A systematic review of sustainable finance. A review from 2002 to 2022

Auteur : Phan, Minh Hoai Thuong
Promoteur(s) : Santi, Caterina
Faculté : HEC-Ecole de gestion de l'Université de Liège
Diplôme : Master en sciences de gestion, à finalité spécialisée en Banking and Asset Management
Année académique : 2022-2023
URI/URL : http://hdl.handle.net/2268.2/18697

A SYSTEMATIC REVIEW OF SUSTAINABLE FINANCE

A review from 2002 to 2022

Jury:

Supervisor: Caterina SANTI

Readers: Anouck FAVERJON

Master Thesis by **Minh Hoai Thuong PHAN**

For Master's degree in Banking and Asset Management

Academic year 2022 – 2023

1 Abstract

The escalating global challenge of climate change has necessitated the integration of sustainability principles into financial decisions, marking the emergence of a critical intersection between sustainability and finance. The disparity between climate change concerns among investors and governmental agencies underscores the challenges in integrating climate-related information into decision making. However, there remains a lack of research that integrates and systematizes the available knowledge on sustainable finance. This study adopts a systematic literature review approach, which includes meticulously selecting, categorizing, and evaluating recent articles from prominent finance journals. By narrowing the focus to the most current and relevant research, the paper captures the evolving discourse within the sustainable finance arena. Drawing from these insights, the results section identifies trends, discrepancies, and gaps, proposing a research agenda to guide future investigations. This systematic literature review not only consolidates existing knowledge but also advances the dialogue on sustainable finance by offering a comprehensive overview of the state-of-the-art literature. The insights presented contribute to informed decision-making, paving the way for a more responsible and resilient financial sector in the face of global sustainability challenges. As a result of the gaps in the analysis of current literature, a research agenda was proposed aiming to guide and strengthen the state-of-the-art research on sustainable finance.

2 Introduction

The escalating global issue of climate change has brought about profound and concerning alterations to our environment. The accumulation of carbon dioxide (CO2) and other greenhouse gases in our atmosphere has led to disruptive climate changes. The consequences, both physical and economic, are becoming increasingly apparent as time passes. The United Nations' 2020 report emphasizes the irreversible impacts of these changes, including prolonged droughts, extensive flooding, melting ice, warming oceans, and a heightened frequency of extreme events. The projection of a warmer future also entails more frequent and severe cold and heat waves, floods, droughts, wildfires, and storms (United Nations, 2022).

2.1 Definition of Sustainable Finance

Sustainable finance, within this context, represents a proactive approach to mitigate these risks by fostering environmentally responsible decision-making. It encompasses a spectrum of financial practices that align economic pursuits with environmental sustainability, social responsibility, and corporate governance.

Sustainable finance involves incorporating environmental, social, and governance (ESG) factors when making investment choices within the financial sector. This approach encourages greater emphasis on long-term investments in economically sustainable activities and projects. Environmental aspects include areas such as addressing climate change, both in terms of mitigation and adaptation, as well as broader ecological concerns like preserving biodiversity, minimizing pollution, and promoting a circular economy. Social considerations pertain to issues of fairness, inclusivity, labor relations, investments in human resources and communities, and the protection of human rights. Effective governance of both public and private entities, which includes organizational structures, employee relationships, and executive compensation, plays a pivotal role in ensuring that social and environmental concerns are integrated into the decision-making process (European Commission, n.d.).

Central to the notion of sustainable finance is the concept of Environmental, Social, and Governance (ESG) criteria. These criteria provide a framework to evaluate the sustainability performance of corporations and institutions, facilitating the integration of environmental and social factors into investment and business decisions. A high ESG rating indicates strong sustainability practices, which can translate into enhanced risk management, reputation enhancement, and better long-term financial performance. This integration of ESG criteria and sustainability considerations into financial analysis underlines a paradigm shift in the financial industry, moving beyond purely profit-driven motives toward a more holistic and responsible approach.

2.2 Emergence and Challenges of Sustainable Finance

The need for sustainable finance is underlined by the profound impacts of environmental disruptions on economic systems. Extreme weather events, shifting weather patterns, and rising sea levels are manifesting as tangible economic threats. These phenomena not only pose immediate risks to businesses and financial institutions but also pose long-term systemic vulnerabilities.

In light of these pressing environmental concerns, the intersection of sustainability and finance has emerged as a critical area of investigation. The integration of sustainable practices into financial decisions has gained prominence as an essential strategy for addressing environmental challenges. However, navigating this intersection poses significant challenges. This paper aims to bridge the gaps in current literature on sustainable finance, with the intent of providing insights that can be applied to financial decision making and policy making.

The CFA Institute's survey conducted among its community members revealed a noteworthy discrepancy in the integration of climate change information into investment strategies. While approximately 40% of respondents incorporate such information, a poll of C-level executives indicates that around 75% view climate change as a serious concern. The disparity between these figures is often attributed to issuers' insufficient data and transparency regarding climate risks (CFA Institute, 2020). The literature surrounding the financial performance of high Environmental, Social, and Governance (ESG) rating firms is characterized by ambiguity. Research in the area has highlighted a significant concern: the scarcity of quality data and information available for informed investment decisions in the realm of sustainable finance. The lack of standardized reporting and transparent disclosure of environmental and social performance metrics by companies hampers the accurate assessment of their sustainability initiatives and challenges (CFA Research Foundation, 2017).

The growing prominence of sustainable finance is further corroborated by global initiatives and frameworks that show the importance of aligning financial practices with sustainability imperatives. The United Nations' Principles for Responsible Investment (PRI), established in 2006, has gained support from a substantial number of institutional investors and asset managers. These principles advocate for the incorporation of ESG factors into investment decision-making processes, reflecting a broader shift toward more conscientious investment strategies.

Moreover, various regulatory bodies and governmental agencies have recognized the significance of sustainable finance in addressing environmental concerns. Efforts such as the Paris Agreement and the United Nations Sustainable Development Goals (SDGs) have highlighted the necessity of financial systems that can support the transition to a low-carbon, resilient, and sustainable global economy (United Nations, 2023).

However, the integration of sustainability and finance is not without its challenges. Navigating this intersection necessitates the development of effective methodologies for evaluating environmental, social, and governance risks, as well as their potential financial impacts. Additionally, the lack of standardized reporting and transparent disclosure of sustainability-related metrics by companies poses hurdles in

accurately assessing their sustainability initiatives and challenges. This lack of consistent data hampers the ability of investors to make informed decisions and underlines the need for robust reporting frameworks.

Furthermore, the ambiguity extends to the realm of investment outcomes itself. Despite the growing body of literature examining the financial performance of sustainable investments compared to non-sustainable investments, a clear consensus has yet to be reached. Empirical evidence remains inconclusive regarding the distinct financial performance of these two categories (CFA Research Foundation, 2017). The intricacies of this relationship and the potential causal factors that underpin the difference in financial outcomes between sustainable and non-sustainable investments continue to be areas of active investigation. This persistent lack of consensus highlights the complexity of assessing and quantifying the financial implications of sustainable investments and highlights the need for further research to disentangle these intricate dynamics. This paper contributes to this ongoing discourse by systematically reviewing the existing literature, identifying trends, and pinpointing gaps, all of which collectively pave the way for a more comprehensive understanding of the financial implications of sustainable finance.

In conclusion, the convergence of sustainability and finance represents a pivotal response to the pressing challenges posed by climate change and environmental degradation. This integration is not confined to theoretical discourse but has affected the practices of financial institutions, investors, and corporations. However, this integration is accompanied by challenges that necessitate innovative approaches to data collection, analysis, reporting and research. As the world grapples with the imperative of sustainability, the role of finance as a catalyst for positive environmental and social change is increasingly indispensable.

2.3 Systematic Literature Review

This paper conducts a systematic literature review for articles on sustainability and finance. A systematic literature review is a structured and rigorous process aimed at identifying, assessing, and synthesizing existing research studies in a specific field. This approach transcends traditional narrative reviews by employing a systematic methodology to ensure objectivity, comprehensiveness, and replicability.

The systematic literature review methodology involves a series of well-defined steps that guide the selection and evaluation of relevant studies. These steps include formulating research questions, designing search strategies, screening studies for inclusion, extracting data, and conducting a thorough synthesis of findings. By adhering to a predefined protocol, the systematic review minimizes bias and subjectivity, enhancing the credibility and reliability of the ensuing analysis.

In the context of this thesis, the systematic literature review approach offers a robust framework for comprehensively exploring the field of sustainable finance. It enables the identification of key trends, critical research gaps, and methodological variations present in the body of literature. By systematically reviewing articles over a specific time frame, this study seeks to contribute to the consolidation and advancement of knowledge in the field of sustainable finance.

2.4 Scope and Focus of this study

Systematic literature reviews for the field of sustainable finance are limited. Among prior work, the work of De Carvalho Ferreira and colleagues in 2016 stands as a notable milestone. Their comprehensive literature review in the field of sustainable finance synthesized the findings of various studies, offering a consolidated perspective on emerging trends, research methodologies, and gaps in understanding. Such literature reviews play a vital role in shaping the trajectory of a growing field, providing a roadmap for future research and highlighting areas that demand further investigation. The study's scope focuses on the Journal of Sustainable Investment & Innovation for the period of 2011 to 2014, which covers 113 articles. While literature reviews have been employed successfully in other fields by various researchers (e.g., Seuring and Müller, 2008; Lages Junior and Godinho Filho, 2010; Kampen et al., 2012), their application to sustainable finance is relatively unexplored.

This study's approach departs from previous research in several distinct ways. Unlike the prior review of De Carvalho Ferreira et al. (2016) which analyzed only the Journal of Sustainable Investment & Innovation for a 4-year span, this thesis is positioned to delve deeply into a broad temporal span of 20 years and consolidated contributions from prominent finance journals. This chosen temporal scope aligns with the era marked by heightened global awareness of climate change, the rise of sustainability as a strategic imperative, and the transformation of financial systems to address environmental challenges.

Different from previous systematic review, this research directs its focus toward contributions primarily from prominent finance journals. This nuanced selection of sources enables a closer examination of the contemporary dialogue surrounding sustainable finance. By prioritizing articles published in renowned finance journals, this study aims to delve into insights, trends, and debates that have emerged within the academic forefront of finance.

This research's scope encompasses a wider array of topics within the domain of sustainable finance. The exploration ranges from the integration of ESG factors into investment decisions, the financial performance of sustainable investments, to the impact of sustainability initiatives on corporate valuation, asset pricing and risk management.

By delving into these multifaceted dimensions, this thesis aims to provide a comprehensive and unbiased overview of the existing literature, identify gaps, and offer insights for further research.

Specifically, this paper's objectives are multifold:

- To identify pertinent articles related to sustainable finance
- To categorize and codify the various characteristics of these articles
- To provide succinct summaries of each article's objectives and findings
- To outline a research agenda and framework for addressing the key gaps in knowledge regarding sustainable finance

This study makes a dual contribution. Primarily, it enhances the existing understanding of sustainable finance by systematically analyzing pertinent research from leading finance journals. This methodical approach not only consolidates the current knowledge landscape but also enriches it with fresh insights. Secondly, the systematic review process leads to the identification of gaps within the collected articles and also highlights overarching gaps across the entirety of the selection. This, in turn, lays the groundwork for an actionable research agenda aimed at addressing these gaps. As a result of the gaps in the analysis of current literature, a framework was proposed aiming to guide and strengthen the state-of-the-art research on sustainable finance.

This study’s findings suggest that the research landscape in sustainable finance has been predominantly centered in developed countries, comprising a substantial 76% of the articles (Figure 1). There exists a compelling avenue for future exploration in the context of developing countries, to uncover unique dynamics and challenges that pertain to these regions.

As the analysis unfolds, the review demonstrates the prominence of equities as the primary focus of research during the studied period (2002-2022), as indicated by its proportion of 37% in total studies, followed by real estate, of 9% (Figure 2). The main reasons for high interest in real estate climate research, compared to other alternative asset classes, are because it is an asset that is directly subject to physical risk and transition risk of climate change, hence the implications of these risks on properties are significant and require thorough understanding. A significant 30% of studies fall into the non-applicable category, focusing on aspects such as firms' behavior and conceptual frameworks. This indicates the diverse dimensions that have been examined under the umbrella of sustainable finance. More research is needed to investigate how alternative asset classes, such as derivatives, mutual funds, impact funds, are impacted by sustainability opportunities and threats.

A salient gap emerges concerning the publicity of assets under scrutiny. While a majority of studies revolve around public or listed assets, a mere 4% center on private assets, like hedge funds. This opens the door to prospective research avenues in the exploration of private asset classes and their dynamics within sustainable finance.

Upon examining the main subjects of the studies, finance emerges as the dominant focus, accounting for 74% of the articles, while sustainability and social issues collectively constitute only 22%. A call to action is evident, as it suggests a need for more research that delves into sustainability and social issues and their interplay with finance, in order to foster a more comprehensive understanding of their intricate relationship.

In terms of research objectives, the majority of studies, 96%, aim to conceptually contribute to their subjects. A mere 2% adopt a case study approach, and an even smaller 0% perform literature reviews. This unveils an opportunity for future research that embraces the literature review approach to enhance the organized and shared understanding between researchers and practitioners.

The methodological landscape of the research is dominated by quantitative methods, utilized in 63% of the studies. Conceptual models represent the second most employed approach, constituting 26% of the studies. This distribution signifies a preference for empirically grounded research in the exploration of sustainable finance topics. Future research could benefit from employing qualitative approaches to understand investors' beliefs and expectations, firms' behavior theories. It is recommended to develop conceptual models, theories to explore different assumptions and guidance for empirical research and practices.

Descriptive analysis showcases that 56% of the studies are conducted over a span of more than 5 years, indicating a focus on longer-term trends and effects. In contrast, 20% are confined to periods of less than 5 years, underscoring the significance of both short-term and long-term insights in the realm of sustainable finance.

The analysis also reveals that climate change, social responsibility, sustainability, climate, and governance emerge as the five most extensively researched topics. Climate change was the most researched topic, featured in 19% of the studies, closely trailed by social responsibility at 15%. While ESG (Environmental, Social, and Governance) has indeed gained popularity, it is noteworthy that the overarching trend gravitates towards climate change and socially responsible topics, reflecting the research landscape's orientation towards addressing pressing environmental and social concerns. However, the total number of articles on ESG and its sub-topics (Environment, Social, and Governance) accounts for 19%, with the majority of studies dedicated to Governance. This comprehensive analysis guides the way for a deeper understanding of the nuanced landscape of sustainable finance and sets the stage for further informed and impactful research endeavors.

The paper proceeds as follows: Section 3 presents the research methodology and details the classification and coding method for identified articles, Section 4 provides profiles of the reviewed articles, Section 5 delivers the results of the analysis of the entirety of the articles, and Section 6 provides the research agenda and concludes the paper. This systematic and comprehensive exploration of the literature on sustainable finance aims to contribute to a deeper understanding of the complex relationship between financial decisions and environmental considerations.

3 Methodology

While literature reviews have been employed successfully in other fields by various researchers (e.g., Seuring and Müller, 2008; Lages Junior and Godinho Filho, 2010; Kampen et al., 2012), their application to sustainable finance is relatively unexplored. This literature review is based on the works of Lage Junior and Godinho Filho (2010), and De Carvalho Ferreira et al. (2016) adapting their methods to this analysis, which focus on articles from five prominent finance journals. Lages Junior and Godinho Filho (2010) proposed a stepwise approach for literature reviews:

- First step: Conduct a thorough search across reputable academic databases for relevant articles.
- Second Step: Develop a systematic classification system using logical codes.
- Third Step: Apply the classification system to structure and clarify the existing knowledge in the field.
- Fourth Step: Create a profile of the scientific contributions and main findings from the identified articles based on the coding system.
- Fifth Step: Analyze gaps, opportunities, and challenges for future research.

In this study, a systematic search was performed for articles related to sustainable finance, utilizing keywords found in titles, abstracts, keywords, and article text. The search terms were “negative screening OR exclusion”, “positive screening OR best-in-class”, “ESG”, “thematic”, “engagement OR active ownership”, “impact investing/investment”, “socially responsible OR SRI”, “sustainable OR sustainability”, “green bonds”, “climate OR climate change”, “carbon”, “emission”, “global warming”, “greenium”. Other variations were also considered to increase the chance of a successful search. The search was conducted in Scopus databases. Articles that were unrelated to sustainability, finance, or sustainable finance, as well as those not accessible for download, were excluded. This left 54 articles for review. In contrast, the study by De Carvalho Ferreira et al. (2016) recommended 113 articles for systemization. The key distinction lies in the source of articles and horizon of the review. De Carvalho Ferreira et al. (2016) conducted a systematic review for articles on sustainable finance between 2011 and 2014 in the Journal of Sustainable Finance and Innovation. In contrast, this research conducted a systematic review across five major finance journals: the Journal of Finance, Journal of Financial Economics, Journal of Financial and Quantitative Analysis, Review of Finance, and Review of Financial Studies for a horizon of 20 years, from 2002 to 2022.

3.1 Classification and coding

After gathering and screening the primary studies related to sustainable finance, a classification framework was developed to categorize and code the articles. This framework comprised eight major themes numbered from 1 to 8, each of which was assigned an alphabetical code (A, B, C, etc.). This coding system employed alphabet letters to categorize each article. It was possible for an article to receive multiple codes for each category. The classification framework and codes are presented in Table 1. Classification 1, for example, involved determining the geographical context being studied in the articles and was coded on a scale ranging from A to D.

Table 1. The framework for classifying and coding the studies analyzed.

Classification	Meaning	Codes
1	Context	1A - Developed
		1B - Developing
		1C - International
		1D - Non-applicable
2	Asset class	2A - Equities
		2B - Fixed Income
		2C - Alt-Derivatives
		2D - Alt-Mutual fund
		2E - Alt-Impact funds
		2F - Alt-RE
		2G - Non-applicable
3	Public/private asset	3A - Public
		3B - Private
		3C - Both
		3D - Non-applicable
4	Main subject	4A - Finance
		4B - Sustainability
		4C - Social issues
		4D - Non-applicable
5	Objective	5A - Conceptually contribute to the subjects
		5B - Present a case study
		5C - Literature review
		5D - Non-applicable
6	Method	6A - Quantitative
		6B - Qualitative
		6C - Conceptual
		6D - Survey
		6E - Case study
		6F - Non-applicable
7	Period of study	7A - More than 5 years
		7B - Less 5 years
		7C - Non-applicable
8	Topic	8A - Active ownership
		8B - Carbon
		8C - Climate
		8D - Climate change
		8E - Emission
		8F - Environment
		8G - ESG
		8H - Global warming
		8I - Governance
		8J - Green bonds
		8K - Greenium
		8L - Impact investing
		8M - Negative screening
		8N - Positive screening
		8O - Social
		8P - Socially responsible
		8Q - Sustainable
		8R - Thematic

The classification system employed in this study serves as a comprehensive framework for categorizing and codifying the diverse facets of the analyzed articles. This framework encapsulates various dimensions that illuminate the nature of the research, providing a structured overview of the literature landscape.

4 Profiles of Articles

Table 2 provides an overview of the profiles of the articles following the classifications.

Table 2. Results of classification and coding

ID	Paper	Context	Asset Class	Public/Private assets	Main subject	Objective	Method	Period of study	Topic
1	Active ownership (Dimson et al., 2015)	1A	2A	3A	4A	5A	6A	7A	8A
2	Institutional shareholders and corporate social responsibility (Chen et al., 2020)	1A	2A	3A	4A	5A	6A	7B	8A
3	Carbon Tail Risk (Ilhan et al., 2020)	1A	2C	3A	4A	5A	6A	7A	8B
4	Do investor care about carbon risk? (Bolton & Kacperczyk, 2021)	1A	2A	3A	4A	5A	6A	7A	8B
5	Seeing the Unobservable from the Invisible: The Role of CO2 in Measuring Consumption Risk (Z. Chen & Lu, 2017)	1C	2G	3D	4B	5A	6C	7C	8B
6	The Big Three and Corporate Carbon Emissions around the world (Azar et al., 2021)	1A	2A	3A	4B	5B	6A	7A	8B
7	Climate Finance (Hong et al., 2020)	1C	2G	3D	4D	5D	6F	7C	8C
8	Going Underwater? Flood Risk Belief Heterogeneity and Coastal Home Price Dynamics (Bakkensen & Barrage, 2021)	1A	2F	3D	4A	5A	6C	7B	8C
9	Real effects of climate policy: Financial constraints and spillovers (Bartram et al., 2022)	1A	2G	3D	4B	5A	6A	7A	8C
10	The Importance of Climate Risks for Institutional Investors (Krueger et al., 2020)	1C	2G	3D	4A	5A	6D	7B	8C
11	What Do You Think about Climate Finance? (Stroebel & Wurgler, 2021)	1C	2G	3D	4A	5A	6D	7B	8C
12	An inconvenient cost: The effects of climate change on municipal bonds (Painter, 2020)	1A	2B	3A	4A	5A	6A	7A	8D
13	Climate change and long-run discount rates: evidence from real estate (Giglio et al., 2015)	1C	2F	3D	4A	5A	6C	7C	8D
14	Climate Change News Risk and Corporate Bond Returns (Huynh & Xia, 2020)	1A	2B	3A	4A	5A	6A	7A	8D
15	Disaster on the horizon: The price effect of sea level rise (Bernstein et al., 2019)	1A	2F	3D	4A	5A	6A	7A	8D
16	Does climate change affect real estate prices? Only if you believe in it (Baldauf et al., 2020)	1A	2F	3D	4A	5A	6C	7A	8D
17	Hedging climate change news (Engle et al., 2019)	1A	2A	3A	4A	5A	6A	7A	8D
18	Let the rich be flooded: The distribution of financial aid and distress after hurricane Harvey (Billings et al., 2022)	1A	2G	3D	4C	5A	6A	7B	8D
19	Mortgage finance and climate change: securitization dynamics in the aftermath of natural disasters (Ouazad & Kahn, 2019)	1A	2B	3D	4A	5A	6A	7A	8D
20	Partisan residential sorting on climate change risk (Bernstein et al., 2022)	1A	2F	3D	4C	5A	6A	7B	8D
21	Pricing Uncertainty Induced by Climate Change (Barnett et al., 2020)	1C	2G	3D	4A	5A	6C	7C	8D
22	Equilibrium Price Dynamics of Emission Permits (Hitzemann & Uhrig-Homburg, 2018)	1A	2G	3D	4A	5A	6C	7B	8E
23	ESG Preference, Institutional Trading, and Stock Returns Patterns (Cao et al., 2022)	1A	2A	3A	4A	5A	6A	7A	8G
24	Responsible investing: The ESG-efficient frontier (Pedersen et al., 2021)	1A	2A	3A	4A	5A	6C	7A	8G
25	Silence is safest: Information disclosure when the audience's preferences are uncertain (Bond & Zeng, 2022)	1A	2G	3D	4D	5A	6C	7C	8G
26	Corporate Environmental Policy and Shareholder Value: Following the Smart Money (Fernando et al., 2017)	1A	2A	3A	4A	5A	6A	7A	8F
27	Do institutional investors drive corporate social responsibility? International evidence (Dyck et al., 2019)	1B	2G	3A	4A	5A	6A	7A	8F
28	Financial Constraints and Corporate Environmental Policies (Xu & Kim, 2021)	1A	2G	3A	4B	5A	6A	7A	8F
29	Corporate governance and pollution externalities of public and private firms (Shive & Forster, 2020)	1A	2A	3C	4A	5A	6A	7A	8I
30	Do corporate governance ratings change investor expectations? Evidence from announcements by institutional shareholder services* (Guest & Nerino, 2019)	1A	2A	3A	4C	5A	6A	7B	8I
31	International Corporate Governance Spillovers: Evidence from Cross-Border Mergers and Acquisitions (Albuquerque et al., 2018)	1B	2G	3D	4A	5A	6A	7A	8I

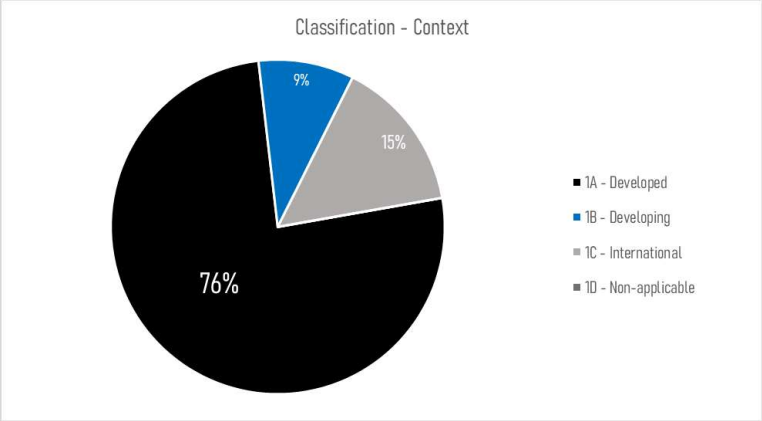
32	Restraining Overconfident CEOs through Improved Governance: Evidence from the Sarbanes-Oxley Act (Banerjee et al., 2015)	1A	2G	3A	4B	5A	6A	7A	8I
33	Attention to global warming (Choi et al., 2020)	1B	2A	3A	4A	5A	6A	7A	8H
34	Market expectations of a warming climate (Schlenker & Taylor, 2021)	1A	2C	3A	4A	5A	6A	7A	8H
35	Prediction anomaly performance with politics (Novy-Marx, 2014)	1A	2A	3A	4A	5A	6A	7C	8H
36	Corporate green bonds (Flammer, 2021)	1A	2B	3A	4A	5A	6A	7C	8J
37	Dissecting green returns (Pastor et al., 2022)	1A	2A	3A	4A	5A	6A	7A	8J
38	Contracts with (Social) benefits: The implementation of impact investing (Geczy et al., 2021)	1A	2E	3B	4B	5A	6A	7A	8K
39	Impact investing (Barber et al., 2021b)	1A	2E	3B	4A	5A	6A	7C	8K
40	Investing for Impact (Chowdhry et al., 2018)	1C	2E	3D	4A	5A	6C	7C	8K
41	Asset Prices and Portfolios with Externalities (Baker et al., 2022)	1C	2A	3D	4A	5A	6C	7C	8O
42	Can socially responsible firms survive competition? An analysis of corporate employee matching grant schemes (Gong & Grundy, 2017)	1A	2G	3A	4C	5A	6C	7B	8O
43	Corporate goodness and shareholder wealth (Krüger, 2015)	1A	2A	3A	4A	5A	6A	7A	8O
44	Mutual Fund Attributes and Investor Behavior (Bollen, 2007)	1A	2D	3D	4A	5A	6A	7A	8O
45	Social Screens and Systematic Investor Boycott Risk (Luo & Balvers, 2017)	1A	2A	3A	4A	5A	6C	7A	8O
46	Socially responsible corporate customers (Dai et al., 2021)	1B	2G	3A	4B	5A	6A	7A	8O
47	Socially responsible firms (Ferrell et al., 2016)	1B	2A	3A	4B	5A	6A	7A	8O
48	Why Do Investors Hold Socially Responsible Mutual Funds? (Riedl & Smeets, 2017)	1A	2D	3D	4A	5A	6D	7A	8O
49	Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows (Hartzmark & Sussman, 2019)	1A	2D	3D	4A	5A	6A	7B	8P
50	Get Real! Individuals Prefer More Sustainable Investments (Bauer et al., 2021)	1A	2G	3D	4A	5A	6D	7C	8P
51	Portfolio choice with sustainable spending: A model of reaching for yield (Campbell & Sigalov, 2022)	1A	2A	3A	4A	5A	6C	7C	8P
52	Sustainability Preferences Under Stress: Evidence from COVID-19 (Döttling & Kim, 2022)	1A	2D	3D	4A	5A	6A	7B	8P
53	Sustainable investing in equilibrium (Pastor et al., 2021)	1A	2A	3A	4A	5A	6C	7C	8P
54	Sustainable investing with ESG rating uncertainty (Avramov et al., 2022)	1A	2A	3A	4A	5A	6C	7A	8P

5 Results of the Analysis

5.1 Context

This classification unveils the geographical and contextual scope of the studied articles. The categories range from '1A-Developed', '1B-Developing', to '1C-International' and '1D-Non-applicable,' offering insights into the spatial contexts within which sustainable finance research has been conducted. The results obtained after the analysis of the 54 articles are shown in Figure 1.

Figure 1. Classification - Context



The findings of the analysis indicate that the predominant focus of research in sustainable finance has been on developed countries, which account for a substantial 76% of the articles. However, there is a significant gap in exploring the context of developing countries, which presents an exciting avenue for future investigation to uncover unique dynamics and challenges specific to those regions.

Gap$_1$: How is the relationship between finance, investment and sustainability seen in developing countries?

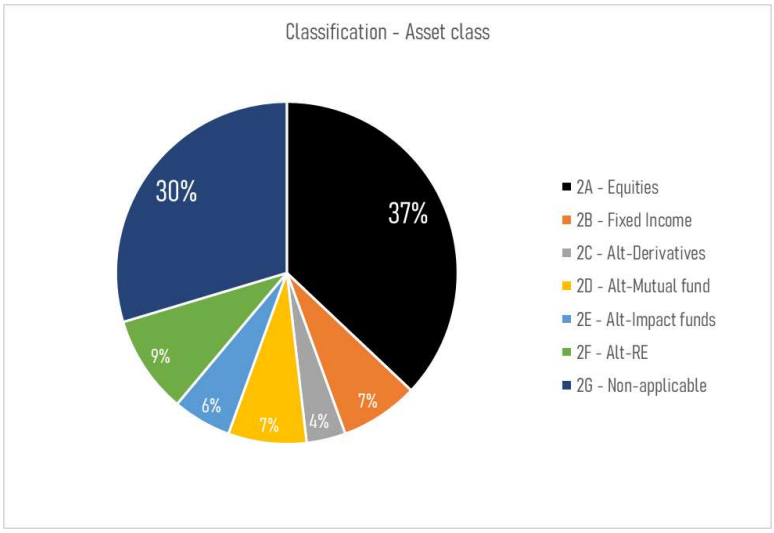
5.2 Asset class

Classifying the asset class under scrutiny, this dimension ranges from '2A-Equities' and '2B-Fixed Income' to alternative categories such as '2C-Alt-Derivatives,' '2D-Alt-Mutual funds,' '2EAlt-Impact funds,' '2F-Alt-RE', and '2G-Non applicable'. This classification provides a panoramic view of the range of financial instruments or assets explored in the sustainable finance discourse.

Within the studied period (2002-2022), the review highlights equities as the primary research focus, constituting 37% of the total studies, followed by real estate at 9%. This emphasis on real estate climate research is due to its vulnerability to the physical and transition risks of climate change, making it crucial to understand the implications of these risks on properties. Moreover, 30% of studies fall under the non-applicable category, including areas like firms' behavior and conceptual frameworks. This diversity illustrates the breadth of dimensions explored in sustainable finance, yet there is a need for more research examining the impact of sustainability opportunities and threats on alternative asset classes such as derivatives, mutual funds, and impact funds.

Gap$_2$: What is the impact of sustainability opportunities and challenges on alternative asset classes such as derivatives, hedge funds?

Figure 2. Classification – Asset class



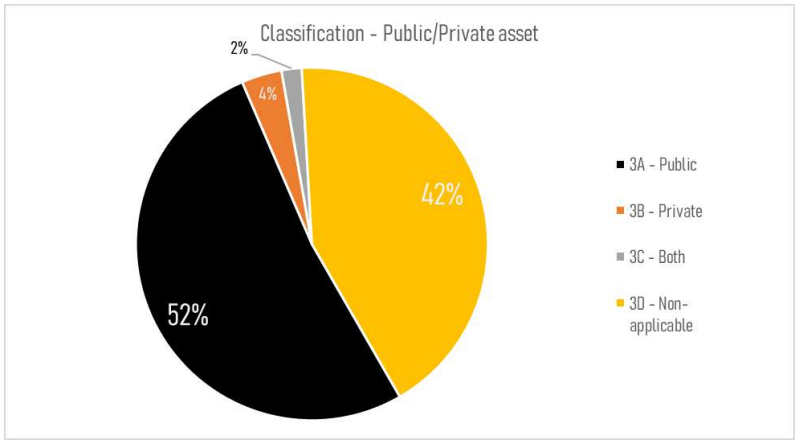
5.3 Public/Private asset

Delineating the public and private nature of assets, this classification spans '3A-Public,' '3B-Private,' '3C-Both,' and '3D-Non-applicable,' showcasing the focus of research on publicly traded, privately held, or a combination of assets.

A notable gap arises in the attention given to different types of assets. While the majority of studies revolve around public or listed assets, only a mere 4% focus on private assets, including hedge funds. This gap suggests a potential research avenue to investigate the dynamics of private asset classes within the realm of sustainable finance.

Gap_3: The necessity of having new studies that explore the sustainable finance dynamics in private asset classes.

Figure 3. Classification – Public/Private assets



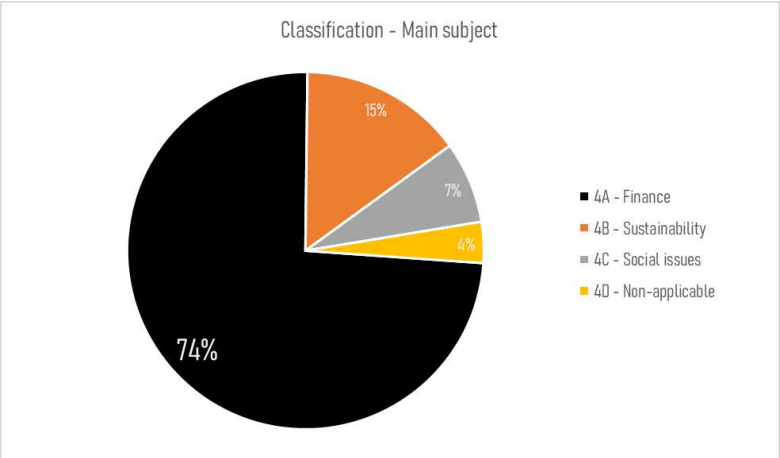
5.4 Main subject

This classification dissects the primary subjects of the studies into '4A-Finance,' '4B-Sustainability,' '4C-Social issues,' and '4D-Non-applicable,' unveiling the thematic orientations that guide the research endeavors.

Regarding the main subjects of the studies, finance dominates as the central focus, representing 74% of the articles, while sustainability and social issues collectively account for only 22%. This observation emphasizes the need for more research that delves into the intersection of sustainability, social issues, and finance, fostering a more comprehensive understanding of their intricate relationship.

Gap$_4$: The necessity of new research on sustainability and social issues areas, such as carbon pricing, financial implications on exposed real estates.

Figure 4. Classification – Main subject



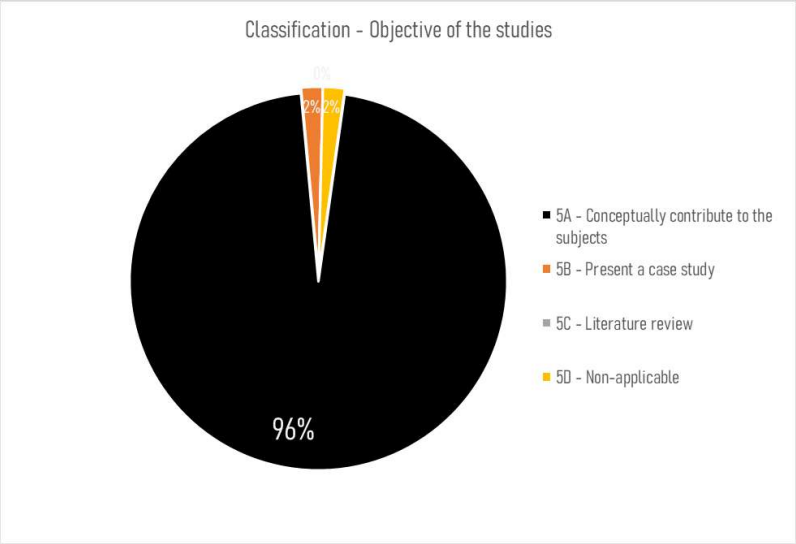
5.5 Objective of study

Categorizing the research objectives, this dimension includes '5A-Conceptually contribute to the subjects' to '5B-Present a case study,' '5C-Literature review,' and '5D-Non-applicable.' This offers insights into the purpose and intent of the studies, whether they seek to conceptualize, present, review, or address other research objectives.

The research objectives show that a large majority of studies (96%) aim to conceptually contribute to their respective subjects. Only 2% adopt case study approaches, and none perform literature reviews. This indicates an opportunity for future research to employ literature review methodologies to enhance the organized and shared understanding between researchers and practitioners.

Gap$_5$: Establish more literature reviews to organize and synthetize research on sustainable finance.

Figure 5. Classification – Objective of the studies



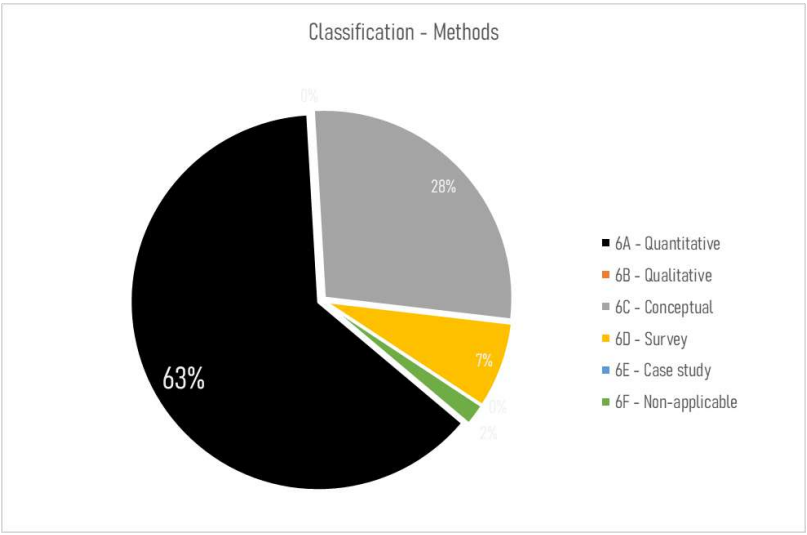
5.6 Method

This classification delineates the methodologies employed in the research, which were '6A-Quantitative,' '6B-Qualitative,' '6C-Conceptual,' '6D-Survey,' '6E-Case study,' and '6F-Non-applicable'. It delves into the empirical and theoretical underpinnings of the studies.

Quantitative methods are the most prevalent in the methodological landscape, used in 63% of the studies, followed by conceptual models at 26%. This distribution implies a preference for empirically grounded research in sustainable finance topics. Future research could benefit from incorporating qualitative, surveys and case study approaches to understand investor beliefs, firms' behavioral theories, and exploring different assumptions through conceptual models.

Gap$_6$: The necessity of having new studies that use conceptual approaches to allow for generalization of financial impacts of different sustainability challenges.

Figure 6. Classification - Methods

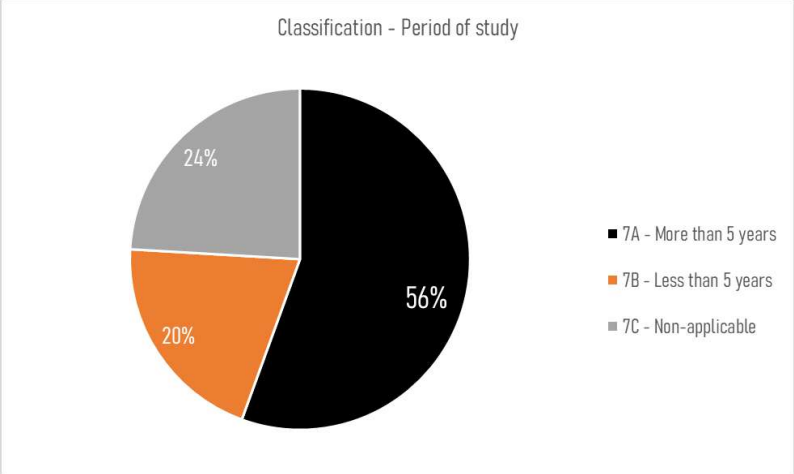


5.7 Period of study

Classifying the duration of the studies, this dimension categorizes into '7A-More than 5 years', '7B-Less than 5 years' and '7C-Non-applicable,' shedding light on the temporal contexts explored within sustainable finance.

The temporal dimension of research reveals that 56% of studies span more than 5 years, emphasizing a focus on longer-term trends and effects. Conversely, 20% are limited to periods of less than 5 years, highlighting the significance of both short-term and long-term insights in the sustainable finance domain.

Figure 7. Classification – Period of study



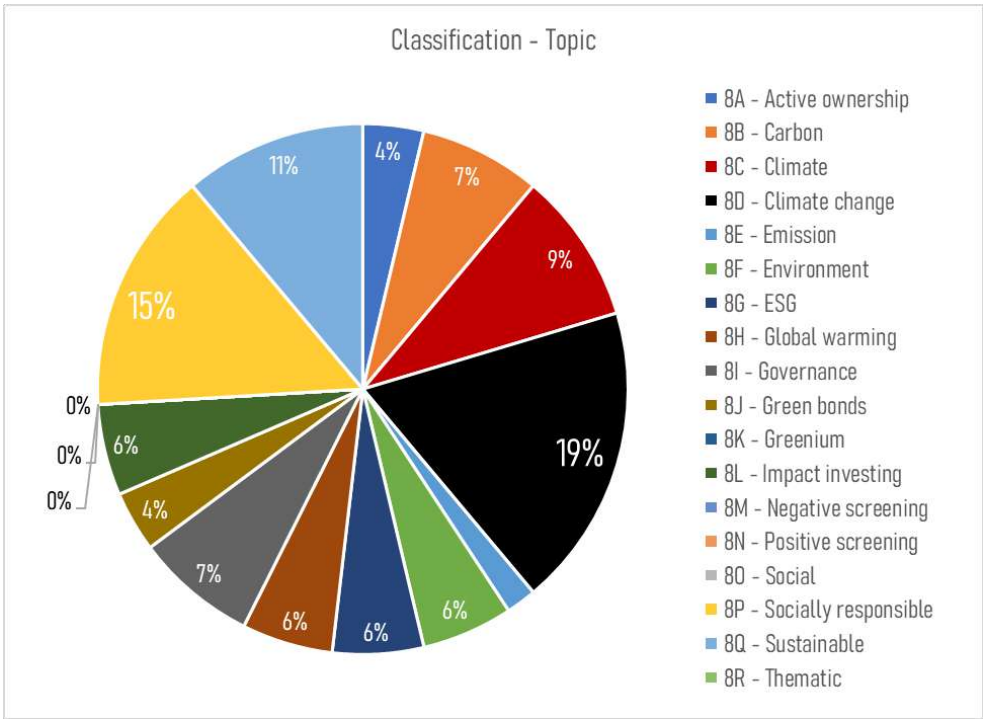
5.8 Topic of study

This classification reflects the diverse spectrum of topics investigated within sustainable finance. It spans from '8A-Active ownership' and '8B-Carbon' to '8C-Climate,' '8G-ESG,' '8L-Impact investing,' '8P-Socially responsible,' '8Q-Sustainable,' and more. This dimension unravels the intricate web of themes driving the sustainable finance discourse.

This classification showed that data were widespread. The analysis identifies climate change, social responsibility, sustainability, climate, and governance as the most extensively researched topics. Climate change takes the lead with 19% of the studies, followed closely by social responsibility at 15%. While ESG has gained popularity, the research landscape leans toward climate change and socially responsible topics, reflecting a strong orientation towards addressing pressing environmental and social concerns. This comprehensive analysis provides insights into the diverse landscape of sustainable finance and lays the groundwork for further research endeavors that contribute to a more informed and impactful understanding of the field. It is notable that Social, Negative screening, Positive screening, and Thematic are not researched topics amongst the 54 articles. This signifies a gap in current literature about the investment principles that incorporate sustainable factors and their performance.

Gap_8: The necessity of new research on Social aspects (S in ESG), Negative screening, Positive screening, and Thematic investing.

Figure 8. Classification - Topic



5.9 Common goal

Through the evaluation of these articles (Appendix 9), it becomes evident that three primary research objectives have emerged. The first objective pertains to investigating the influence of shareholders' and institutional ownership on the corporate social responsibility (CSR) or environmental, social, and governance (ESG) performance of firms. The second objective involves comprehending the reasons behind investors' preferences for socially responsible (SR) investments and delving into the underlying factors. Lastly, the third objective centers around scrutinizing the potential impact of sustainability factors on asset prices, comprising stock prices, bond prices, option prices, and housing prices.

Articles 1, 2, 26, and 27 are aligned with the first research goal. Similarly, articles 39, 48, and 50 converge on the second objective. The third research goal is addressed by articles 3, 4, 14, 15, 16, 30, 34, and 43.

While other articles have distinct and individualized research aims, without overlapping or sharing common objectives, these findings highlight the diversity of research endeavors within the field.

*Factors such as climate policy, carbon emission, climate change news, sea level rise, belief difference, governance rating announcements, positive and negative events concerning a firm's CSR.

6 Discussion and Conclusion

The present study aims to provide a comprehensive overview of the state of research in sustainable finance by conducting a systematic literature review. While the study has shed light on significant insights within the field, it is essential to acknowledge several limitations that impact the scope and findings of this research.

The first limitation arises from data source selection. This study focused exclusively on articles published in five prominent finance journals. It is important to acknowledge that the number of articles related to sustainable finance in these selected journals might be lower compared to other journals that specialize in sustainability topics. Although the chosen journals are recognized for their quality, this selection may have influenced the representation of the articles in the analysis.

The second limitation concerns the keywords used for sourcing articles. The utilization of specific keywords may have led to the omission of articles that employ variations of these terms. The rapid evolution of terminology in the field of sustainable finance can make it challenging to capture all relevant research articles using a predefined set of keywords.

The third limitation pertains to the potential exclusion of certain papers that meet the search criteria but do not appear due to the technical workflow of publishing platforms. Despite crafting a comprehensive search string, unforeseen technicalities within publication workflows might result in some articles being unintentionally omitted from the analysis.

In conclusion, this systematic literature review has highlighted essential trends, discrepancies, and gaps within the domain of sustainable finance. The analysis underscores the significance of exploring sustainable finance dynamics in the context of developing countries, investigating the impact of sustainability opportunities and challenges on alternative asset classes, and delving into private asset classes' sustainable finance dynamics. Additionally, the study emphasizes the need for more research at the intersection of sustainability, social issues, and finance, the utilization of literature review methodologies for a comprehensive understanding, and the incorporation of conceptual approaches to allow for generalization of financial impacts of different sustainability challenges.

Moreover, the study identified significant gaps in research concerning topics such as Social aspects (S in ESG), Negative screening, Positive screening, and Thematic investing. These areas present untapped potential for contributing to a more holistic understanding of sustainable finance principles and their practical implications.

The identified common research goals provide insight into the general interest of current literature. Four articles pertain to investigating the influence of shareholders' and institutional ownership on the corporate social responsibility (CSR) or environmental, social, and governance (ESG) performance of firms. Three articles aim to understand the reasons and factors of investors’ preferences for socially responsible (SR) investments. A notable pool of eight articles examines whether certain sustainability or climate-related factors affect asset prices or returns.

In addition to the gaps identified from analyzing the 54 articles, the study provides a comprehensive overview of their research question, findings, and their proposed research agenda (Appendix 9).

The insights derived from this systematic literature review contribute to informed decision-making, setting the stage for a more responsible and resilient financial sector in the face of global sustainability challenges. Furthermore, the proposed research agenda can guide future scholars and practitioners in addressing the identified gaps and advancing the dialogue on sustainable finance. Through a collaborative effort to bridge these gaps, sustainable finance can make more impactful contributions to addressing pressing environmental and social concerns while ensuring financial stability and growth.

7 References

Albuquerque, R., Brandao-Marques, L., Ferreira, M. A., & Matos, P. (2018). International Corporate Governance Spillovers: Evidence from Cross-Border Mergers and Acquisitions. *Review of Financial Studies*, *32*(2), 738–770. https://doi.org/10.1093/rfs/hhy053

Avramov, D., Cheng, S., Lioui, A., & Tarelli, A. (2022). Sustainable investing with ESG rating uncertainty. *Journal of Financial Economics*, *145*(2), 642–664. https://doi.org/10.1016/j.jfineco.2021.09.009

Azar, J., Duro, M., Kadach, I., & Ormazabal, G. (2021). The Big Three and corporate carbon emissions around the world. *Journal of Financial Economics*, *142*(2), 674–696. https://doi.org/10.1016/j.jfineco.2021.05.007

Baker, S. D., Hollifield, B., & Osambela, E. (2022). Asset Prices and Portfolios with Externalities. *Review of Finance*, *26*(6), 1433–1468. https://doi.org/10.1093/rof/rfac065

Bakkensen, L. A., & Barrage, L. (2021). Going underwater? Flood risk belief heterogeneity and coastal home price dynamics. *Review of Financial Studies*, *35*(8), 3666–3709. https://doi.org/10.1093/rfs/hhab122

Baldauf, M., Garlappi, L., & Yannelis, C. (2020). Does Climate Change Affect Real Estate Prices? Only If You Believe In It. *Review of Financial Studies*, *33*(3), 1256–1295. https://doi.org/10.1093/rfs/hhz073

Banerjee, S., Humphery-Jenner, M., & Nanda, V. (2015). Restraining Overconfident CEOs through Improved Governance: Evidence from the Sarbanes-Oxley Act. *Review of Financial Studies*, *28*(10), 2812–2858. https://doi.org/10.1093/rfs/hhv034

Barber, B. M., Morse, A., & Yasuda, A. (2021a). Impact investing. *Journal of Financial Economics*, *139*(1), 162–185. https://doi.org/10.1016/j.jfineco.2020.07.008

Barber, B. M., Morse, A., & Yasuda, A. (2021b). Impact investing. *Journal of Financial Economics*, *139*(1), 162–185. https://doi.org/10.1016/j.jfineco.2020.07.008

Barnett, M., Brock, W. A., & Hansen, L. P. (2020). Pricing uncertainty induced by climate change. *Review of Financial Studies*, *33*(3), 1024–1066. https://doi.org/10.1093/rfs/hhz144

Bartram, S. M., Hou, K., & Kim, S. (2022). Real effects of climate policy: Financial constraints and spillovers. *Journal of Financial Economics*, *143*(2), 668–696. https://doi.org/10.1016/j.jfineco.2021.06.015

Bauer, R., Ruof, T., & Smeets, P. (2021). Get real! Individuals prefer more sustainable investments. *Review of Financial Studies*, *34*(8), 3976–4043. https://doi.org/10.1093/rfs/hhab037

Bernstein, A., Billings, S. B., Gustafson, M., & Lewis, R. (2022). Partisan residential sorting on climate change risk. *Journal of Financial Economics*, *146*(3), 989–1015. https://doi.org/10.1016/j.jfineco.2022.03.004

Bernstein, A., Gustafson, M., & Lewis, R. (2019). Disaster on the horizon: The price effect of sea level rise. *Journal of Financial Economics*, *134*(2), 253–272. https://doi.org/10.1016/j.jfineco.2019.03.013

Billings, S. B., Gallagher, E., & Ricketts, L. R. (2022). Let the rich be flooded: The distribution of financial aid and distress after hurricane harvey. *Journal of Financial Economics*, *146*(2), 797–819. https://doi.org/10.1016/j.jfineco.2021.11.006

Bollen, N. P. B. (2007). Mutual fund attributes and investor behavior. *Journal of Financial and Quantitative Analysis*, *42*(3), 683–708. https://doi.org/10.1017/s0022109000004142

Bolton, P., & Kacperczyk, M. (2021). Do investors care about carbon risk? *Journal of Financial Economics*, *142*(2), 517–549. https://doi.org/10.1016/j.jfineco.2021.05.008

Bond, P., & Zeng, Y. (2022). Silence is safest: Information disclosure when the audience's preferences are uncertain. *Journal of Financial Economics*, *145*(1), 178–193. https://doi.org/10.1016/j.jfineco.2021.08.012

Campbell, J. Y., & Sigalov, R. (2022). Portfolio choice with sustainable spending: A model of reaching for yield. *Journal of Financial Economics*, *143*(1), 188–206. https://doi.org/10.1016/j.jfineco.2021.05.018

Cao, J., Titman, S., Zhan, X., & Zhang, W. (2022). ESG preference, institutional trading, and stock return patterns. *Journal of Financial and Quantitative Analysis*, 1–35. https://doi.org/10.1017/s0022109022000916

Chen, T., Dong, H., & Lin, C. (2020). Institutional shareholders and corporate social responsibility. *Journal of Financial Economics*, *135*(2), 483–504. https://doi.org/10.1016/j.jfineco.2019.06.007

Chen, Z., & Lu, A. (2017). Seeing the Unobservable from the Invisible: The Role of CO2 in Measuring Consumption Risk*. *Review of Finance*, *22*(3), 977–1009. https://doi.org/10.1093/rof/rfx027

Choi, D., Gao, Z., & Jiang, W. (2020). Attention to global warming. *Review of Financial Studies*, *33*(3), 1112–1145. https://doi.org/10.1093/rfs/hhz086

Chowdhry, B., Davies, S. W., & Waters, B. (2018). Investing for impact. *Review of Financial Studies*, *32*(3), 864–904. https://doi.org/10.1093/rfs/hhy068

Dai, R., Liang, H., & Ng, L. (2021). Socially responsible corporate customers. *Journal of Financial Economics*, *142*(2), 598–626. https://doi.org/10.1016/j.jfineco.2020.01.003

De Carvalho Ferreira, M. C. R., Sobreiro, V. A., Kimura, H., & Barboza, F. (2016). A systematic review of literature about finance and sustainability. *Journal of Sustainable Finance & Investment*, *6*(2), 112–147. https://doi.org/10.1080/20430795.2016.1177438

Dimson, E., Karakaş, O., & Li, X. (2015). Active ownership. *Review of Financial Studies*, *28*(12), 3225–3268. https://doi.org/10.1093/rfs/hhv044

Döttling, R., & Kim, S. (2022). Sustainability Preferences Under Stress: Evidence from COVID-19. *Journal of Financial and Quantitative Analysis*, 1–39. https://doi.org/10.1017/s0022109022001296

Dyck, A., Lins, K. V., Roth, L., & Wagner, H. F. (2019). Do institutional investors drive corporate social responsibility? International evidence. *Journal of Financial Economics*, *131*(3), 693–714. https://doi.org/10.1016/j.jfineco.2018.08.013

Engle, R. F., Giglio, S., Kelly, B. T., Lee, H., & Stroebel, J. (2019). *Hedging climate change news*. https://doi.org/10.3386/w25734

Fernando, C. S., Sharfman, M. P., & Uysal, V. B. (2017). Corporate environmental policy and shareholder value: following the smart money. *Journal of Financial and Quantitative Analysis*, *52*(5), 2023–2051. https://doi.org/10.1017/s0022109017000680

Ferrell, A., Liang, H., & Renneboog, L. (2016). Socially responsible firms. *Journal of Financial Economics*, *122*(3), 585–606. https://doi.org/10.1016/j.jfineco.2015.12.003

Flammer, C. (2021). Corporate green bonds. *Journal of Financial Economics*, *142*(2), 499–516. https://doi.org/10.1016/j.jfineco.2021.01.010

Geczy, C. C., Jeffers, J., Musto, D. K., & Tucker, A. M. (2021). Contracts with (Social) benefits: The implementation of impact investing. *Journal of Financial Economics*, *142*(2), 697–718. https://doi.org/10.1016/j.jfineco.2021.01.006

Giglio, S., Maggiori, M., Strobel, J., & Weber, A. (2015). *Climate Change and Long-Run Discount Rates: Evidence from Real Estate*. https://doi.org/10.3386/w21767

Gong, N., & Grundy, B. D. (2017). Can socially responsible firms survive competition? An analysis of Corporate employee matching grant schemes*. *Review of Finance*, *23*(1), 199–243. https://doi.org/10.1093/rof/rfx025

Guest, P. M., & Nerino, M. (2019). Do Corporate Governance Ratings Change Investor Expectations? Evidence from Announcements by Institutional Shareholder Services*. *Review of Finance*, *24*(4), 891–928. https://doi.org/10.1093/rof/rfz021

Hartzmark, S. M., & Sussman, A. B. (2019). Do investors value sustainability? A natural experiment examining ranking and fund flows. *Journal of Finance*, *74*(6), 2789–2837. https://doi.org/10.1111/jofi.12841

Hitzemann, S., & Uhrig-Homburg, M. (2018). Equilibrium price dynamics of emission permits. *Journal of Financial and Quantitative Analysis*, *53*(4), 1653–1678. https://doi.org/10.1017/s0022109018000297

Hong, H., Karolyi, G. A., & Scheinkman, J. A. (2020). Climate finance. *Review of Financial Studies*, *33*(3), 1011–1023. https://doi.org/10.1093/rfs/hhz146

Huynh, T. D., & Xia, Y. (2020). Climate change news risk and corporate bond returns. *Journal of Financial and Quantitative Analysis*, *56*(6), 1985–2009. https://doi.org/10.1017/s0022109020000757

Ilhan, E., Sautner, Z., & Vilkov, G. (2020). Carbon Tail risk. *Review of Financial Studies*, *34*(3), 1540–1571. https://doi.org/10.1093/rfs/hhaa071

Jabbour, C. J. C. (2013). Environmental training in organisations: From a literature review to a framework for future research. *Resources Conservation and Recycling*, *74*, 144–155. https://doi.org/10.1016/j.resconrec.2012.12.017

Krueger, P., Sautner, Z., & Starks, L. T. (2020). The importance of climate risks for institutional investors. *Review of Financial Studies*, *33*(3), 1067–1111. https://doi.org/10.1093/rfs/hhz137

Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics*, *115*(2), 304–329. https://doi.org/10.1016/j.jfineco.2014.09.008

Luo, H., & Balvers, R. J. (2017). Social screens and systematic investor boycott risk. *Journal of Financial and Quantitative Analysis*, *52*(1), 365–399. https://doi.org/10.1017/s0022109016000910

Novy-Marx, R. (2014). Predicting anomaly performance with politics, the weather, global warming, sunspots, and the stars. *Journal of Financial Economics*, *112*(2), 137–146. https://doi.org/10.1016/j.jfineco.2014.02.002

Ouazad, A., & Kahn, M. E. (2019). *Mortgage Finance and Climate Change: Securitization dynamics in the aftermath of Natural Disasters*. https://doi.org/10.3386/w26322

Overview of Sustainable Finance. (n.d.). European Commission. Retrieved August 15, 2023, from https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance_en

Painter, M. (2020). An inconvenient cost: The effects of climate change on municipal bonds. *Journal of Financial Economics*, *135*(2), 468–482. https://doi.org/10.1016/j.jfineco.2019.06.006

Pastor, L., Stambaugh, R. F., & Taylor, L. A. (2021). Sustainable investing in equilibrium. *Journal of Financial Economics*, *142*(2), 550–571. https://doi.org/10.1016/j.jfineco.2020.12.011

Pastor, L., Stambaugh, R. F., & Taylor, L. A. (2022). Dissecting green returns. *Journal of Financial Economics*, *146*(2), 403–424. https://doi.org/10.1016/j.jfineco.2022.07.007

Pedersen, L. H., Fitzgibbons, S., & Pomorski, L. (2021). Responsible investing: The ESG-efficient frontier. *Journal of Financial Economics*, *142*(2), 572–597. https://doi.org/10.1016/j.jfineco.2020.11.001

Riedl, A., & Smeets, P. (2017). Why do investors hold socially responsible mutual funds? *Journal of Finance*, *72*(6), 2505–2550. https://doi.org/10.1111/jofi.12547

Schlenker, W., & Taylor, C. A. (2021). Market expectations of a warming climate. *Journal of Financial Economics*, *142*(2), 627–640. https://doi.org/10.1016/j.jfineco.2020.08.019

Shive, S., & Forster, M. (2020). Corporate governance and pollution externalities of public and private firms*. *Review of Financial Studies*, *33*(3), 1296–1330. https://doi.org/10.1093/rfs/hhz079

Stroebel, J., & Wurgler, J. (2021). What do you think about climate finance? *Journal of Financial Economics*, *142*(2), 487–498. https://doi.org/10.1016/j.jfineco.2021.08.004

Xu, Q., & Kim, T. H. (2021). Financial constraints and corporate environmental policies. *Review of Financial Studies*, *35*(2), 576–635. https://doi.org/10.1093/rfs/hhab056

8 Appendices

Appendix 1. Descriptive of classification – Context

Context	# of Articles
1A - Developed	41
1B - Developing	5
1C - International	8
1D - Non-applicable	0

Appendix 2. Descriptive of classification – Asset class

Asset class	# of Articles
2A - Equities	20
2B - Fixed Income	4
2C - Alt-Derivatives	2
2D - Alt-Mutual fund	4
2E - Alt-Impact funds	3
2F - Alt-RE	5
2G - Non-applicable	16

Appendix 3. Descriptive of classification – Public/Private asset

Public/Private asset	# of Articles
3A - Public	28
3B - Private	2
3C - Both	1
3D - Non-applicable	23

Appendix 4. Descriptive of classification – Main subject

Main subject	# of Articles
4A - Finance	40
4B - Sustainability	8
4C - Social issues	4
4D - Non-applicable	2

Appendix 5. Descriptive of classification – Objective

Objective	# of Articles
5A - Conceptually contribute to the subjects	52
5B - Present a case study	1
5C - Literature review	0
5D - Non-applicable	1

Appendix 6. Descriptive of classification – Method

Method	# of Articles
6A - Quantitative	34
6B - Qualitative	0
6C - Conceptual	15
6D - Survey	4
6E - Case study	0
6F - Non-applicable	1

Appendix 7. Descriptive of classification – Period of study

Period of study	# of Articles
7A - More than 5 years	30
7B - Less than 5 years	11
7C - Non-applicable	13

Appendix 8. Descriptive of classification – Topic

Topic	# of Articles
8A - Active ownership	2
8B - Carbon	4
8C - Climate	5
8D - Climate change	10
8E - Emission	1
8F - Environment	3
8G - ESG	3
8H - Global warming	3
8I - Governance	4
8J - Green bonds	2
8K - Greenium	0
8L - Impact investing	3
8M - Negative screening	0
8N - Positive screening	0
8O - Social	0
8P - Socially responsible	8
8Q - Sustainable	6
8R - Thematic	0

Appendix 9. Findings and research agenda of each analyzed study

Article	Research question	Findings	Research agenda
Active ownership (Dimson et al., 2015)	Impact of shareholder activism on Environmental and Social issues and firm performance (operation, governance, abnormal returns)	· ESG improvements in target firms are unlikely to be a consequence of their superior future performance. · Engagements on corporate governance and climate change have the most pronounced positive abnormal returns.	· Future research should focus on the precise mechanisms that determine the price reaction to activist engagements and examine whether the models developed in the United States have validity in other markets.
Institutional share holders and corpo rate social responsibility (Chen et al., 2020)	Examine the effect of institutional shareholders on CSR	· Higher levels of institutional ownership led to better CSR ratings and that institutional shareholders mainly drive improvements in CSR issues that are financially material to firm values. · Higher ownership reduces certain negative CSR issues that might lead to lawsuits or regulatory penalties. · Evidence that institutional shareholders use SRI proposals to increase their influence on CSR investments and affect social impact outcomes.	· The study contributes to our understanding of the real effect of sustainable investments and institutional shareholders' role in improving social benefits.
Carbon Tail Risk (Ilhan et al., 2020)	Test whether climate policy uncertainty is priced in the option mkt	· Climate policy uncertainty is priced in the option market. · The cost of option protection against downside tail risk is larger for more carbon-intense firms. · A one-standard-deviation increase in a firm's log industry carbon intensity increases the implied volatility slope by 10% of the variable's standard deviation. · The cost of downward option protection is magnified when public attention to climate change spikes. · The cost of option protection significantly decreased at highly carbon-intense firms after President Trump's election in 2016, relative to other firms.	· Future research should investigate the implications of climate policy uncertainty on firms' investment decisions and long-term strategies, as well as how firms can mitigate the risks associated with climate policy uncertainty, and how policy-makers can provide more clarity and stability in their climate policies.
Do investor care about carbon risk? (Bolton & Kacperczyk, 2021)	Examine whether carbon emission affect US cross-sectional stock returns	· Carbon emissions significantly and positively affect stock returns, indicating that investors are pricing in carbon risk. · Carbon premium cannot be explained through a sin stock divestment effect, and there is no carbon premium associated with emission intensity. · Investors are discerning cross-sectional differences and are pricing in carbon risk, which has implications for climate change mitigation policies.	· The study recommends further research to explore the causal link between carbon emissions and stock returns, the relationship between carbon risk and firm value, and the effectiveness of policies to curb carbon emissions.

Seeing the Unobservable from the Invisible: The Role of CO2 in Measuring Consumption Risk (Z. Chen & Lu, 2017)	Propose an innovative measure of the unobserved usage of durable goods from carbon dioxide emission	· The risk associated with time-varying utilization of durable goods is important. · Variation in the utilization of durable goods is more procyclical, which explains countercyclical variation in the equity premium. · The model developed in the paper delivers stronger cross-sectional pricing power than the CAPM and several CCAPMs. · The model alleviates the joint risk premium and implied risk-free rate puzzle and yields a RRA of 10.5 and a subjective discount rate of 0.98. · The model explains the cross-section of excess returns for 25 Fama-French portfolios and 30 other portfolios but does not perform well in pricing industry portfolios.	· Tests using higher frequency data may offer a better assessment of the model. · Further research should explore why the model does not perform well in pricing industry portfolios despite positive and significant loadings on the utilization factor. · Extensions to the model, such as considering habit formation in household's durable goods utilization, can be explored.
The Big Three and Corporate Carbon Emissions around the world (Azar et al., 2021)	Study carbon emissions of The Big Three (BlackRock,..) portfolio firms	· Big Three's engagements with firms are associated with lower carbon emissions, particularly among smaller firms. · Higher ownership by the Big Three is followed by lower carbon emissions, especially in later years of the sample period. · Results are consistent with the view that large investment institutions are catalysts in driving firms to reduce their carbon emissions.	· Establish a causal link between Big Three influence and corporate CO2 emissions. · Investigate whether the reduction in CO2 emissions associated with Big Three ownership increases shareholder wealth. · Determine whether the level of monitoring provided by the Big Three is socially optimal.
Climate Finance (Hong et al., 2020)	Describe and frame 9 research findings within broader climate finance	· Financial economists are late in addressing climate finance issues. · Financial economists have a unique toolkit and interests that make them suited for answering important climate finance questions. · Engagement of the broader academic finance community on these issues will lead to valuable contributions to improve the usefulness of the finance field. · The finance field can help society address unprecedented risks from climate change in the upcoming years.	· The authors suggest that although the taxonomy they proposed is a good starting point for advancing the climate finance agenda, there are several other areas that researchers should explore. · One important area is the modelling and sharing of extreme weather risks, which can be managed using remote sensing, machine learning, and insurance data to characterize loss distributions. · The insurance and mortgage industries also play critical roles in facilitating risk-sharing and extending credit in the aftermath of extreme weather events. · A second major research push should focus on divestment, stranded assets, and the consequences for financial stability, given that energy companies have become the new "sin stocks" facing divestment campaigns and lawsuits from shareholders. · A third research initiative is on the impact of climate change on municipal finance, as cities are increasingly affected by severe weather events, and ratings agencies are considering incorporating climate change resilience measures into municipal bond ratings. · Finally, a fourth research agenda should focus on the impediments to corporate and financial innovation related to climate change, as

			there is surprisingly little on corporate adaptation to climate change via innovations, which could be funded by financial innovations such as green bonds.
Going Underwater? Flood Risk Belief Heterogeneity and Coastal Home Price Dynamics (Bakkensen & Barrage, 2021)	Propose a model to explain How do climate risk beliefs affect coastal housing markets?	· Capitalization of flood risks into housing prices is weak and variable across housing markets and segments. · Flood risk optimism and misperceptions may account for these pricing dynamics. · Coastal flood zone residents have lower flood risk perceptions and higher coastal amenity valuations than their inland counterparts. · Coastal housing prices may exceed fundamentals by 6%-13% in Rhode Island, and potentially more in other locations facing higher sea level rise vulnerability and more climate change skepticism. · Flood insurance reform may have large distributional effects across agents with different beliefs. · Devaluations in at-risk markets may also be a significant policy concern due to their potential effects on mortgage and credit markets.	· Future work could elicit policy beliefs and explicitly model uncertainty about policy reform. · Formalize impact mechanisms of devaluations in at-risk markets. · Study other coastal housing markets and flood risks nationally. · Highlight the importance of accurate flood risk information and policy to ensure the efficiency and stability of coastal housing markets.
Real effects of climate policy: Financial constraints and spillovers (Bartram et al., 2022)	Study firms' emission following California cap-and-trade program	· Financially constrained firms reallocate their emissions away from California to other states due to heightened regulatory costs that alter the relative net expected returns across plants. · Firms prefer to internally reallocate emissions, primarily across plants that are horizontally linked within the firm's supply chain and toward plants with higher excess capacity. · The reallocation is largely driven by a shift in output rather than changes in production carbon efficiency, more pronounced toward nearby or less regulated states, and stronger among firms with low prior investments in abatement. · The overall consequence of this reallocation is that firms show no evidence of reducing their total emissions, in fact, constrained firms strictly increase their emissions firm-wide.	· Harmonize climate policies across jurisdictions to minimize leakage. · Devise appropriately differentiated subsidies to mitigate distortions from implementing climate policies (e.g., tax incentives). · Further research should be conducted to understand the effects of corporate environmental policies on internal plant-level emission activities and resource allocations within firms.
The Importance of Climate Risks for Institutional Investors (Krueger et al., 2020)	Study the importance of climate risks for institutional investors	· Institutional investors generally believe that climate risks have important financial implications for their portfolio firms and have already started to materialize. · Investors incorporate climate risks into their investment processes due to nonfinancial and financial reasons. · Most investors have taken at least first steps towards managing climate risks, but less than half have used carbon footprint and stranded asset risk analyses. · Larger and longer-horizon investors use a wider range of tools to	· Conduct additional theoretical and empirical research on climate risks and institutional investors. · Investigate why some investors have not yet incorporated basic approaches to identify and manage carbon and stranded asset risks. · Study the effectiveness of divestment and engagement approaches in combating climate change.

		manage climate risks and engage firms along more dimensions. · Equity valuations are considered not to fully reflect climate risks, with overvaluations largest among oil firms, traditional car manufacturers, and electric utilities.	
What Do You Think about Climate Finance? (Stroebel & Wurgler, 2021)	Study professionals on their view about climate risks, physical risks	· The paper surveys the intersection of climate and finance, aiming to identify points of agreement, disagreement, and promising research topics. · The survey includes 861 anonymous respondents from finance academia, the public sector, and the private sector located around the world with varying levels of concern about the climate and interest in climate finance. · Despite differences in respondent subgroups, they tend to agree on a majority of questions. · Respondents view regulatory risks as the most important climate risk to businesses and investors over the next five years, but physical climate risks as the most important over the next 30 years. · More respondents believe that asset markets are underestimating climate risks compared to overestimating them.	· Future research is needed to determine whether these beliefs are justified.
An inconvenient cost: The effects of climate change on municipal bonds (Painter, 2020)	Study if climate change risk (Sea level rise) affects a country's cost of issuing LT municipal bonds (underwriting fee, initial yield)	· Long-term municipal bonds are significantly affected by exposure to climate change risk, whereas short-term bonds are not. · Market accounts for differences in credit quality when assessing climate risk. · Investors react to climate change news and consider climate change risks in their investment decisions. · Climate change risk is causing counties to have higher debt issuance costs, negatively affecting them today. · Investors are aware of climate change risks and are taking these risks into account when investing in fixed income assets.	· Further investigation into the mechanisms through which investors incorporate climate change risk into their investment decisions. · Exploration of how credit rating agencies incorporate climate change risk into their credit ratings for municipalities. · Analysis of potential impacts on the market if counties do not take steps to prepare for the damages of sea level rise. · Examination of how other types of fixed income assets are affected by climate change risk.
Climate change and long-run discount rates: evidence from real estate (Giglio et al., 2015)	Estimate the term structure of discount rates for Real Estate	· Discount rates for real estate are downward-sloping over maturity, with an average rate of return to real estate of at least 6.4% and a long-run discount rate of 2.6%. · Declining discount rates in real estate and other asset classes imply a declining term structure of risk premia, which is linked to partial mean reversion in aggregate cash flows. · Applying observed average returns of traded assets to discount cash flows from investments in climate change abatement is misleading when discount rates vary substantially across horizons.	· Investigate which mechanisms used in the current literature to generate a downward-sloping term structure of discount rates are consistent with empirical findings. · Analyze the appropriate discount rate schedule for investments in climate change abatement in the context of different scenarios and assumptions about climate change and its impacts on real estate and other asset classes.

		· Investments in climate change abatement should be discounted at a rate below 2.6% as long as climate change is a form of aggregate risk.	
Climate Change News Risk and Corporate Bond Returns (Huynh & Xia, 2020)	Study if climate change news impact corporate bond returns	· Climate change news risk has a significant negative impact on corporate bond returns. · The effect is stronger for bonds with a higher climate change news beta (βCCN), especially during high climate change news risk periods. · Bonds of issuers with stronger environmental performance have a higher βCCN when market wide concern about climate change risk is elevated, suggesting investors' intertemporal hedging demand. · Improved environmental performance can help lower the cost of debt financing, especially when the market is most concerned about climate change risk.	· Investigate how different factors, such as industry, issuer size, and rating, affect the relationship between climate change news risk and bond returns. · Explore the impact of climate change news risk on other financial instruments, such as equity and derivatives. · Examine the effectiveness of socially responsible investment strategies in mitigating climate change risk in corporate bond portfolios.
Disaster on the horizon: The price effect of sea level rise (Bernstein et al., 2019)	Study if sea level rise affect housing prices	· Home buyers discount coastal properties affected by sea level rise by approximately 7% of the home value, and non-owner occupiers discount more, at around 10%. · The discount increases over time and is driven by concerns about long-horizon sea level rise risks. · The discount varies at the county level by the degree to which inhabitants are worried about the effects of climate change. · The results are robust to a wide range of specifications and suggest that policy interventions, such as increased disclosure requirements for coastal property transactions, may affect residential real estate prices.	· Understanding the relation between financial markets and climate change is an important step in providing guidance and solutions for this global challenge. · Further research is needed to examine the effectiveness of policy interventions on real estate prices and to understand the mechanisms behind the discount variations at the county level.
Does climate change affect real estate prices? Only if you believe in it (Baldauf et al., 2020)	Study if belief differences affect housing prices	· Differences in beliefs about long-run climate change risks are reflected in residential real estate prices. · Homes located in climate change "denier" neighborhoods sell for about 7% more than homes in "believer" neighborhoods. · The effects of projected climate change may affect real estate prices decades before the projected damages are expected to occur.	· Investigate whether it is believers who overreact or deniers who underreact to long-run risks of climate change. · Distinguish between uncertainty about climate change and uncertainty about policy responses to climate change. · Understand the frictions that prevent real estate prices from being a fully disciplining device.
Hedging climate change news (Engle et al., 2019)	Propose a procedure to dynamically hedge climate change risk	· The mimicking portfolio approach is successful in hedging innovations in climate change news. · Sustainalytics EScores have the best in-sample fit and out-of-sample performance for hedge portfolios. · Hedge portfolios based on MSCI E-Scores and ETFs (XLE and PBD) have a lower ability to hedge innovations in climate news.	· Future research directions include adding more assets to the hedge portfolios, integrating better data to measure firm-level climate risk exposures, and developing alternative definitions of climate change risks. · The cost of the climate hedge portfolios should be quantified by looking at the associated risk premia.

		· Portfolios based on absolute or ranked versions of the raw E-Scores show no systematic differences in relative performance. · Longer time series of E-Scores and climate news measures should deliver ever-better portfolios to hedge climate change news.	· General equilibrium effects resulting from the lower cost of capital for firms with high E-Scores should be studied, as it may affect the path of greenhouse gas emissions. · The design of structural asset pricing models that feature general equilibrium feedback loops seems a promising direction for research.
Let the rich be flooded: The distribution of financial aid and distress after hurricane Harvey (Billings et al., 2022)	Study the implications of flood losses for households with different access to insurance and credit	· Consumers with lower ability-to-repay experienced a 13% increase in severe delinquency after Hurricane Harvey. · Flood insurance better mitigates the negative financial impact of flooding on credit constrained households compared to disaster assistance. · Disaster assistance programs, both SBA loans and FEMA IHP grants, are regressive in allocation. · Inside the floodplain, treatment effects on credit outcomes are universally insignificant. · Negative treatment effects are highly concentrated in a relatively small subset of the population.	· To encourage broader insurance take-up, FEMA may consider tying flood insurance premiums to income and using tax incentives. · Any expansion of NFIP subsidies must be balanced with disincentives to live and build in flood-prone areas. · Caution when evaluating the efficacy of Federal disaster programs based on average outcomes across heterogeneous underlying populations.
Mortgage finance and climate change: securitization dynamics in the aftermath of natural disasters (Ouazad & Kahn, 2019)	Study the securitization dynamics in the aftermath of natural disasters	· The securitization policies of Fannie Mae and Freddie Mac do not charge fees related to flood insurance risk, leading to a significant mispricing in the debt market. · This mispricing implies that Fannie Mae and Freddie Mac may bear a substantial share of the increasing climate risk. · The Government Sponsored Enterprises may encourage lenders to "originate and distribute" their climate risk and encourage households to locate in flood risk areas. · Unpriced climate risk may lead to the existence of a large set of arbitrage opportunities, including in the Mortgage-Backed Securities market. · These findings should be of interest to regulators and stakeholders interested in monitoring systemic climate risk held onto financial institutions' balance sheets.	· Climate risk probabilities and the correlation of natural disaster shocks may spark a new research field in empirical finance and asset pricing. · Develop new financial techniques for the diversification of climate risk as the volume of at-risk loans increases. · Monitor systemic climate risk held onto financial institutions' balance sheets. · Study the possibility that the mechanism of mispricing may not be limited to hurricane storm surge risk but could also apply to wildfire risk.
Partisan residential sorting on climate change risk (Bernstein et al., 2022)	Examine partisan residential sorting anticipation of climate change	· Partisan differences in beliefs regarding the long-run effects of climate change are reflected in residential choices. · Democratic voters in coastal communities are less likely, and Republican voters are more likely than Independents to own properties at risk of becoming worthless because of rising sea levels caused by climate change. · The Republican-Democrat residency gap for moderately exposed	· Investigate the implications of shifts in residential choice decades in advance of any actual climate change-induced damage or that this earlier shift in migrants may differ systematically based on beliefs. · Consider the growing share of those bearing the burden of future climate change, who may also be those least concerned and perhaps unlikely to support adaptation/mitigation efforts.

		properties is 4-5 percentage points, and it more than doubled between 2012 and 2018. · The residency gap is as large as 10 percentage points for the most highly exposed homes. · Partisan-based sorting does not exist with respect to measures of immediate flood risk, and exists among the owners, but not renters, of non-owner-occupied properties.	· Study the role of partisan rhetoric about climate change in shaping residents' choices and the implications for environmental economics, geography, real estate, urban economics, and climate finance.
Pricing Uncertainty Induced by Climate Change (Barnett et al., 2020)	Propose a framework for pricing uncertainty from climate change (asset pricing)	· The paper presents a framework that applies continuous-time decision theory and asset pricing tools to address multiple components of uncertainty in social valuation. · The framework allows for model uncertainty and model misspecification to be integrated formally into decision-making. · The example of applying the framework to study the social cost of carbon shows that when both climate and economic uncertainties are taken into account, the social cost of carbon increases substantially.	· Develop richer models of the economy that include research on mitigation or the development of viable green technologies. · Conduct research on climate tipping points to better understand the potential nonlinearities in climate dynamics. · Adopt a broader perspective on uncertainty to contribute productively to this line of research.
Equilibrium Price Dynamics of Emission Permits (Hitzemann & Uhrig-Homburg, 2018)	Propose a stochastic equilibrium model for environmental markets that allows to study the properties of emission permit prices induced by cap-and-trade system. Model that predicts dynamics and volatility of emission permit prices	The developed stochastic equilibrium model for environmental markets incorporates the specific design features of cap-and-trade systems. The model identifies emission permits as a strip of European binary options on economy-wide emissions, which influences the characteristics of emission permit prices. The hybrid nature of emission permits is revealed, representing a combination of investment and consumption assets, resulting in a partially contangoed and partially backwardated forward price curve. The model aligns with empirical evidence from existing emissions markets, capturing the stylized facts of emission permit prices and related derivatives.	Utilize the consistent framework provided by the model to evaluate the impact of policy measures on permit prices, enabling policymakers to adjust running systems effectively. Investigate the applicability of the model to assess the effects of specific policy proposals, such as increasing emissions reduction goals, on permit prices. Expand the analysis to consider different compliance periods and varying abatement costs to capture a broader range of scenarios. Explore the potential use of related derivatives to infer market expectations of future emissions, providing policymakers with additional information for policy decisions.
ESG Preference, Institutional Trading, and Stock Returns Patterns (Cao et al., 2022)	Examine the investment performance of both quantitative and SR investment strategies	· Socially responsible investors exhibit different trading behaviors, with lower turnover and less sensitivity to quantitative signals. · The emergence of socially responsible investors has had an important influence on the efficacy of quantitative signals. · The predictive power of SUE score and SYY score is much weaker in the post-2004 period, but continues to predict the returns of stocks with high socially responsible institutional ownership. · The increased focus on ESG by socially responsible institutions may explain why the efficacy of quantitative signals is reduced substantially more for small capitalization than for large capitalization stocks in the recent period.	· Further research is needed to fully understand the implications of ESG investing strategies on quantitative signals. · Additional research is needed to explore the indirect effects of investor tastes on return patterns. · The period studied is special, so caution is recommended when implementing these insights in quantitative strategies.

		· The evidence provided is consistent with mispricing, but caution is recommended when implementing these insights in quantitative strategies going forward.	
Responsible investing: The ESG-efficient frontier (Pedersen et al., 2021)	Propose a theory in which stocks' ESG score plays two roles. Show the costs and benefits of responsible investing	· Investors are increasingly incorporating ESG views in their portfolios. · The benefit of ESG information can be quantified as the resulting increase in the maximum Sharpe ratio, while the cost of ESG preferences can be quantified as the drop in Sharpe ratio. · The ESG-efficient frontier is a useful way to conceptualize and quantify these costs and benefits, and it can be viewed as a theoretical foundation for ESG integration. · Empirically, the maximum Sharpe ratio is achieved for a relatively high level of ESG, and increasing the ESG level even further leads to only a small reduction in SR, implying that ethical goals can be achieved at a small cost. · Screens that remove the lowest ESG assets from the investment universe can lead investors to choose a portfolio with lower ESG scores than those chosen by unconstrained investors who allow investments in low-ESG assets. · The ESG-adjusted CAPM helps describe market environments that make ESG scores predict returns positively or negatively, and the relation between ESG and expected returns can be positive, negative, or neutral depending on the relative importance of each investor type. · The proxy G has historically offered ESG investors guiltless saintliness, while proxies for E, S, and overall ESG are weaker predictors of future profits, and investor demand appears stronger for these proxies.	· Further research is needed to evaluate the costs and benefits of responsible investing realistically. · Future research should focus on improving traditional approaches to incorporating ESG into portfolio construction based on simple screening. · Future research should explore the range of possible equilibria depending on the relative importance of each investor type. · More research is needed to better understand how ESG information can be used as an alpha signal.
Silence is safest: Information disclosure when the audience's preferences are uncertain (Bond & Zeng, 2022)	Propose a model to explain why some firms do not disclose earnings breakdowns, executive compensation, or ESG performance when they face diverse audiences	· Voluntary disclosure may occur with probabilities below 1 despite classic unraveling arguments, and this paper explores a new possible explanation. · The explanation is that potential disclosers do not know their audiences' preference orderings and dislike the risk this imposes due to risk aversion, leading to equilibrium silence. · Silence is preferred over disclosure because disclosure may make some audiences very unhappy, while staying silent avoids this extreme outcome. · Silence reduces the risk borne by potential disclosers with extreme information, which leads to a decrease in disclosure as potential disclosers become more risk-averse. · However, silence also increases the risk borne by the audience,	· Further research could explore the implications of these findings for different types of disclosure settings and audiences. · The model could be expanded to incorporate other factors that influence the decision to disclose or remain silent, such as reputational concerns or legal requirements. · Empirical research could be conducted to test the predictions of the model in different contexts and to examine how risk aversion affects the likelihood and content of voluntary disclosure.

		which leads to increased equilibrium disclosure as audiences become more risk-averse.	
Corporate Environmental Policy and Shareholder Value: Following the Smart Money (Fernando et al., 2017)	Study the relation between corporate environmental performance, institutional ownership, and shareholder value in US firms.	· The study examines the effect of corporate environmental policy on institutional holdings, analyst coverage, and shareholder value. · There is a sharp asymmetry between policies that affect a firm's exposure to environmental risk and its perceived environmental friendliness. · Green and toxic firms have a larger NS (number of shareholders) but a smaller percentage of institutional holdings compared to neutral firms. · Institutional investors shun stocks with high environmental risk exposure, while high greenness also does not increase shareholder value. · Analyst following is significantly higher for toxic firms. · Toxic and green firms have lower Tobin's Q values than neutral firms, indicating lower valuations.	· The study provides new insights and suggests a new line of research for the growing importance of environmental performance in the business world.
Do institutional investors drive corporate social responsibility? International evidence (Dyck et al., 2019)	Assess whether shareholders drive the E&S performance of firms worldwide	· Institutional investors push for stronger E&S (environmental and social) performance in publicly traded firms around the world. · Financial motivations play a strong role in this push, as firms with greater institutional ownership pushed harder for improved E&S performance during the global financial crisis. · Cultural origin also matters, with foreign institutional investors from countries with social norms supportive of strong E&S commitments having the biggest impact on firms' E&S performance. · E&S-minded foreign investors already have a small but successful influence on US firms' E&S performance, and further ownership could lead to substantial changes.	· Further exploration of the relationship between cultural norms and institutional investor behavior in advocating for E&S performance in firms. · Examination of the long-term impact of institutional investors' push for improved E&S performance on firms' financial performance. · Analysis of the potential impact of increased ownership by E&S-minded foreign investors on US firms' E&S performance.
Financial Constraints and Corporate Environmental Policies (Xu & Kim, 2021)	Examine how finance constraints affect corporate environmental policies	· Financial constraints have direct impacts on corporate environmental policies. · Firms reduce abatement expenditures when facing financial constraints because their environmental protection costs increase correspondingly. · Additional toxic chemicals released impose costs on the environment, society, and public health.	· Further research could examine the impact of different types of financial constraints on corporate environmental policies. · The role of regulatory oversight and enforcement on the relationship between financial constraints and environmental policies could be further investigated.

		· The impacts are amplified by weak regulatory enforcement and external monitoring. · Temporal variations in toxic releases are closely tied to a firm's financial strength.	· Further research could explore the extent to which different forms of environmental pollution affect firm behavior.
Corporate governance and pollution externalities of public and private firms (Shive & Forster, 2020)	Test whether private or public EPA-regulated firms have a greater propensity to emit greenhouse gases and whether any firm characteristics mitigate this effect	· Concentrated ownership and personal responsibility may be driving these differences, while the effect of short-term investor pressure is mixed. · Personal experiences and beliefs of managers may play a large role in their decisions about emissions and may be a promising avenue for future research.	· Investigate the role of personal experiences and beliefs of managers in emissions decisions. · Explore whether the findings can inform policy decisions in the energy sector in the United States and other countries. · Study the effects of variables that drive differences in emissions among public firms in an international setting, such as mutual fund ownership, board oversight, and ESG adoption.
Do corporate governance ratings change investor expectations? Evidence from announcements by institutional shareholder services* (Guest & Nerino, 2019)	Examine empirically the announcement effect of commercial corporate governance ratings on share returns	· Governance analysts, such as those providing ratings, have become important information intermediaries in financial markets. · Downgrades by ISS have a large negative impact on stock returns, indicating that they contain information content and are price-relevant. · The negative returns are consistent with the market revising downward its expectation of firm performance due to unexpected lower governance quality as conveyed by downgrades. · The information content is independent and cannot be explained solely by having drawn the market's attention to prior governance changes.	· Investigate whether other governance analysts' ratings also contain information content and are price-relevant. · Explore whether other factors, such as ESG ratings, also influence stock returns and contain information content. · Analyze the impact of proxy advisory firms and their ratings on voting outcomes and company performance. · Further study the role of information intermediaries in financial markets and their impact on corporate governance.
International Corporate Governance Spillovers: Evidence from Cross-Border Mergers and Acquisitions (Albuquerque et al., 2018)	Test whether FDI promotes corporate governance spillovers in the host country	· Cross-border M&A activity from countries with better investor protection leads to corporate governance improvements in the host country. · Evidence is consistent with spillovers to nontarget firms in the same country and industry as the target firm, but not to nontarget firms in other industries. · Cross-border M&As lead to increases in investment and market valuation of nontarget firms, suggesting that FDI not only affects corporate governance, but also produces real effects. · Direct link established between FDI and the adoption of corporate governance practices that promote corporate accountability and empower shareholders worldwide.	· Further research needed to understand the specific mechanisms through which spillover effects operate. · Future research could examine the impact of cross-border M&A activity on other dimensions of corporate governance, such as executive compensation, board structure, or shareholder activism. · Further analysis could be conducted on whether there are any specific characteristics of the nontarget firms that make them more or less susceptible to spillover effects.
Restraining Overconfident CEOs through	Test whether increased oversight and exposure to diverse viewpoints from	· CEO overconfidence is associated with both benefits (innovation) and costs (overinvestment and risk taking). · Improving internal governance and disclosure can help restrain	· Further investigation into the specific mechanisms by which SOX restrains overconfident CEOs. · Examination of the generalizability of these findings to other types

Improved Governance: Evidence from the Sarbanes-Oxley Act (Banerjee et al., 2015)	majority independent boards improves decision making by overconfident CEOs	overconfident CEOs and create shareholder value. · SOX reduces overinvestment and risk taking by overconfident CEOs, and enhances the effect of CEO overconfidence on various firm metrics, including firm value, earnings, R&D value, and CAPEX value. · SOX also leads to an increase in dividends by overconfident CEOs, and acquisitions by overconfident CEOs create more value (or destroy less value) after SOX.	of governance mandates. · Exploration of the potential unintended consequences of such mandates on managerial decision-making.
Attention to global warming (Choi et al., 2020)	Test how pp react to abnormal temperature by examining their attention to global warming stock price	· The scientific community has a 97-98% consensus that humans are causing global warming through greenhouse gas emissions. · Despite this, not everyone takes climate risk seriously, and people's beliefs about climate change are influenced by limited attention and salient weather events. · People update their beliefs upward when the local temperature is abnormally warm, and Google search activity for "global warming" increases. · Carbon-intensive firms underperform in the month in which the exchange city is warmer than usual, and retail investors seem to be responsible for these price patterns. · People in countries where the impact of climate was more prominent in the past suffer less from limited attention.	· Policies that reduce the information gap between the scientific community and the general public can increase public awareness and the efficacy of climate campaigns. · Methods relating to personal and salient experiences, such as simulated extreme weather events and maps of potential sea-level rise, may be more effective in educating the public on climate risk. · Weaker links between local abnormal temperatures and attention and stock prices are expected as aggregate beliefs move closer to the scientific consensus.
Market expectations of a warming climate (Schlenker & Taylor, 2021)	Examine how market participants update their expectations about climate over time	· The paper uses weather-based futures contracts as a direct measure of climate change expectations. · Financial markets have been accurately pricing in a warming climate since at least the early 2000s. · The market also seems to price in recent scientific findings like the polar vortex effect. · The findings have direct implications for firms and financial markets, providing pertinent information on future weather and climate trends and a hedge against potential lost profit. · The findings suggest that agents have been updating their beliefs that summers are getting hotter and winters colder. · The observed annual trend in futures prices shows that the supposedly efficient financial markets agree that the climate is warming.	· Investigate whether weather-based futures contracts can provide accurate assessments of predicted warming for climate adaptation. · Examine whether other financial markets are also accurately pricing in climate change risk. · Explore the implications of these findings for policy, especially for politicians who still question the existence and extent of climate change.
Prediction anomaly performance with	Investigate the power that additional variable predicts	Several variables, including the party of the US President, weather, global warming, El Niño, sunspots, and planetary conjunctions, do not	Encourage further research to replicate the tests and explore other variables that may predict anomaly performance. Take advantage of the proliferation of anomalies, the availability of machine-readable data on explanatory variables, and the ease of

politics (Novy-Marx, 2014)	performance of well-known anomalies	have a significant relationship with anomaly performance. The results are surprising and may challenge readers' intuition.	conducting similar regressions. Researchers should carefully consider the potential of this line of work and its implications for the return predictability literature.
Corporate green bonds (Flammer, 2021)	What are the rationales of issuing green bonds and their implications?	· Corporate green bonds have become more prevalent over time, are more prevalent in industries where the environment is material to the firm's operations, and are especially prevalent in China, the US, and Europe. · The stock market responds positively to the announcement of green bond issuance, especially for first-time issuers and certified bonds. · Companies that issue green bonds improve their environmental performance and experience an increase in ownership by long-term and green investors. · These findings support the signaling argument that issuing green bonds signals a commitment to the environment and improves environmental performance, rather than greenwashing or cheaper debt financing.	· Future research could provide larger-scale evidence and a more refined characterization of the long-term implications of corporate green bonds. · Future developments in the green bond market, such as regulations, may provide alternative empirical settings to deepen understanding of green bonds. · An important question pertains to the optimal design of the governance of the green bond market, which could be addressed through research on private and public governance regimes.
Dissecting green returns (Pastor et al., 2022)	What does past performance of green assets imply about their future performance?	· High realized returns on green assets over the past decade were unexpected and reflected news about environmental concerns rather than high expected returns. · The recent outperformance of the green-minus-brown portfolio vanishes after removing the effects of unexpected increases in climate concerns, and the implied cost of capital is consistently negative. · Small stocks underreact to climate news, and a two-factor asset pricing model featuring a theoretically motivated green factor absorbs much of the historic underperformance of value stocks in the 2010s.	· Investigate the pricing of climate risk while accounting for the large unanticipated positive component of green stock returns during the last decade, which could lead to incorrect inferences about expected returns of climate hedges. · Estimate expected returns in other settings using the second approach, which removes unanticipated shocks from the realized average return. · Study how small stocks and other asset classes react to climate news and how different factors affect their pricing.
Contracts with (Social) benefits: The implementation of impact investing (Geczy et al., 2021)	Examine how private market contracts adapt to serve multiple goals, particularly the social-benefit goals that impact funds add to their financial goals	· Impact funds generally choose not to tie compensation to impact, opting instead for the waterfall compensation for financial performance chosen by their non-impact peers. · Funds adapt other elements of the contract to channel effort toward impact, and in some cases, effort toward financial performance may be complementary with an effort toward impact. · Contract terms devoted to impact often take a more flexible form, focusing on process and reporting. Participatory governance terms likewise allow LPs to implement their impact goals dynamically.	· Contracting for impact is likely to be less complete than contracting for dollars because the parties know little about the nature of the best impact opportunities until the fund is well underway, and the economics of impact investing could be different and important enough to merit its own contracting theory. · As the sector continues to develop, new practices may evolve that confirm or depart from the state of play shown here, making this a promising area for future research.

Impact investing (Barber et al., 2021b)	Do investors knowingly accept lower expected financial returns in exchange for nonfinancial objectives?	· Impact funds have lower financial returns than traditional VC funds. · Impact investors are willing to forego 2.5 to 3.7 ppts in expected excess IRR for nonpecuniary benefits of intentional impact investing. · Companies financed by impact funds have a lower cost of capital. · Investors in development organizations, financial institutions, and public pensions exhibit positive willingness to pay (WTP) for impact. · Investors with organizational missions and PRI signatories have high WTP. · Investors facing political and/or regulatory pressure and those benefiting from political or local goodwill exhibit higher WTP for impact. · Laws that discourage the sacrifice of financial returns for impact may reduce the WTP for impact.	· Explore the factors that govern the variation in WTP for impact across legal and regulatory environments, investor geography, and time. · Investigate how shifts in legal interpretations of institutions' fiduciary duty affect investors' WTP for impact. · Examine the impact of recent growth in fundraising by impact buyout and impact infrastructure funds by mainstream General Partners. · Analyze how investors' WTP for impact affects capital allocation decisions.
Investing for Impact (Chowdhry et al., 2018)	Model a project that produce both monetary payoff and social benefit and consider settings in which there is a trade-off regarding which output to emphasize	· Impact investors must hold financial claims to incentivize profit-motivated owners to pursue social goals. · Joint financing is mutually beneficial when a project's potential social value is large enough, leading to an increase in expected profit and social output. · Impact investors invest only in firms with significant social value due to the cost of holding financial claims. · Impact investments increase attention to social goals only when the manager's participation constraint is slack, i.e., socially motivated managers. · Social investors hold a larger fraction of firm equity in the most socially valuable firms. · Impact investments in for-profit firms arise as an intermediate solution between pure for-profit and non-profit status. · Governments subsidize social activities within for-profit firms and aid in achieving social good through taxation. · Profit-motivated agents should be compensated more heavily when projects succeed, and socially motivated agents should be compensated more when projects fail.	· Investigate the effects of joint financing on social welfare and economic growth. · Study the impact of social impact bonds and social impact guarantees on achieving social objectives. · Explore the optimal design of contingent social contracts.

Can socially responsible firms survive competition? An analysis of corporate employee matching grant schemes (Gong & Grundy, 2017)	Can companies afford to be socially responsible given that they must compete for labor and capital?	· Corporate matching grant schemes can act as a coordination mechanism to mitigate the free-rider problem among employee donors. · Matching schemes are superior to decentralized giving by employees. · The viability of matching schemes is challenged by labor market competition and capital market competition. · A separating equilibrium can exist where socially conscious employees work for socially responsible firms that offer matching programs and lower take-home pay. · Numerical analysis suggests that the observed one-for-one match ratios in matching schemes are close to optimal considering labor market competition.	· Investigate the long-term impact of matching grant schemes on employee motivation, productivity, and retention. · Examine the effectiveness of different match ratios in attracting socially conscious employees and encouraging their participation. · Explore the potential benefits and challenges of alternative coordination mechanisms for employee giving. · Study the role of matching schemes in enhancing a firm's reputation, employee satisfaction, and attracting top talent. · Assess the impact of matching schemes on charitable organizations and their fundraising efforts. · Analyze the implications of matching schemes in different industries and company sizes. · Investigate the relationship between matching schemes and shareholder value.
Corporate goodness and shareholder wealth (Krüger, 2015)	Study how stock mkt reacts to positive and negative events concerning a firm's CSR	· Investors react strongly negatively to negative news about corporate social responsibility (CSR), particularly regarding communities and the environment. · The median cost associated with negative CSR events is estimated at approximately $76 million, indicating a substantial cost of corporate social irresponsibility to shareholders. · Investors exhibit a slightly negative reaction to positive news about a firm's CSR policies, but the reaction is weaker and less systematic compared to negative events. · Improving a firm's CSR can enhance shareholder value, especially when agency problems are less likely or when positive CSR news offsets prior social irresponsibility.	· Investigate the specific factors that influence the strength of investor reactions to CSR events, both positive and negative. · Examine the long-term impact of CSR events on shareholder value and the sustainability of positive CSR practices. · Explore the relationship between CSR events and firm-specific characteristics, such as industry, size, and corporate governance. · Further analyze the textual content of CSR news to identify key information that triggers stronger investor reactions. · Study the role of CSR events in shaping investor perceptions, market valuations, and investment decisions. · Investigate the effectiveness of different CSR strategies and initiatives in generating positive shareholder value. · Examine the interaction between CSR events and stakeholder engagement to understand how firms can proactively manage CSR risks and opportunities.

Mutual Fund Attributes and Investor Behavior (Bollen, 2007)	Study dynamics of investor cash flows in SR mutual funds	· Socially screened equity mutual funds (SR funds) have lower monthly fund flow volatility compared to conventional funds, indicating that SR investors trade mutual funds at a slower rate. · SR investors exhibit a larger positive response to returns in SR funds compared to investors in conventional funds, suggesting that they derive utility from the SR attribute. · SR investors show a smaller negative response to returns in SR funds compared to investors in conventional funds, indicating a potential preference for maintaining exposure to the SR attribute even during periods of negative returns. · The differences between SR funds and conventional funds persist over time and as funds age, indicating the robustness of SR investor preferences.	· Explore whether the observed findings regarding SR investor behavior extend to other sectors of the mutual fund industry with specific extra-financial attributes. · Investigate the factors that contribute to the loyalty of SR investors and their preference for SR funds, including the role of ethical considerations and long-term investment objectives. · Examine the impact of different types of extra-financial attributes (beyond SR) on investor behavior and fund flows. · Analyze the performance and risk characteristics of SR funds compared to conventional funds to assess their financial and extra-financial trade-offs. · Conduct qualitative research to gain insights into the underlying motivations and decision-making processes of SR investors. · Explore the potential implications of SR investor behavior for the design and marketing of mutual funds, as well as the overall competitiveness of the mutual fund industry.
Social Screens and Systematic Investor Boycott Risk (Luo & Balvers, 2017)	Model pricing implications of screens adopted by SR investors	· Self-restricted investors face reduced investment opportunities, leading to violation of the identical investment opportunities assumption in the Sharpe-Lintner Capital Asset Pricing Model (CAPM). · An additional source of risk, called the investor boycott risk factor, emerges due to the absorption of boycotted stocks by unrestricted investors who require compensation for holding these stocks in excess of efficient market weights. · The investor-boycott-augmented CAPM segregates investors into self-restricted and unrestricted groups, and the risk premiums of stocks are influenced by the market and boycott risk factors, explaining abnormal returns on sin stocks. · The boycott risk premium is theoretically and empirically positive, with a magnitude close to the average return of boycotted stocks, particularly influential in explaining differences in average returns across industries. · The boycott risk premium cannot be explained by litigation risks, neglect effect, liquidity measures, or standard industry characteristics, indicating the distinct impact of boycott risk on stock returns. · The boycott risk premium is higher for firms with a stronger socially responsible investing (SRI) intensity measure and tends to decline during recessions when restricted investors may be less willing to	· Further explore the implications of investor boycott risk factor in asset pricing models and its influence on risk premiums and stock returns. · Investigate the specific mechanisms and factors driving the boycott risk premium, considering alternative explanations such as litigation risks, neglect effect, and liquidity measures. · Examine the dynamics of the boycott risk premium during different market conditions and economic cycles to gain insights into the behavior of self-restricted investors. · Analyze the relationship between SRI intensity measures and boycott risk premium to understand the impact of socially responsible investing on stock pricing. · Investigate the potential spillover effects of boycott risk and non-pecuniary preferences on other market variables and asset classes. · Explore alternative approaches and models to incorporate boycott risk and investor preferences into asset pricing frameworks for a more comprehensive understanding of pricing effects.

		compromise their principles. · Investor boycott factor loadings reflect the covariances between firm payoffs and aggregate payoffs of sin firms, suggesting a real foundation for these factor loadings.	
Socially responsible corporate customers (Dai et al., 2021)	Test whether SR corporate customers can impact SR behavior on suppliers	· Corporate customers with large stakes have an active role in driving improvements in suppliers' CSR initiatives and standards. · Passing a CSR proposal by a small margin of votes leads to a significant improvement of about 7% in suppliers' subsequent year's CSR performance. · Global shocks related to product-safety scandals prompt customers to exert pressure on suppliers to accelerate their product responsibility practices. · Customers tend to establish supply chain relationships with firms inclined towards responsible social and environmental practices. · Customers with greater bargaining power and stakes in supplier firms have influence over decisions regarding suppliers' responsible business operations. · Collaborative CSR efforts aligned with CSR standards create economic value for both suppliers and customers, improving operational efficiency, sales growth, and firm value.	· Further investigate the mechanisms through which corporate customers influence suppliers' CSR, exploring additional channels and factors that drive this relationship. · Explore the potential ripple effect of CSR practices across extensive global supply chains, examining how one firm's CSR practices impact others. · Analyze the socio-cultural and institutional factors that influence the unidirectional CSR effect from customers to suppliers, considering variations across different countries and contexts. · Study the specific policies and strategies that can promote socially responsible practices among public companies, taking into account the relative position of firms in the global network. · Examine the strategic considerations and trade-offs faced by managers in allocating corporate resources between social investments, other capital expenditures, and indirect costs and benefits incurred by upstream and downstream firms. · Investigate the long-term effects of CSR initiatives on firm performance, consumer perception, and future purchases of products. · Expand the analysis to include a wider range of industries and regions to assess the generalizability of the findings and explore potential industry-specific dynamics. · Consider the role of regulatory frameworks and government policies in shaping corporate customers' influence on suppliers' CSR practices, examining the interplay between public and private sector efforts in promoting responsible business operations.
Socially responsible firms (Ferrell et al., 2016)	Test whether well-governed firms are more likely to be SR	· Corporate social responsibility (CSR) is often viewed as cash diversion and an agency problem, contrasting with the value-enhancing CSR perspective. · Legal rules and ownership structures vary across countries, influencing executives' incentives, fiduciary duties, and decision-making processes. · Empirical analysis does not support the association of CSR with agency concerns, such as an abundance of cash or weak managerial pay-performance connection.	· Investigate the motivations behind CSR activities, distinguishing between utility-driven considerations and enhancement of shareholder wealth. · Analyze the impact of varying ownership stakes on CSR spending, examining how shareholders' increased ownership affects CSR expenditures. · Further explore the relationship between CSR ratings and sustainability ratings at the country level, considering their implications for achieving sustainable development.

		· Higher CSR performance is related to tighter cash management, higher pay-for-performance sensitivity, better legal protection of shareholder rights, and non-monotonic relationships with large shareholders' ownership. · CSR can counterbalance the negative effects of managerial entrenchment, leading to higher shareholder value as measured by Tobin's Q. · CSR engagement is consistent with shareholder wealth maximization and supports the positive stance on CSR.	· Study the specific mechanisms through which CSR activities preserve core values of capitalism and generate returns for investors. · Examine the potential policy implications for corporate governance, particularly regarding the role of CSR in private sectors as a means of preserving social welfare. · Evaluate the effectiveness and incentives of governments in addressing market failures and externalities, considering the role of private provision of public goods in the absence of efficient government intervention. · Assess the relationship between CSR and corporate governance reforms, considering how reforms can incorporate the positive externalities associated with CSR.
Why Do Investors Hold Socially Responsible Mutual Funds? (Riedl & Smeets, 2017)	To understand why investors hold SR mutual funds	· Intrinsic social preferences and social signaling are significant factors in individuals' decisions to hold socially responsible equity funds. · Financial motivations also influence socially responsible investment (SRI) decisions, with investors expecting lower returns, worse Sharpe ratios, and higher fees from SRI funds. · The proportion of socially responsible investors in the market may influence asset prices as SRI grows in volume.	· Generalize the findings to other countries by examining variations in culture, economic development, religion, and socioeconomic factors that impact social preferences and their effect on SRI decisions. · Develop incentive-compatible mechanisms to elicit risk and return perceptions of SRI and conventional equity, testing the robustness of financial motives in SRI decisions. · Conduct laboratory experiments to better measure social signaling and control for signaling possibilities and content in the context of SRI. · Explore the relative importance of social preferences, social signaling, and financial motives in other SRI asset classes such as hedge funds, impact investments, and fixed income. · Investigate specific models of other-regarding preferences and their relation to SRI, examining factors such as altruism and warm-glow from doing good. · Study the stability of social preferences across different decision domains and the external relevance of lab experiments in the context of SRI. · Assess the external relevance of social preferences by comparing experimentally measured preferences with real-world field behavior in SRI investments. · Consider the design of experiments to mitigate potential biases, such as participants behaving consistently prosocially, experimenter demand effects, and matching survey responses with trading

			records to establish the relationship between lab behavior and field behavior in SRI.
Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows (Hartzmark & Sussman, 2019)	Examine whether investors collectively (US) put a positive value on sustainability by providing evidence that mkt demand varies as a function of sustainability ratings	· Investors value sustainability and view it as a positive attribute for companies. · Funds with high sustainability ratings receive significant inflows, while those with low ratings experience outflows. · Investors focus more on the simpler and salient globe ratings rather than detailed percentile rank information. · Extreme-ranked categories have a greater impact on investment decisions, highlighting the importance of category construction. · The causal effect of sustainability ratings on fund flows is identified through a natural experiment.	· Investigate the role of social constraints in institutional investors' response to sustainability ratings. · Explore nonpecuniary motives such as altruism or warm glow in influencing investment decisions related to sustainability. · Examine the role of affect and the affect heuristic in shaping investor expectations and perceptions of performance. · Study the interpretation and understanding of sustainability ratings by investors and their implications for decision-making. · Explore how investors perceive and respond to different socially responsible investment objectives beyond sustainability. · Further research is needed to define sustainability and understand what aspects investors consider when evaluating sustainability ratings.
Get Real! Individuals Prefer More Sustainable Investments (Bauer et al., 2021)	To see whether pensioners prefer more sustainable investments in their pensions	· Individuals are willing to support investments based on the United Nations Sustainable Development Goals (SDGs), including investing their pension savings more sustainably. · The support for sustainable investing is driven by strong social preferences, ruling out other explanations such as financial beliefs, confusion, lack of information, or social concerns. · Social preferences have a significant influence on economic decisions and can decrease free riding problems while motivating people to sacrifice resources for social welfare. · Institutional investors, such as pension fund managers, have been	· Investigate the role of social preferences in decision-making for institutional investors in different countries with varying levels of social preferences. · Explore the existence of a hypothetical gap in eliciting true preferences for sustainable investments in situations where social preferences might be weaker. · Examine the generalizability of the findings beyond the Netherlands and assess the growth potential for sustainable investments in other markets, particularly those with stronger social preferences like the United States.

		hesitant to incorporate social preferences into their decision-making process due to challenges in identifying and understanding client preferences. · The study provides a toolbox for institutional investors to address the social preferences of their clients and cater to sustainable investments.	· Apply the proposed method to inform decision-making in other domains, such as politics, where eliciting real social preferences can help address key sustainable policy questions and gain wider public support.
Portfolio choice with sustainable spending: A model of reaching for yield (Campbell & Sigalov, 2022)	How does the level of the safe real interest rate affect investors' willingness to take risk? Merton's theory with 1 additional element	A constraint on an investor's ability to save or dissave can break the traditional result that risk-taking depends solely on risk aversion, risk, and the risk premium. An investor with a sustainable spending constraint engages in reaching for yield, taking more risk as the risk-free interest rate declines, even when other determinants of risk-taking remain constant. Reaching for yield is more pronounced in a low-interest rate environment. The response of risk-taking to changes in the risk premium is affected by reaching for yield. An increase in the risk premium stimulates risk-taking through the substitution effect, but weakens reaching for yield due to an offsetting income effect. The impact of a sustainable spending constraint on welfare varies with the level of the risk-free interest rate. The cost is low when the rate is near the threshold where the constraint does not bind, but increases as the rate declines. Reaching for yield may be more significant in the current low-interest rate environment compared to earlier decades. The model's insights can extend to alternative preference structures, such as Epstein-Zin preferences.	Enrich the model to allow for flexible constraints or smoothing rules that allow spending to adjust gradually towards sustainable targets. Explore the implications of the analysis in dynamic models with persistent risk-free rates. Generalize the findings beyond the specific functional forms assumed in the paper, such as power utility and arithmetic or geometric sustainable spending constraints. Consider extensions of the model to incorporate different types of constraints and preferences. Investigate the effects of a stream of donations on risk-taking and the interplay between different types of gifts. Analyze the impact of nominal terms and inflation on risk-taking in the presence of a sustainable spending constraint.
Sustainability Preferences Under Stress: Evidence from COVID-19 (Döttling & Kim, 2022)	Study impact of an unexpected economic and mkt condition (covid19) on retail mutual fund flows	· Mutual funds with higher sustainability ratings experienced a sharper decline in fund flows during the COVID-19 pandemic, losing their previous relative attractiveness to retail investors. · The results suggest that retail socially responsible investing (SRI) demand is highly sensitive to income shocks, indicating that nonpecuniary benefits associated with SRI are perceived as costly and unsustainable for retail investors during extreme economic conditions. · Retail investors pose a source of fragility for sustainable and responsible investing (SRI) in mutual funds, which can have implications for the long-term prospects of ESG investing.	· Explore potential changes in the composition of retail investors during the COVID-19 crisis using more disaggregated data. · Investigate the externalities of retail fund flows on the long-term viability of ESG investing, considering the significant presence of retail investors in the mutual fund and institutional client base. · Further examine the underlying factors and mechanisms that drive retail SRI demand, particularly during periods of economic shocks and uncertainty. · Assess the sustainability of nonpecuniary benefits associated with SRI for retail investors in different economic conditions and explore potential strategies to enhance the resilience of retail SRI demand.

Sustainable investing in equilibrium (Pastor et al., 2021)	Model investing that considers ESG criteria	· ESG preferences impact asset prices, with greener stocks having lower ex ante CAPM alphas and brown stocks having positive alphas. · Stocks are priced by a two-factor asset pricing model, where the factors are the market portfolio and the ESG factor. · Portfolio holdings exhibit three-fund separation, with investors aligning their portfolios based on their ESG preferences. · The size of the ESG investment industry increases with the dispersion of investors' ESG preferences. · Sustainable investing has positive social impact by encouraging firms to become greener and influencing real investment decisions.	· Empirically test the model's predictions for asset prices and portfolio holdings, which have been examined to some extent but remain largely untested. · Investigate how the model fits different time periods, considering the recent prominence of ESG criteria in investing. · Explore other untested predictions of the model, such as the relationship between ESG preferences and the size of the ESG investment industry. · Assess the long-term implications of sustainable investing on asset prices, portfolio allocations, and social impact in various economic and market conditions. · Examine the role of ESG factors and preferences in different asset classes and investment vehicles beyond stocks.
Sustainable investing with ESG rating uncertainty (Avramov et al., 2022)	Analyze the asset pricing and portfolio implications of uncertainty about corporate ESG profile	· ESG rating uncertainty increases perceived market risk, market premium, and reduces investor demand. · ESG uncertainty affects the risk-return trade-off and investor behavior, particularly for ESG-sensitive investors and green stocks. · Rating uncertainty has negative implications for economic welfare and the ability of green firms to make socially responsible investments.	· Extend the analysis to multiperiod dynamic setups to account for time variation in market ESG and its impact on asset pricing. · Incorporate investors' learning about a firm's ESG profile to better understand the dynamics of ESG-related investment decisions. · Investigate the impact of rating uncertainty on other aspects of financial markets, such as credit ratings and bond markets. · Explore the implications of ESG rating uncertainty for different types of investors, including individual investors and institutional investors with varying levels of ESG sensitivity. · Assess the effectiveness of policy interventions, such as establishing clear taxonomy and disclosure standards for sustainability reporting, in mitigating ESG uncertainty and promoting sustainable investments.