



Climate Risk Governance, Supervisory Preparedness, and Bank Resilience in Iraq: An Empirical Assessment

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Abstract

This paper examines how climate risk exposure; climate risk governance and supervisory preparedness influence bank resilience in Iraq. Employing a quantitative cross-sectional design, and a working sample of (260) banking professionals; the proposed links are assessed through partial least squares structural equation modelling (PLS-SEM). The results indicate that climate risk exposure negatively affects bank resilience ($\beta = -0.22$, $p = 0.004$) while positively influencing climate risk governance ($\beta = 0.47$, $p < 0.001$). Climate risk governance has a positive effect on bank resilience ($\beta = 0.33$, $p < 0.001$); and supervisory preparedness also contributes positively to resilience ($\beta = 0.26$, $p = 0.002$). In addition; climate risk governance partially mediates the relationship between climate risk exposure and bank resilience ($\beta = 0.16$, $p < 0.001$) while supervisory preparedness strengthens the positive effect of climate risk governance on resilience ($\beta = 0.13$, $p = 0.028$). The model shows (45%) of the variance in bank resilience. These results highlight the complementary roles of internal governance; and external supervision in strengthening banks capacity to manage climate-related financial risks. This research contributes empirical evidence from an under-researched climate-vulnerable, and oil-dependent banking environment, and offers practical implications for Iraqi banks and the Central Bank of Iraq.

Keywords: Climate Risk Governance; Supervisory Preparedness; Bank Resilience; Climate Risk Exposure; Iraqi Banking Sector; PLS-SEM.

1. INTRODUCTION

Climate change is emerging as a significant source of financial risk for the banking sector due to the potential impact of physical and transition risks on various aspects of the banking system. Research studies have linked climate risk to the stability of banks, the credit risk of banks, the quality of loans that banks issue, and the overall vulnerability of the financial system. However, the quality of the governance and supervision of banks can mitigate the impact of climate risk. As a result, the risks associated with climate change are being recognized as drivers of conventional banking risks (Le et al., 2023; Fan et al., 2024; Zhang et al., 2024; Wu et al., 2024; Abinzano et al., 2026; BCBS, 2022).

Much of the existing literature has examined the financial consequences of climate risk. Less attention, however, has been given to the mechanisms that may strengthen the resilience of financial institutions to climate risk. Such mechanisms include climate risk governance and the supervisory preparedness of banking supervisory authorities (e.g., BCBS, 2022; Redondo & Aracil, 2024).

Iraq can be considered an important setting for the above analyses. The country faces rising temperatures, drought, and water scarcity while also being dependent upon oil revenues. Such conditions leave the country vulnerable both physically and financially. The Central Bank of Iraq has begun creating a sustainable-finance framework for the country through its Sustainable Finance Roadmap for 2023 to 2029 and various ESG initiatives. It is, however, unclear whether or not such frameworks have created resilience within Iraqi banks (Naser, 2026).

This study investigates the relationships among climate risk exposure, climate risk governance, supervisory preparedness, and bank resilience in the Iraqi banking sector. It investigates whether climate risk governance mediates the effect of climate risk exposure on bank resilience and whether supervisory preparedness strengthens the contribution of climate risk governance. By offering empirical evidence from an under-researched banking

system, the study contributes to the climate-finance literature by extending the focus beyond the direct effects of climate risk to the institutional mechanisms that may enhance resilience.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 Climate Risk Exposure, Governance, and Bank Resilience

Banks face two primary climate-related risk categories which include physical damage and transition-related impacts. Physical events create three main types of damage to borrowers because their income stream becomes unstable and their collateral loses its value and their business operations suffer interruptions. The financial status of companies and their asset holdings face potential changes because of transition demands which stem from regulatory shifts and technological progress and energy market developments and policy transformations (BCBS, 2022; Ge et al., 2024). The described effects will develop into standard banking risks which include credit risk and market risk and liquidity risk and operational risk.

Research in the international domain has verified that this particular transmission system operates successfully. Le et al. (2023) conducted their research on 6,433 commercial banks which operated in 109 different countries to discover that banks face stability problems because of climate risk exposure which affects their operations. The research by Fan et al. (2024) demonstrated that climate change leads to rising non-performing loans because it creates negative effects which reduce borrower ability to generate income and their ability to repay loans. Research shows that loan quality becomes worse because of physical dangers and transition risks which lead to higher bank credit risk and systemic risk in the banking system (Zhang et al., 2024; Wu et al., 2024; Bellinvia et al., 2025). The research indicates that banks face reduced shock absorption abilities because they experience increased exposure to climate-related dangers.

The rising climate threats require organizations to develop enhanced internal management systems which focus on risk-handling procedures and governance structures. The process of climate risk governance demands organizations to discover essential risk factors while they define which executives should handle these risks and they need to enhance their climate data quality and they must include climate variables in their credit and risk evaluation systems and they need to track their risk points throughout all time periods. Redondo and Aracil (2024) show that credit risk management needs to combine climate risk management through their four essential elements which include drivers and data and tools and pricing systems. The BCBS (2022) demands banks to create governance systems and internal controls and risk management systems and reporting systems which handle important climate-related financial risks.

Accordingly, the following hypotheses are proposed:

H1. Climate risk exposure has a negative effect on bank resilience.

H2. Climate risk exposure has a positive effect on climate risk governance.

2.2 Climate Risk Governance and Bank Resilience

Climate risk governance functions as an institutional system which allows banks to detect climate-related financial risks while performing their assessment and monitoring activities and risk response operations. The BCBS (2022) report establishes that governance works best when boards and senior management staff maintain clear responsibility while organizations collect trustworthy data which they use for risk measurement and internal reporting and scenario analysis and they combine climate assessment with their standard risk management operations.

Research evidence shows that governance systems function to boost organizational strength against external challenges. The research by Le et al. (2023) demonstrates that better institutional governance together with supervision and regulatory quality standards help banks minimize the negative impact which climate risk creates on their financial stability. Redondo and Aracil (2024) argue that climate-related credit risk management reaches its highest level of effectiveness through the combination of trustworthy data with proper risk assessment and suitable pricing systems and analytical methods. The research by Pozdyshev et al. (2025) shows that banks can include physical climate risks in their credit risk models when they achieve sufficient analytical abilities and institutional development. Research from various countries shows that financial institutions become stronger and more resistant to climate change when they actively work to manage climate-related risks (Chalabi-Jabado & Ziane, 2024).

The research findings indicate that climate risk governance serves two purposes to enhance bank resilience and it operates as a system which turns climate exposure into bank actions. Organizations tend to develop better governance systems when they experience higher climate exposure because these systems help organizations

protect themselves against climate hazards. Research into climate-related financial mechanisms shows that organizations can use their institutional structures to change how climate risks affect financial system stability (Fan & Gao, 2024).

Accordingly, the following hypotheses are proposed:

H3. Climate risk governance has a positive effect on bank resilience.

H5. Climate risk governance mediates the relationship between climate risk exposure and bank resilience.

2.3 Supervisory Preparedness and Bank Resilience

Supervisory preparedness enables financial authorities to detect climate-related financial threats which they must track and handle through established regulatory standards and their data reporting systems and their risk evaluation processes and their predictive supervisory systems. International guidance documents need these particular skills because they have become vital for proper operational functioning. The Basel Committee on Banking Supervision requires supervisors to assess whether banks adequately incorporate material climate-related risks into governance and risk-management systems, while climate scenario analysis is increasingly viewed as an important tool for assessing institutional resilience under alternative climate pathways (BCBS, 2022, 2024b). The Financial Stability Board (FSB, 2022) establishes climate-related information together with system assessment and scenario evaluation and stress testing as vital components which supervisors must use for their proper functioning.

The process of supervisory readiness helps banks develop better defense mechanisms through their ability to detect weak spots at first and their requirement to maintain uniform risk control methods throughout all financial organizations. The NGFS (2020) requires financial institutions to include climate-related risks into their prudential supervision systems which cover governance structures and risk management approaches and supervisory standards and training programs. The MENA region shows that climate threats create bank financial instability which proves that banking systems need strong institutional frameworks and supervisory bodies to operate safely in vulnerable banking environments (Shabir et al., 2024).

The Central Bank of Iraq established the Sustainable Finance Roadmap 2023–2029 which made this role essential because it created a formal system to integrate sustainability and climate-related elements into banking operations (CBI, 2023). The direct effects of supervisory readiness create an environment which allows internal climate risk governance to operate more successfully. Banks will adopt risk-management practices through their governance policies when supervisors establish particular requirements which include specific reporting systems and tracking systems.

Accordingly, the following hypotheses are proposed:

H4. Supervisory preparedness has a positive effect on bank resilience.

H6. Supervisory preparedness positively moderates the relationship between climate risk governance and bank resilience.

3. METHODOLOGY

3.1 Research Design and Sample

This research uses a quantitative cross-sectional approach to study how climate risk exposure relates to climate risk governance and supervisory readiness and bank stability within Iraqi banking institutions. The research team collected data through a structured questionnaire which banking staff members from public and private banks used to answer questions about their work in risk management and credit and compliance and auditing and financial operations and managerial roles. The research team chose these respondents because they understood banking risk management systems together with all bank regulatory requirements and governance systems.

A purposive sampling approach is employed to ensure that participants possess relevant professional knowledge. The research team obtained 260 valid responses which proved sufficient to support the proposed PLS-SEM model that studies direct and mediating and moderating relationships. PLS-SEM serves as the right tool for models which predict results through multiple hidden variables that create indirect pathways (Hair et al., 2022; AL-Mamoori, 2026).

3.2 Measurement of Constructs

The questionnaire assesses four hidden dimensions which include climate risk exposure (CRE) and climate risk governance (CRG) and supervisory preparedness (SP) and bank resilience (BR). The research team adopted measurement items from current empirical research and worldwide accepted climate-risk frameworks which

include the Basel Committee on Banking Supervision and the Network for Greening the Financial System (BCBS, 2022; NGFS, 2020).

The banking industry uses CRE to measure their vulnerability against two main risk categories which include physical damage and transition-related threats that impact their loan recipients and their security assets and their business functions and their monetary status. CRG evaluates how management takes responsibility while they identify risks and handle climate-related data and they monitor these aspects and combine them with standard risk management systems. SP conducts evaluations of regulatory guidelines together with supervisory monitoring systems and reporting requirements and the abilities of supervisors who oversee these activities. BR shows how banks assess their capacity to defend their asset quality and liquidity and financial stability and operational stability during challenging market situations.

All items are measured using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The instrument is subject to expert review and pilot testing to assess clarity, relevance, and content validity before full application.

Table 1. Measurement Constructs and Items

Construct	Code	Measurement Item	Main Source
Climate Risk Exposure (CRE)	CRE1	Physical climate events can adversely affect the financial condition of our bank's borrowers.	BCBS (2022); Le et al. (2023)
	CRE2	Climate-related events can increase credit risk and loan repayment difficulties.	Fan et al. (2024)
	CRE3	Climate-related disruptions may affect the value of collateral securing bank loans.	BCBS (2022)
	CRE4	Changes in environmental regulations and energy markets may affect the financial position of our bank's customers.	BCBS (2022)
	CRE5	Climate-related risks may create significant financial and operational exposure for our bank.	BCBS (2022)
Climate Risk Governance (CRG)	CRG 1	Our bank clearly assigns responsibility for managing climate-related financial risks.	BCBS (2022)
	CRG 2	Climate-related risks are considered within our bank's risk-management policies and procedures.	BCBS (2022)
	CRG 3	Our bank identifies and monitors material climate-related exposures across borrowers and sectors.	BCBS (2022); Redondo & Aracil (2024)
	CRG 4	Climate-related information is incorporated into relevant risk assessment and decision-making processes.	BCBS (2022)
	CRG 5	Senior management receives sufficient information to oversee material climate-related financial risks.	BCBS (2022)
Supervisory Preparedness (SP)	SP1	The supervisory authority provides clear guidance on managing climate-related financial risks.	BCBS (2022); NGFS (2020)
	SP2	Banks are encouraged to identify and report material climate-related exposures.	BCBS (2022)
	SP3	The supervisory framework adequately monitors banks' climate-related risk-management practices.	NGFS (2020)
	SP4	The supervisory authority has sufficient capacity to assess climate-related financial risks.	NGFS (2020)
	SP5	Existing supervisory practices support the integration of climate risks into conventional banking risk management.	BCBS (2022); CBI (2023)
Bank Resilience (BR)	BR1	Our bank is capable of maintaining asset quality when facing significant external shocks.	Adapted from Le et al. (2023)
	BR2	Our bank has adequate capacity to maintain liquidity during adverse conditions.	BCBS (2024)
	BR3	Our bank can maintain adequate financial strength when exposed to unexpected risks.	Le et al. (2023); BCBS (2024)
	BR4	Our bank can maintain critical operations during major disruptions.	BCBS (2024)
	BR5	Overall, our bank has sufficient capacity to absorb climate-related financial and operational shocks.	BCBS (2022, 2024)

Note: All items are measured on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). The items are adapted and contextualized to the Iraqi banking environment rather than reproduced verbatim from the sources.

3.3 Data Analysis

The proposed model is analyzed using partial least squares structural equation modelling (PLS-SEM). The analysis follows the two-stage procedure recommended by Hair et al. (2022). The measurement model receives its first evaluation through indicator loadings and Cronbach's alpha and composite reliability and average variance extracted (AVE) and discriminant validity. The structural model receives its evaluation through variance inflation factors (VIF) and standardized path coefficients and bootstrapping and explanatory power (R^2) and effect sizes.

Mediation is assessed through the bootstrapped indirect effect of climate risk exposure on bank resilience through climate risk governance. Moderation is examined by estimating the interaction between climate risk governance and supervisory preparedness in predicting bank resilience.

3.4 Ethical and Procedural Considerations

The questionnaire serves academic research purposes and all participants must join the study. The survey does not ask for any personal identification details because all answers will be processed through statistical methods which do not need to identify individual participants. The procedures operate to defend respondent privacy while they work to minimize the chances of respondents developing response bias.

4. EMPIRICAL RESULTS

4.1 Descriptive Statistics

The four constructs include their descriptive statistics which appear in Table 2. The average value for climate risk exposure stands at 3.72 which shows that people have strong knowledge about physical and transition financial risks. The average score for climate risk governance stands at 3.28 but supervisory preparedness shows the lowest average at 3.18 which demonstrates that institutional and supervisory measures have reached a basic level of development. The average score for bank resilience stands at 3.46 which shows people have moderate to positive trust that banks will survive financial and operational disruptions.

Table 2. Descriptive Statistics

Construct	Mean	Standard Deviation	Interpretation
Climate Risk Exposure (CRE)	3.72	0.71	Relatively high
Climate Risk Governance (CRG)	3.28	0.68	Moderate
Supervisory Preparedness (SP)	3.18	0.73	Moderate
Bank Resilience (BR)	3.46	0.66	Moderate-to-positive

These patterns are consistent with the evolving sustainable-finance environment in Iraq, where awareness of climate-related risks appears to be developing faster than formal governance and supervisory capabilities (CBI, 2023).

4.2 Measurement Model Assessment

The measurement model evaluation process included assessment of indicator reliability and internal consistency reliability and convergent validity and discriminant validity. The outer loadings for all retained indicators reached levels which exceeded the recommended threshold of 0.70. The research achieved acceptable reliability through Cronbach's alpha and composite reliability scores and all constructs showed convergent validity because their average variance extracted (AVE) values reached above 0.50 (Hair et al., 2022).

Table 3. Indicator Loadings

Construct	Item	Outer Loading
CRE	CRE1	0.78
	CRE2	0.81
	CRE3	0.76
	CRE4	0.80
	CRE5	0.79
CRG	CRG1	0.82
	CRG2	0.85
	CRG3	0.80
	CRG4	0.84
	CRG5	0.83

Construct	Item	Outer Loading
SP	SP1	0.79
	SP2	0.82
	SP3	0.81
	SP4	0.80
	SP5	0.83
BR	BR1	0.75
	BR2	0.78
	BR3	0.77
	BR4	0.74
	BR5	0.79

Table 4. Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE
CRE	0.84	0.89	0.62
CRG	0.88	0.91	0.66
SP	0.85	0.90	0.64
BR	0.81	0.87	0.58

Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT). All values remained below the conservative threshold of 0.85, indicating sufficient distinction among the four constructs.

Table 5. HTMT Ratio

Construct	CRE	CRG	SP	BR
CRE	—			
CRG	0.61	—		
SP	0.54	0.68	—	
BR	0.49	0.72	0.65	—

Overall, the measurement model demonstrates satisfactory reliability, convergent validity, and discriminant validity.

4.3 Structural Model and Hypothesis Testing

The structural model received evaluation through standardized path coefficients and bootstrapping and collinearity diagnostics and explained variance. The VIF values stayed under 3.3 which shows that multicollinearity does not present any major problems. The model explained 22% of the variance in climate risk governance ($R^2 = 0.22$) and 45% of the variance in bank resilience ($R^2 = 0.45$), indicating moderate explanatory power.

The data shows that climate risk exposure creates a major negative impact on bank ability to withstand challenges ($\beta = -0.22$, $p = 0.004$) which confirms H1. Climate risk exposure creates a substantial positive impact on climate risk governance through its effect on governance structures ($\beta = 0.47$, $p < 0.001$) which supports H2. The research shows that bank resilience receives positive impacts from climate risk governance ($\beta = 0.33$, $p < 0.001$) which supports H3 and supervisory preparedness also produces a positive impact on bank resilience ($\beta = 0.26$, $p = 0.002$) which supports H4.

Table 6. Structural Model Results

Hypothesis	Relationship	β	p-value	Decision
H1	CRE $\rightarrow$ BR	-0.22	0.004	Supported
H2	CRE $\rightarrow$ CRG	0.47	<0.001	Supported
H3	CRG $\rightarrow$ BR	0.33	<0.001	Supported
H4	SP $\rightarrow$ BR	0.26	0.002	Supported

4.4 Mediation and Moderation Analysis

The research shows climate risk exposure creates an indirect impact on bank resilience through climate risk governance which produces positive and statistically significant results ($\beta = 0.16$, $p < 0.001$) which confirms

H5. The data shows partial mediation because climate risk exposure creates direct harm to resilience but it also triggers improved governance measures which help reduce the negative impact.

The research discovered a positive relationship between climate risk governance and supervisory preparedness which achieved statistical significance ($\beta = 0.13$, $p = 0.028$) which confirms H6. The data shows that banks become more resilient through climate risk governance when their supervisors develop better readiness for their roles.

Table 7. Mediation and Moderation Results

Hypothesis	Effect	β	p-value	Decision
H5	CRE $\rightarrow$ CRG $\rightarrow$ BR	0.16	<0.001	Supported
H6	CRG $\times$ SP $\rightarrow$ BR	0.13	0.028	Supported

Overall, the results support the proposed model and indicate that climate risk governance and supervisory preparedness play complementary roles in strengthening bank resilience.

5. DISCUSSION

The research findings establish a clear connection between banking sector climate-related financial risks and the operational frameworks which Iraqi banks use for their governance and supervision systems. The research findings demonstrate that banks become more vulnerable to climate risks which damage their operational strength but effective climate risk management and supervisory readiness systems reduce these negative effects.

The initial analysis shows that banks experience significant damage to their operational strength because of climate risk exposure. The research findings demonstrate that physical and transition risks create bank damage through borrower weakness which leads to loan deterioration and collateral damage and operational system breakdowns and financial market breakdowns. The research findings from Le et al. (2023) support this study because they demonstrate that banks become less stable when climate risks increase. The research by Fan et al. (2024) shows that climate change leads to more non-performing loans because it reduces borrowers' ability to earn money and their ability to make loan payments. Research from recent years shows that climate-related pressures lead to lower loan quality which creates higher credit risk and systemic risk according to Zhang et al. (2024) and Wu et al. (2024) and Bellinvia et al. (2025). The relationship between these factors becomes crucial for Iraq because the nation faces drought conditions and severe heat and limited water resources while it still relies on its hydrocarbon income.

Second, the study found that climate risk exposure positively affects climate risk governance. This suggests that banks exposed to climate risk tend to strengthen their internal governance and risk-management responses to mitigate that risk. In other words, climate risk exposure acts as a driver for banks to develop stronger institutional preparedness for climate-related risks. This finding aligns with the BCBS (2022) recommendation that financial institutions incorporate climate-related financial risks into their governance and risk-management processes.

Third, the study found that climate risk governance has a significant positive effect on bank resilience. Banks with effective climate risk governance are better able to absorb shocks related to climate risk. This finding supports the recommendations of Redondo and Aracil (2024) regarding the importance of data and risk assessment in climate risk management. It also aligns with the findings of Pozdyshev et al. (2025), who demonstrated that physical climate factors can be incorporated into credit-risk models. Additionally, recent studies have shown that effective climate risk management leads to improved performance and resilience of banks (Chalabi-Jabado & Ziane, 2024).

The mediation results revealed an additional effect which extended beyond the original research findings. Climate risk exposure creates two important effects on bank operations because it makes banks less able to handle risks yet it drives them to create better climate risk management systems which boost their overall risk management abilities. Climate risk governance functions as a limited institutional defense system which controls how climate exposure affects financial results. The research shows that climate exposure does not produce set outcomes because bank ability to identify and control new risks determines how much damage will occur. The findings match with recent research which demonstrates that institutional and financial-response systems function as moderators between climate risk and financial market stability (Fan & Gao, 2024).

The bank's ability to handle shocks receives strong positive influence from its supervisory readiness status. The research outcome shows that banks need more than their internal capabilities to handle financial risks which stem from climate change. Supervision becomes more effective when it establishes clear regulatory requirements which enable better reporting and disclosure and supports standardized risk evaluation methods and identifies important system-wide weaknesses. The BCBS (2022), FSB (2022), and NGFS (2020) all support this

understanding because they require climate-related risks to become part of prudential supervision and financial stability evaluation systems. The MENA region shows that climate risk creates bank stability problems which need proper supervisory and institutional frameworks to protect banking institutions in at-risk banking regions (Shabir et al., 2024).

The research shows that supervisory readiness creates better bank resilience when organizations establish effective climate risk management systems. The research shows that internal governance systems tend to function better when external supervision systems operate at their highest possible level. The analysis follows international standards which require financial institutions to perform scenario analysis and reporting while they should also develop their monitoring systems and supervisory abilities for climate-related financial resilience (BCBS, 2022, 2024b; FSB, 2022). The research data from Iraq takes on special importance because the Central Bank of Iraq launched its Sustainable Finance Roadmap 2023–2029 and ESG programs while climate-related supervisory systems operate at their initial development phase (CBI, 2023).

The research findings reveal that bank resilience depends on two factors which include climate exposure levels and the available institutional systems for climate risk management. The banking industry in Iraq can decrease its financial exposure to physical and transition risks through improved climate risk governance systems and better supervisory readiness.

6. THEORETICAL AND PRACTICAL IMPLICATIONS

The findings of this study have several theoretical and practical implications. Theoretically, this study adds to the existing body of research on the relationship between climate risk and the stability of banks. More specifically, the study suggests that climate risk governance can act as an institutional mechanism for banks to respond to the risks created by climate change. Furthermore, the degree to which bank supervisors are prepared for the impacts of climate change can strengthen the internal climate risk governance of banks. These findings extend the literature on the link between climate risk and bank stability, bank credit, and bank risk-taking behaviors (Le et al., 2023; Fan et al., 2024; Liu et al., 2024).

The study found that climate risk governance has a mediating effect on the relationship between climate risk and the stability of banks. This suggests that the stability of banks exposed to climate risk is not predetermined. Banks can mitigate the impacts of climate change on their stability by improving their climate risk governance. The study also found that the preparedness of bank supervisors in the face of climate change can moderate the effectiveness of internal climate risk governance of the banks. This finding implies that the effectiveness of the internal climate risk governance mechanisms of banks can be improved through increased preparedness of the bank supervisors. These findings support the idea that the financial resilience of banks to climate change is a result of the interaction between the internal capabilities of banks and the supervisory environment in which they operate (BCBS, 2022; NGFS, 2020).

Iraqi banks need to start adding climate-related factors into their current credit and risk and governance systems instead of creating climate-risk systems which operate independently. The main focus needs to start with finding borrowers and business sectors which face climate risks while organizations should work on better climate data collection and create specific management duties and include climate risks in their credit evaluation and investment tracking systems.

The Central Bank of Iraq should follow a step-by-step supervisory system which develops from the Sustainable Finance Roadmap 2023–2029. The first priorities need to establish better climate-risk direction and define basic reporting standards and banks should face material exposure monitoring by supervisors and both banks and supervisors need to develop their abilities (CBI, 2023). The established measures will expand their scope to include climate scenario analysis and stress testing and they will achieve complete integration into prudential systems when data and institutional capabilities reach their peak.

The research findings show that Iraqi banks need to build their resilience through basic methods instead of using advanced climate-risk modeling systems. The initial step requires organizations to build dependable systems which will handle governance activities and data management and monitoring and supervision to support developing climate-related financial risk management approaches.

7. CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

This study investigates the relationships between climate risk exposure, climate risk governance, supervisory preparedness, and bank resilience in the Iraqi banking sector. The study finds that higher levels of climate risk exposure can weaken the resilience of banks. However, good climate risk governance and appropriate supervisory

preparedness can strengthen the capacity of banks to absorb financial and operational shocks. Furthermore, the study finds that climate risk governance can mediate the impact of climate risk exposure on bank resilience. Finally, supervisory preparedness can further strengthen climate risk governance in banks, suggesting the importance of both internal and external components in bank resilience.

The study adds to the climate-finance literature by investigating the mechanisms that can strengthen bank resilience to climate change. This is particularly relevant for Iraq, which is vulnerable to the impacts of climate change but also has an emerging framework for sustainable finance. The study finds that integrating climate risk into banking processes is appropriate for Iraqi banks and is in line with international banking recommendations (BCBS, 2022; NGFS, 2020).

The study is subject to several limitations. First: the cross-sectional design limits the ability to capture changes in climate-risk governance and resilience over time. Second: the analysis relies on respondents' perceptions and may therefore be affected by subjective assessment. Third: the study focuses on the Iraqi banking sector, which may limit the generalizability of the findings to banking systems with different regulatory and institutional characteristics.

The Future Studies could employ longitudinal or bank-level financial data to test whether climate-risk governance produces measurable improvements in asset quality, liquidity, capital adequacy; and financial stability.

Further research could also compare public and private banks, incorporate objective indicators of physical and transition risk, or extend the model to other climate-vulnerable emerging economies. Such evidence would provide a stronger basis for assessing how governance, and supervision can reduce the financial consequences of climate-related risks.

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