Chapter 13
A Systematic Review of Climate Risk Integration in Banking Risk Management

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ABSTRACT

This chapter presents a systematic literature review of 54 peer-reviewed studies on how commercial banks integrate climate-related risks into their risk management frameworks. Drawing upon institutional, agency, stakeholder, and resource-based theories, the analysis identifies three interrelated dimensions of bank responses: climate adaptation, loan pricing, and climate risk disclosure. Findings reveal that banks, particularly in China and the European Union, increasingly incorporate environmental considerations into strategic and operational decisions through green credit, ESG engagement, digital innovation, and board diversity. However, persistent challenges, such as symbolic compliance, brown lending, and uneven regulatory enforcement, limit substantive progress. The review highlights how institutional pressures, managerial incentives, stakeholder expectations, and organisational capabilities jointly shape banks' climate behaviours.

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1. INTRODUCTION

Risk management in banking refers to the systematic process of assessing how an organisation's strategies influence its exposure to financial, operational, and strategic risks (Srivastav and Hagendorff, 2015). Effective risk management strengthens banks' resilience against adverse shocks, safeguarding solvency, liquidity and public confidence. Historical crises, such as the collapse of Lehman Brothers in 2008 and the 2023 liquidity crisis at Credit Suisse, underscore how even well-capitalised banks remain vulnerable to systemic contagion (Ratnovski, 2013). To mitigate these risks, banks operate under stringent regulatory oversight. The Basel Framework, developed by the Basel Committee on Banking Supervision, represents the cornerstone of global banking regulation, setting principles for credit, market, operational, and liquidity risk. Importantly, a bank's risk management function must remain independent from revenue-generating activities to preserve objectivity and ensure compliance (Lim et al., 2017).

Extensive research has examined different aspects of banking risk management. Aebi et al. (2012) and Srivastav and Hagendorff (2015) emphasised the role of corporate governance, while Kunz and Heitz (2021) reviewed how risk culture is embedded within management control systems. More recently, scholars have linked risk management to environmental strategy, showing that banks increasingly recognise both risks and opportunities associated with climate change (Cucinelli et al., 2024). However, the literature remains fragmented in explaining how climate-related risks, an emerging category of systematic risk, are incorporated into traditional risk management frameworks.

The World Economic Forum (2025) identifies climate change as one of the most critical threats to global stability in the coming decade. Climate risks manifest through three interrelated dimensions: (1) physical risks from events such as floods, hurricanes, and wildfires that damage assets and impair collateral values; (2) transition risks arising from policy, regulatory, or technological shifts towards a low-carbon economy; and (3) liability risks linked to litigation, stranded assets, and reputational losses from failing to meet climate commitments. These risks have profound implications for banks' credit exposures, market stability, and long-term growth prospects.

Recent scholarship increasingly addresses this issue through the systematic literature review (SLR) method. Breitenstein et al. (2021) reviewed environmental hazards and financial sector risk management; Nguyen et al. (2023) investigated how Vietnamese banks advance green financing; de Bandt et al. (2025) analysed the impact of climate risks on credit exposures; and Vyshnevskyi and Sohn (2025) explored central banks' roles in supporting climate action. Despite these advances, the literature remains fragmented: some focus on central banks, others on commercial

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