	61.331		60.726		38.616		39.622		43.645		44.331	
India	61.333		61.456		34.523		35.164		42.976		43.147	
China	62.033		61.019		40.224		40.002		47.133		47.475	
South Africa	66.536		66.542		34.335		33.663		38.445		38.541	
Overall	63.388		63.394		36.576		36.394		42.122		42.393	

Note: Table 3 reveals the summary statistics of the variables.

Table 4 displays the average scores of the WGI components. As seen, Russia, with a mean of −0.955 and −0.341, had the highest corruption and lowest government effectiveness environment, respectively. South Africa, with a mean of −0.133 and 0.636, had the most politically stable environment and the highest voice and accountability, respectively, compared to other countries. Furthermore, Table 4 shows that Russia, with a mean of −0.375 and −0.854, had the lowest regulatory quality and the weakest rule of law, respectively, whereas South Africa, with a mean of 0.346 and 0.025, had the highest regulatory quality and the strongest rule of law, respectively. Overall, Table 4 suggests that the BRICS countries should enhance governance quality through various practices such as decreasing corruption, enhancing government effectiveness, increasing political stability and decreasing violence, increasing regulatory quality and voice and accountability, and strengthening the rule of law.

Table 4. Average scores of WGI components (2004–2021).

BRICS	Corruption	Government Effectiveness	Political Stability and Absence of Violence/Terrorism	Regulatory Quality	Rule of Law	Voice and Accountability
Brazil	−0.216	−0.242	−0.278	−0.003	−0.212	0.446
Russia	−0.955	−0.341	−0.875	−0.375	−0.854	−0.962
India	−0.377	0.036	−1.053	−0.318	0.002	0.383
China	−0.383	0.248	−0.466	−0.271	−0.403	−1.619
South Africa	0.065	0.232	−0.133	0.346	0.025	0.636

Figure 2 reveals that the global financial crisis significantly triggered the BRICS banking sector's CR and led to a substantial increase in non-performing loans in 2008–2009. Figure 2 also shows that CR soared between 2014 and 2018 after declining between 2009 and 2013. The increases in CR are explained by the excessive inflation and the regulation and policy risks in the BRICS environment [47]. Meanwhile, many operating industries in BRICS, such as telecom, steel, textile, and infrastructure, faced significant financial and operational stress, which eventually had an adverse spillover effect on the performance and financial stability of the banking sector. Moreover, Figure 2 highlights the opposite co-movement between CR and WGI, implying that CR decreased by improving WGI and vice versa.

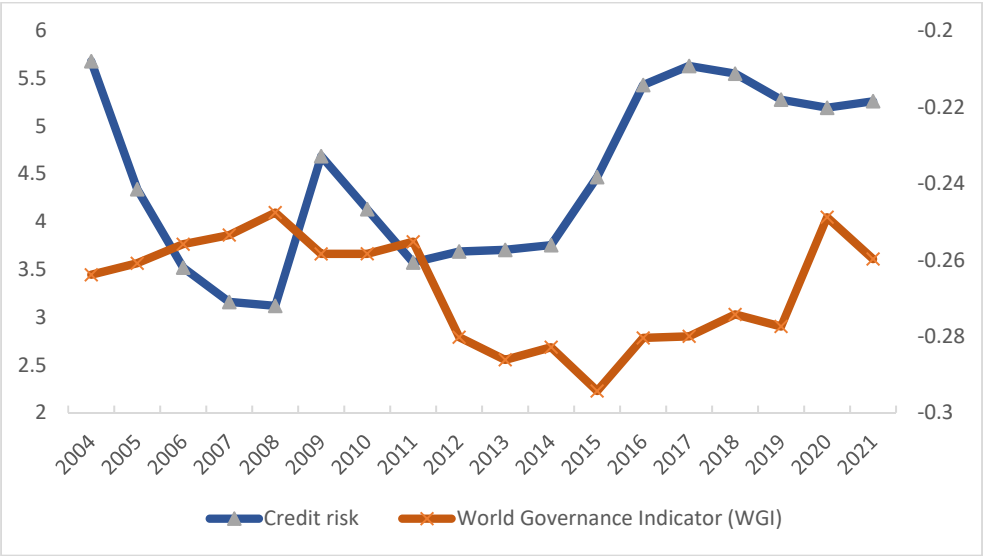

Figure 2. Credit risk (CR) and WGI.

Table 5 reveals the correlation matrix and variance inflation factors (VIF). Table 5 implies that the proposed model was considerably free from the multicollinearity problem (VIF < 5), and we could include the examined variables simultaneously in Equation (2).

Table 5. Correlation matrix.

	LIQ/TA	C/TA	ROA	C/I	NI/TI	CRI	DC/GDP	LIR	WGI	VIF
LIQ/TA	1.000									1.09
C/TA	0.024	1.000								1.22
ROA	0.014	0.104 *	1.000							1.24
C/I	0.251 *	0.102 *	0.092	1.000						1.11
NI/TI	0.224 *	0.166 *	0.045	0.125 *	1.000					1.12
CRI	−0.177 *	0.001	0.217 *	−0.009	−0.252 *	1.000				1.08
DC/GDP	−0.145 *	−0.152 *	−0.126 *	−0.122 *	−0.114 *	0.178 *	1.000			1.05
LIR	0.106 *	0.195 *	0.115 *	0.145 *	−0.015	−0.225 *	−0.171 *	1.000		1.16
WGI	0.226 *	−0.012	−0.137 *	−0.021	0.036	−0.206 *	0.143 *	−0.132 *	1.000	1.13

Note: * is statistically significant at 1%.

3.2. Estimation Results

This study performed the pre-estimation unit root test to probe the stationarity of determinants. To do so, we followed the prior studies by [44,45] and applied the panel unit root methods recommended by [48,49]. As presented in Table 6, the results show that the determinants were stationary after taking the first difference I(1).

Table 6. Unit root test results.

Variables	Panel (A): Levin–Lin–Chu (2002) [48]		Panel (B): Im–Pesaran–Shin (2003) [49]	
	With Trend	With Cross-Sectional Dependence	With Trend	With Cross-Sectional Dependence
NPL/TL	5.352 *	−10.442 *	−3.649 *	−12.462 *
LIQ/TA	−6.332 *	−6.522 *	−11.643 *	−7.255 *
C/TA	−5.243 *	−5.441 *	−7.451 *	−6.363 *
ROA	−10.423 *	−11.264 *	−6.325 *	−4.534 *
C/I	−9.352 *	−7.425 *	−5.542 *	−8.122 *
NI/TI	−11.414 *	−9.537 *	−4.316 *	−4.661 *
CRI	−12.525 *	−7.344 *	−7.502 *	−6.346 *
DC/GDP	−8.236 *	−5.155 *	−2.754 **	−4.224 *
LIR	−11.342 *	−8.241 *	−3.431 *	−6.653 *
WGI	−8.534 *	−7.467 *	−5.244 *	−8.437 *

Note: Table 6 reveals the panel unit root test results of the examined factors. The null hypothesis of the Levin–Lin–Chu (LLC) and Im–Pesaran–Shin (IPS) unit root tests is that the panels include unit roots. The symbols * and ** show statistical significance at the 1% and 5% levels, respectively.

Table 7 reveals the factors of the CR for the different quantiles. The estimation results show that LIQ/TA and C/TA had a significant negative impact on CR in BRICS economies. According to the "moral hazard" assumption, banks holding smaller amounts of capital prefer to make excessive risk-taking decisions, which eventually leads to an increase in non-performing loans [50]. This finding is in line with previous works [11,51], which showed that decreasing capital regulation and liquidity leads to increased CR.

Likewise, the results imply that increasing ROA led to decreasing CR in BRICS countries, supporting a previous study [10]. Consistently, the work by [38] underscored that larger-sized banks are more likely to be more profitable, more diversified, and more engaged with risk management practices, which ultimately leads to decreasing CR. However, Table 7 shows that C/I positively impacted CR and that it had a significant effect in the 0.75 (Q.75 = 0.103) and 0.95 (Q.95 = 0.112) quantiles. This finding confirms the bad management assumption, indicating that banks with high inefficiency are likely to have high

non-performing loans. Consistently, the work by [6] confirmed the positive impact of inefficiency on CR. Furthermore, Table 7 highlights that NI/TI had a negative impact on the CR in BRICS countries, but the effect was only significant in the 0.25 (Q.25 = −0.326) and 0.50 (Q.50 = −0.442) quantiles. Based on the diversification assumption and prior works [12,52], banks with portfolio diversification practices could impede increases in CR.

Table 7. Determinants of the credit risk (2004–2021).

Explanatory Factors	Quantile Estimated Coefficients			
	Q.25	**Q.50**	**Q.75**	**Q.95**
LIQ/TA	−0.072 *	−0.061 *	−0.076 **	−0.064 *
	(0.001)	(0.000)	(0.033)	(0.002)
C/TA	−0.033 **	−0.021	−0.043 *	−0.038 ***
	(0.025)	(0.324)	(0.000)	(0.084)
ROA	−0.368	−0.453 **	−0.644 *	−0.521 **
	(0.327)	(0.031)	(0.002)	(0.045)
C/I	0.095	0.052	0.103 **	0.112 *
	(0.242)	(0.441)	(0.027)	(0.001)
NI/TI	−0.326 **	−0.442 *	−0.225	−0.237
	(0.036)	(0.001)	(0.317)	(0.422)
CRI	−0.109 *	−0.116 **	−0.124 *	−0.135 ***
	(0.001)	(0.024)	(0.002)	(0.074)
DC/GDP	0.015 **	0.011 ***	0.008	0.018 *
	(0.042)	(0.072)	(0.244)	(0.001)
LIR	0.092 ***	0.078	0.124 *	0.143 **
	(0.064)	(0.252)	(0.000)	(0.026)
WGI	−0.025 ***	−0.031 **	−0.042 *	−0.037 **
	(0.087)	(0.017)	(0.002)	(0.041)
Time dummy	✓	✓	✓	✓
Country dummy	✓	✓	✓	✓
FC dummy	✓	✓	✓	✓

Note: Table 7 reveals the factors of credit risk using Equation (2). FC is the global financial crisis dummy variable, which equaled 1 in 2008 and 2009. *p*-values are reported in parentheses. *, **, and *** show the significance level at 1%, 5%, and 10%, respectively.

In addition, Table 7 reveals that the CR was influenced by the CRI and that the coefficients were negative and statistically significant in different quantiles. In particular, the estimation results highlight that CRI had a gradually adverse impact (Q.25 = −0.109, Q.50 = −0.116, Q.75 = −0.124, Q.95 = −0.135) on CR. This indicates that an increase in a country's exposure to specific FRI, ERI, and PRI has the most positive outstanding impact on the banking sector of environments with a higher level of CR. Our result confirms previous works [24,25], in which the findings stress the significant role of environmental characteristics in explaining CR. In other words, their findings underlined that the increases in CR are associated with the increasing exposure of economies to PRI (e.g., rising corruption, having an inefficient legal system), ERI (e.g., increasing inflation, decreasing GDP), and FRI (e.g., increasing exchange rate instability).

Moreover, Table 7 shows that DC/GDP and LIR were significant drivers that led to increased CR in BRICS. In line with prior work [53], our result implies that by developing a capital market and increasing the lending interest rate, banks are more likely to be exposed to higher CR, and the use of applicable CR practices is necessary to alleviate CR in such environments. The results also show that the WGI had a statistically significant negative effect, indicating that enhancing governance quality could lead to decreasing the CR. This result also supports prior works [26,28,29], in which the findings underline the important role of country governance in controlling CR.

3.3. Further Analysis: Does Country Governance Have a Moderator Role?

Table 8 reveals the interaction impact of country-specific FRI, ERI, and PRI and country governance on CR using the FE with the cluster-robust standard error approach (using the fixed effects model controls for all time-invariant differences between the individuals. Therefore, the estimated coefficients cannot be biased due to omitted time-invariant characteristics).

Table 8. The interaction effect of country-specific risks and country governance on credit risk (2004–2021).

Explanatory Factors	Financial Risk Index (FRI)	Economic Risk Index (ERI)	Political Risk Index (PRI)
CRI	−0.043 **	−0.113 ***	−0.134 **
	(0.015)	(0.078)	(0.026)
WGI	−0.019	−0.024 *	−0.018
	(0.436)	(0.001)	(0.132)
CRI × WGI	0.003 ***	0.014 **	0.025 *
	(0.065)	(0.023)	(0.001)
Banking sector-specific variables	✓	✓	✓
Country-level variables	✓	✓	✓
Time dummy	✓	✓	✓
Country dummy	✓	✓	✓
FC dummy	✓	✓	✓
Adj.R^2	0.46	0.38	0.42
CD test (*p*-value)	(0.322)	(0.415)	(0.356)

Note: Table 8 reveals the estimation results using FE with the cluster-robust standard error approach. *p*-values are reported in parentheses. *, **, and *** show the significance level at 1%, 5%, and 10%, respectively.

As seen, the results reveal that FRI, ERI, and PRI were significant factors of CR. This supports previous works, which showed that decreases in financial risk (e.g., a decrease in the real effective exchange rate) [50] and economic risk (e.g., by increasing GDP) [30] could lead to decreases in CR. Consistently, prior studies highlighted that increasing political risk through rising corruption, weak judicial empowerment, and low bureaucracy quality could also lead to increased CR [12]. Several studies [33,37] stressed that CR could be controlled by increasing political stability by strengthening the judicial system, improving legal enforcement, and committing to the rule of law. Recently, the work by [54] revealed that an increase in economic risk and political risk stimulates risk-taking in the banking sector worldwide, which leads to a reduction in banking sector stability and eventually an increase in bad loans. Overall, the results reveal that increasing FRI, ERI, and PRI is significantly associated with increasing CR in BRICS environments.

Remarkably, as shown in Table 8, the interaction coefficients (CRI*WGI) were positive and significant for FRI, ERI, and PRI. This indicates that WGI has a significant moderator role and that by enhancing the quality of country governance, the degree of the effect of country-specific risks on CR could be attenuated. In other words, the extent of the impact of country-specific FRI, ERI, and PRI on CR could be moderated by improving country governance quality in BRICS. In accordance with this, the work by [27] implied that country governance has a significant role in decreasing the adverse impacts of macroeconomic cycles on the CR of banks operating in Emerging Asia. Ref. [28] also uncovered that banks in better-governed environments involve greater risk management relative to their counterparts in MENA economies. As revealed in Table 8, the post-estimation CD test (cross-sectional dependence test) accepted the null hypothesis that there is no cross-section, confirming that the results are robust.

4. Robustness Checks

The present work performed several robustness checks to confirm the consistency of the estimated results. First, we re-estimated Equation (2) by using the new proxies of the ratio of bank regulatory capital to risk-weighted assets (REQ/RWA) for calculating

capital regulation, bank return on equity (ROE) for gauging profitability, and the ratio of bank overhead costs to total assets (OC/TA) for calculating inefficiency factors. Second, we estimated Equation (2) by using alternative methods of FE by clustering standard errors (by controlling the possible cross-sectional and heteroscedasticity concerns, the FE model with the Driscoll–Kraay standard error is also performed, the similar results of which are not reported for the sake of space) to probe the reliability of the estimated results. Remarkably, the work by [55] discussed that the estimation results using the FE with the cluster-robust standard error are reliable for serial correlation and heteroskedasticity. In probing the soundness of the estimated models using the FE, the cross-sectional dependence (post-estimation test (CD test) [56]) was also applied. Third, this study estimated Equation (2) by adding a COVID-19 dummy variable, which equaled 1 for 2020 and 2021 and 0 otherwise. Tables 9 and 10 reveal the robustness estimation results.

Table 9. Robustness results I.

Explanatory Factors	**Quantile Estimated Coefficients**				**Fixed Effects**
	Q.25	**Q.50**	**Q.75**	**Q.95**	**Coefficients**
LIQ/TA	−0.012	−0.018 *	−0.014	−0.022 **	−0.017 **
	(0.348)	(0.000)	(0.433)	(0.042)	(0.011)
REQ/RWA	−0.054	−0.117 ***	−0.106	−0.101	−0.046
	(0.264)	(0.054)	(0.228)	(0.144)	(0.427)
ROE	−0.225 *	−0.287 **	−0.124	−0.395 ***	−0.338 *
	(0.002)	(0.026)	(0.518)	(0.083)	(0.000)
OC/TA	0.011	0.016 **	0.026 **	0.014 ***	0.038 **
	(0.362)	(0.033)	(0.041)	(0.059)	(0.027)
NI/TI	−0.012	−0.035 ***	−0.037 **	−0.011	−0.012
	(0.338)	(0.074)	(0.029)	(0.226)	(0.183)
CRI	−0.128 *	−0.181 **	−0.223 ***	−0.286 *	−0.324 **
	(0.000)	(0.042)	(0.055)	(0.001)	(0.038)
DC/GDP	0.022 **	0.011	0.013	0.038 **	0.009
	(0.017)	(0.314)	(0.339)	(0.032)	(0.185)
LIR	0.128 **	0.116 ***	0.084	0.143 **	0.032 **
	(0.028)	(0.058)	(0.341)	(0.037)	(0.018)
WGI	−0.019 *	−0.022 *	−0.028 ***	−0.031 **	−0.036 **
	(0.000)	(0.001)	(0.072)	(0.029)	(0.036)
Time dummy	✓	✓	✓	✓	✓
Country dummy	✓	✓	✓	✓	✓
FC dummy	✓	✓	✓	✓	✓
COVID-19 dummy	✓	✓	✓	✓	✓
Adj.R^2	---	---	---	---	0.51
CD test (*p*-value)	---	---	---	---	(0.439)

Note: Table 9 reveals the robust results of Equation (2) using the quantile and FE methods. *p*-values are reported in parentheses. *, **, and *** show the significance level at 1%, 5%, and 10%, respectively.

As shown, the results are consistent after the various modifications were considered, and they suggest that the CR in the BRICS is affected by internal and external factors. In particular, the results uncovered that increasing LIQ/TA, REQ/RWA, ROE, and NI/TI have a significant role in managing CR in BRICS, whereas OC/TA has the opposite impact. Likewise, the results revealed that a country's increased exposure to specific FRI, ERI, and PRI; development of the DC/GDP; increasing LIR; and weakening WGI lead to increased CR in BRICS.

Consistently, prior studies stressed the significant role of governance in managing CR. For instance, ref. [57] showed that larger boards and older CFOs lead to decreased CR in commercial banks. Ref. [58] uncovered that higher board members, board independence, and the presence of foreign directors lead to lowered CR. Ref. [59] found that increasing environmental, social, and governance knowledge leads to decreased CR. Ref. [60] found that enhancing the governance by the composition of the board of directors, board committees,

and ownership concentration leads to decreased CR. Ref. [61] also found that elevating the inside directors is linked with lesser CR exposure.

Table 10. Robustness results II.

Explanatory Variables	Financial Risk Index (FRI)	Economic Risk Index (ERI)	Political Risk Index (PRI)
CRI	−0.023	−0.126 **	−0.162 **
	(0.437)	(0.029)	(0.041)
WGI	−0.016 **	−0.018	−0.013
	(0.039)	(0.266)	(0.348)
CRI × WGI	0.003 ***	0.011 *	0.032 **
	(0.074)	(0.000)	(0.038)
Banking sector-specific variables	✓	✓	✓
Country-level variables	✓	✓	✓
Time dummy	✓	✓	✓
Country dummy	✓	✓	✓
FC dummy	✓	✓	✓
COVID-19 dummy	✓	✓	✓
Adj.R^2	0.47	0.41	0.44
CD test (*p*-value)	(0.369)	(0.377)	(0.395)

Note: Table 10 reveals the robust results using the FE approach. *p*-values are reported in parentheses. *, **, and *** denote the significance level at 1%, 5%, and 10%, respectively.

Moreover, the results show that CRI has a progressive impact on CR and that the degree of the effect of country-specific FRI, ERI, and PRI on CR is moderated by improving country governance quality. As revealed in Tables 9 and 10, the post-estimation CD test (cross-sectional dependence test) accepted the null hypothesis that there is no cross-section, indicating that the results are robust.

5. Conclusions

Although some works have examined the factors of CR in advanced and developing countries, less attention has been paid to the context of BRICS emerging countries. In particular, there is a gap in carefully examining the impact of country governance; country-specific FRI, ERI, and PRI; and its interaction with CR in BRICS environments in particular. Hence, the present work fills this gap by focusing on the banking sector in BRICS countries using the FE and QR estimation approaches for the period between 2004 and 2021.

The results reveal that increasing liquidity, profitability, capital regulation, and income diversification led to decreased CR, whereas increasing inefficiency led to increased CR. Likewise, the results show that a country's increased vulnerability to specific FRI, ERI, and PRI; developing capital markets; increasing lending interest rates; and weakening country governance quality were significantly linked to increased CR. Furthermore, the results highlight that country governance had a significant moderator role and that by enhancing the quality of country governance, the degree of the effect of country-specific FRI, ERI, and PRI on CR could be attenuated.

The results have significant implications. First, the findings imply that bank managers should pay more attention to the significant factors at the internal level to manage CR in the banking sector. In particular, bank managers should be focused on increasing liquidity, profitability, capital regulation, income diversification, and efficiency to curb CR, which eventually helps enhance financial stability. Second, the findings imply that policymakers should pay more attention to the significant factors at the external level to control CR in the banking sector. In particular, policymakers should be focused on decreasing the country's exposure to FRI, ERI, and PRI; lowering lending interest rates; and strengthening country governance quality to control CR in the banking sector, which ultimately helps the banking sector's sustainability and the economic growth of environments. Third, the findings recommend that policymakers and practitioners should prepare an environment

with efficient settings through various channels, such as by decreasing corruption, decreasing internal and external conflicts, increasing government stability, decreasing inflation, increasing budget balance and current accounts (% GDP), increasing exchange rate stability, and decreasing foreign debt (% GDP) to make BRICS countries less exposed to the FRI, ERI, and PRI. Furthermore, the findings imply that regulators and practitioners should be focused on enhancing country governance quality by strengthening government effectiveness, regulatory quality, rule of law, and voice and accountability to moderate the effect of country-specific FRI, ERI, and PRI on CR.

Further studies should be carried out on the moderator role of country governance for other countries and regions to provide a broader picture. Furthermore, further studies should be conducted to test this nexus by using the alternative dynamic panel estimation approach to control the possible endogeneity issue. In addition, as suggested by [62], it would be useful to test the reliability of the results by choosing a different time frequency (e.g., daily, weekly, monthly). Moreover, further studies could be performed to investigate the role of the components of country governance and corporate governance [63] in controlling the banking sector's CR and achieving sustainability.

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