

RIISING TEMPERATURES, DECREASING COSTS AND RISKS: ASSESSING THE FINANCIAL BENEFITS OF CLIMATE CHANGE INSTRUMENTS

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Abstract

Over the past two decades, climate change and global warming have been recognised as paramount environmental challenges on a worldwide scale. One of the primary obstacles in advancing a sustainable economy is the effective mitigation and management of the risks associated with climate change. The accelerated pace of economic development and the proliferation of international business activities have exerted considerable pressure on planetary ecosystems, resulting in pronounced environmental degradation (Salvi et al., 2025a). According to the World Health Organisation, the combined effects of ambient and household air pollution are linked to millions of premature deaths annually, highlighting the significant public health implications of air quality.

This compelling scenario emphasises the critical need for a comprehensive approach to sustainability that integrates economic, environmental, and social dimensions to ensure the well-being of future generations (Aibar-Guzmán et al., 2024). Among the numerous environmental challenges facing humanity today, climate change emerges as one of the most urgent and significant issues (Anton, 2024). The persistent dependence on fossil fuels, deforestation, and escalating greenhouse gas (GHG) emissions have markedly contributed to the acceleration of global warming, thereby intensifying climate-related risks on a global scale (Krueger et al., 2020).

The impacts of climate change are already evident, evidenced by increased frequency and severity of extreme weather events such as storms, droughts, floods, and heatwaves, which significantly impair ecological systems and pose substantial threats to global economic stability and human well-being (Amran et al., 2014). Effectively addressing these pressing issues necessitates coordinated efforts among governmental agencies, local communities, and private sector stakeholders. Strategic priorities should include the mitigation of greenhouse gas emissions, the promotion of renewable energy sources, the conservation of natural ecosystems, and the development of resilient adaptation strategies (Octavio & Setiawan, 2025).

Considering the rising urgency of these issues, stakeholders are increasingly calling on companies to provide transparent disclosures about their climate change impacts and the related operational risks (Daradkeh et al., 2023).

In the current scenario, with increasing environmental concerns, many organisations are turning to climate finance tools like carbon credits as strategic measures to reduce their carbon footprints (Salvi et al., 2025b). These instruments help companies cut emissions and reach carbon neutrality (Salvi et al., 2025b), allowing pollution-generating firms to meet their emission reduction goals by funding emission-reducing projects, even if these projects are separate from their main business activities (Martielli et al., 2025).

This study aims to assess the financial benefits of innovative climate change instruments, such as carbon credits, through the framework of climate change mitigation tools. Specifically, it evaluates how these instruments can reduce costs and risks in the context of global warming and escalating climate-related hazards, an area currently insufficiently explored in the existing literature. The research seeks to address this gap by analysing the financial implications of climate change and related financial instruments, with a particular focus on carbon credits, within the theoretical framework of signalling theory (Ross, 1977; Spence, 1973). Attention is directed towards critical financial metrics, specifically the cost of capital (L'Abate et al., 2024; Chava, 2014) and the systematic risk exposure, as measured by beta (Korinith & Lueg, 2022; Gregory et al., 2014).

Signalling theory occupies a central role across multiple disciplines, including strategic management, finance and marketing. Recently, its application has expanded into the analysis of sustainability practices, where it offers significant potential for elucidating the signals conveyed by corporate entities (Friske et al., 2023; López-Santamaría et al., 2021). In particular, climate change mitigation instruments have become increasingly salient for investors and stakeholders, exerting a significant influence on market performance (Fedorova & Iasakova, 2024). Corporations increasingly issue signals, often in the form of certifications, to highlight their competitive advantages in areas such as advanced energy utilisation and management, achieving net-zero emissions, and thereby attracting additional market incentives (Guo et al., 2022). Moreover, investors are increasingly integrating climate risk exposure into their decision-making processes, recognising the significant financial implications that such risks pose for firms (Vestrelli et al., 2024). Similarly, financial institutions tend to favour companies that implement effective climate change strategies by providing more favourable financing conditions through climate-related financial instruments (Chava, 2014). In this context, it is plausible to posit that the broader dissemination of climate change information and the adoption of climate finance mechanisms will contribute to a reduction in the cost of capital and a decrease in systematic risk exposure. On these bases, we pose our hypothesis, which serves as the starting point for our model and quantitative analysis.

The econometric analysis, conducted on a sample of 72 firms worldwide observed over the period from 2020 to 2024, covering five fiscal years, provides preliminary evidence that addressing the challenges of climate change through targeted instruments – specifically, carbon credits – significantly influences corporate financial performance and

returns. The findings suggest that the adoption of climate finance tools is associated with a reduction in the cost of capital and a gradual decline in risk perception. These results suggest that increased awareness and the implementation of targeted measures to address climate-related issues can enhance investor confidence and mitigate perceived risks, ultimately improving firms' access to capital.

This research substantially contributes to the scholarly discourse by advancing the understanding of the financial implications associated with climate change instruments, an area characterised by limited prior investigation. Specifically, it highlights the function of carbon credit instruments as signals that facilitate the dissemination of corporate information, thereby providing valuable insights to investors and stakeholders. Moreover, the study extends the application of signalling theory to encompass sustainability disclosures within the context of climate change. In addition to its theoretical advancements, the research offers important practical implications for corporate entities, policymakers, and investors. It recommends that firms strategically utilise specific climate change instruments as supplementary tools to bolster their positive contributions to addressing climate-related challenges.

Previous studies have shown that carbon emissions exert a detrimental effect on financial performance (Salvi et al., 2025b). This study demonstrates that reducing emissions through the implementation of specific instruments also has a significant negative impact on the cost of capital, lowering it and expanding the range of available alternatives, as well as on perceived risk. About the risk, the literature remains extensively debated, and this study may represent a further step towards examining how risk evolves in relation to climate change, including through the adoption of ad hoc indicators such as climate and carbon beta (Huij et al., 2022; Dietz et al., 2018).

Keywords: Climate change; Carbon credit; Cost of capital; Beta; Signaling theory

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