Climate-resilient banking: a comprehensive framework for optimizing industrial sector loan portfolios

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This study underscores the critical significance of climate-related risks within the banking and industrial sectors, emphasizing the need for a climate-resilient response system and strategic loan portfolio planning. It introduces an efficient methodology for identifying key climate-linked risks (CLRs) across the impacted sectors, capturing their diverse impacts, quantifying them and subsequently designing optimal loan portfolios. A comprehensive review of the literature and primary responses from CLR experts, coupled with secondary data sources, forms the basis of our analysis. Initially, CLR impacts were categorized into push and pull indicators based on empirical weighted averages. Subsequently, fuzzy logic theory was employed to quantify CLRs in the form of composite index across industries. Finally, the study proposes portfolio planning for banks using the mean variance portfolio. The proposed control approach assesses sectoral severity, prioritizes sectors, identifies root causes and recommends cost-effective strategies, thus enhancing the overall resilience of the banking ecosystem.

Keywords: Banking and industrial sectors, climate-resilient response systems, climate risks, loan portfolio planning.

including greenhouse gas (GHG) emissions and climate-friendly product adoption. The initial step involves identifying possible CLR measurable impact indicators (CRIs) across industries. The impacts of CRIs vary according to industry-specific factors such as geography, energy consumption, infrastructure and population behaviour. For example, heavy rainfall may pose challenges for agriculture but offer opportunities for insurance.

Based on their impact on various sectors, CRIs are classified as either challenges (push indicators) or opportunities (pull indicators). To understand whether a sector attracts or repels banks, it is essential to examine the push–pull behaviour of the industrial sector. CRIs are captured in a structured and simple composite index format, which represents an overall quantified risk value associated with a specific sector. Using this index-based quantified risk and return analysis, the present study aims to identify sectors that are attractive or deterrent to banks in planning their loan portfolios.

As a result, banks can manage their loan portfolios while the industrial sector can maintain operational continuity. The present study examines how banks can devise optimal loan portfolios in a climate-related risk environment. Its objectives include developing a framework for