Final report

Project information and reporting objectives

Project information

Project number:	328822
Project title:	Investors in green bonds and financial resilience.
Activity / Programme:	FINANSMARKED
Project manager:	Ryduchowska, Malgorzata
Project owner:	STIFTELSEN HANDELSHØYSKOLEN BI
Project period:	2022.01.01 - 2025.12.31

Reporting objectives

1.	**Main page of the progress report:** Update progress report up to project completion date.	**Completed**
2.	**Final accounts:** Give a summary of the financial status of the project	**Completed**
3.	**Outcomes and impacts:** I understand that the information entered into the field for Outcomes and impacts will be made publicly accessible*	**Completed**
4.	**Results report:** Attach results report	**Completed**
5.	**Special reports:** Any requests for special reports must be fulfilled. Have special reports been submitted?	**Completed**
6.	**Final data management plan:** Has the final data management plan been uploaded?	**Completed**

Final accounts

Actual cost plan (Amount in NOK 1000)

Account	2025	2024	2023	2022	Total sum
Payroll and indirect expenses	823	615	449	482	2,369
Procurement of R&D services	0	0	0	0	0
Equipment	0	0	0	0	0
Other operating expenses	168	90	14	10	282
Sum	991	705	463	492	2,651

Actual cost code (Amount in NOK 1000)

Account	2025	2024	2023	2022	Total sum
Trade and industry	0	0	0	0	0
Research institutes	0	0	0	0	0
Universities and university colleges	872	460	400	427	2,159
Other sectors	0	0	0	0	0
Abroad	119	245	63	65	492
Sum	991	705	463	492	2,651

Actual funding plan (Amount in NOK 1000)

Account	2025	2024	2023	2022	Total sum
The Research Council	368	299	808	757	2,232
Own financing	140	36	100	143	419
Public funding	0	0	0	0	0
Private funding	0	0	0	0	0
International funding	0	0	0	0	0
Deviation	-483	-370	445	408	0
Deviation basis	991	705	463	492	2,651
Sum	508	335	908	900	2,651

Comment

Impacts and effects

Anticipated outcomes and impacts - from the grant application form

-Journal paper on resilience and restructuring of investors in green bonds.
-Journal paper on the portfolios of investors in green bonds will open new avenues for research in governance and sustainable finance.
-Journal paper with empirical study of resilience of green assets.
- Engagement with policymakers to provide support for financial market resilience in this crisis and to strengthen resilience for the next.
-Memo with new descriptive statistics about green bonds ownership to inform the literature about the role of green bonds in investor portfolios and characterising the extent and type of endogeneity problems relevant for future empirical research in the field.
-Workshop for investors and policy makers on our analysis of ownership and trading patterns of investors in green bonds to help assessing impact of regulations regarding ESG actions and their disclosure.

Achieved and potential outcomes and impacts - based on the project results

Actual outcomes:
- Working Paper 1: “The Sustainability Preferences of Individual and Institutional Investors” (currently under revision at the Review of Financial Studies).
- Working Paper 2: “Restructuring Outcomes Under Cross-Security Debt Ownership”.
- Working Paper 3: “Bond Cross-Ownership at the Time of Default”.
- CCGR Report 2/2025: “The Norwegian Green Bond Market”.
- CCGR Report 1/2026: “Defaults and Ownership of Green Bonds in the Norwegian Bond Market”.
- Dissemination: Presented at numerous international finance conferences between 2022 and 2025 (including EFA 2024, CCGI 2025, EFBC 2025, Boca-ECGI 2023, GRASFI 2023, and CICF 2023).

Future/Potential Outcomes
- Each working paper will be submitted to a top-tier finance journal and may result in an academic publication (e.g., Review of Financial Studies, Journal of Finance).
- Each CCGR report will be submitted to a practically oriented finance journal and may result in an academic publication (e.g., Financial Management).
- A planned online workshop on sustainability, bond ownership, and financial distress.

Results - Summary

Uploaded results - summary

Original filename: Final report.pdf

File reference: RESULTAT_Sluttrapport11906464.pdf

Message to the Research Council of Norway

Special reports

Comment

Uploaded file

Original filename: Special report.pdf

File reference: SARSKILT_Sluttrapport11906464.pdf

Final data management plan

Uploaded final data management plan

Original filename: DMP.pdf

File reference: DATAHAND_Sluttrapport11906464.pdf

Progress report

Project information and reporting objectives

Project information

Project number:	328822
Project title:	Investors in green bonds and financial resilience.
Activity / Programme:	FINANSMARKED
Project manager:	Ryduchowska, Malgorzata
Project owner:	STIFTELSEN HANDELSHØYSKOLEN BI
Project period:	2022.01.01 - 2025.12.31
Report period:	2024.10.01 - 2025.12.31

Reporting objectives

1.	**Popular science presentation:** I understand that the text of the popular science presentation will be made publicly available*	**Yes**
2.	**Results:** Has information on publications been provided?	**Yes**
3.	**Performance indicators:** All results data that have emerged from the project are to be reported. Has this been done?	**Yes**
4.	**Fellowship grants:** Information regarding all fellowship grants must be complete and correct. Have you updated the man-months and other information for each fellowship-holder?	**Yes**
5.	**International cooperation:** The extent of international cooperation is to be indicated. Has any international cooperation taken place during the report period?	**Yes**
6.	**Special reports:** If any requests for special reports have been put forth by the case officer at the Research Council, these must be fulfilled.	**No**

Popular science presentation

Popular science presentation (Norwegian)

Prosjektets mål er å empirisk kartlegge karakteristikker ved grønne porteføljer samt den finansielle robustheten til investorer i grønne eiendeler. Populariteten til grønne obligasjoner er rekordhøy som følge av høy etterspørsel etter investeringer som adresserer klimarisiko og sosial ulikhet. Likevel vet vi lite om hvem som investerer i disse obligasjonene. Det er viktig å forstå hvem investorene er, ikke bare for prising og prediksjon, men også for å forstå grønne obligasjoners potensielle rolle i en finanskrise.
Kjernen i vår forskning er på porteføljesammensetning og handelsmønstre til investorer i grønne obligasjoner. Siden dette er et uutforsket forskningsområde, vil vi starte med å karakterisere eierstrukturen til grønne obligasjoner. Vi il dokumenterer trendene i utstedelser av grønne obligasjoner og sammenligner dem med det øvrige markedet. Vi tester spådommene til teorien om at bærekraftspreferanser beskytter investorer mot økonomiske tap, slik at de kan holde mer risikable porteføljer. Vi studerer også nødrisikoen. Vi vil også studere konkursrisiko og hvordan porteføljesammensetningen til investorer i grønne obligasjoner responderer til negative markedshendelser. For utvalget av grønne obligasjoner som har vært igjennom konkurs, vil vi gi innledende estimater av sannsynligheten, varigheten og resultatene av konkurs. Til slutt vil vi vurdere bærekraftsavtrykket til grønne obligasjoner. På den måten vil prosjektet svare på om det er merkelappen «grønn» eller faktiske preferanser for bærekraft som driver investeringer. Vi avslutter med å sammenligne bærekraften og den økonomiske ytelsen til grønne obligasjoner og deres investorer.
Dette er første gang vi empirisk kan studere robustheten til grønne obligasjoner takket være unike data på obligasjonseierskap. Miljøpolitikk er et av de viktigste områdene der statlig regulering av privat næringsliv alltid har vært fremmet. Vårt prosjekt understøtter regulatoriske beslutninger ved å dokumentere hvem som i dag eier grønne obligasjoner og hvordan disse investorene oppfører seg i kriser og hvordan eierskapet er knyttet til miljøprestasjonene til utstedere. Denne informasjonen hjelper myndigheter med å vurdere virkningen av potensiell eierskapspolitikk på etterspørselen etter bærekraftige investeringer, samt deres robusthet mot kriser.

Popular science presentation - Updated (Norwegian)

Interessen for grønne obligasjoner er rekordhøy som følge av høy etterspørsel etter investeringer som adresserer klimarisiko og sosial ulikhet. Det er viktig å forstå investorgrunnlaget for grønne obligasjoner både for å sikre korrekt prising og for å vurdere deres potensielle rolle under finansielle kriser. Vårt prosjekt dokumenterer empirisk investorers porteføljesammensetning, eierskapsmønstre og resiliens knyttet til grønne obligasjoner.
Eierskap i obligasjoner har lenge vært et lite utforsket forskningsområde på grunn av manglende datatilgang. I dette prosjektet håndterer vi denne utfordringen ved å bruke unike data fra det norske obligasjonsmarkedet. Dette gjør det mulig å presentere ny og detaljert dokumentasjon av obligasjonseiernes porteføljer, handelsmønstre og eierskapsstrukturer. Vi starter med å dokumentere trender i utstedelser av grønne obligasjoner og sammenligne disse med utviklingen i resten av markedet.
Videre vurderer vi bærekraftsprofilen til grønne obligasjoner i forhold til resten av investorenes porteføljer. Prosjektet besvarer dermed det mangeårige spørsmålet om grønne obligasjoner representerer symbolske investeringer, eller om de reflekterer reelle preferanser for bærekraft. Vi tester også prediksjoner fra teoretiske modeller for bærekraftspreferanser – nærmere bestemt om grønne eiendeler skjermer investorer mot finansielle tap, og dermed gjør det mulig for dem å holde porteføljer med høyere risiko. Til slutt studerer vi risiko knyttet til finansiell nød («distress risk»). Risikoen for mislighold og potensielle utfall av restrukturering er blant de viktigste obligasjonsspesifikke driverne for avkastning i rentemarkedet. En høy konsentrasjon av investorer i grønne obligasjoner kan potensielt innebære større resiliens under markedsnedgang dersom grønne beholdninger signaliserer en langsiktig investeringshorisont. Samtidig blir reelt engasjement for bærekraft virkelig testet når selskaper havner i finansiell nød. For utvalget av grønne obligasjoner som har vært i mislighold, analyserer vi prediktorer for svikt, varigheten av misligholdsperioden og endelige inndrivelsesutfall sammenlignet med det bredere konvensjonelle markedet.
Miljøpolitikk er et av kjerneområdene der det ofte argumenteres for statlig inngripen i privat sektor. Vårt prosjekt bidrar til å informere slike regulatoriske rammeverk ved å dokumentere eierskapsstrukturer i grønne obligasjoner, investoratferd under finansiell nød og sammenhengen mellom eierskap og utstedernes miljøprestasjoner. Denne informasjonen hjelper regulatorer med å vurdere effekten av potensiell eierskapspolitikk på etterspørselen etter bærekraftige eiendeler og deres motstandskraft i møte med finansiell uro.

Popular science presentation (English)

Our project aims to provide empirical evidence about portfolios and the resilience of investors involved in green assets. The popularity of green bonds is at a record high amid demand for investments addressing climate risks and social inequality. Yet, we know little about who invests in these bonds. Understanding investors in green bonds is important, not only to price them and predict their performance but also to understand their potential role in a financial crisis.
The core of our research is on the portfolios' structures and trading patterns of green bond investors. Since this is an unexplored research area, we start by characterizing the ownership structure of green bonds. We document the trends in green bond issuances and compare them to the remaining market. We test the predictions of the theory that sustainability preferences shield investors from financial losses, allowing them to hold riskier portfolios. We also study the distress risk. For the small sample of green bonds in distress, we aim to provide initial estimates of the probability, duration, and outcomes of restructuring. Finally, we assess the sustainability footprint of green bonds relative to the rest of their investors' portfolios. By so doing, the project attempts to answer whether green bonds in portfolios are token investments or revelations of true preferences for sustainability. We conclude by comparing the sustainability and financial performance of green bonds and their investors.
This is the first time we can empirically study the resilience of green bonds, thanks to the unique data about bond ownership. Environmental policy is one of the key areas where government intervention in private business has always been advocated. Our project supports such regulatory decisions by documenting who owns green bonds, how these investors behave in distress, and how the ownership is linked to environmental performance of issuers. This information helps regulators assess the impact of potential ownership policies on the demand for sustainable assets and their resilience to financial distress.

Popular science presentation - Updated (English)

The popularity of green bonds is at a record high amid demand for investments addressing climate risks and social inequality. Understanding the green bond investor base is important, not only to price bonds and predict their performance, but also to evaluate their potential role during financial crises. Our project provides empirical evidence regarding investors in green bonds, focusing on their portfolio compositions, ownership patterns, and resilience.
Bond ownership has been an unexplored research area due to a lack of data availability. In this project, we overcome this challenge by using unique data from the Norwegian bond market. This allows us to provide new, detailed evidence on bondholders' portfolios, trading patterns, and ownership structures. We start by documenting trends in green bond issuances and comparing them to the rest of the market.
Second, we assess the sustainability footprint of green bonds relative to the remainder of the investors' portfolios. In doing so, the project answers the long-standing question of whether green bonds represent token investments or a revelation of true preferences for sustainability. We also test predictions from theoretical models of sustainability preferences—specifically, whether green assets shield investors from financial losses, thereby allowing them to hold riskier portfolios.
Finally, we study the distress risk. Arguably, the risk of distress and potential restructuring outcomes are the most important bond-specific drivers for fixed income performance. A high concentration of green bond investors may potentially imply greater resilience during market downturns if green holdings signal a long-term investment horizon. However, the genuine commitment to sustainability is truly tested during financial distress. For the small sample of green bonds in distress, we analyse the predictors of failure, the duration of the distress period, and ultimate recovery outcomes relative to the broader conventional market.
Environmental policy is one of the key areas where government intervention in private sector has always been advocated. Our project informs such regulatory frameworks by documenting green bond ownership structures, investor behaviour during distress, and the link between ownership and the environmental performance of issuers. This information helps regulators assess the impact of potential ownership policies on the demand for sustainable assets and their resilience to financial distress.

Message to the Research Council of Norway

Results

Category: Dissemination

Author(s)	Title	Journal/Publisher/Event	Year	ISSN/ISBN	DOI
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Restructuring outcomes under cross-security debt ownership		2025		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Restructuring outcomes under cross-security debt ownership		2025		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Restructuring outcomes under cross-security debt ownership		2025		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	The Sustainability Preferences of Individual and Institutional Investors		2025		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	The Sustainability Preferences of Individual and Institutional Investors.		2024		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	The Sustainability Preferences of Individual and Institutional Investors.		2024		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Green Bond Investors		2023		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Green Bond Investors		2023		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Green Bond Investors		2023		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Green Bond Investors		2023		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Restructuring under common debt ownership.		2023		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Restructuring under common debt ownership.		2023		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	The Portfolio Volatility of Green Bond Investors.		2023		
Groen-Xu, Moqi; Ryduchowska, Malgorzata	Green Bond Investors		2022		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Green Bond Investors		2022		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Investors in Green Bonds		2022		
Groen-Xu, Moqi; Ryduchowska, Malgorzata	Investors in Green Bonds and Financial Resilience		2022		

Category: Other publication

Author(s)	Title	Journal/Type/Publisher	Year	ISSN/ISBN	DOI
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Defaults and ownership of green bonds in the Norwegian bond market		2026		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Norwegian Green Bond Market		2025		

Category: Other

Author(s)	Title	Type	Year	ISSN/ISBN	DOI
Ryduchowska, Malgorzata; Groen-Xu, Moqi	Restructuring outcomes under cross-security debt ownership		2025		
Ryduchowska, Malgorzata; Groen-Xu, Moqi	The Sustainability Preferences of Individual and Institutional Investors		2025		

Performance indicators

Dissemination measures for users

Reports, memoranda, articles, presentations held at meetings/conferences for project target groups (public sector, trade and industry, organisations)

2022	2023	2024	2025	Cumulative number
4	7	2	4	17

Fellowship grants

Fellowship grants funded under the project

International cooperation

International cooperation funded under the project (in NOK 1000)

Amount in NOK 1000

Country	2022	2023	2024	2025
United Kingdom	119	274	75	63

Special reports

Comment

- Special report attached in Section 5.
- In Section 1.3, reports and invited university presentations are not automatically be counted into "Dissemination means". They are reported into NVA and appear in Section 1.2.

Uploaded file

Investors in green bonds and financial resilience

Our project studies investors in Scandinavian green bonds. Our objective was to learn about the role of sustainable investment in their portfolios, with a special focus on their resilience to distress. We did so by establishing stylized facts, mapping trading patterns, and studying the role of ownership in default and recovery. Our results serve to inform regulators and investors. Our scientific output opens new research avenues in both the literature on sustainability and the one on restructuring.

1. Findings

The research brings several novel findings. First, it reveals a distinct ownership architecture within the Norwegian green bond market that deviates significantly from traditional debt structures. Mutual funds maintain a dominant 40% market share across both segments, but green bonds attract a disproportionately high volume of mission-driven capital, with government-related and non-profit organizations holding 12% of the market—double the share found in conventional debt. Second, there is a divide between retail and institutional motivations. While institutional investment appears driven by "mandate-matching", only individual retail investors exhibit the portfolio volatility patterns consistent with genuine, non-pecuniary preferences. Therefore, while institutions provide the bulk of the capital, the retail sector may more accurately reflect sustainability values.

We also document that green bond investors are not passive. They actively trade in response to sustainability-related news. This sensitivity confirms that ESG factors are a fundamental driver of liquidity and valuation in this segment. Furthermore, we discover that sustainability preferences appear to function as a "risk buffer." Green bond investors demonstrate unique resilience by maintaining higher portfolio volatility. Higher risk tolerance suggests that non-pecuniary preferences shield green investors from the traditional financial risk-aversion triggers.

In the context of financial distress, we find that the secondary market for green bonds functions as a risk-clearing mechanism. Long-term institutional investors and banks typically exit these securities well before formal credit events. Consequently, by the time of default, risk is almost entirely reallocated to specialized foreign and distress investors. This pre-default migration ensures that domestic institutions remain insulated from the direct impact of green bond failures. This transition of ownership not only protects the domestic financial system but also shifts the assets into the hands of specialists better equipped to manage the restructuring process.

The final stage of the research identifies how specific ownership patterns influence the efficiency of debt resolution. We find that the presence of specialized investors with "common ownership"—those holding stakes across multiple issuers—significantly improves restructuring dynamics. These repeated interactions among a small group of sophisticated players mitigate coordination failures, reducing the average resolution time by 5% and lowering the probability of liquidation. Furthermore, we document that the Norwegian bond market involves many “multi-class” lenders. This stands in contrast to the traditional view where investors are entangled in senior-versus-junior conflict. When lenders hold decisive stakes across different security classes, they engage in holistic inter-security negotiations. Such ownership landscape results in faster restructuring conclusions and a more systematic distribution of recoveries across the different claim classes.

2. Implementation

The project was executed in accordance with the original proposal. It started with establishing access to the confidential data from two main data sources from the Norwegian bond market: one describing securities and the other including information on investors, their portfolios and transactions. We integrated these unique, granular data sources to construct a comprehensive overview of the Norwegian bond market. By doing so, we obtained a summary of the green bond issuance trends, ownership structures over time and by investor type, detailed portfolio characteristics and trading behaviour of investors holding green assets, as well as incidence and outcomes of the restructuring processes.

Building on this data foundation, the project employed regression analyses to investigate the determinants of bond performance and investor behaviour, resulting in the preparation of several academic papers and research reports. These empirical findings were further refined through a robust dissemination strategy. The project's findings generated interest within the academic community, leading to numerous invitations to international conferences. Consequently, active conference participation became a vital tool for dissemination from the earliest stages of the project.

In the context of finances, a significant portion of the budget was allocated to the acquisition of granular, proprietary data that was the necessary foundation for the analysis. The implementation relied also on the support of Research Assistants (RAs) recruited from the BI Norwegian Business School's Master's programs. This collaboration accelerated the data cleaning process, facilitating an exploration of data patterns for which no prior stylized facts existed. The RAs support not only improved operational efficiency but also allowed for the early completion of the first working paper.

3. Impact

The project's findings provide a significant leap in the theoretical and empirical understanding of both sustainable finance and corporate restructuring. By identifying that only retail investors—rather than institutional funds—exhibit the portfolio volatility associated with non-pecuniary preferences, this research challenges the "uniform investor" assumption prevalent in conventional sustainable finance models. This suggests a notable decoupling between delegated investment, which often focuses on mandate-matching, and genuine ESG-driven behavior. Consequently, this opens a new research avenue into the agency problems of green mandates and the institutional-retail divide. What is more, since different investor types differ both in sustainability preferences as well as in size – and hence also market impact, the findings allow to identify investor classes that actually possess the capacity to influence the pricing and valuation of green assets.

Furthermore, the project advances the literature by documenting how markets reallocate green bond default risk and how specific market segments specialize in risk-bearing. This work is also the first to bridge the gap between the common ownership literature and restructuring research. By documenting the prevalence of multi-class and multi-issuer ownership, the project provides a new approach for studying inter-creditor bargaining, shifting the academic focus from traditional intra-class conflicts to strategic inter-security bargaining.

Beyond the academic sphere, our results offer actionable insights for regulators, industrial issuers, and the broader financial ecosystem, ultimately fostering a more

resilient green economy. The finding that delegated green investment may not reflect underlying ESG preferences can help inform regulation that addresses the trade-off between fiduciary duty and ESG objectives. Furthermore, the evidence about ownership and restructuring outcomes provides a positive outlook for regulators concerned with the stability of the Norwegian bond market. Quicker restructurings lead to less value destruction, the preservation of employment, and a faster return to operational normalcy for distressed firms, particularly in critical sectors like energy and shipping.

For industry players, understanding that the investor base changes dramatically before a default allows for more sophisticated strategic planning. Recognizing that long-term domestic institutions tend to exit, leaving specialized foreign investors at the negotiation table, helps firms manage their stakeholder relationships more effectively during periods of underperformance. Finally, on a societal level, mapping the resilience and preferences of green bond investors provides a clearer picture of how "green capital" behaves under pressure. The resilience of these investors to financial risk suggests that the green bond market can serve as a stable source of funding for the environmental transition, maintaining its integrity even during periods of broader market volatility.

4. Outputs

The project maintains a robust strategy for the ongoing dissemination and utilization of its findings, ensuring both academic impact and practical relevance. We continue to actively present research results at various international conferences to engage with the broader scientific community. We also prepare a specialized online workshop scheduled for March 2026, which is designed to bridge the gap between theory and practice. This event will serve as a platform to disseminate results to industry professionals while bringing together leading academics and practitioners to discuss the real-world implications of the data.

Several high-impact outputs are expected to reach finalization following the formal completion of the project. Currently, the paper titled *"The Sustainability Preferences of Individual and Institutional Investors"* is under review at the *Review of Financial Studies*; given the standard lead times in the finance field, publication is anticipated within the next one to two years. Additionally, two foundational reports—*"The Norwegian Green Bond Market"* and *"Defaults and Ownership of Green Bonds in the Norwegian Bond Market"*—have already been disseminated via the CCGR network. These works will be formally launched as a comprehensive White Paper during the March workshop. Following the incorporation of feedback from stakeholders, these will be submitted to practically oriented academic journals, such as *Financial Management*.

The project's pipeline also includes advanced manuscripts targeting top-tier finance journals. The study on *"Restructuring Outcomes Under Cross-Security Debt Ownership"* is currently being prepared for initial submission to the *Journal of Finance* by mid-2026. Furthermore, the working paper *"Bond Cross-Ownership at the Time of Default"* is presently being circulated for peer comments to refine its empirical contributions. These collective efforts, alongside the already published CCGR reports, ensure that the project's insights into ownership architecture and market resilience are shared with academic, regulators and practitioners.

“Investors in green bonds and financial resilience.”

Introduction

Our project explores the unique dynamics of the Scandinavian green bond market. It examines how different types of investors behave, the risks they undertake, and how the market manages financial distress.

The Norwegian bond market is a large part of the economy. In 2018, it was valued at NOK 2,060 billion (USD 223 billion), representing more than half of Norway’s total GDP. Within this landscape, green bonds—introduced only in 2013—have experienced rapid growth. In just six years, the volume of green debt issued in Norway rose from a mere NOK 3 billion in 2014 to over NOK 30 billion in 2020.

The rapid scaling of the green market has inevitably led to the first green credit events. While there have only been five actual defaults on green bonds so far, the data shows that green companies are typically twice as large as regular ones. Consequently, a single green default carries significantly more “systemic risk” than a standard mid-market insolvency.

The Green Investor Landscape

The landscape of green bond investing is defined by a clear split between individual investors and large institutions. While individual investors represent the vast majority of participants by count, institutional capital provides the necessary scale. Individual "retail" investors make up over 80% of the 26,000+ people participating in this market. Despite their numbers, however, individuals hold only 2% to 5% of the total green bond market value. Instead, it is mutual funds (17%) and pension or insurance firms (19%) that absorb the bulk of green bond issuances. These entities act as the market’s anchor, providing the depth required for large-scale green projects to secure funding.

Green investors do not simply "buy and hold" blindly; they are highly sensitive to sustainability news. They increase their exposure when an issuer receives its first ESG (Environmental, Social, and Governance) rating, as well as when companies improve their existing ESG scores. This suggests that for green investors, the mere availability of information acts as a catalyst for investment, and they "reward" issuers for achieving measurable sustainability milestones. Conversely, green investors are quick to sell off their holdings—dropping them by 6 to 9 percentage points—if a company is involved in a negative environmental incident.

Green Investors and Risk Taking

Our comparison between institutional and individual investors reveals a new empirical finding: green investors are more willing to take financial risk. This is intuitive, as investors who care about environmental impact are often less concerned with financial certainty than those whose primary focus is monetary gain. This is an important

distinction for market resilience; it suggests that green investors can better withstand financial risk, meaning firms may need to compensate investors less for risk when embarking on sustainable projects. We are able to demonstrate for the first time that this theoretical prediction holds true in reality, thanks to our unique data on individual investors.

The data shows that green portfolios are 9% more volatile than those of their peers. Crucially, these investors are not being compensated with higher profits for taking these extra risks. In financial terms, they accept lower "risk-adjusted returns". This performance gap represents the literal price paid for sustainability, confirming that their primary motivation is to drive environmental change rather than maximize personal wealth. The higher volatility in green portfolios is driven by a concentration in specific issuers and an increased exposure to firm-specific risk. Regarding financial resilience, green investors hold more securities of firms that are currently struggling with financial difficulties.

Interestingly, this willingness to take risks is only found among individual investors. Large institutional asset managers show no such flexibility. This is largely because legal "fiduciary" rules require them to prioritize financial gain over other goals. Our findings raise a critical question: do these traditional rules prevent the broader financial market from supporting the green transition as effectively as individual citizens do?

From Risk-Taking to Risk-Resolution

The high willingness to assume financial risk documented in the portfolios of individual green bond investors means they are also more likely to hold securities that experience credit events—a fraction 6.9% higher than that of regular investors. However, individual investors collectively own only a small stake in the green bond market. We demonstrate that this does not necessarily imply a disorderly restructuring process, primarily because ownership shifts significantly prior to default.

At issuance, domestic institutions—such as banks and insurance companies—hold nearly half of the debt. However, as financial distress approaches, these entities, restricted by mandates and fiduciary duties, exit their positions. This trend is most pronounced in the green sector. While foreign investors hold only 25% of green debt at issuance, they hold a staggering 99% at the time of default. This shift does not represent a "fire sale," but rather a transfer of risk to those best equipped to handle it; the risk-taking green investor essentially "hands the baton" to the restructuring specialist.

The entry of specialized "distress specialists" solves a critical coordination problem. Traditional dispersed ownership often makes it difficult to reach the 67% voting threshold required for a successful restructuring. Specialized funds, however, hold large, decisive stakes that simplify these negotiations.

Common Ownership and Efficiency

Furthermore, our analysis of the Norwegian bond market reveals that corporate restructuring is not a series of isolated events, but a sophisticated ecosystem spanning a "Distress Network." Rather than a fragmented base of thousands of retail investors, the median defaulting issuer in Norway faces a concentrated table of only 21 to 23 investors. Crucially, these specialist investors are often "repeat players." We document that one-third of all default events feature "Common Ownership," where the same specialized investors—primarily foreign institutional funds— frequently hold significant stakes in the same defaulting companies.

This network structure transforms the restructuring process from a one-off battle into a recurring interaction among professional peers. Because these specialists are repeat players who collaborate across various cases, they utilize standardized "blueprints" for negotiation and have professional reputations to maintain. We find that within this structure, the time a company spends in default is reduced by an average of 9 months. This represents a significant improvement over the average duration of a bankruptcy process. This illustrates how a "Repeat Player" environment can effectively mitigate "Strategic Delay," a commonly recognized issue in restructuring negotiations.

We also discover that in the Norwegian market, investors holding multiple classes of debt are the norm. This multiclass ownership is present at issuance but becomes even more prevalent in cases of distress. Every default in our sample features at least one investor who holds significant stakes in both senior and junior debt classes.

Again, this finding challenges the traditional view that senior and junior debtholders are naturally set against each other. Without multiclass investors, a firm is often trapped in a conflict where a senior-only holder might prefer immediate liquidation, while a junior-only holder wants to hold out for a long-shot recovery. Their presence, on the other hand, facilitates coordination. In 78% of defaults, these multiclass investors hold enough power to make the final decision. Because they own a portion of each debt class, they avoid internal conflict. Instead, they find a middle ground that keeps the company operational, thereby saving jobs and preserving the business's value.

Summary

Our analysis of the Norwegian bond market (2006–2024) examines how sustainability goals interact with financial risk and corporate survival. We find that the market has evolved into a two-stage ecosystem: a broad-based issuance stage driven by sustainability mandates and individual risk-taking, followed by a highly concentrated restructuring stage managed by specialized, multiclass investors.

The hand-off from green-minded investors to distress specialists is not a sign of market failure, but rather a sophisticated mechanism for value preservation. While green

bond investors exhibit a higher willingness to assume financial risk, the concentration of debt in the hands of repeat players at the time of default ensures that this risk does not lead to unnecessary liquidations. By internalizing class conflicts and leveraging cross-issuer networks, these specialists provide the coordination necessary to shorten default periods by an average of nine months.

Our findings carry significant weight for regulators and market participants as the volume of green and sustainable debt continues to grow. To move beyond "mandate-matching" and encourage genuine ESG risk-taking, regulators may need to rethink the boundaries of fiduciary duty to allow managers to better address sustainability-return trade-offs. Additionally, it is vital to ensure that the transition from green investors to restructuring specialists remains smooth, as these specialists play a crucial role in saving companies and ensuring the long-term success of the green economy. Policies that restrict high-yield or "vulture" fund participation could inadvertently destroy firm value by leaving debt in the hands of dispersed, uncoordinated creditors. Finally, given the 99% foreign ownership of green debt at default, there is a clear need for transparency regarding voting majorities. Enhancing disclosure requirements for ad-hoc committees and common ownership blocks could further reduce uncertainty and accelerate negotiations.