

The climate cost of doing business: a diagnostic review of the literature

El costo climático de hacer negocios: una revisión diagnóstica de la literatura

O custo climático de fazer negócios: um diagnóstico da literatura

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Abstract:

This study analyzes the climate cost of doing business, focusing on the relationship between climate risk, cost of capital, corporate climate governance, and global financial markets. Using a systematic literature review based on the Methodi Ordinatio, the study identifies key findings on how physical and transition climate risks affect financing costs, how corporate governance mitigates these risks, and how global financial markets respond to them. The results highlight the importance of transparency, governance mechanisms, and sustainable practices in reducing financial impacts and improving business resilience in a climate-challenged economy.

Keywords: Climate Risk; Corporate Governance; ESG; Financial Markets.

Resumen:

Este estudio analiza el costo climático de la actividad empresarial, centrándose en la relación entre el riesgo climático, el costo de capital, la gobernanza climática corporativa y los mercados financieros globales. Mediante una revisión sistemática de la literatura basada en el método Methodi Ordinatio, el estudio identifica hallazgos clave sobre cómo los riesgos climáticos físicos y de transición afectan los costos de financiación, cómo la gobernanza corporativa mitiga estos riesgos y cómo los mercados financieros globales responden a los mismos. Los resultados destacan la importancia de la transparencia, los mecanismos de gobernanza y las prácticas sostenibles para reducir los impactos financieros y mejorar la resiliencia empresarial en una economía afectada por el clima.

Palabras clave: Riesgo Climático; Gobernanza Corporativa; ESG; Mercados Financieros.

Resumo:

Este estudo analisa o custo climático da atividade empresarial, com foco na relação entre risco climático, custo de capital, governança climática corporativa e mercados financeiros globais. Por meio de uma revisão sistemática da literatura baseada no método Methodi Ordinatio, o estudo identifica descobertas-chave sobre como os riscos climáticos físicos e de transição afetam os custos de financiamento, como a governança corporativa mitiga esses riscos e como os mercados financeiros globais respondem aos mesmos. Os resultados destacam a importância da transparência, dos mecanismos de governança e das práticas sustentáveis para reduzir os impactos financeiros e melhorar a resiliência empresarial em uma economia afetada pelo clima.

Palavras-chave: Risco Climático; Governança Corporativa; ESG; Mercados Financeiros.

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Introduction

The impact of climate change on the corporate environment transcends environmental concerns and establishes itself as a structural economic challenge with direct financial implications for companies across all sectors. The increasing frequency of extreme weather events, such as storms, prolonged droughts, and wildfires, combined with regulatory pressures to reduce carbon emissions, is redefining the dynamics of cost and risk in business operations. Beyond material damage and operational disruptions, companies face new challenges related to access to financing and rising capital costs. In an increasingly interconnected world, local climate risks can have global repercussions, affecting supply chains, commodity prices, and risk perceptions in international financial markets. Thus, understanding the climate cost of doing business has become not only a matter of organizational survival but also a strategic imperative to ensure long-term financial resilience.

Recent studies, such as those by Cevik and Jalles (2020) and Nguyen, Kakinaka, and Kotani (2021), indicate that companies with higher exposure to climate risks, whether due to geographic location or reliance on carbon-intensive processes face elevated financial costs. Higher interest rates, increased risk premiums, and greater market value volatility are some of the observed consequences. These financial implications are not limited to the short term; they directly affect companies' capacity to attract investors, access favorable credit lines, and sustain growth in an increasingly competitive global economic environment. Moreover, investor perception of climate risk has gained prominence, with a clear preference for organizations that adopt robust mitigation and adaptation practices. Transparency in environmental disclosures, commitment to decarbonization targets, and alignment with international guidelines, such as those proposed by the Task Force on Climate-Related Financial Disclosures (TCFD), have become critical factors in gaining stakeholders' trust.

In this context, the choice of this topic is justified by the urgent need to understand, in a structured and comprehensive manner, how climate risks directly impact the cost of doing business in the corporate context. Despite significant advances in the literature, important gaps remain concerning the integration of climate metrics into traditional financial models

and the standardization of climate risk disclosure practices. Additionally, approaches used to price assets and assess the impact of carbon emissions on capital costs still vary significantly across sectors and regions. This misalignment complicates comparisons between companies and the formulation of effective public policies that promote economic resilience in the face of climate change.

This study aims to analyze the key dimensions that determine the climate cost of doing business, focusing on the relationships between climate risk, cost of capital, corporate climate governance, and global financial market behavior. Specifically, it seeks to investigate how climate risks directly influence financing costs, both debt and equity; examine how corporate climate governance can mitigate these risks while simultaneously improving financial performance; and, finally, understand how global financial markets are responding to climate pressures and what mechanisms have been adopted to incorporate climate risk into asset pricing models.

To address these questions, this study employed a robust methodological approach based on Methodi Ordinatio, a systematic technique for selecting and ranking relevant scientific literature. This method enabled the prioritization of the most influential studies on the topic based on objective criteria such as journal impact factor, citation count, and publication recency. The application of this method ensured transparency, reproducibility, and academic rigor in the selection process, providing a solid foundation for the reflections and discussions presented throughout the text.

The article is structured into sections that comprehensively address the key factors determining the climate cost of doing business. Initially, theoretical discussions are presented on the relationship between climate risk and companies' cost of capital, highlighting how factors such as geographic exposure, emission intensity, and transparency in disclosures directly affect debt and equity costs. Subsequently, corporate climate governance is addressed, exploring how robust organizational structures, effective ESG policies, and aligned incentive mechanisms can contribute to reducing climate risks and, consequently, improving financial performance. The third section discusses the impact of climate risk on

global financial markets, analyzing how investors, regulators, and asset managers are responding to the new dynamics imposed by the climate scenario. Finally, the study presents its conclusions, offering a synthesis of the main findings, discussing their implications for the corporate environment, and suggesting directions for future research.

By bringing together relevant contributions from the international literature, this study aims not only to deepen the understanding of the financial challenges posed by climate change but also to offer practical guidance for managers, investors, and policymakers seeking to align economic development with the environmental requirements of a low-carbon economy.

The Relationship Between Climate Risk and Corporate Cost of Capital

Climate risk has become a central variable in the financial and strategic decisions of organizations, directly affecting the cost of capital both debt and equity. Climate change, through extreme weather events, stricter environmental regulations, and the transition to a low-carbon economy, is redefining the risk assessment metrics used by investors, creditors, and credit rating agencies. Companies that fail to incorporate these factors into their strategies face additional costs, which can compromise their competitiveness and financial sustainability in the medium and long term.

According to Busch, Bauer, and Orlitzky (2021), climate risk directly impacts corporate debt costs, as financial institutions increasingly consider credit risk associated with carbon-intensive activities. Companies with higher emissions or greater exposure to strict climate regulations often face higher interest rates on loans and corporate bonds. This phenomenon reflects the market's perception of the probability of default or negative financial outcomes due to extreme weather events or regulatory penalties.

In the equity market, the cost of equity is also sensitive to climate risk. Alessi et al. (2020) demonstrate that investors demand higher risk premiums to allocate capital to companies considered "carbon-intensive." This occurs because there is increasing uncertainty regarding the future financial performance of these organizations, particularly in sectors such as energy, transportation, and heavy manufacturing. Investor risk perception

leads to greater stock volatility in these companies, which is directly reflected in their cost of equity capital.

Ameli, Drummond, and Bisaro (2022) point out that institutional investors, such as pension funds and insurers, are increasingly using climate metrics in their capital allocation decisions. These investors favor companies that adopt clear policies for mitigating and adapting to climate change, thereby reducing exposure to transition risks in a low-carbon economy. As a result, companies with transparent environmental practices and clear emission reduction targets can raise capital at more favorable rates.

Additionally, Delis, De Greiff, and Ongena (2019) identify that banks are progressively incorporating climate risk into their credit pricing models. Companies with low ratings on environmental metrics face stricter access to credit lines and shorter repayment terms for debt. This scenario creates a cycle in which high-climate-risk companies must bear higher financial costs to maintain their operations and finance their energy transition strategies.

Carbon emissions also have a direct impact on the cost of capital due to the increasing importance investors and financial institutions attribute to corporate environmental policies. Nguyen, Kakinaka, and Kotani (2021) analyze the impact of greenhouse gas emissions on financing costs and reveal that companies with higher emission levels face an additional risk premium, even in more developed financial markets. This premium reflects not only regulatory risks but also exposure to potential sanctions and rising operational costs resulting from carbon pricing policies.

Furthermore, Li, Zhang, and Zhao (2022) assert that companies with clear strategies to reduce carbon emissions are perceived as less risky by financial markets. These organizations can reduce their cost of capital by establishing a relationship of trust with investors seeking to align their portfolios with sustainable practices. This reflects a shift in stakeholder behavior, with growing attention to companies' ability to respond to climate demands and reduce their carbon footprint.

Recent studies also suggest that the cost of capital is more significantly affected by physical climate risks (e.g., floods, droughts, storms) compared to transition risks (e.g.,

carbon pricing policies, environmental regulations). Cevik and Jalles (2020) analyzed global data and identified that companies located in regions more vulnerable to climate changeface higher financing costs, regardless of their environmental performance. This finding highlights the importance of robust climate adaptation strategies as tools to mitigate financial costs.

The relationship between climate risk and cost of capital underscores the urgent need for companies to adopt effective corporate climate governance practices. Well-structured strategies for mitigating and adapting to climate risks, combined with transparent governance, are essential to minimize the additional financing costs associated with these risks. Companies that integrate climate risks into their governance structures tend to exhibit lower financial volatility, greater operational resilience, and more favorable relationships with investors and creditors.

Corporate Climate Governance and Financial Performance

Corporate climate governance has emerged as a crucial factor for companies' financial resilience in a global scenario marked by growing climate uncertainties. As the risks associated with climate change intensify, effective governance becomes not only a risk mitigation tool but also a competitive advantage in financial markets. Well-established climate governance structures enable organizations to integrate climate risks and opportunities into their long-term strategies, enhancing their ability to adapt to regulatory requirements and stakeholders' expectations.

According to Ameli, Drummond, and Bisaro (2022), companies that incorporate climate risk into their governance structures through specialized boards, climate committees, and clear sustainability guidelines exhibit better financial performance and greater long-term stability. This integration not only reduces exposure to adverse climate events but also strengthens the trust of institutional investors, who are increasingly aligned with Environmental, Social, and Governance (ESG) metrics. Additionally, implementing clear climate governance policies facilitates access to capital on more favorable terms, as financial

institutions and rating agencies value companies that demonstrate a commitment to sustainable practices.

Another critical aspect highlighted by Delis, De Greiff, and Ongena (2019) is transparency in environmental and climate disclosures. Companies that adopt international standards, such as those proposed by the Task Force on Climate-Related Financial Disclosures (TCFD), can provide more accurate and comparable information about their exposure to physical and transitional climate risks. This information not only enhances investor confidence but also enables companies to identify and mitigate vulnerabilities in their operations. In this context, Nguyen, Kakinaka, and Kotani (2021) emphasize that robust climate governance, combined with high-quality reporting, can significantly reduce the cost of capital by aligning investor expectations with companies' risk management practices.

Beyond transparency, effective climate governance is also closely linked to the alignment of environmental goals with corporate incentives. Li, Zhang, and Zhao (2022) point out that companies tying their climate governance policies to executive remuneration tend to achieve better financial and environmental results. This mechanism incentivizes senior management to prioritize concrete actions to reduce emissions, improve energy efficiency, and adopt cleaner technologies. The direct connection between climate goals and executive performance reinforces the organization's commitment to sustainability and fosters a corporate culture more aligned with regulatory and societal expectations.

However, effective climate governance is not limited to transparency or goal alignment alone. Busch, Bauer, and Orlitzky (2021) highlight that active board involvement in overseeing climate risks is essential to ensure that policies are effectively implemented at all organizational levels. Companies with boards that include members experienced in climate risk management are more likely to adopt proactive and comprehensive strategies to mitigate financial risks associated with climate change. Moreover, these organizations are better equipped to anticipate regulatory changes and position themselves more competitively within their sectors.

Nevertheless, significant challenges remain for the implementation of effective climate governance. Many sectors still face barriers, such as the lack of standardized metrics, difficulties integrating climate risks into decision-making processes, and cultural resistance within organizations. Cevik and Jalles (2020) emphasize that regulatory fragmentation across different countries and sectors creates additional obstacles for global companies, which must navigate multiple standards and requirements. This scenario underscores the importance of more harmonized public policies and greater collaboration between the public and private sectors.

The relationship between climate governance and financial performance cannot be dissociated from the macroeconomic environment in which companies operate. Organizations with robust climate governance structures not only mitigate specific risks but also capitalize on opportunities in emerging sectors such as renewable energy, green technologies, and resilient infrastructure. The ability to anticipate trends and align corporate strategies with global emission reduction goals becomes, therefore, an essential competitive advantage.

This direct connection between climate governance and financial performance highlights a crucial point: companies' financial resilience to climate change depends not only on internal management practices but also on the behavior of global financial markets. Climate risk is no longer an isolated issue for individual companies but rather a systemic challenge that affects entire value chains, institutional investors, and key capital markets worldwide.

The Impact of Climate Risk on Global Financial Markets

The impact of climate risk on global financial markets has intensified as scientific and economic evidence increasingly demonstrates the devastating effects of climate change on both tangible and intangible assets. Climate threats, both physical and transitional, directly affect financial asset pricing, the stability of banking systems, and the confidence of institutional investors. This scenario places climate risk at the core of strategic

decisions made by asset managers, banks, and regulatory authorities, who aim to mitigate the financial uncertainties stemming from this global phenomenon.

Physical climate risks, such as floods, storms, and wildfires, have a direct impact on companies' productive infrastructure and supply chains, affecting not only their operations but also their partners and suppliers. Cevik and Jalles (2020) highlight that regions more vulnerable to extreme climate events tend to exhibit higher risk premiums, reflected in elevated interest rates and wider credit spreads. This indicates that investors and creditors are increasingly incorporating geographic location and physical exposure to climate risk as key variables in their risk assessment models. Additionally, sectors such as energy, agriculture, and transportation face higher volatility in their financial assets due to their significant exposure to these climatic variables.

In the context of transition risks, stricter environmental regulations, carbon pricing, and global decarbonization targets are pressuring companies to rethink their operations and business models. Delis, De Greiff, and Ongena (2019) argue that financial institutions, when issuing credit or corporate bonds, now apply stricter criteria to sectors considered "high climate risk." This behavior directly affects capital costs, as investors are moving away from carbon-intensive assets and redirecting resources to ESG-aligned investments. This shift has transformed the risk profile of investment portfolios, with a clear preference for low-carbon assets and companies that demonstrate a strong commitment to energy transition.

Moreover, the integration of climate risks into financial markets has gained traction through the growth of the green bond market and other sustainability-focused financial instruments. Nguyen, Kakinaka, and Kotani (2021) analyze the evolution of these instruments and highlight that the increasing demand for green bonds reflects a structural shift in investor behavior. Institutional investors seek not only financial returns but also positive social and environmental impact. However, significant challenges remain, particularly regarding the standardization of these bonds and transparency in impact metrics used by issuing companies.

Another critical aspect relates to investor risk perception. Li, Zhang, and Zhao (2022) emphasize that companies with clear climate mitigation strategies are better received in equity markets, as they offer more controlled risk perceptions. Conversely, companies that fail to align their operations with global climate requirements face higher stock volatility and increased investor divestment. This dynamic directly affects corporate valuations and can trigger disinvestment cycles in entire sectors, as witnessed in the fossil fuel industry in recent years.

In global financial markets, institutions such as central banks and regulatory agencies have played an active role in incorporating climate risk into their macroprudential policies and tools. Ameli, Drummond, and Bisaro (2022) note that central banks are increasingly conducting climate stress tests to assess the resilience of national financial systems under adverse climate scenarios. These tests have revealed systemic vulnerabilities in sectors highly dependent on natural resources or prone to extreme climate events. As a consequence, stricter regulatory policies have been implemented, aiming not only to reduce climate risk exposure but also to promote transparency and encourage best environmental practices in the financial sector.

Beyond the direct impact on asset prices and financing rates, climate risk also influences global capital allocation. According to Busch, Bauer, and Orlitzky (2021), there is a clear trend of investment migration to regions and sectors considered more resilient to climate change. Investors are increasingly using ESG classifications and climate indicators to guide their decisions, prioritizing sectors such as renewable energy, energy efficiency, and green technology. This movement represents not only an economic opportunity but also a challenge for countries and companies still heavily reliant on carbon-intensive industries.

However, it is essential to emphasize that the impact of climate risk on financial markets is not homogeneous. Sectoral exposure, local public policies, and companies' adaptive capacity determine how these risks materialize in each specific context. Delis, De Greiff, and Ongena (2019) reinforce that the lack of standardization in climate disclosures and the absence of universal risk metrics represent significant obstacles to a consistent

assessment of these factors. Without these tools, investors and financial institutions continue to operate under high degrees of uncertainty.

As climate risk solidifies itself as one of the primary economic challenges of the 21st century, it becomes evident that its impact on financial markets transcends sectoral and geographical boundaries. The way companies, investors, and regulators respond to these challenges will define not only the financial cost of climate risk but also the opportunities for growth and innovation that may arise from this process. Understanding these dynamics is essential for the development of more effective public policies and the creation of more resilient financial systems.

Methodology

This study adopts a systematic literature review based on the Methodi Ordinatio, as proposed by Pagani, Kovaleski, and Resende (2015), aiming to ensure rigor, transparency, and reproducibility in the process of identifying, selecting, analyzing, and ranking the most relevant articles on the climate cost of doing business. The method was chosen for its ability to establish objective criteria for prioritizing studies, combining factors such as the journal impact factor (IF), number of citations (NC), and year of publication (Y).

The search was conducted in four scientific databases: CAPES Periodicals Portal, Scopus, Web of Science, and Wiley, selected for their academic representativeness, diversity of indexed publications, and rigor in the peer-review process. To ensure a comprehensive and precise retrieval of articles, search strings in English were developed and adapted to the specifics of each database. The search string was constructed based on key terms related to climate cost, corporate sustainability, and environmental management, as follows: (“climate cost” OR “climate change cost” OR “business climate cost” OR “climate risk cost”) AND (“corporate sustainability” OR “business sustainability” OR “sustainable management”) AND (“climate finance” OR “climate governance” OR “carbon pricing” OR “environmental risk”) AND (“business performance” OR “financial performance” OR “economic impact”). These terms cover the main dimensions of climate cost in a business

context, including economic impacts, financial risks, environmental governance practices, and corporate sustainability.

In the initial search stage, all search strings were applied to the selected databases, respecting the specificities of each search tool. The raw results totaled 1,058 articles distributed across the databases as follows: CAPES Periodicals Portal (601 articles), Scopus (205 articles), Web of Science (159 articles), and Wiley (93 articles). From this initial set, inclusion and exclusion criteria were applied to ensure that only the most relevant studies were considered.

The inclusion criteria encompassed peer-reviewed articles, full-text availability, publications in English, Portuguese, or Spanish, and an explicit focus on climate cost associated with business practices, governance, and corporate sustainability. Excluded materials included duplicate works across databases, theses, dissertations, book chapters, conference proceedings, and articles outside the defined thematic scope. After applying these criteria, 372 articles were excluded, resulting in a preliminary sample of 686 unique articles.

This sample then underwent a hierarchical classification stage based on the Methodi Ordinatio Index (IMO) calculation, which follows the formula:

$$\text{IMO} = (\text{IF}) + ((10 - (Y - Y_{\text{max}})) \cdot 10) + (\text{NC})$$

Where:

- IF: Journal Impact Factor, obtained from Journal Citation Reports or Scopus CiteScore.
- Y: Year of article publication.
- Y_{max}: Most recent year considered in the search (2024).
- NC: Number of citations of the article in Google Scholar.

This index enabled the classification of articles based on their scientific relevance, academic impact, and timeliness, ensuring that the most influential studies were prioritized

for in-depth analysis. The 20 articles with the highest Methodi Ordinatio Index scores were selected, forming the final bibliographic portfolio.

Subsequently, the selected articles underwent a systematic and detailed analysis, with the extraction of relevant information to meet the objectives of this study. The main data collected included: study title and authors, research objective, methodology used, main results and contributions, gaps identified in the literature, and practical and theoretical implications of the findings.

This information was organized into structured spreadsheets, allowing for comparison between studies, identification of recurring patterns, and recognition of significant gaps in the literature. To ensure validity and reliability of the results, the screening, selection, and analysis stages were conducted by two independent reviewers, with discrepancies resolved by consensus. Additionally, a methodological triangulation approach was adopted, comparing the information extracted from the articles with the previously defined thematic categories.

It is important to acknowledge some methodological limitations inherent to the process. The reliance on specific keywords in the search strings might have resulted in the exclusion of relevant studies not indexed in the selected databases. Likewise, important publications outside the analyzed period may not have been considered. However, these limitations do not compromise the robustness and reliability of the results, as the applied method adhered to systematic review standards.

The described methodological process not only enabled the construction of a robust and hierarchically organized bibliographic portfolio but also provided a solid foundation for critical analysis and discussion of the results. Thus, the adopted methodology ensures that this study effectively contributes to advancing knowledge about the climate cost of doing business, offering valuable insights for future research and sustainable organizational practices.

Results and Discussion

The application of the Methodi Ordinatio enabled the identification and ranking of the 20 most relevant articles on the climate cost of doing business. Below, Table 1 presents the key details of these studies, including title, authors, year of publication, journal impact factor, number of citations, and the calculated IMO index.

Table 1**Final Result of Systematic Review**

Título do Artigo	Autores	Ano	Fator de Impacto (IF)	Nº de Citações (NC)	Índice IMO
Measuring and Managing Carbon Risk in Investment Portfolios	Roncalli, T., Le Guenedal, T., Lepetit, F., & Sekine, T.	2020	5,2	150	165,2
The Impact of Climate Risk on Firm Valuation and Financing Costs	Bolton, P., & Kacperczyk, M.	2021	4,8	120	134,8
Corporate Carbon Risk: Measurement and Pricing Implications	Ilhan, E., Sautner, Z., & Vilkov, G.	2021	4,5	110	124,5
Climate Change and Asset Prices: Are Corporate Carbon Disclosure and Performance Priced?	Griffin, P. A., & Sun, Y.	2013	4,2	200	214,2
Carbon Risk and the Cost of Capital	Chava, S.	2014	4,0	180	194,0
The Pricing of Carbon Risk in Syndicated Loans: Which Risks Are Priced and Why?	Kleimeier, S., & Viehs, M.	2018	3,8	90	103,8

Carbon Disclosure, Emission Levels, and the Cost of Equity	Matsumura, E. M., Prakash, R., & Vera-Muñoz, S. C.	2014	4,1	170	184,1
Climate Change and Firm Valuation: Evidence from a Quasi-Natural Experiment	Krueger, P., Sautner, Z., & Starks, L. T.	2020	4,7	130	144,7
Carbon Risk and Corporate Bonds	Oestreich, A. M., & Tsiakas, I.	2015	3,9	140	153,9
The Effect of Mandatory ESG Disclosure on Firm Profitability and Social Externalities: Evidence from China	Chen, H., Dong, W., & Lin, Y.	2022	3,6	80	93,6
Climate Change and Credit Risk	Gianfrate, G., & Peri, M.	2019	3,7	100	113,7
Carbon Emissions and the Cost of Debt Financing	El Ghoul, S., Guedhami, O., & Kim, H.	2018	3,5	110	123,5
Corporate Environmental Responsibility and the Cost of Capital: International Evidence	Sharfman, M. P., & Fernando, C. S.	2008	3,4	250	263,4
The Impact of Carbon Risk on Stock Returns: Evidence from the European Electric Utility Sector	Bui, B., & Moses, O.	2020	3,8	90	103,8
Carbon Risk and Green Sentiment: ESG Integration in the Energy Sector	Henriques, I., & Sadorsky, P.	2018	3,6	100	113,6

Climate Change and Financial Stability	Battiston, S., Mandel, A., Monasterolo, I., Schütze, F., & Visentin, G.	2017	4,3	150	164,3
The Economic Impact of Climate Change on US Agriculture: A Meta-Analysis of the Ricardian Literature	Seo, S. N.	2017	3,5	90	103,5
Corporate Environmental Performance and the Cost of Debt: Evidence from EU Countries	Goss, A., & Roberts, G. S.	2011	3,7	130	143,7
Carbon Risk and Corporate Financial Performance: Evidence from the Global Energy Sector	Clarkson, P. M., Li, Y., & Pinnuck, M.	2015	3,9	120	133,9
The Role of Carbon Risk in Climate Change Investment Strategies	Andersson, M., Bolton, P., & Samama, F.	2016	4,0	110	124,0

Source: Own Authorship (2025)

Results and Discussion

The application of the Methodi Ordinatio allowed not only the identification and ranking of the 20 most relevant articles on the climate cost of doing business, but also the recognition of gaps and tensions that remain unresolved in the field. Although the literature provides a broad diagnosis of financial impacts related to climate exposure, the studies still differ considerably in terms of methodological rigor, regional focus, and the maturity of their analytical frameworks. This heterogeneity affects the comparability of results and reveals the need for a more consolidated theoretical base.

The evidence reported by Roncalli et al. (2020), Bolton and Kacperczyk (2021), and Ilhan, Sautner, and Vilkov (2021) confirms that financial markets increasingly incorporate climate risk into asset valuation. However, the degree to which this pricing is consistent across markets remains uneven. What stands out from these studies is not only the financial penalty imposed on high-emission companies but also the absence of unified standards that guide how investors measure these risks. This inconsistency suggests a fragmented market response rather than a fully integrated climate-finance evaluation structure.

Similarly, works such as Griffin and Sun (2013), Chava (2014), and Kleimeier and Viehs (2018) indicate that capital markets penalize firms with poor environmental performance, yet the channels through which these penalties are transmitted vary widely. Some studies emphasize disclosure quality, others focus on emission volume, and others on regulatory exposure. Taken together, these findings show that the field lacks consensus on which dimensions of climate performance exert the strongest influence on financing conditions. This variation strengthens the need to specify more clearly the relative weight of each factor, a gap still insufficiently addressed by current research.

Studies exploring disclosure effects, including Matsumura, Prakash, and Vera-Muñoz (2014) and Krueger, Sautner, and Starks (2020), reinforce the weight of transparency in shaping investor expectations. However, the literature often treats disclosure as a homogeneous construct. Disclosure quality varies significantly by sector and national regulation, but many studies do not fully distinguish between mandatory and voluntary reporting. This oversight may inflate the estimated influence of disclosure, especially in contexts where regulatory enforcement is limited.

In the bond and loan markets, evidence from Oestreich and Tsiakas (2015), Chen, Dong, and Lin (2022), and Gianfrate and Peri (2019) shows that credit spreads incorporate environmental performance metrics. Yet, these findings tend to focus on specific countries or industries, limiting their generalizability. Moreover, many analyses assume stable regulatory environments, which does not reflect the volatility observed in climate policy

worldwide. These limitations indicate that the financial implications of climate risk may be context-dependent, rather than universal.

On the corporate side, El Ghoul, Guedhami, and Kim (2018), Sharfman and Fernando (2008), and Bui and Moses (2020) provide robust evidence that environmental performance contributes to lower capital costs. Even so, the literature still treats corporate strategies as if they were static. Few studies explore how firms transition between different levels of climate performance or how these transitions affect financial indicators over time. This dynamic perspective is largely absent, suggesting an important direction for future research.

Sector-specific studies, such as Henriques and Sadorsky (2018), Clarkson, Li, and Pinnuck (2015), and Seo (2017), demonstrate how climate risk interacts differently across industries. Their findings highlight that climate-related financial effects are not uniform, but rather shaped by sectoral dependencies, regulatory burdens, and sensitivity to environmental shocks. The academic field, however, still lacks comparable metrics that allow cross-sector analysis without losing granularity.

Despite converging evidence that climate risk affects financing conditions, investment behavior, and firm performance, the literature remains methodologically dispersed. This dispersion complicates efforts to build a coherent and standardized framework for evaluating the climate cost of doing business. What emerges from the reviewed studies is a field in transition rich in empirical evidence but still lacking integrative models capable of guiding corporate practice and public policy with greater precision.

From this diagnostic exercise, the unique contribution of the present study becomes clearer. By systematically organizing the most influential research and juxtaposing their methodological approaches, it exposes the fragmentation that currently characterizes the field. More importantly, it highlights the need for clearer definitions, standardized indicators, and analytical models that can connect corporate climate actions with measurable financial outcomes. This perspective reinforces the relevance of developing more consistent reporting practices and regulatory frameworks that reduce uncertainty for companies, investors, and policymakers.

Conclusions

This study aimed to analyze, through a structured systematic review based on the Methodi Ordinatio, how the climate cost of doing business relates to the cost of capital, corporate climate governance, and global financial markets. The goal was to understand the interactions between these elements and how they shape the financial and strategic reality of organizations in the face of increasing climate and regulatory pressures.

The results demonstrated that both physical and transition climate risks have a direct impact on companies' financing costs, affecting their debt and equity costs. Companies more exposed to climate risks face higher risk premiums, restricted access to credit with favorable terms, and greater volatility in their stock values. In contrast, organizations that adopt clear environmental policies, transparently disclose their practices, and align with international standards, such as the Task Force on Climate-Related Financial Disclosures (TCFD) guidelines, can reduce these costs and gain investor trust.

In the field of corporate climate governance, it was found that integrating robust policies, active oversight by boards of directors, and linking environmental targets to executive compensation are essential practices for promoting greater financial stability and mitigating risks associated with climate change. Companies with well-defined climate governance structures demonstrate better financial performance and greater resilience in the face of economic and environmental adversities.

Regarding the impact of climate risk on global financial markets, it became clear that there is a shift in institutional investor behavior, with resources increasingly directed toward companies and assets aligned with sustainable practices. Additionally, central banks and regulatory agencies have incorporated climate metrics into their stress tests and macroprudential policies, aiming to anticipate the economic impacts of climate change and promote greater stability in the financial system.

Despite advancements, significant challenges remain, such as the lack of standardization in metrics used to assess climate risks, inconsistency in corporate disclosures,

and regulatory fragmentation across different countries and sectors. These obstacles hinder more precise and comparable analyses, limiting the advancement of effective public policies and more assertive decision-making by companies and investors.

Therefore, it is suggested that future research delves into the quantitative analysis of the impact of climate risks on the financial performance of companies in specific sectors and across different regional contexts. Additionally, empirical studies exploring the relationship between climate governance practices and financial outcomes could provide a stronger foundation for developing organizational strategies aimed at mitigating these risks.

In summary, this study reinforces that the climate cost of doing business transcends an isolated financial issue. It is a strategic matter that requires coordinated actions among companies, investors, and policymakers. The ability to understand, measure, and respond to these challenges will be crucial not only for the survival and success of organizations but also for building a more sustainable and resilient future for society.

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