UNIVERSITY OF TARTU

Faculty of Social Sciences

School of Economics and Business Administration

Anhelina Honcharenko

CHALLENGES OF ISSUING GREEN BONDS: THE CASE OF BALTIC COMPANIES

Bachelor thesis

Supervisor: Lecturer Mark Kantšukov

Tartu 2025

I have written this Bachelor Thesis independently. Any ideas or data taken from other authors or other sources have been fully referenced.

Table of contents

Introduction

Green finance instruments, particularly green bonds, have emerged as a vital tool in addressing global environmental challenges and fostering sustainable development, as evidenced by the EU's adherence to the Paris Agreement and the European Green Deal. These frameworks highlight the importance of transitioning towards green finance to achieve climate neutrality by 2050. (Spinaci, 2022) Unlike conventional bonds, green bonds are specifically designed to finance projects with clear environmental benefits, making them a cornerstone of sustainable finance.

In the Baltic region, comprising Estonia, Latvia, and Lithuania, the green bond market remains at an early stage of development. Despite structural differences in the financial systems of these countries, the overall issuance of green bonds is still limited. For instance, the markets in Lithuania and Latvia are dominated by sovereign bonds, while corporate bonds play a more prominent role in Estonia. (CBI, 2018) Notable developments in the region include Ignitis Grupė (formerly Lietuvos Energija) issuing the first-ever €300 million corporate green bond in 2017. In 2018, the Lithuanian government became the first in the Baltics to issue a green-labelled sovereign bond worth €68 million, which received Moody's GB1 (excellent) assessment and was allocated to energy-efficient residential development. (Altunina & Alieva, 2021) These milestones underscore the region's potential for adopting green bonds, yet obstacles such as market fragmentation and a lack of investable projects persist (CBI, 2018).

The academic discourse on green bonds reveals varying dynamics across regions and market types. Aleksandrova-Zlatanska and Kalcheva (2019) stress that sustainable finance is essential for both the public and private sectors and emphasise the need for integrated frameworks to support such instruments. They further note that green bonds are comparable to conventional bonds in terms of profitability, but that their growth depends heavily on stakeholders' awareness of climate change mitigation and adaptation. Meanwhile, Lebelle et al. (2020) highlight that investor responses to green bond issuance can vary significantly, with concerns such as greenwashing and the uncertainty regarding the long-term profitability of environmentally sustainable projects posing challenges. Altunina and Alieva (2021) identify further barriers in the Baltics, including underdeveloped financial ecosystems, economic constraints, low levels of corporate social responsibility, and a lack of cohesive strategies to integrate green finance into broader economic development plans in the Baltic region. They emphasise the importance of policy support and international cooperation. Sheenan (2023) highlights that green bonds, unlike conventional bonds, are significantly affected by geopolitical risks during periods of high market volatility.

The aim of this thesis is to explore the challenges associated with issuing green bonds from the perspective of Baltic companies and arrangers of issuance. Since green bonds are still a relatively new financing instrument, issuers may face uncertainties or difficulties that are not yet well understood. Identifying these challenges can help future market participants understand what to expect and what to prepare for when considering this form of capital raising. The aim will be achieved through an overview of green bond issuers in the Baltics, as well as through interviews with both companies and arrangers to explore the challenges they encountered first-hand during the issuance process. To achieve this aim, the research is structured around the following research tasks:

- to discuss the theoretical foundations of green bonds, including their definitions, types, dynamics, and comparison with conventional bonds;
- to explore policies implemented to regulate the green bond market;
- to identify and synthesise key challenges and difficulties from existing empirical studies;
- to provide an overview of companies that have issued green bonds in the Baltics, including issuance size, coupon rates, and financed projects;
- to compile an interview questionnaire and conduct interviews with representatives of Baltic companies and arrangers involved in green bond issuance;
- to analyse the results of the interviews and present the findings.

The research problem addressed in this thesis is the limited academic focus on corporate green bond issuance in the Baltic region. While global green bond markets have been extensively studied, little is known about the challenges faced by companies in smaller, emerging markets like Estonia, Latvia, and Lithuania. This thesis investigates green bond issuance across different years, sectors, and countries within the Baltics. The findings may be especially relevant for companies planning to issue green bonds, as they highlight common challenges and practical aspects to consider throughout the process. The study also contributes to existing research by sharing insights from interviews with companies and arrangers in the Baltics, a part of Europe that has received little attention in green finance studies so far. The thesis consists of a theoretical part, which provides an overview of green bonds, their market development, and key barriers identified in the literature, and an empirical part, which includes a review of Baltic issuers and an analysis of interviews with companies and arrangers to explore practical challenges in the issuance process.

Keywords: green bonds, Baltic bond market, sustainable development.

1. Green bonds in sustainable finance and the evolving regulatory landscape

1.1. Green bonds: Features, evolution, and comparison with conventional bonds

Over the past ten years, environmental concerns have become one of the most urgent global priorities. According to the World Economic Forum (2022), environmental risks such as climate action failure, extreme weather, and biodiversity loss are ranked as the top three most significant global threats for the next ten years. Since the 1990s, there has been a notable rise in the number of natural disasters reported worldwide, particularly floods and extreme weather events (*Our World in Data, n.d.*). Yet, the root causes of environmental challenges remain insufficiently addressed.

At the same time, a growing number of people are becoming more environmentally conscious, recognizing that environmental degradation is a global issue with far-reaching consequences for human life and society (Dai et al., 2024). The increasing frequency of climate-related disasters has driven efforts to develop instruments and solutions to reduce their impact on humanity (Grishunin et al., 2023). One such innovative solution is the green bond, a financial instrument designed to address climate challenges (Karim et al., 2023).

To understand the role of green bonds in addressing these issues, it is crucial to first look at their definitions that are presented in the Table 1.

Table 1

Definitions of 'green bond'

Author(s)	Definition
Ehlers & Packer (2017, p.89)	"Green bonds are fixed-income securities which finance investments with environmental or climate-related benefits."
TEG (2019a, section 2.3.)	"Green bonds serve the purpose of driving awareness of sustainability in the economy and the financial markets at large."
Hoinaru et al. (2020, p.237)	"Green bonds refer to a type of ordinary bond issued by a company for use in climate and environmental projects such as pollution-free transport, sustainable technologies, and energy efficiency."
ICMA (2021, p.3)	"Green bonds are any type of bond instrument where the proceeds will be exclusively applied to finance or refinance, in part or full, new and existing eligible Green Projects and aligned with the four core components of the GBP."
Sobik (2023, p.300)	"Green bonds are an important element of green finance, becoming an increasingly common instrument for financing green investments on a global scale."

Source: compiled by the author

All the definitions share the idea that green bonds are financial instruments specifically designed to fund projects with environmental benefits. They share a common understanding that green bonds help address climate challenges and promote sustainable development. While some definitions focus on the practical use of green bonds, emphasising their purpose of financing environmental or climate-friendly projects, including clean technologies or sustainable infrastructure (Ehlers & Packer, 2017; Hoinaru et al., 2020), others take a broader perspective and view green bonds not just as financial tools but as instruments that drive sustainability efforts on a larger scale and influence the economy and financial markets toward greener practices (TEG, 2019a; Sobik, 2023). The ICMA (2021) adds a regulatory dimension, focusing on the guidelines and criteria green bonds must meet to ensure transparency. It highlights the importance of compliance with established standards, which is crucial for maintaining trust and consistency in the market. Summarising, green bonds are financial instruments used to fund projects and initiatives that provide environmental benefits, such as renewable energy, sustainable infrastructure, or pollution reduction, while promoting broader sustainability goals and adhering to established standards for transparency.

It is crucial to bring further clarify about their structure. The Green Bond Principles (GBP), as defined by ICMA (2021), outline four key types of green bonds:

1. Green Use of Proceeds Bond is fully recourse to the issuer, meaning the issuer's entire balance sheet serves as collateral. The proceeds are earmarked for financing or refinancing green projects.
2. Green Revenue Bond is a non-recourse bond, where repayment is collateralized by specific revenue streams, such as taxes or fees. The proceeds are earmarked for green projects, even if unrelated to the revenue source.
3. Green Project Bond is specifically earmarked for a single or multiple green projects. Collateral is limited to the project's assets and revenues, with repayment providing little or no recourse to the issuer.
4. Green Securitized Bond is a bond collateralized by revenues generated from one or more green projects. These revenues are used to repay the bond. The proceeds are directly earmarked for financing or refinancing these projects.

Although environmental concerns have been discussed for decades, the green bond market only emerged in 2007. Figure 1 summarises key milestones in the global development of the green bond market.

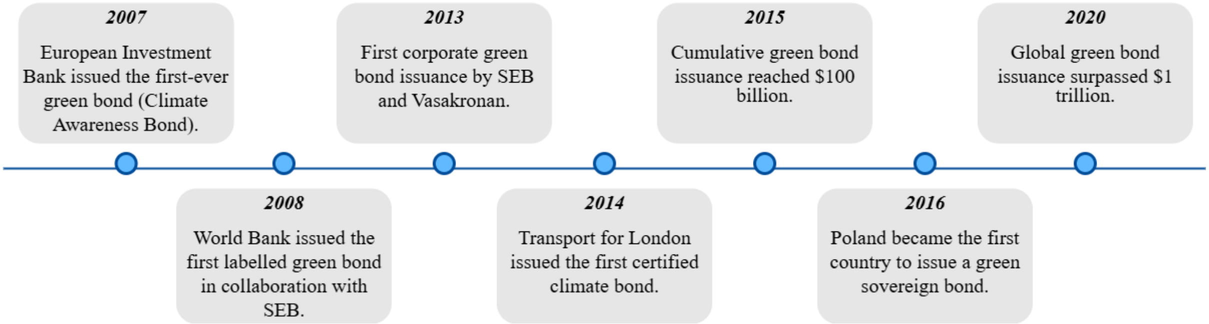

Figure 1. Milestones in green bond issuance

Source: compiled by the author

In 2007, the European Investment Bank (EIB) issued the first-ever green bond, known as a Climate Awareness Bond, with an AAA rating and an issue size of €600 million, focusing on renewable energy and energy efficiency projects (EIB, 2011; Spielberger, 2024). The World Bank followed in 2008 by issuing the first labelled green bond in collaboration with the Swedish bank SEB. The first corporate green bond was introduced in 2013 by the SEB bank and Swedish largest real estate company, Vasakronan. (Deschryver & De Mariz, 2020) The UK issued the first certified climate bond in 2014. Poland became the first sovereign issuer in 2016, and by 2017, the global market had reached $250 billion in cumulative issuance. By 2020, total issuance surpassed $1 trillion. (CBI, 2020) Global cumulative green bond issuance reached $3.5 trillion by end-2024 (CBI, 2025). In H1 2024, aligned green bond volume was $385.1 billion, comprising 70% of the aligned GSS+ market and representing 4.2% of global debt issuance ($13.2 trillion), down from 5.3% in 2023 (CBI, 2024). S&P Global Ratings forecasts annual GSSSB issuance could approach $1 trillion in 2024, potentially reaching 14% of total issuance, with green bonds continuing their dominance (Cochelin et al., 2024).

Europe led H1 issuance with 62% of green bond volume, with the USA, Germany, and France among the top contributors (CBI, 2024). The euro was the dominant currency, representing 44% of H1 aligned GSS+ volume (CBI, 2024; Cochelin et al., 2024). By issuer type, in H1 2024, non-financial corporates made up 34% and sovereigns 24% of aligned green bond issuance (CBI, 2024). The EU and World Bank were major public issuers, with the EU being the largest non-sovereign green issuer in H1 2024 and the World Bank the largest cumulative aligned GSS+ issuer overall. Proceeds mainly supported energy, buildings, and low-carbon transport, including projects related to the Paris Olympics. Issuance is also growing in steel and cement sectors, and blue bonds are gaining visibility as a subset of green bonds. (CBI, 2024; Cochelin et al., 2024)

While green bonds are gaining traction, conventional bonds remain the primary financing tool across sectors. Table 2 provides comparison of green and conventional bonds based on six aspects to highlight their structural, financial, and regulatory differences.

Table 2

Comparison between green bonds and conventional bonds

Aspect	Green bonds	Conventional bonds (i.e., non-green bonds)
Use of proceeds	Funds must be used for environmentally beneficial projects	No restrictions on how funds are used
Transparency & reporting	Requires annual reporting on the use of proceeds and environmental impact	No mandatory reporting on use of proceeds or impact
Average maturity	Typically, longer maturity (around 12 years)	Typically, shorter maturity (around 10 years)
Typical issuance size	Smaller average issuance size (approx. €225 million)	Larger average issuance size (approx. €300 million)
Cost of debt (greenium)	May offer lower yields due to investor willingness to accept lower returns (potential cost saving)	Generally, offer higher yields aligned with standard risk-return expectations
External review	Typically reviewed by third parties (e.g., SPOs, verification, certification) for green alignment.	No external review required

Source: compiled by the author

The use of proceeds remains the most fundamental difference. Green bonds are issued with the explicit condition that proceeds fund environmentally beneficial projects (Kanamura, 2020; Gianfrate & Peri, 2019; Han & Li, 2021). In contrast, conventional bonds have no such restriction; their proceeds may be used for general corporate or government purposes (Ma et al., 2020). This commitment to sustainability leads to enhanced transparency and reporting. Green bond issuers are required to publish annual reports to disclose how proceeds were allocated and the environmental impact achieved (Han & Li, 2021; Chausteur, 2020; Ma et al., 2020). Conventional bond issuers, by contrast, face no such reporting obligations related to project use.

In terms of maturity, green bonds tend to be issued with slightly longer durations, averaging around 12 years, compared to about 10 years for conventional bonds (Flammer, 2020). This difference reflects the longer horizon typically needed for environmental infrastructure and climate-focused projects. Green bonds tend to have a smaller issuance size, with an average of €225 million, while conventional bonds often reach around €300 million (Hinsche, 2021; Lin & Su, 2022). Another often-discussed difference is pricing. Green bonds may offer lower yields, a phenomenon referred to as the "greenium", due to investor willingness to accept lower returns in exchange for supporting sustainable initiatives (Zerbib, 2019; Gianfrate & Peri, 2019). Conventional bonds, priced solely on financial fundamentals, typically provide higher yields aligned with standard risk-return expectations (Karpf & Mandel, 2018). Finally, the table highlights the role of external review. Green bonds typically undergo third-party verification or receive a formal "green" label under frameworks such as the Green Bond Principles or the Climate Bonds Standard (Hyun et al., 2019; Gianfrate & Peri, 2019). This process is carried out by specialised external reviewers, often referred to as second-party opinion providers. These include: non-financial rating agencies like Sustainalytics, ISS-oekom, Vigéo-Eiris (now part of Moody's), and CICERO; Big Four audit firms offering post-issuance assurance (e.g., Deloitte, KPMG, PwC, EY); credit rating agencies such as Moody's, S&P, and Fitch; and global technical inspection bodies like DNV-GL and Bureau Veritas (Technical Expert Group on Sustainable Finance, 2019a). In contrast, conventional bonds are not subject to such external review, as their proceeds are unrestricted by sustainability criteria.

Despite being generally secured against the issuer's full balance sheet like conventional bonds, green bonds are sometimes perceived as riskier due to uncertainties in environmental project outcomes (Chang et al., 2022). This perception can create tension between capital supply and demand for such investments. However, strong investor interest, particularly from environmentally conscious investors who typically follow a buy-and-hold strategy can provide benefits such as lower volatility, increased price stability, and greater liquidity in the green bond market (Preclaw & Bakshi, 2015; MacAskill et al., 2020). For issuers, the demand can result in more favourable pricing and potentially lower borrowing costs compared to conventional bonds (Deschryver & de Mariz, 2020; Gianfrate & Peri, 2019).

As the growth of the EU green bond market continues, so too does the risk of greenwashing (Demary & Neligan, 2019). Greenwashing occurs when companies exaggerate or misrepresent the environmental benefits of their products or services to appear more trustworthy in the market (Nemes et al., 2022). This can involve selective disclosure, ambiguous eco-labels, or misleading visuals and claims, often driven by the desire to boost sales or attract investor trust (Bonanno & Brunelli, 2022). Greenwashing undermines trust in ecologically conscious businesses and discourages investors from supporting impactful green projects. This lack of confidence can incentivize undesirable environmental behaviours instead of promoting sustainable progress (Delmas & Burbano, 2011). To tackle these issues, the European Commission's Action Plan on Financing Sustainable Growth (2018) focuses on strengthening the regulatory framework for green bonds. Key initiatives include the creation of the EU Green Bond Standard and recommendations to improve the way companies and financial institutions disclose climate-related information. Central to these efforts is the EU taxonomy, which guarantees improved tracking and verification of green bond proceeds, helping to build investor confidence (Bukvić et al., 2023).

Overall, green bonds have become an important instrument for financing climate-friendly projects and encouraging more sustainable business practices. While green bonds share similar features with conventional bonds, their focus on environmental impact sets them apart. As the market grows, especially in Europe, stronger rules and standards, like the EU Green Bond Standard, are being introduced to make sure green bonds actually deliver on their promises and help build trust among investors.

1.2. Green bond market regulatory frameworks

Sustainable development is fundamentally tied to initiatives that address global warming and aim to protect the environment. The term was first introduced in the 1987 report by the World Commission on Environment and Development, titled "Our Common Future." It was defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p. 18). In 2015, the 2030 Agenda for Sustainable Development was endorsed by 193 member states under General Assembly Resolution A/RES/70/1. This framework established 17 Sustainable Development Goals (SDGs) and 169 targets that countries are committed to achieving by 2030. (United Nations, 2015) According to Bonanno and Brunelli (2022), the green bond market has grown significantly in recent years, with clean energy projects (SDG 7) accounting for nearly 40% of issuances, followed by low-carbon buildings (24%) and low-carbon transportation (15%). These investments not only contribute to mitigating climate change but also play a critical role in advancing multiple SDGs.

The Paris Agreement, which came into effect in November 2016, represents a historic commitment by 195 nations to address the urgent challenges posed by global climate change. Its primary objectives include limiting the rise in global average temperature to 1.5°C and ensuring it does not exceed 2°C above pre-industrial levels (UNFCCC, 2015). To achieve these targets, investments should be directed toward initiatives that cut greenhouse gas emissions and foster climate-resilient development (UNFCCC, 2015). Building on these principles, the European Union launched the European Green Deal (EGD) in 2019, a framework aimed at achieving a climate-neutral Union by 2050 while contributing to the Paris Agreement goals (European Commission, 2019). Based on *The net-zero transition* report by McKinsey & Company (2022), achieving this scenario requires an annual investment of $9.2 trillion in energy and land-use systems, primarily in low-emission assets. Despite these efforts, $2.8 trillion per year will still be spent on high-emission assets during the transition.

Furthermore, the EU has adopted the EU Climate Law, which reinforces the commitment to achieving climate neutrality by 2050. It also raises the 2030 target for greenhouse gas emissions reduction from 40% to 55% compared to 1990 levels. (European Union, 2021) The European Taxonomy, introduced in 2020, stands out as a key instrument for implementing the Green Deal. It defines clear criteria for determining whether an economic activity is environmentally sustainable, aligning finance with sustainability goals (TEG, 2019b). The United Nations Environment Programme Finance Initiative, established after the 1992 Earth Summit, works with over 400 financial institutions to promote sustainability in the financial sector. Through frameworks such as the Principles for Responsible Banking and the Net-Zero Asset Owner Alliance, it supports alignment with the Sustainable Development Goals and the Paris Agreement. (UNEP FI, 2020) Similarly, the Principles for Responsible Investment (PRI), a UN-supported initiative with over 5,000 signatories, promotes ESG integration in investment decisions and is widely recognised (PRI, 2024). By promoting ESG awareness, providing training on green and SDG-linked bonds, and engaging in sustainable taxonomy development, UNEP FI and PRI have helped create the foundation for formal green bond frameworks.

Several green bond frameworks have emerged to help channel capital into sustainable projects. As of today, there is no single regulation at the global level; instead, various principles and recommendations are issued by different organisations. Table 3 presents a comparison of the EU Green Bond Standard (EU GBS), introduced in 2020, the Green Bond Principles (GBP) developed by the International Capital Market Association (ICMA), and the Climate Bonds Standard (CBS) introduced by the Climate Bonds Initiative (CBI) in 2010.

The EU Green Bond Standard (EU GBS) is the most closely tied to regulation. It was introduced under the European Green Deal Investment Plan and is built on the EU Taxonomy Regulation (Regulation 2020/852), which sets criteria for determining whether an activity is environmentally sustainable (TEG, 2019a; European Union, 2020). Initially voluntary, the EU GBS becomes binding from December 2024 for issuers using the official “European Green Bond” (EuGB) label, following the adoption of Regulation (EU) 2023/2631 (European

Union, 2023). In comparison, both the Green Bond Principles (GBP) and the Climate Bonds Standard (CBS) remain voluntary. The GBP, developed by ICMA, were first published in 2014 and are used globally (ICMA, 2021). CBS, introduced by CBI in 2010, functions as a certification scheme based on sector-specific thresholds (CBI, 2020).

Table 3

Comparison of EU GBS, GBP, and CBS frameworks

Aspect	EU Green Bond Standard	Green Bond Principles	Climate Bonds Standard
Type of framework	Legally binding in EU from Dec 2024 for EuGB label	Voluntary global guidelines	Voluntary certification scheme
Use of proceeds	Must align with EU Taxonomy	Flexible; fund green projects, no binding taxonomy	Projects in approved sectors (e.g. energy, water), with clear thresholds
Verification	Mandatory pre- and post-issuance by registered reviewers	External review or second-party opinion is recommended	Mandatory pre- and post-issuance assurance by approved verifiers
Reporting requirements	Allocation (annual until full allocation) and impact reports (at least once); both must be available until maturity	Annual reporting encouraged, format flexible	Annual reporting and updated verification 12–24 months after issuance
Target users	EU-based or EU-focused issuers. Harmonised framework across Member States	Public and private issuers globally; most widely used standard	Global issuers, best for high-emission sectors seeking science-based certification

Source: compiled by the author based on TEG (2019a; 2020), European Union (2020; 2023), ICMA (2015; 2021), CBI (2017; 2021).

The EU GBS requires proceeds to fund projects that contribute to at least one of six environmental objectives, do no significant harm to others, and meet social safeguards (European Union, 2020). This ensures environmental and social alignment. CBS also applies clear limits. Projects must fall within approved sectors like energy, transport, or water and meet performance thresholds under the Climate Bonds Taxonomy (CBI, 2021). Issuers are also required to establish a Green Bond Framework detailing how the bond meets CBS criteria. This framework must align with the Green Bond Principles (GBP), covering essential elements like use of proceeds, project selection, proceeds management, and reporting (Hyun et al., 2019). In contrast, the GBP offer more flexibility. They recommend proceeds support environmental projects but don't require alignment with any taxonomy or technical criteria (ICMA, 2021). This makes them broadly accessible but less prescriptive.

Verification requirements differ across frameworks. The EU GBS mandates both pre-issuance review of the Green Bond Framework and post-issuance verification of the Final Allocation Report, conducted by registered external reviewers. Impact report verification is optional but encouraged. (TEG, 2020, p. 25) CBS is similarly strict, requiring pre- and post-issuance assurance by approved verifiers (CBI, 2017). GBP does not require verification but recommends external review or a second-party opinion to strengthen investor confidence (ICMA, 2015; 2021). As a result, EU GBS and CBS treat verification as essential, while GBP leaves it optional. All three frameworks emphasise transparency, though expectations vary. EU GBS requires annual allocation reports until full allocation or CapEx completion, and an impact report at least once, with both to be made publicly available until maturity. Allocation reports must show alignment with the Taxonomy, including sectoral and regional use of funds. Impact reports should include targets, metrics, and methodology. (TEG, 2020, p. 24-25) CBS also requires annual reporting and post-issuance verification within 12–24 months to confirm continued compliance (CBI, 2017). GBP supports transparency but is more flexible. It recommends annual reports but allows issuers to decide on frequency and detail (ICMA, 2021). EU GBS targets EU-based issuers or those seeking access to European capital markets. Regulation (EU) 2023/2631 establishes a harmonised legal framework across Member States (European Union, 2023). The GBP are used globally by public and private issuers and are the most widely adopted standard (ICMA, 2021). CBS also has international reach but is particularly suited for high-emission sectors and issuers seeking science-based certification (CBI, 2021).

As of 2022, the GBP had become the de facto standard in Europe, with nearly 100% of green bonds issued under its principles, often in combination with a second-party opinion (Brückbauer et al., 2023). In contrast, CBS certification peaked in 2018 and has since declined, with most EU bonds informally aligned to its taxonomy but only a few fully certified. The EU GBS offers the strongest regulatory alignment but faces barriers to uptake due to its procedural burden. Consequently, many opt for GBP frameworks verified by SPOs, used in 93% of reviewed EU green bond issuances, offering high credibility and potential pricing benefits without the full rigidity of EU GBS requirements. (Brückbauer et al., 2023)

Overall, a key distinction is in the mandatory nature of external review and verification. The EU GBs requires both pre-issuance and post-issuance verification, and mandates allocation and impact reports to be published and available until maturity. CBS also mandates assurance by approved verifiers. In contrast, the GBP treat external reviews as optional, though encouraged.

1.3. Challenges of green bond issuance – empirical studies overview

The author conducted a structured review of empirical studies on green bond issuance to establish the research gap. This review aimed to assess how prior research was designed, what key challenges were identified, and which areas remained underexplored. The literature search was carried out using academic databases and filtered by keywords such as *green bonds*, *issuance barriers*, *success factors*, and *ESG determinants*. The findings from this review are summarised in Appendix A: *Key studies on green bond issuance*, which provides an overview of each study's main idea, geographical scope, methodology, and key findings.

Determinants of green bond issuance were explored across the European Union, particularly between 2014 and 2019 (Dan & Tiron-Tudor, 2021). In the context of corporate market, firm-level factors were analysed within Europe (Cicchiello et al., 2022). Lithuania's specific challenges and success factors were explored in a national-level study (Buzinske & Stankeviciene, 2023). Issuance dynamics in the Baltic region, especially post-COVID, have also received attention (Tocelovska & Jekabsone, 2024; Tocelovska et al., 2023). Globally, research covered both emerging and developed markets (Chiesa & Barua, 2019; Baldi & Pandimiglio, 2022), while country-specific studies focused on China and Vietnam (Wang & Wang, 2022; Nguyen et al., 2024).

Methodologies varied significantly. Linear regression examined macroeconomic, ESG, and credit rating data in the European Union (Dan & Tiron-Tudor, 2021), while logit regression analysed firm-level governance factors in Europe (Cicchiello et al., 2022). Ordinary Least Squares regression assessed global issuance trends (Chiesa & Barua, 2019). Analytical Hierarchy Process ranked success and challenge factors in Lithuania (Buzinske & Stankeviciene, 2023). In the Baltics, panel regression, probit analysis, and qualitative surveys were combined to analyse corporate bond issuance (Tocelovska & Jekabsone, 2024; Tocelovska et al., 2023). Corporate board dynamics and environmental performance post-issuance were investigated using logit models and difference-in-difference analysis (García et al., 2023). Probit and OLS regression models explored ESG performance and governance characteristics in China using Wind and CSMAR databases (Wang & Wang, 2022), while advanced multi-criteria techniques such as Fuzzy Delphi identified barriers in Vietnam (Nguyen et al., 2024).

The studies identify important drivers and barriers to green bond issuance. In the EU, ESG scores and sovereign ratings were significant predictors of issuance size, alongside macroeconomic variables such as population and inflation (Dan & Tiron-Tudor, 2021; Chiesa & Barua, 2019). In Lithuania, issuer reputation and credit ratings were key success factors, while greenwashing and high costs were prominent challenges (Buzinske & Stankeviciene, 2023). Greenwashing risks were notable among firms with lower initial environmental performance, although this is primarily an inferred risk based on post-issuance behaviour (García et al., 2023). Board size and gender diversity played a role in issuance in Europe, while in China, independent directors and ESG performance had positive effects (Cicchiello et al., 2022; Wang & Wang, 2022). In Vietnam, key barriers included weak regulation, limited investor confidence, and capacity constraints (Nguyen et al., 2024). Policy reform and market-specific regulation were seen as essential to increase issuance (Chiesa & Barua, 2019). Table 4 outlines key green bond issuance challenges and their implications for issuers.

Table 4

Challenges of green bond issuance

Challenge	Implication for issuer	Sources
Cost-related Barriers	High costs of issuance, certification, and compliance make green bonds less competitive.	Bužinskė & Stankevičienė (2023), Cicchiello et al. (2022), Tocelovska & Jekabsone (2024), Baldi & Pandimiglio (2022), García et al. (2023), Nguyen et al. (2024), Tocelovska et al. (2023)
Regulatory barriers	Fragmented regulations and lack of global standards undermine market transparency and accessibility.	Dan & Tiron-Tudor (2021), Nguyen et al. (2024), Bužinskė & Stankevičienė (2023), García et al. (2023), Tocelovska et al. (2023)
Low credit rating	Low rating limits access to international markets and reduces investor confidence.	Bužinskė & Stankevičienė (2023), Dan & Tiron-Tudor (2021), Chiesa & Barua (2019), Tocelovska et al. (2023)
Low ESG score	Low ESG score reduces the attractiveness of green bonds by failing to meet sustainability criteria.	Bužinskė & Stankevičienė (2023), Dan & Tiron-Tudor (2021), Baldi & Pandimiglio (2022), Wang & Wang (2022)
Greenwashing	Greenwashing undermines trust in green bonds, creating scepticism about their environmental impact.	Bužinskė & Stankevičienė (2023), Baldi & Pandimiglio (2022), García et al. (2023)
Small issuance size	Smaller issuance sizes reduce their appeal to institutional investors.	Dan & Tiron-Tudor (2021), Bužinskė & Stankevičienė (2023), Tocelovska & Jekabsone (2024)
Insufficient public awareness	Lack of awareness among investors and the public limits participation in green bonds.	Bužinskė & Stankevičienė (2023), Tocelovska & Jekabsone, (2024), Nguyen et al. (2024)
Leverage	High leverage reduces issuers' flexibility to issue additional debt, limiting green bond capacity.	Chiesa & Barua (2019), Cicchiello et al. (2022), Wang & Wang, 2022

Source: compiled by the author

High costs associated with issuing, certifying, and complying with green bond standards pose significant challenges, especially for smaller issuers and SMEs. These costs, which include documentation, registration, certification, and compliance, make green bonds less competitive compared to conventional bonds (García et al., 2023). Certification expenses discourage smaller issuers, while fixed and legal costs disproportionately burden SMEs, further limiting their participation (Tocelovska et al., 2023). These barriers are consistently highlighted in research, including by Bužinskė & Stankevičienė (2023), Cicchiello et al. (2022), and Nguyen et al. (2024).

Fragmented regulations further limit market transparency and accessibility, reducing investor confidence. Efforts to establish unified taxonomies and address weak regulatory frameworks remain insufficient, particularly in developing countries (Dan & Tiron-Tudor, 2021; Nguyen et al., 2024). Calls for standardized global frameworks emphasise the need to improve market accessibility and transparency, as noted by Bužinskė & Stankevičienė (2023) and García et al. (2023). Low credit ratings present another significant challenge, restricting access to international markets and diminishing investor confidence. Good credit ratings are crucial for successful issuance, as they enhance credibility and attract international investors (Bužinskė & Stankevičienė, 2023; Tocelovska et al., 2023). However, issuers in countries with weaker sovereign ratings, particularly in emerging markets, face greater struggles in securing funding (Dan & Tiron-Tudor, 2021, Chiesa & Barua, 2019). A low ESG score also discourage investors by failing to meet sustainability criteria. ESG performance plays a critical role in attracting investment, with strong ESG scores positively associated with green bond issuance (Dan & Tiron-Tudor, 2021; Bužinskė & Stankevičienė, 2023). In contrast, insufficient ESG credentials reduce green bonds' attractiveness, as confirmed by Baldi & Pandimiglio (2022) and Wang & Wang (2022).

Greenwashing, whether perceived or real, undermines trust in green bonds and reduces investor confidence. While some argue that green bonds do not always result in real environmental improvements, García et al. (2023) found that issuers often demonstrate strong environmental performance prior to issuance. This scepticism about environmental claims further affects the market's credibility (Bužinskė & Stankevičienė, 2023, Baldi & Pandimiglio, 2022). Smaller issuance sizes, often between EUR 5-10 million, reduce green bonds' appeal to institutional investors due to limited liquidity and participation. This challenge is especially pronounced in smaller markets such as the Baltics (Tocelovska & Jekabsone, 2024; Dan & Tiron-Tudor, 2021; Bužinskė & Stankevičienė, 2023). A lack of public awareness further prevents the growth of green bonds. Limited knowledge among the public and investors limits participation, undermining confidence and broader adoption (Nguyen et al., 2024; Bužinskė & Stankevičienė, 2023). Finally, high levels of leverage restrict issuers' ability to raise additional funds through green bonds. Firms with high debt-to-capital ratios face reduced flexibility, making it more difficult to expand their financing capacity (Chiesa & Barua, 2019; Cicchiello et al., 2022). This constraint limits their ability to participate effectively in the green bond market.

The reviewed studies identify several recurring barriers to green bond issuance. These include high costs of issuance and certification, fragmented or underdeveloped regulatory frameworks, and low credit ratings or ESG scores. Greenwashing risks reduce investor confidence, while small issuance sizes and limited public awareness further constrain market growth, especially in smaller or emerging economies. High leverage also limits issuers' financial flexibility to raise additional green debt. Chapter 1 provides an overview of the green bond market within the broader context of sustainable finance. Subchapter 1.1 introduces green bonds as fixed-income instruments used to fund environmentally beneficial projects. It traces their evolution, outlines different types, and compares them with conventional bonds. Subchapter 1.2 reviews the main regulatory frameworks, such as EU Green Bond Standard, Green Bond Principles (GBP), and Climate Bonds Standard (CBS), and compares their requirements for use of proceeds, verification, reporting, and target users. Subchapter 1.3 identifies key challenges faced by green bond issuers in empirical studies, including cost-related barriers, regulatory barriers, low credit rating and ESG score, greenwashing risks, small issuance size, insufficient public awareness, and leverage.

2. The study of challenges faced by Baltic corporate green bond issuers

2.1. Data and methodology

This subchapter first provides an overview of the data and then introduces the methodology used to examine green bond issuance by Baltic companies. Table 5 presents an overview of corporate green bonds listed on the Nasdaq Baltic Bond List. The table compares issuers based on country of origin, sector, issue value, and their share in weighted total green bond issuance. These bonds reflect the growing importance of green finance and sustainability in the Baltics. Issue values refer to the total nominal amounts issued under each ISIN, including additional tranches or tap offerings. Only corporate green bonds are included in the dataset. Sovereign bonds and conventional corporate debt instruments are not covered in this analysis. Weighted total green bond issuance is calculated as a proportion of the total green corporate bond issuance volume in the Baltics as of May 2025.

Table 5

List of sustainable corporate bond issuers in the Baltics and their share in weighted total green bond issuance

Issuer and year of issue	ISIN	Country	Sector	Coupon rate (%)	Maturity date	Issue value (mil. EUR)	Weighted total green bond issuance (%)
AB "Ignitis Grupė" (2017)	XS1646530565	Lithuania	Renewable Energy	2	14.07.2027	300	24.62
AB "Ignitis Grupė" (2018)	XS1853999313	Lithuania	Renewable Energy	1.875	10.07.2028	300	24.62
AS “Augstsprieguma tīkls” (2021)	LV0000802528	Latvia	Energy Transmission	0.5	20.01.2027	100	8.21
AS „Latvenergo” (2022)	LV0000870129	Latvia	Energy Generation	2.42	05.05.2027	100	8.21
AS „Latvenergo” (2015)	LV0000801777	Latvia	Energy Generation	1.9	10.06.2022	100	8.21
UAB "Atsinaujinančios Energetikos Investicijos” (2022)	LT0000405938	Lithuania	Renewable Energy	5	14.12.2025	91.315	7.49
EPSO-G (2022)	LT0000406530	Lithuania	Energy Transmission	3.117	08.06.2027	75	6.15
AS „Latvenergo” (2021)	LV0000802460	Latvia	Energy Generation	0.5	17.05.2028	50	4.10
AS „Latvenergo” (2023)	LV0000802684	Latvia	Energy Generation	4.952	22.02.2029	50	4.10
AUGA group, AB (2019)	LT0000404238	Lithuania	Farming	6	17.12.2024	20	1.64
AS “Attīstības finanšu institūcija Altum” (2017)	LV0000802353	Latvia	Financial services	1.3	17.10.2024	20	1.64
AS "Liven" (2024)	EE3300004332	Estonia	Real Estate	10.5	23.05.2028	6.200	0.51
AS "Liven" (2025)	EE0000000354	Estonia	Real Estate	9	19.03.2029	6.200	0.51
Total	-	-	-	-	-	1218.715	100%

Source: compiled by the author based on data from Nasdaq

In terms of issue value, AB "Ignitis Grupė" stands out as the largest green bond issuer in the region, having issued two bonds worth €300 million each. In contrast, AS "Liven" issued the smallest bonds, each worth €6.2 million, aimed at supporting sustainable residential real estate development. The Baltic green bond market remains relatively small, with Latvia leading in the number of issuances - Latvenergo alone has issued four bonds. Lithuania, however, leads in total issue value, with Ignitis Grupė accounting for €600 million, nearly half of the region's total green corporate bond volume. Estonia is represented by just one issuer, Liven, which entered the market more recently, with bonds issued in 2024 and 2025. Most bonds are concentrated in energy-related sectors, particularly renewable energy and infrastructure. Ignitis Grupė and Atsinaujinančios Energetikos Investicijos (AEI) focus on renewable energy generation, while Augstsprieguma tīkls and EPSO-G operate in electricity transmission. Meanwhile, AUGA group and Altum represent the use of green bonds in farming and financial services, respectively, illustrating the cross-sector relevance of green finance.

The bonds were listed between 2015 and 2025, showcasing a decade of green market development in the Baltics. Early entries by Ignitis Grupė and Altum reflect their early involvement in the market, while more recent issues from Latvenergo (2023) and Liven (2024–2025) indicate continued growth. Maturity periods typically range from 2025 to 2029, with shorter-term bonds (such as AEI's) reflecting faster project cycles, and longer-term bonds (like those issued by Ignitis and Latvenergo) aligned with capital-intensive infrastructure investments. Ignitis Group has financed projects such as wind power parks in Estonia and Lithuania, the Pomerania Wind Farm in Poland, the Vilnius and Kaunas CHP plants, and the renewal of ESO's electricity distribution network (Ignitis grupė, n.d.). Latvenergo's projects include the reconstruction of hydropower plants, improvements to the electric distribution grid, and biodiversity conservation initiatives (Latvenergo, n.d.). In contrast, AEI has financed onshore wind and solar PV parks in Lithuania and Poland, including a wind park in Rokiškis and solar parks at various development stages (Lords LB Asset Management, n.d.). Lower coupon rates (e.g. 0.5–2%) usually reflect investment-grade stability and are often associated with institutional investors. In contrast, higher rates (such as Liven's 10.5%) suggest a higher perceived risk and are more commonly aimed at retail investors seeking greater yields. Overall, the data presented in Table 5 forms the basis for selecting companies for the qualitative analysis. This ensures that the study captures a representative range of challenges across sectors, issuance years, and Baltic countries.

The empirical part of this study relies on a qualitative research approach and aims to shed light on the challenges of green bond issuance faced by Baltic companies. The analysis is based on semi-structured interviews conducted with both company representatives and arrangers involved in structuring and facilitating green bond issuances (see definition of "arranger" below). The methodological approach builds on the findings of prior empirical studies reviewed in Subchapter 1.3. It aligns particularly with the works of Bužinskė & Stankevičienė (2023) and Tocelovska and Jekabsone (2024). Bužinskė & Stankevičienė applied expert surveys and the Analytical Hierarchy Process (AHP) to prioritise success and challenge factors in green bond issuance, focusing on Lithuania. Tocelovska and Jekabsone, on the other hand, employed surveys and interviews with corporate bond issuers across the Baltic region. This study expands on those approaches by conducting qualitative interviews focused specifically on issuer-side challenges, where limited publicly available data exist. The methodological approach is outlined in Figure 2.

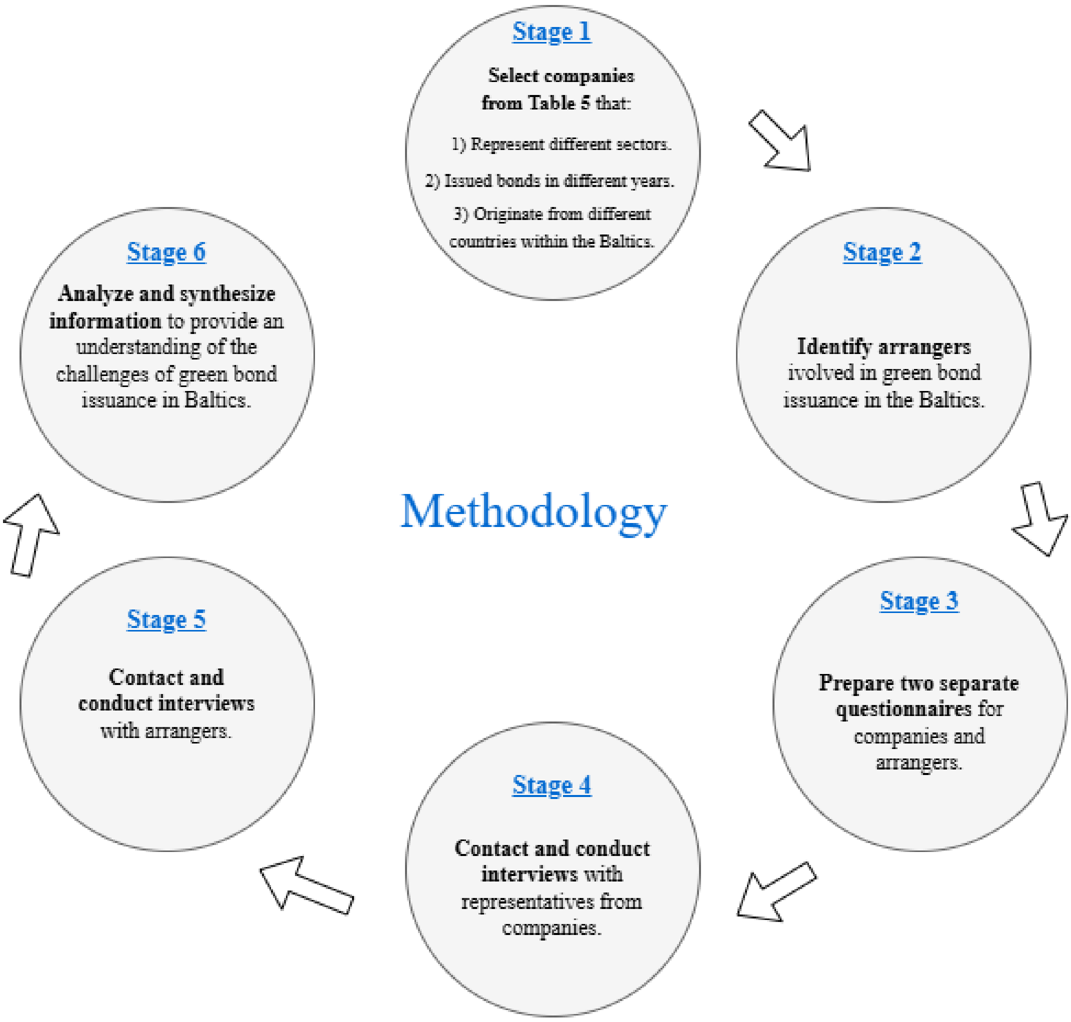

Figure 2. Research process for the empirical analysis

Source: compiled by the author

It involves a six-stage process, beginning with the selection of companies from Table 5 and the conduction of interviews with their representatives to explore the challenges associated with green bond issuance in the Baltics.

Companies were selected based on the following criteria: representation of different sectors, issuance years (from 2017 to 2025), and all three Baltic countries. This diversity ensured an intercultural, cross-sectoral perspective over time. To gain a broader perspective on the issuance process and to observe the challenges of companies from multiple viewpoints, arrangers involved in structuring green bond issuance were identified and invited for interviews. According to Nordea (2019), in the context of bond issuance, the arranger or bookrunner is the bank selected by the issuer to manage the placement of the bond. This role typically includes managing the investor order book, determining bond allocations, advising on documentation in collaboration with legal advisors, and organising investor roadshows. In larger transactions, multiple institutions may serve as joint bookrunners, sharing these responsibilities. (Nordea, 2019) For simplicity, the term “arranger” is used throughout this thesis to refer to institutions fulfilling these functions. Including financial institutions in the interviews allowed the study to capture issuer challenges from the arranger’s point of view.

Prior to the interviews, two separate semi-structured questionnaires were developed based on the findings of empirical studies reviewed in subchapter 1.3, which highlighted the main aspects of green bond issuance challenges. One set of interview questions was tailored for company representatives, such as CEOs, ESG managers, and sustainability managers, and another specifically designed for arrangers. For companies, the questions were grouped into key themes: general perception, financial barriers, regulatory barriers, market perception and ratings, greenwashing concerns, issuance size and public awareness, financial constraints and leverage, and future outlook and policy. These topics aimed to capture both internal and external factors influencing companies’ experiences with issuing green bonds. For arrangers, the questionnaire followed a similar thematic structure: institutional role and issuer fit, internal limits and risk controls, building market trust, placement and financial barriers, and policy, support and market outlook. This approach enabled the study to explore both perspectives on issuer challenges. The full list of questions is presented in Appendix B.

Once the interview questions were finalised, representatives of the selected companies and arrangers were contacted and invited to participate. In total, seven companies were contacted, and interviews were successfully conducted with three of them from Table 5. Additionally, three arranger interviews were conducted. Details about each interview, such as entity, date, format, duration, and transcript length, are presented in Table 6.

Table 6

The list of interviews conducted

Entity	Date	Duration	Format and platform	Pages transcription
Liven	20.02.2025	40:34 min	Online, MS Teams	14 pages
UAB Atsinaujinančios Energetikos Investicijos	21.03.2025	59:17 min	Online, MS Teams	19 pages
Arranger “X”	31.03.2025	57:36 min	Online, MS Teams	13 pages
AS “Attīstības finanšu institūcija Altum”	04.04.2025	1:11:32 min	Online, MS Teams	20 pages
Arranger LHV	15.04.2025	42:38 min	Online, MS Teams	11 pages
Arranger SEB	16.04.2025	1:09:32 min	Online, MS Teams	16 pages

Source: compiled by the author based on interviews conducted

To transcribe the interviews the Notta platform was used. Each transcript was manually checked against the original audio recordings to ensure accuracy. In total, the interviews generated 93 pages of transcription, corresponding to 339.89 minutes (5.66 hours) of discussion.

The interviews were conducted with representatives from the following three Baltic companies: Liven (Estonia), UAB "Atsinaujinančios Energetikos Investicijos” (Lithuania), and AS “Attīstības finanšu institūcija Altum” (Latvia). These companies were selected because they operate in different sectors, issued green bonds in different years, and represent all three Baltic countries. Interviews were also held with financial institutions familiar with the Baltic green bond market, including SEB and LHV Bank. One additional institution requested anonymity and is referred to throughout the thesis as arranger “X.” All company participants responded to a core set of 19 predetermined questions, supplemented by additional questions that arose during the discussion. Due to the specific nature of the participant pool and their limited availability, a pilot interview was not conducted. Additionally, three arrangers responded to a set of 21 predetermined questions, with follow-up questions asked during the interviews where appropriate.

Following the interviews, the data were analysed and synthesised using thematic analysis to identify patterns in qualitative data through coding. The Figure 3 outlines the key stages of thematic analysis. This approach aims to provide a structured understanding of the challenges faced by Baltic companies in issuing green bonds.

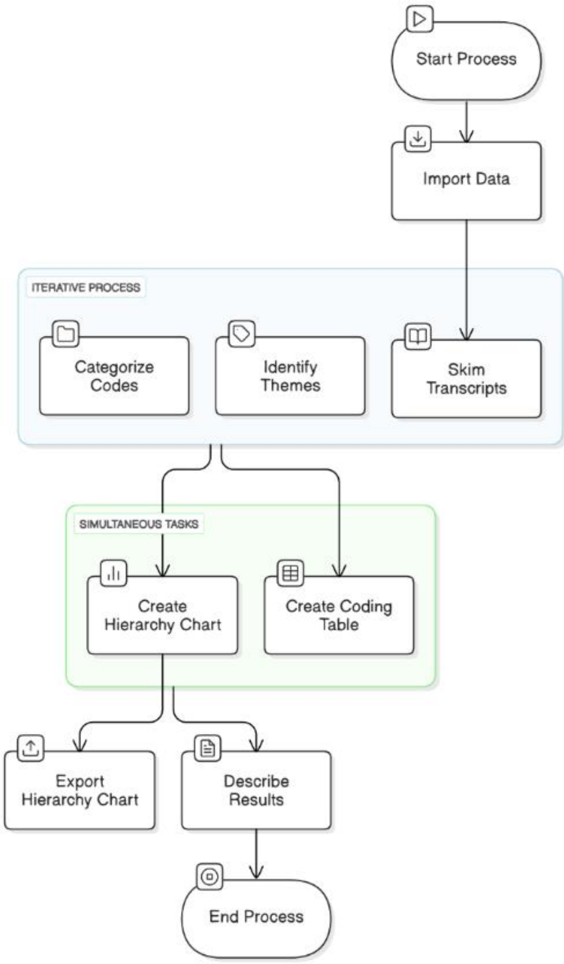

Figure 3. Thematic analysis process

Source: compiled by the author

The process began with importing the interview transcripts into the qualitative analysis software NVivo and skimming through the content. This was followed by iterative coding and theme development. A hierarchy chart and coding table were then created to structure the data. Finally, the results were described and interpreted.

Despite the study's rigorous methodological approach and reliable data sources, several limitations should be acknowledged. One major limitation is the relatively small sample size of interviewed companies and financial institutions. While efforts were made to include more respondents from different countries, the availability and willingness of people to participate in interviews posed a constraint. However, the interviews captured a diverse range of challenges across sectors, timelines, and all three Baltic countries from both company and arranger perspectives, and the author believes that the saturation point was reached.

Additionally, while the study focuses on challenges in green bond issuance, it does not cover the post-issuance performance or long-term environmental impact of the bonds. Future research could expand the scope to include these aspects for a more comprehensive understanding of green finance in the region. Moreover, as this study captures challenges from company's side, the future research could shed the light on the challenges of arrangers and to look on the challenges of companies and arrangers under comparative lens. Another limitation relates to the confidentiality of certain financial and strategic information shared during interviews. While interviewees provided valuable insights, some details may have been withheld due to confidentiality concerns, potentially limiting the depth of the analysis.

Ethical considerations were fundamental to ensuring the integrity and confidentiality of the research process. Interviewees provided explicit consent to participate and be recorded during interviews, with the exception of arranger "X," who requested not to be recorded and not to be quoted directly. Thus, during the interview detailed notes were taken for each question that allowed to reflect arrangers' perspective for each theme in the analysis. To uphold confidentiality, personal data, including names, specific job titles, and sensitive company-related details, have been anonymized in the study. Some participants explicitly permitted the use of their name and job title. These include company representatives such as Andero Laur, CEO of Liven; Elīna Salava, Advisor to the Management Board on Finance and Head of Sustainability and Bonds Issue at Altum; and Silver Kalmus, Debt Securities Area Manager and Head of the Green Bond Working Committee at LHV Bank.

All recorded interviews and transcripts were securely stored on a password-protected personal device to prevent unauthorized access. Additionally, the transcriptions were manually verified to ensure accuracy. In accordance with ethical research practices, all data (including recordings and transcripts) will be permanently deleted upon completion of the study to protect participant privacy. By adhering to these ethical standards, the research ensures transparency, confidentiality, and respect for the participants while providing valuable insights into the challenges of green bond issuance in the Baltic region.

To sum up, this subchapter has provided an overview of the data and methodology used to explore the challenges faced by Baltic companies in issuing green bonds. It introduced the structure of the regional green bond market, explained how interview participants were selected, and described the steps taken to analyse the data using thematic analysis. By including both company and arranger perspectives, the study offers a more comprehensive view of the challenges of the green bond issuance process in the Baltics.

2.2. Common challenges in the Baltic green bond market - results of interviews

This subchapter presents the main challenges identified through semi-structured interviews with representatives from three Baltic green bond issuers and three financial institutions active in the Baltics. The results of the thematic analysis are presented in Table 7. The table shows the common challenges in the Baltic green bond market.

This table outlines the four main themes that emerged from the interview data, along with their associated codes and broader categories. The themes were developed based on patterns observed across interviews with companies and financial institutions. The codes capture specific challenges mentioned by respondents, while the categories group these challenges into more general patterns. The themes, codes, and categories provide a structured basis for the interpretation of findings.

Table 7

Coding results: Common challenges in the Baltic green bond market

Themes (pre-coding)	Codes	Categories (patterns of codes)
1. Internal expertise gaps and advisory limitations	• Lack of internal ESG expertise	Internal expertise gaps
	• Overreliance on external advisors • Advisors lack issuer-specific understanding	External advisory dependence
	• Zero track record	Lack of ESG track record
2. Regulatory uncertainty	• Lack of technical guidance • Terminology gaps • Risk of regulatory overload	Underdeveloped frameworks
3. Limited investor base in Baltics	• Narrow investor base • Limited foreign interest	Limited market access
4. Geopolitical and political risk	• Regional risk premium • Shorter maturity preference	Geopolitical risk
	• Investor confidence risk	Political risk

Source: compiled by the author

Theme 1: Internal expertise gaps and advisory limitations. All companies shared a similar concern about the lack of internal expertise that may arise when preparing to issue green bonds. Elīna Salava, Advisor to the Management Board on Finance and Head of Sustainability and Bonds Issue at Altum, noted: "*It takes time and internal resource to do all* *this",* referring to the preparation of the green bond framework and supporting documentation. *"It's much more challenging than the financial burden, because companies usually don't have the necessary expertise or a professional team in place. You're spending a lot, and without a professional team, you just can't get it done*" (personal communication, 4 April 2025). The AEI representative similarly admitted: "*We didn't have a lot of experience in something like ESG reporting and so on... we had to hire additional advisors to write specific ESG policies*" (personal communication, 21 March 2025). Debt Securities Area Manager and Head of the Green Bond Working Committee at LHV Bank, Silver Kalmus, confirmed: "*Larger companies normally have some sort of sustainability expert or ESG expert, but in smaller and medium-sized companies it's a treasury department or the chief financial officer who is in charge of ESG aspects as well, and that means that they are not really knowledgeable*" (personal communication, 15 April 2025).

The arranger "X" also stressed that companies often underestimate the time and internal human resources required to prepare proper ESG frameworks. The process may demand organisational changes (e.g., additional structural or matrix-type units may need to be established). In such cases, the arranger must also spend time providing the necessary information and training. When additional human resources are allocated, green structuring may be done in parallel with the bond origination process flow, while with the same resources, the green structuring flow may require up to four additional weeks (interview, March 2025). The studies by Nguyen et al. (2024) and Tocelovska & Jekabsone (2024) acknowledge the lack of internal expertise as a potential barrier. However, this problem was not reflected as dominant in Section 1.3, Table 4 "Challenges of green bond issuance", as fewer authors identified it as a primary challenge.

CEO of Liven, Andero Laur, highlighted the importance of full involvement of the issuing company in the process and warned against over-reliance on external parties for framework structuring, as arrangers and advisors might lack specific understanding of the issuer's business (personal communication, 20 February 2025). Elīna Salava from Altum emphasised: "*If there is a weak team inside the issuer or potential issuer, nothing will happen... no matter how strong and good external advisors are. You have to change quite a lot of processes inside in order to enter the capital market. And when there is an external consultant, they're not in a position to change the mindset internally*" (personal communication, 4 April 2025). The arranger "X" further noted that companies understand their own business better than advisors do, and it is therefore the company's responsibility to evaluate whether the framework developed by external advisors is feasible, and to provide the full data necessary to assess whether it complies with the relevant requirements (interview, March 2025). It can also be stated that none of the articles in Section 1.3, Table 4 “Challenges of green bond issuance” directly discuss over-reliance on arrangers and advisors, or their lack of issuer-specific understanding, as an explicitly stated challenge within the green bond market.

Across nearly all interviews, respondents acknowledged that companies lacking a historical track record in sustainability reporting or strategy development may struggle to receive regulatory approval. The SEB representative noted: “*First of all, companies need to build a track record of sustainability... If a company’s financial policy has not existed before, now they have set it up, so there's zero track record, so that's not going to be a very strong assessment*” (personal communication, 16 April 2025). Similarly, the arranger “X” pointed out that issuers without a visible ESG history or public sustainability data are likely to face more scrutiny during due diligence and may be seen as riskier by both arrangers and investors (interview, March 2025). Several companies acknowledged that without strong ESG policies established early, it becomes significantly harder to secure credibility and meet issuance requirements later. Nguyen et al. (2024) is the only source from Section 1.3, Table 4 that specifically identifies "limited track record and performance data of green projects" as a barrier.

Overall, the interviews revealed that internal capacity gaps and over-dependence on external advisors remain underexplored in the literature but are perceived by issuers as critical challenges for successful green bond issuance.

Theme 2: Regulatory uncertainty. The second theme focuses on underdeveloped frameworks in the green bond issuance process. In particular, the lack of technical guidance was repeatedly mentioned as a source of confusion for issuers. The thoughts were shared regarding the European Green Bond Standard (EUGBS), noting that, as of April 2025, there is still no clear guidance on how the audit report on pre-issuance should be carried out. The arranger “X” confirmed that the EUGBS is still interpreted inconsistently across Europe, with only a few examples of issuance so far under the EUGB, pointing out that there's no universal set of rules for how the issuance should be treated and set up. In their view, this increases the risk that green bond frameworks may not meet second-party opinion providers’ expectations and may confuse investors (interview, March 2025).

Some interviewees described gaps in terminology as part of a broader issue of underdeveloped guidance. Difficulties in understanding what qualifies as a sustainable activity or what can be financed under the proceeds were still seen as a “grey area” within the new standard. The SEB representative warned that some lower-emission industries are not included in the taxonomy, meaning that companies in these sectors might be excluded from EU-labelled green bonds despite having sustainable practices. In their view, this could lead to lost opportunities for credible issuers and restrict market participation. Including industries that do not produce a lot of emissions, but which are still part of the circular economy or bioeconomy would help clarify the definitions of green activities for the market and allow more companies to be able to qualify and label bonds with “EU green bond label” (personal communication, 16 April 2025).

During the interviews, the author also tried to identify whether the process is seen as bureaucratic among issuers. While companies acknowledged that the first green bond issuance involves additional preparation and internal coordination, this was generally seen as a manageable, one-time effort rather than a significant challenge. Most noted that subsequent issuances (tranches) were faster and easier. However, some respondents expressed concern that continuous regulatory tightening could discourage green bond issuance. The CEO of Liven expressed concern that further regulation might deter companies from participating in the market, especially if the process becomes overly complex (personal communication, 20 February 2025).

Similar issues related to lack of technical guidance, unclear definitions, and regulatory burden are also raised in the literature (Nguyen et al., 2024; Bužinskė & Stankevičienė, 2023; Baldi & Pandimiglio, 2022; Tocelovska et al., 2023). In summary, while most issuers viewed the bureaucratic aspects as manageable, the lack of clear technical guidance and inconsistencies in the regulatory frameworks were seen as more critical concerns that could limit broader market participation.

Theme 3: Limited investor base in Baltics. The interviewees discussed the limitations of the Baltic capital market in terms of investor reach and diversity. The AEI representative noted: “*Specifically looking at the Baltics… the biggest issue is the number of investors you can approach… you have a small circle of investors compared to more of the Western European countries*” (personal communication, 21 March 2025). It was explained that the local institutional investor base, typically pension funds, insurance companies, and private funds, is relatively narrow. The arranger “X” confirmed that most Baltic bond placements remain domestic, with limited foreign interest, particularly after the war in Ukraine broke out. Cross-border placements are generally only feasible for significantly larger issuances, typically supported by international banks. Domestic issues rarely have a green label assigned (mainly due to issue size), while cross-border transactions may contain a green label, as it helps to attract larger international demand (and earn an extra fee for the arranger) (interview, March 2025).

The AEI representative also emphasised that attempts to market bonds internationally were hindered by scale-related thresholds: "*Some of the foreign investors do minimum €100 million tickets and don't want to own more than 20% of the whole issuance… so for that the company should be bigger in size*" (personal communication, 21 March 2025). Bužinskė and Stankevičienė (2023) also highlight the difficulty of attracting foreign investors due to the limited financial capacity of the local market. Similarly, Tocelovska et al. (2023) note that domestic placements target both institutional and retail investors, whereas international placements are aimed exclusively at institutional ones. Only about 10% of domestic placements are purchased by foreign investors, and high international issuance costs further limit broader access. The arranger "X" noted that international placements usually begin at €200–300 million, which is far beyond the scale of most domestic issuers. The low level of inflows and outflows of domestic pension funds, and such funds' access to international green bond issues, reduces pressure for domestic issuers to issue green bonds. As a result, green-labelled bonds are rarely placed locally. Institutional investors are eager to buy green-labelled bonds; however, they still prioritise structure and pricing over labels (interview, March 2025).

The SEB representative pointed out that local investors tend to follow a buy-and-hold strategy; after buying they hold the bonds until maturity. There is a very weak secondary market in the Baltics. This leads to a conclusion that the market is small and illiquid (personal communication, 16 April 2025). The same respondent suggested that foreign investors require high-volume issuances and are generally less interested in considering smaller deals from peripheral markets. Similarly, the SEB representative noted that large Eurobond issuances, typically higher issuance volumes targeting foreign investors, are rare in the region due to smaller size of issuers. Debt Securities Area Manager and Head of the Green Bond Working Committee at LHV Bank, Silver Kalmus, stated that the region's limited volume and liquidity may discourage international investment: "*For investors, there is a liquidity risk. If an international investor were to invest in the Baltics, they should understand that the Baltic market is not as liquid as markets in London or Frankfurt*" (personal communication, 15 April 2025).

Tocelovska and Jekabsone (2024) confirm that investor demand and liquidity remain key challenges in the Baltic bond market, particularly due to the concentration in pension funds and limited foreign access. Overall, the literature reflects similar constraints to those described by interviewees: small local markets, limited cross-border access, and structural barriers to foreign investor participation. However, this challenge was not strongly reflected in Section 1.3, Table 4 “Challenges of green bond issuance”, as most of the reviewed studies focused on regions such as China, Vietnam, or Western Europe, where a limited investor base and restricted cross-border access are not considered to be as significant as in the Baltic region.

Theme 4: Geopolitical and political risk. Interviewees identified geopolitical tensions and domestic political developments as key risks influencing green bond issuance in the Baltic region. Some companies noted that fears around the war in Ukraine had led some investors to withdraw entirely from the region. One of the companies reported that a risk premium of approximately 70 basis points is applied to Baltic issuers due to their geographical location.

Geopolitics also affects investor preferences. According to the AEI interviewee, retail investors tend to favour short-term instruments due to perceived uncertainty: “*Geopolitics plays a role in the maturity of the bonds that you're issuing… shorter is better for retail investors*” (personal communication, 21 March 2025). Institutional investors, such as pension funds, were seen to prefer longer maturities, but this depends on domestic political stability and regulatory certainty. If political decisions allow for sudden withdrawals, these institutions are less likely to hold long-term, illiquid assets. The arranger “X” confirmed that foreign investor appetite for Baltic bonds declined sharply after the full-scale war began in February 2022 and noted that sustainability labels alone are unlikely to increase demand under such conditions (interview, March 2025). Debt Securities Area Manager and Head of the Green Bond Working Committee at LHV Bank, Silver Kalmus, also acknowledged that liquidity in the local market remains low, and that geopolitical concerns affect both green and conventional bonds equally (personal communication, 15 April 2025).

Further risks were seen in domestic political decisions affecting investor behaviour. During the interviews, one of the examples pointed to pension reforms in Baltic countries, where sudden policy changes enabling early withdrawals led pension funds to shift from long-term instruments to short-term, low-risk assets. This not only affected green bond placements but also limited the availability of long-term capital in the domestic market. Another example was about changing international political sentiment, which may shift investor interest away from sustainability. Following recent elections in the United States, some global investors deprioritised green bonds altogether. These findings align with Tocelovska et al. (2023), who identify political stability as a key factor enabling both domestic and international bond issuance. Geopolitical risk is not always addressed directly in the literature reviewed and presented in Section 1.3, Table 4 “Challenges of green bond issuance”. However, “country risk” and institutional confidence remain important determinants for investors evaluating long-term commitments.

The sunburst chart in Figure 4 visualises the main common challenges in the Baltic green bond market, identified through interviews. Larger and darker areas indicate more frequent mentions across interviews, with the segment size reflecting the number of coding references (e.g., larger areas indicate a greater number of references related to a particular challenge). Colour intensity indicates how frequently a challenge was mentioned across interviews (e.g., darker shades represent more frequent mentions across respondents).

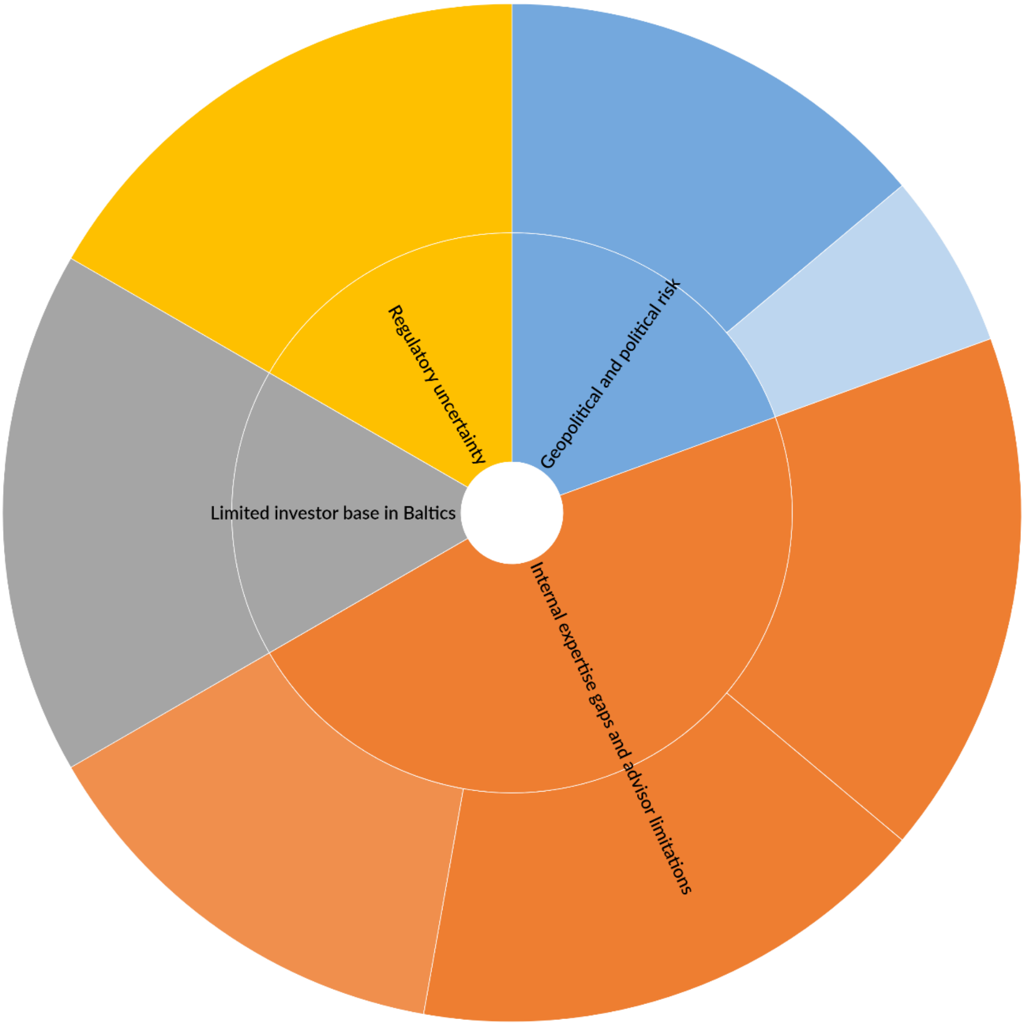

Figure 4. Distribution of common challenges in the Baltic green bond market
Source: compiled by the author in NVivo

The most prominent theme was internal expertise gaps and advisory limitations, particularly the categories internal expertise gaps (33 references, 6 interviews) and external advisory dependence (22 references, 6 interviews). Lack of ESG track record also appeared but was mentioned less frequently, with 11 references across 5 interviews. Underdeveloped frameworks was the most frequently coded category, mentioned 37 times across 6 interviews, highlighting issues such as missing guidance and unclear definitions. Limited investor base in Baltics and geopolitical risk were also widely discussed (22 and 15 references respectively). However, as shown in the chart, the geopolitical and political risk segment is less colour-intensive, as these issues appeared in 5 and 2 interviews respectively, but were still noted as relevant concerns by some respondents. Overall, the chart underscores that internal expertise gaps and underdeveloped frameworks remain the most critical barriers for green bond issuers.

2.3. Issuer-specific challenges - results of interviews

This subchapter presents a set of issuer-specific challenges that emerged from the interviews. Table 8 summarises challenges that depend on company size, market experience, or investor profile, and are therefore useful for understanding more specific barriers to green bond issuance in the Baltics. Many of these barriers are consistent with the literature (Section 1.3, Table 4), but offer a more practical view of green bond issuance in the Baltics.

Table 8

Coding results: Issuer-specific challenges

Themes (pre-coding)	Codes	Categories (patterns of codes)
1. Financial challenges	• Cost of issuance	Structural cost burden
	• High costs for small deals	Cost burden for small deals
	• Low interest in incentives	Incentive scepticism
2. Credit rating and pricing challenges	• Difficult access to ratings for small issuers • ESG scores are not widely used	Credit rating barriers and limited ESG relevance
	• Limited pricing benefit for green label	Limited pricing advantage
3. Greenwashing concerns	• Uncertainty in proceeds allocation	Greenwashing risk
4. Insufficient public awareness	• Lack of issuer/investor knowledge	Limited green bond understanding
5. Leverage	• Leverage restricts new issuances	Leverage limits

Source: compiled by the author

Theme 1: Financial challenges. Academic literature frequently identifies high issuance costs as a central obstacle to green bond market development (Cicchiello et al., 2022; Bužinskė & Stankevičienė, 2023; García et al., 2023; Nguyen et al., 2024). However, interviews with Baltic issuers and arrangers revealed a slightly different perspective. Companies acknowledged that issuing green bonds involves additional costs, such as legal documentation, second-party opinion, and ESG-related reporting, but generally described them as manageable. In fact, the AEI interviewee viewed green bonds as a cost-effective alternative compared with other financing methods, such as project loans: "*Debt capital market advisors usually charge anywhere from half a percent to 2% from the raised amount. On the legal side, fixed costs are paid - up to 50,000 euros for the prospectus. Compared to a 100-million-euro loan, where you'd pay 1.5 million upfront, issuing green bonds is much cheaper"* (personal communication, 21 March 2025).

Moreover, the first bond issue is more costly, but after that it's a 'rinse and repeat' process. Elīna Salava, Advisor to the Management Board on Finance and Head of Sustainability and Bonds Issue at Altum, explained: "*When you are doing the second issue, you spend 16 hours and around 2,000 euros. If you have a programme, you can tap the market whenever you want - say, within a year*" (personal communication, 4 April 2025).

Similarly, Elīna Salava also explained that costs become proportionally heavier for smaller transactions due to their fixed nature: "*If you're issuing €10 million, the cost per million is much higher than if you issue €19 million. This is especially relevant for smaller bond issuances. For larger issues, the costs are not so heavy comparing how big funding would be arranged and how*" (personal communication, 4 April 2025).

This point was supported by arrangers. Silver Kalmus from LHV Bank highlighted that maintaining a credit rating can cost around €100,000 annually, an expense that is bearable for larger companies, but burdensome for smaller issuers who may not return to the bond market (personal communication, 15 April 2025). The arranger "X" also noted that even if green bond frameworks are prepared free of charge by arrangers, fees for second-party opinions (starting from approximately €15,000) represent a substantial portion of the total issue cost in deals below €10 million (interview, March 2025). The SEB representative further explained that the overall cost structure, including NASDAQ listing, legal counsel fees, and bank mandate fees, makes smaller green bond issues less commercially viable unless there is sufficient volume: "*For five years, the tenor of the bond… the credit rating agency will cost half a million. You need volume for it to pay off*" (personal communication, 16 April 2025).

While the literature widely suggests that incentives could help mitigate financial barriers to green bond issuance, especially for smaller players (Nguyen et al., 2024; Tocelovska & Jekabsone, 2024), there were mixed thoughts among interviewees. Andero Laur from Liven questioned the idea of subsidies or tax breaks: "*A lot more companies would go for green bonds if there were tax incentives… but I don't think that will be good for the market at the end of the day*" (personal communication, 20 February 2025).

While general subsidies were met with scepticism, some interviewees supported more targeted, institutional incentives. Both AEI and LHV interviewees highlighted the role local development banks could play in boosting market participation.

"*If there's a commitment of 10% from local financial institutions… this would help increase the number of green bonds being issued*" (personal communication, 21 March 2025).

"*There should be local development banks promoting green bond issuance... probably some grants should be offered to companies as well. Moreover, if there is a public development bank that has the mandate to buy, let's say up to 10% of the green bond, it would tremendously boost the green bond market in the Baltics*" (personal communication, 15 April 2025).

In summary, unlike the dominant narrative in the literature, companies did not frame cost as a universal barrier. Larger and more experienced issuers viewed costs as manageable, but fixed fees disproportionately affect small and first-time issuers. Some remarks during the interviews suggested that Baltic issuers may benefit more from institutional support mechanisms, especially those that share the risk or reduce upfront issuance costs.

Theme 2: Credit rating and pricing. Low credit ratings were identified as a key barrier by multiple authors in the literature (Dan & Tiron-Tudor, 2021; Bužinskė & Stankevičienė, 2023; Tocelovska et al., 2023), particularly due to their limiting effect on investor access. In the Baltics, credit rating is considered an extremely important factor in both institutional investor access and bond pricing. Interviews revealed that a solid credit profile is often a prerequisite for institutional participation, particularly among pension funds, which adhere to strict investment mandates. As the AEI interviewee noted: "*Some of the institutional investors have a mandate that they cannot invest in low investment grade*" (personal communication, 21 March 2025).

However, obtaining a credit rating was seen as costly and often unfeasible for smaller issuers, as already discussed in Theme 1. As the CEO of Liven stated: "*We don't have a credit rating… our company is a little bit too small for that*" (personal communication, 20

February 2025).

While the literature suggests that green bonds may offer pricing benefits compared to conventional bonds (Zerbib, 2019; Maltais & Nykvist, 2020), interviewees repeatedly emphasised that any pricing advantage in the Baltics stems from investor demand, not from the green label alone. As Elīna Salava from Altum explained: "*It is not because the bond is green… it is because having a green label brings higher interest and oversubscription, which eventually leads to lower price*" (personal communication, 4 April 2025).

Other respondents supported this, saying that investor interest in green bonds is higher, but pricing differences are often negligible. Debt Securities Area Manager and Head of the Green Bond Working Committee at LHV Bank, Silver Kalmus, stated: "*There is usually a bigger demand for green bonds than for the conventional bonds, but the pricing benefit is not as visible as it should be*" (personal communication, 15 April 2025).

The key insight is that although the green label attracts a wider variety of investors, especially institutional investors, favourable terms are more likely to be awarded to well-rated issuers. As SEB interviewee summarised: "*Because of demand and supply, stronger demand results in better pricing… but credit rating still determines the floor*" (personal communication, 16 April 2025).

Although ESG scores are frequently cited in the literature as an important success factor for green bond issuance (Tudor, 2021; Bužinskė & Stankevičienė, 2023), their influence in the Baltic market appears limited. Interviewees explained that ESG scoring systems (such as Sustainalytics or S&P) are not widely used or understood, and their impact on investor behaviour remains marginal. The SEB representative noted: "*There's not that mature knowledge in the Baltics about ESG scores, and very few companies have ESG scores at all*" (personal communication, 16 April 2025).

In summary, a strong credit rating remains essential for attracting institutional investors and securing favourable pricing in the Baltics. While green bonds can help increase investor interest, they rarely result in better financing terms unless supported by solid financial fundamentals.

Theme 3: Greenwashing. Greenwashing, whether perceived or real, is frequently cited in the literature as a key risk to the credibility of green bonds, particularly when the use of proceeds is unclear or unverified (Baldi & Pandimiglio, 2022; García et al., 2023; Bužinskė & Stankevičienė, 2023). None of the interviewed companies reported facing accusations of greenwashing but recognised the reputational risk. The CEO of Liven noted that transparency is essential to maintaining investor trust: "*Using the money in the wrong* *way will lead to bad publicity. Reputational risk and inability to raise money from investors are bigger risks for most of the companies*" (personal communication, 20 February 2025).

To mitigate this, issuers relied on clear investor communication, external (third-party) audits, and public reporting. The AEI representative highlighted that annual audits help confirm that green bond proceeds are used as intended (personal communication, 21 March 2025). Elīna Salava from Altum added that even small project changes can raise questions from investors, underscoring the importance of consistent reporting (personal communication, 4 April 2025). Financial institutions such as SEB and LHV emphasised that reputational risks are best addressed through strict adherence to green bond guidelines and legal due diligence to assess the responsibility of the issuing company's leadership (personal communication, 15 April 2025; personal communication, 16 April 2025).

From the arranger's perspective, due diligence is conducted before issuance, as post-trade control is limited, especially if the issuer later switches banks. As arranger "X" explained, the risk mainly lies in how well internal procedures are set up in the company, since long-term monitoring is rarely feasible (interview, March 2025).

Arranger "X" also pointed to evolving definitions of what is considered "green". Growing market pressure to label products as sustainable could increase the risk of mislabelling, potentially leading to stricter regulation in the future (interview, March 2025).

Overall, greenwashing was seen as a reputational rather than regulatory threat. While considered a real concern, interviewees agreed that it can be effectively managed through transparency, audits, and credible frameworks. None of the interviewees were aware of any concrete greenwashing cases in the Baltics, though the risk was acknowledged.

Theme 4: Limited public awareness. Green bond awareness in the Baltics remains limited beyond institutional circles. Several interviewees described early efforts to explain the concept during investor meetings, especially with retail investors. As the CEO of Liven recalled: "*It was one question in every meeting… 'What are these green bonds? What does it mean?'*" (personal communication, 20 February 2025). While institutional investors were generally viewed as well-informed, companies noted that additional time and effort should be dedicated to educating the market, doing webinars and seminars for investors.

Financial institutions such as LHV and SEB noted that even companies themselves often need guidance on green finance expectations, frameworks, and timelines. Banks stressed the need for extensive preparation, not only in educating issuers, but also in navigating the capital markets calendar and developing action plans (personal communication, 15 April 2025; personal communication, 16 April 2025). As one interviewee noted, banks invest “a lot of time” in helping companies prepare to issue.

This challenge is well supported in the literature, where insufficient public awareness is identified as a key barrier to green bond development (Bužinskė & Stankevičienė, 2023; Tocelovska & Jekabsone, 2024; Nguyen et al., 2024). The interviews confirm that building broader awareness, particularly among retail investors and first-time issuers, remains critical for the long-term growth of the market.

Theme 5: Leverage. While interviewed companies did not describe leverage as a direct challenge, they recognised it as a key consideration in bond structuring. The CEO of Liven, Andero Laur, noted that maximum leverage thresholds were written into their bond terms, while the AEI representative described staying below 75% leverage at both fund and project levels to avoid triggering financial risks (personal communication, 20 February 2025; personal communication, 21 March 2025). Still, neither firm reported facing actual constraints.

In contrast, financial institutions treated high leverage as a hard boundary. Several arrangers confirmed that weak financials or excessive debt would disqualify companies from issuing bonds, regardless of their green credentials. As Silver Kalmus from LHV explained: “*Weak financials of the company can disqualify them from issuing green bonds, so high leverage, high debts that the company has can impact whether they issue or not. But this is the same for companies that are planning to issue non-green bonds*” (personal communication, 15 April 2025).

Overall, leverage was seen more as a screening tool for banks than a challenge faced by companies, yet it remains a firm barrier to green bond access for financially weaker issuers. This view is supported by the literature, which notes that high leverage reduces issuers’ flexibility to raise additional funds through green bonds, thereby limiting their participation in the market (Chiesa & Barua, 2019; Cicchiello et al., 2022; Wang & Wang, 2022).

The distribution of issuer-specific challenges in green bond issuance, as identified through qualitative coding, is presented in Figure 5. The sunburst chart visualises the relative weight of each theme, with the segment size reflecting the number of coding references (e.g., larger areas indicate a greater number of references related to a particular challenge). Colour intensity indicates how frequently a challenge was mentioned across interviews (e.g., darker shades represent more frequent mentions across respondents).

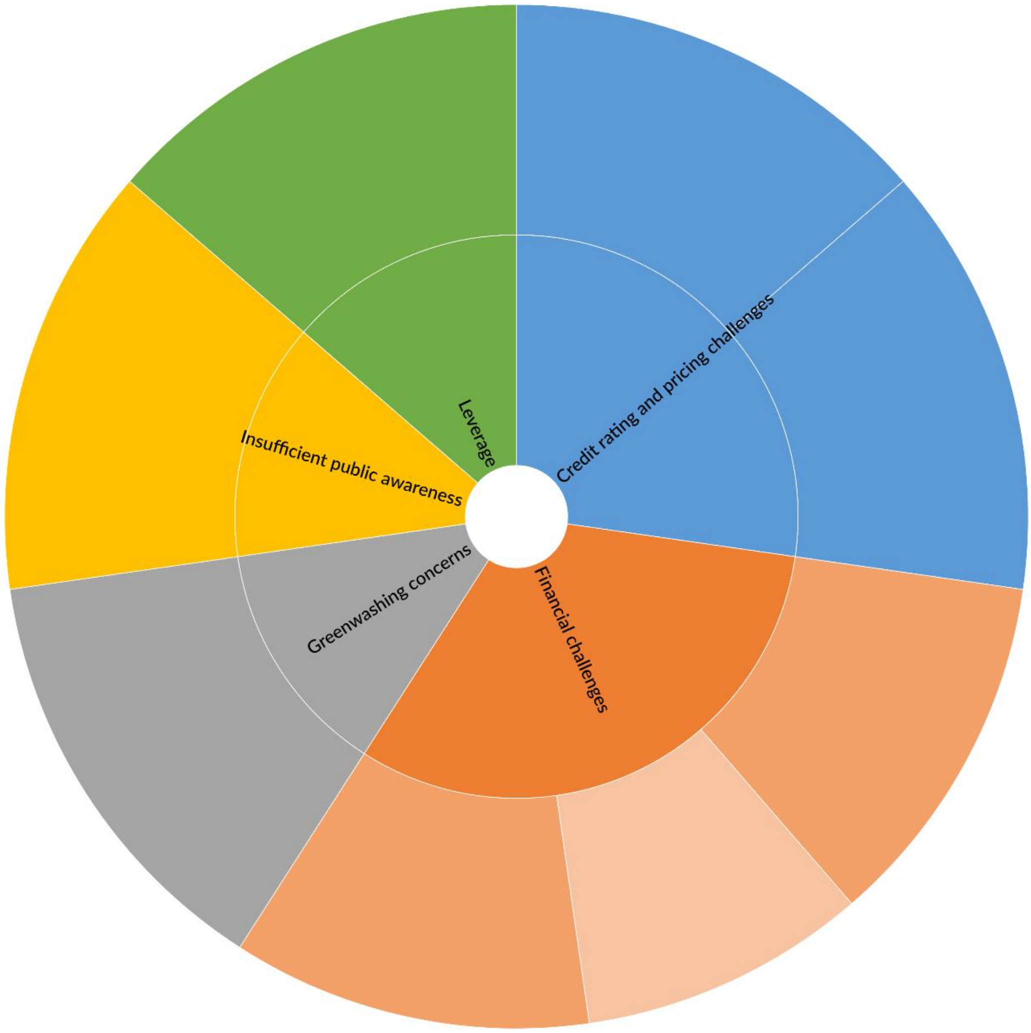

Figure 5. Distribution of issuer-specific challenges in green bond issuance
Source: compiled by the author in NVivo

Figure 5 shows that financial challenges emerged as the most prominent theme, especially structural cost burden (26 references, 5 items) and cost burden for small deals (22 references, 5 items). Larger issuers view costs as manageable, while smaller ones struggle with fixed fees. Incentive scepticism appeared less frequently (14 references, 4 items). Credit rating and pricing challenges were also widely discussed. Credit rating barriers and limited ESG relevance formed the most frequently mentioned category (33 references, 6 items), followed by limited pricing advantage (22 references, 6 items). Greenwashing concerns attracted considerable attention, with 25 references across 6 items, reflecting ongoing concerns about transparency and trust. Insufficient public awareness was mainly linked to limited green bond understanding (14 references, 6 items). Leverage limits were the least discussed, with 12 references across 6 items. As described, they were seen more as a screening tool for banks than a challenge faced by the interviewees.

This approach, however, has its limitations. In the case of Figure 4, the coding reference method was more effective, as it primarily reflects challenges raised directly in interviews. It also includes structural issues, such as geopolitical and political risk, which are broadly relevant to all companies, even if not mentioned by every respondent. In contrast, Figure 5 presents issuer-specific challenges, many of which are drawn from the academic literature. The author found it valuable to include these not only to highlight commonly discussed obstacles, but also to reflect on why certain literature-based challenges may be less applicable in the Baltic context. This introduces a key limitation: a higher number of coding references does not necessarily mean that interviewees viewed a challenge as more important. In some cases, the frequency of discussion was shaped by how the interviews were structured or by literature-driven assumptions, particularly for topics such as cost and credit rating, which appeared in multiple sections of the questionnaire.

As such, when interpreting the data in Subchapter 2.3, more weight should be placed on the context in which respondents explicitly expressed their views, rather than on the number of coded references alone. While the chart provides a helpful overview of how often certain issues were discussed, it does not fully capture how severe or important those challenges were perceived to be. Additionally, only successful issuers were interviewed, meaning that the perspectives of those who postponed or abandoned issuance are not represented. Lastly, due to the semi-structured format, not all interviewees responded to each question in the same depth, resulting in variation across cases. These limitations should be taken into account when interpreting the findings.

Overall, the interviews show that Baltic green bond issuers face a few common challenges. Underdeveloped frameworks was the most frequently coded category, mentioned 37 times across 6 interviews, highlighting issues such as missing guidance and unclear definitions. The most prominent theme was internal expertise gaps and advisory limitations, particularly the category internal expertise gaps (33 references, 6 interviews).

In addition, several issuer-specific challenges were discussed. These challenges were mainly drawn from the academic literature and highly company dependent. Financial challenges emerged as a prominent theme. Credit rating barriers and limited ESG relevance formed the most frequently mentioned category. Other issues, such as greenwashing, limited public awareness, and leverage, were acknowledged but generally viewed as of secondary importance.

Conclusion

Green finance instruments, particularly green bonds, have emerged as a vital tool in addressing global environmental challenges and fostering sustainable development. Green bonds are financial instruments used to fund projects and initiatives that provide environmental benefits, such as renewable energy, sustainable infrastructure, and climate-friendly technologies, while promoting broader sustainability goals and adhering to established standards for transparency. The academic focus on corporate green bond issuance in the Baltic region is limited.

The review of previous empirical studies examined the green bond market in the Baltics through a comparative lens, focusing on key obstacles. The thesis explored the challenges associated with issuing green bonds from the perspective of three Baltic companies and three arrangers. Companies were selected based on their sector, issuance year (2017-2024), and country of origin. Financial institutions familiar with the Baltic green bond market included SEB and LHV Bank. The analysis is based on semi-structured interviews with both company representatives and arrangers. Thematic analysis was used to identify patterns in qualitative data through coding.

The interviews revealed few common challenges faced by Baltic green bond issuers**.** The results identified internal expertise gaps and advisory limitations as the most prominent theme. External advisory dependence remains underexplored in the literature but was seen by issuers as a barrier to successful issuance. Underdeveloped frameworks was the most frequently coded category. Lack of technical guidance, terminology gaps, and risk of regulatory overload restrict the process of issuance in the Baltic region. Access to investors remained limited. The local institutional base was described as narrow, with cross-border placements hindered by issuance size, illiquidity, and geopolitical concerns. The war in Ukraine and domestic political reforms were said to have further reduced long-term investor confidence in the region.

The thesis also discusses issuer-specific challenges. These challenges were mainly drawn from the academic literature and highly company dependent. Financial challenges emerged as a prominent theme. Larger players viewed the process as manageable, while smaller ones struggle with fixed fees and rating expenses. Credit rating barriers and limited ESG relevance formed the most frequently mentioned category. Greenwashing risk was acknowledged, though no cases were reported. Transparency and proper reporting were viewed as essential to maintain trust. Leverage was the least coded, but financial institutions viewed it as a strict barrier for financially weaker issuers.

Nonetheless, certain limitations should be acknowledged. A higher number of coding references does not necessarily mean that interviewees viewed a challenge as more important, especially when it comes to subchapter 2.3. In some cases, the frequency of discussion was shaped by how the interviews were structured or by literature-driven assumptions, particularly for topics such as cost and credit rating, which appeared in multiple sections of the questionnaire. Moreover, all interviewees were involved in successful green bond issuance, which may exclude the perspectives of companies that faced difficulties or abandoned the process. The future research could expand the scope to include the post-issuance performance or long-term environmental impact of the green bonds for a more comprehensive understanding of green finance in the region. The future research could shed the light on the challenges of arrangers and to look at the challenges of companies and arrangers under comparative lens.

This research contributes to understanding how sustainability finance develops in emerging and peripheral EU markets such as the Baltics. It also offers practical insights for both policymakers and future issuers in the Baltic region. Overall, these findings suggest the need for better technical guidance, more targeted support for smaller issuers, and greater coordination between market actors to strengthen the local green bond ecosystem.

List of references

1. Aleksandrova-Zlatanska, S., & Kalcheva, D. Z. (2019). Alternatives for financing of municipal investments - green bonds. *Review of Economic and Business Studies*, *12*(1), 57–77. https://doi.org/10.1515/rebs-2019-0082
2. Alieva, I. A., & Altunina, V. V. (2021). Current trends in the development of a green finance system: Methodology and practice. *Baltic Region*, *13*(2), 64–89. https://doi.org/10.5922/2079-8555-2021-2-4
3. Baldi, F., & Pandimiglio, A. (2022). The role of ESG scoring and greenwashing risk in explaining the yields of green bonds: A conceptual framework and an econometric analysis. *Global Finance Journal*, *52*, 100711. https://doi.org/10.1016/j.gfj.2022.100711
4. Bonanno, T., & Brunelli, S. (2022). *Green bonds: European taxonomy alignment and correlation with pricing* [Master's thesis, Politecnico di Milano]. Retrieved from https://www.politesi.polimi.it/retrieve/de219e1d-0e4a-41b5-b3cf-b282c7d2c5e9/2022_12_Executive_Summary_Bonanno_Brunelli.pdf
5. Brückbauer, F., Cézanne, T., Kirschenmann, K., & Schröder, M. (2023). *Does the European Union need another Green Bond Standard?* ZEW – Leibniz Centre for European Economic Research. Retrieved from https://www.zew.de/en/publications/does-the-european-union-need-another-green-bond-standard/
6. Bukvić, I. B., Pekanov, D., & Crnković, B. (2023). Green bonds and carbon emissions. *Ekonomski Vjesnik*, *36*(1), 113–123. https://doi.org/10.51680/ev.36.1.9
7. Bužinskė, J., & Stankevičienė, J. (2023). Analysis of success factors, benefits, and challenges of issuing green bonds in Lithuania. *Economies*, *11*(5), 143. https://doi.org/10.3390/economies11050143
8. Chang, L., Taghizadeh-Hesary, F., Chen, H., & Mohsin, M. (2022). Do green bonds have environmental benefits? *Energy Economics, 115,* 106356. https://doi.org/10.1016/j.eneco.2022.106356
9. Chausteur, C. (2020). *Green bonds: How do green bonds perform when compared with conventional bonds?* [Master's thesis, Université catholique de Louvain]. DIAL.pr. https://hdl.handle.net/2078.1/thesis:25971
10. Chiesa, M., & Barua, S. (2019). The surge of impact borrowing: The magnitude and determinants of green bond supply and its heterogeneity across markets. *Journal of Sustainable Finance & Investment*, *9*(2), 138–161.

https://doi.org/10.1080/20430795.2018.1550993

11. Cicchiello, A. F., Cotugno, M., Monferrà, S., & Perdichizzi, S. (2022). Which are the factors influencing green bonds issuance? Evidence from the European bonds market. *Finance Research Letters*, *50*, 103190. https://doi.org/10.1016/j.frl.2022.103190
12. Cochelin, P., Popoola, B., & Volland, E. (2024, February 13). *Sustainable bond issuance to approach $1 trillion in 2024.* S&P Global Ratings. Retrieved from https://www.spglobal.com/_assets/documents/ratings/research/101593071.pdf
13. Climate Bonds Initiative. (2017, January). *Climate Bonds Standard version 2.1*. Retrieved from https://www.climatebonds.net/climate-bonds-standard-v21
14. Climate Bonds Initiative. (2018). *Nordic and Baltic public sector green bonds*. Retrieved from https://www.climatebonds.net/resources/reports/nordic-and-baltic-public-sector-green-bonds
15. Climate Bonds Initiative. (2019, December). *Climate Bonds Standard version 3.0*. Retrieved from https://www.climatebonds.net/2019/12/climate-bonds-launches-version-3-international-climate-bonds-standard-universal
16. Climate Bonds Initiative. (2020, December 15). *$1 trillion mark reached in global cumulative green issuance.* Retrieved from https://www.climatebonds.net/2020/12/1trillion-mark-reached-global-cumulative-green-issuance-climate-bonds-data-intelligence
17. Climate Bonds Initiative. (2021, September). *Climate Bonds Taxonomy*. Retrieved from https://www.climatebonds.net/standard/taxonomy
18. Climate Bonds Initiative. (2024, August). *Sustainable debt market summary H1 2024*. Retrieved from https://www.climatebonds.net/resources/reports/sustainable-debt-market-summary-h1-2024
19. Climate Bonds Initiative. (2025). *5 for 25: Five factors that will shape GSS+ growth in 2025*. Retrieved from https://www.climatebonds.net/resources/reports/climate-bonds-initiative-5-25
20. Dai, S., Yu, H., Aiya, F., & Yang, B. (2024). Green bonds and sustainable development: Theoretical model and empirical evidence from Europe. *International Journal of Sustainable Development & World Ecology*, *31*(6), 668–683. https://doi.org/10.1080/13504509.2024.2325366
21. Dan, A., & Tiron-Tudor, A. (2021). The determinants of green bond issuance in the European Union. *Journal of Risk and Financial Management*, *14*(9), 446. https://doi.org/10.3390/jrfm14090446

22. Delmas, M. A., & Burbano, V. C. (2011). The drivers of greenwashing. *California Management Review*, *54*(1), 64–87. https://doi.org/10.1525/cmr.2011.54.1.64
23. Demary, M., & Neligan, A. (2019). *Defining green bonds: The danger of neglecting the issuer side – Looking at problems and solutions* (IW-Policy Paper No. 2/2019). German Economic Institute (IW). Retrieved from https://hdl.handle.net/10419/192975
24. Deschryver, P., & De Mariz, F. (2020). What future for the green bond market? How can policymakers, companies, and investors unlock the potential of the green bond market? *Journal of Risk and Financial Management*, *13*(3), 61. https://doi.org/10.3390/jrfm13030061
25. Ehlers, T., & Packer, F. (2017). Green bond finance and certification. *BIS Quarterly Review*. https://EconPapers.repec.org/RePEc:bis:bisqtr:1709h
26. European Commission. (2018, March 8). *Action plan: Financing sustainable growth* (COM(2018) 97 final). Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0097
27. European Commission. (2019, December 11). *The European Green Deal* (COM(2019) 640 final). Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640
28. European Investment Bank. (2011). *EIB Climate Awareness Bonds newsletter*. Retrieved from https://www.eib.org/files/fi/eib-cab-newsletter-new.pdf
29. European Investment Bank. (2022, July 5). *15 years of EIB green bonds: Leading sustainable investment from niche to mainstream*. Retrieved from https://www.eib.org/en/press/all/2022-308-15-years-of-eib-green-bonds-leading-sustainable-investment-from-niche-to-mainstream
30. European Union. (2020). *Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088*. *Official Journal of the European Union, L 198*, 13–43. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R0852
31. European Union. (2021). *Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ("European Climate Law")*. *Official Journal of the European Union, L 243*, 1–17. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R1119

32. European Union. (2023). *Regulation (EU) 2023/2631 of the European Parliament and of the Council of 22 November 2023 on European green bonds and optional disclosures for bonds marketed as environmentally sustainable and for sustainability-linked bonds*. *Official Journal of the European Union, L 2023/2631*, 1–74. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R2631
33. Flammer, C. (2020). Green Bonds: Effectiveness and implications for public policy. *Environmental and Energy Policy and the Economy*, *1*, 95–128. https://doi.org/10.1086/706794
34. García, C. J., Herrero, B., Miralles-Quirós, J. L., & Del Mar Mirallles-Quirós, M. (2023). Exploring the determinants of corporate green bond issuance and its environmental implication: The role of corporate board. *Technological Forecasting and Social Change*, *189*, 122379. https://doi.org/10.1016/j.techfore.2023.122379
35. Gianfrate, G., & Peri, M. (2019). The green advantage: Exploring the convenience of issuing green bonds. *Journal of Cleaner Production*, *219*, 127–135. https://doi.org/10.1016/j.jclepro.2019.02.022
36. Grishunin, S., Bukreeva, A., Suloeva, S., & Burova, E. (2023). Analysis of yields and their determinants in the European Corporate Green Bond market. *Risks*, *11*(1), 14. https://doi.org/10.3390/risks11010014
37. Han, Y., & Li, J. (2021). Should investors include green bonds in their portfolios? Evidence for the USA and Europe. *International Review of Financial Analysis*, *80*, 101998. https://doi.org/10.1016/j.irfa.2021.101998
38. Hinsche, I. C. (2021). A Greenium for the Next Generation EU Green Bonds Analysis of a Potential Green Bond Premium and its Drivers. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3965664
39. Hoinaru, R., Benson, C., Stănilă, G. O., Dobre, F., & Buda, D. (2020). Green Bonds: Between economic incentives and eco-change. *Proceedings of the . . . International Conference on Business Excellence*, *14*(1), 236–245. https://doi.org/10.2478/picbe-2020-0022
40. Hyun, S., Park, D., & Tian, S. (2019). The price of going green: the role of greenness in green bond markets. *Accounting and Finance*, *60*(1), 73–95. https://doi.org/10.1111/acfi.12515
41. Ibrić, M., Kozarević, E., & Mešković, A. (2024). The Rise of Green Bonds: Global Context and European Insights. *Journal of Economics, Law and Society*, *1*(1), 55–71. https://doi.org/10.70009/jels.2024.1.1.4

42. Ignitis grupė. (n.d.). *Bonds*. Retrieved May 11, 2025, from https://ignitisgrupe.lt/en/investors/bonds
43. International Capital Market Association. (2015, March 27). *Green Bond Principles: Voluntary process guidelines for issuing green bonds*. Retrieved from https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/GBP_2015_27-March.pdf
44. International Capital Market Association. (2021, June). *Green Bond Principles: Voluntary process guidelines for issuing green bonds*. Retrieved from https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/
45. Kanamura, T. (2020). Are green bonds environmentally friendly and good performing assets? *Energy Economics*, *88*, 104767. https://doi.org/10.1016/j.eneco.2020.104767
46. Karim, S., Lucey, B. M., Naeem, M. A., & Yarovaya, L. (2023). Extreme risk dependence between green bonds and financial markets. *European Financial Management*, *30*(2), 935–960. https://doi.org/10.1111/eufm.12458
47. Karpf, A., & Mandel, A. (2018). The changing value of the ‘green’ label on the US municipal bond market. *Nature Climate Change*, *8*(2), 161–165. https://doi.org/10.1038/s41558-017-0062-0
48. Larcker, D. F., & Watts, E. M. (2020). Where’s the greenium? *Journal of Accounting and Economics*, *69*(2–3), 101312. https://doi.org/10.1016/j.jacceco.2020.101312
49. Latvenergo. (n.d.). *Financial information*. Retrieved May 11, 2025, from https://latvenergo.lv/en/investoriem/finansu-informacija
50. Lebelle, M., Lajili Jarjir, S., & Sassi, S. (2020). Corporate Green Bond issuances: an international evidence. *Journal of Risk and Financial Management*, *13*(2), 25. https://doi.org/10.3390/jrfm13020025
51. Lin, B., & Su, T. (2022). Green bond vs conventional bond: Outline the rationale behind issuance choices in China. *International Review of Financial Analysis*, *81*, 102063. https://doi.org/10.1016/j.irfa.2022.102063
52. Lords LB Asset Management. (n.d.). *AEI green bonds*. Retrieved May 11, 2025, from https://lordslb.lt/aei_green_bonds/
53. Löffler, K. U., Petreski, A., & Stephan, A. (2021). Drivers of green bond issuance and new evidence on the “greenium.” *Eurasian Economic Review*, *11*(1), 1–24. https://doi.org/10.1007/s40822-020-00165-y
54. Ma, C., Schoutens, W., Beirlant, J., De Spiegeleer, J., Höcht, S., & Van Kleeck, R.

(2020). *Are green bonds different from ordinary bonds? A statistical and quantitative point of view* (NBB Working Paper No. 394). National Bank of Belgium. Retrieved from https://hdl.handle.net/10419/238181

55. MacAskill, S., Roca, E., Liu, B., Stewart, R., & Sahin, O. (2020). Is there a green premium in the green bond market? Systematic literature review revealing premium determinants. *Journal of Cleaner Production*, *280*, 124491. https://doi.org/10.1016/j.jclepro.2020.124491
56. Maltais, A., & Nykvist, B. (2020). Understanding the role of green bonds in advancing sustainability. *Journal of Sustainable Finance & Investment*, 1–20. https://doi.org/10.1080/20430795.2020.1724864
57. McKinsey & Company. (2022, January). *The net-zero transition: What it would cost, what it could bring.* Retrieved from https://www.mckinsey.com/capabilities/sustainability/our-insights/the-net-zero-transition-what-it-would-cost-what-it-could-bring
58. Michetti, C., Chouhan, N., Harrison, C., & MacGeoch, M. (2023). *Sustainable debt: Global state of the market 2022*. Climate Bonds Initiative. Retrieved from https://www.climatebonds.net/resources/reports/global-state-market-report-2022
59. Nasdaq Baltic. (n.d.). *Bond list*. Retrieved 27 January 2025, from https://nasdaqbaltic.com/statistics/en/bonds
60. Nemes, N., Scanlan, S. J., Smith, P., Smith, T., Aronczyk, M., Hill, S., Lewis, S. L., Montgomery, A. W., Tubiello, F. N., & Stabinsky, D. (2022). An integrated framework to assess greenwashing. *Sustainability*, *14*(8), 4431. https://doi.org/10.3390/su14084431
61. Nguyen, P.-H., Thi Nguyen, L.-A., Le, H.-Q., & Tran, L.-C. (2024). Navigating critical barriers for green bond markets using A fuzzy multi-criteria decision-making model: Case study in Vietnam. *Heliyon*, *10*(13), e33493. https://doi.org/10.1016/j.heliyon.2024.e33493
62. Nordea. (2019). *Your guide to bond issuance and loan transactions.* Retrieved from https://www.nordea.com/en/news/your-guide-to-bond-issuance-and-loan-transactions
63. Our World in Data. (n.d.). *Global reported natural disasters by type.* Retrieved from https://ourworldindata.org/grapher/natural-disasters-by-type
64. Preclaw, R., & Bakshi, A. (2015, September 18). *The cost of being green* (U.S. Credit Focus). Barclays. Retrieved from https://www.environmental-finance.com/content/research/the-cost-of-being-green.html

65. Principles for Responsible Investment. (2024). *2024 annual report: An investor initiative in partnership with UNEP Finance Initiative and UN Global Compact*. Retrieved from https://www.unpri.org/annual-report-2024

66. Sartzetakis, E. S. (2021). Green bonds as an instrument to finance low carbon transition. *Economic Change and Restructuring*, *54*(3), 755–779. https://doi.org/10.1007/s10644-020-09266-9

67. Sheenan, L. (2023). Green bonds, conventional bonds and geopolitical risk. *Finance Research Letters*, *58*, 104587. https://doi.org/10.1016/j.frl.2023.104587

68. Sobik, B. (2023). Green bonds - financial innovation for sustainability financing: The case of the Polish green bonds market and their development barriers. *Central European Economic Journal*, *10*(57), 287–303. https://doi.org/10.2478/ceej-2023-0017

69. Spinaci, S. (2022, January). *European green bonds: A standard for Europe, open to the world* (EPRS Briefing No. PE 698.870). European Parliamentary Research Service. Retrieved from https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2022)698870

70. Spielberger, L. (2024). EIB policy entrepreneurship and the EU's regulation of Green Bonds. *Journal of Economic Policy Reform*, 1–18. https://doi.org/10.1080/17487870.2024.2356810

71. Technical Expert Group on Sustainable Finance. (2019a). *Report on EU Green Bond Standard*. European Commission. Retrieved from https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/european-green-bond-standard-supporting-transition_en

72. Technical Expert Group on Sustainable Finance. (2019b). *Taxonomy technical report: Financing a sustainable economy*. European Commission. Retrieved from https://finance.ec.europa.eu/system/files/2019-06/190618-sustainable-finance-teg-report-taxonomy_en.pdf

73. Technical Expert Group on Sustainable Finance. (2020). *EU green bond standard: Usability guide*. European Commission. Retrieved from https://finance.ec.europa.eu/publications/technical-expert-group-sustainable-finance-teg_en

74. Tocelovska, N., & Jekabsone, I. (2024). Baltic corporate bond market after Covid-2019 and capital markets union actions. *Proceedings of the International Scientific Conference "Economic Science for Rural Development"/Economic Science for Rural*

Development, *58*, 402–410. https://doi.org/10.22616/esrd.2024.58.039

75. Tocelovska, N., Vainovskis, O., & Lenerts, T. (2023). Going global or staying local: determinants of domestic and international corporate bond issues in the Baltics. *European Integration Studies*, *1*(17), 141–152. https://doi.org/10.5755/j01.eis.1.17.34041

76. United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development* (A/RES/70/1). Retrieved from https://sdgs.un.org/2030agenda

77. United Nations Environment Programme Finance Initiative. (2020). *UNEP FI annual overview 07/2019–12/2020*. Retrieved from https://www.unepfi.org/annual-overview-2019-2020/

78. United Nations Framework Convention on Climate Change. (2015). *The Paris agreement* (FCCC/CP/2015/10/Add.1). UNFCCC. Retrieved from https://unfccc.int/process-and-meetings/the-paris-agreement

79. Wang, S., & Wang, D. (2022). Exploring the relationship between ESG performance and green bond issuance. *Frontiers in Public Health*, *10*, 897577. https://doi.org/10.3389/fpubh.2022.897577

80. World Commission on Environment and Development. (1987). *Our common future*. Oxford University Press. Retrieved from https://www.are.admin.ch/are/en/home/media/publications/sustainable-development/brundtland-report.html

81. World Economic Forum. (2022). *The global risks report 2022* (17th ed.). World Economic Forum. Retrieved from https://www.weforum.org/publications/global-risks-report-2022/

82. Zerbib, O. D. (2019). The effect of pro-environmental preferences on bond prices: Evidence from green bonds. *Journal of Banking & Finance*, *98*, 39–60. https://doi.org/10.1016/j.jbankfin.2018.10.012

APPENDICES

APPENDIX A

Key studies on green bond issuance

Author(s)	Main idea	Geographical scope	Methodology	Key findings
Dan& Tiron-Tudor (2021)	Determinants of green bond issuance in EU countries between 2014–2019	European Union countries	Linear regression analysis of macroeconomic, ESG, and credit rating data	ESG scores and sovereign ratings boost issuance. Sustainability indicators outweigh macroeconomic factors. Larger populations demand more green finance.
Buzinske & Stankeviciene (2023)	Success factors, benefits, and challenges of green bonds in Lithuania	Lithuania	Expert survey using Analytical Hierarchy Process (AHP) methodology to prioritize success and challenge factors	Credit ratings, ESG scores, and issuer reputation are critical success factors. Challenges include greenwashing, issuance costs, and small market size.
Cicchiello et al. (2022)	Factors influencing green bond issuance in European corporate markets (2015–2020)	European corporate market	Logit regression analysis of firm-level and governance data, supplemented by bond issuance records	Board size, independent directors, and long-term debt positively impact issuance likelihood. Solvency and debt maturity are key.
Chiesa & Barua (2019)	Determinants of green bond issuance size across emerging and non-emerging markets (2010–2017)	Global (emerging and non-emerging markets)	Ordinary Least Squares (OLS) regression on Bloomberg data covering issuance characteristics and market trends	High credit ratings and collateral boost issue sizes. EUR-denominated bonds are larger. Emerging markets show higher issuance volumes but require tailored policies.
Tocelovska & Jekabsone (2024)	Factors influencing corporate bond issuance in the Baltic region post-COVID-2019, focusing on the role of the Capital Markets Union	Baltic countries	Primary data analysis using surveys and interviews with corporate bond issuers and organisers	Funding costs drive issuance; EU financial support positively impacts issuers. Liquidity and investor demand are obstacles. Institutional investors dominate; retail participation remains low due to fees and low literacy.
Tocelovska et	Determinants of domestic	Baltic	Panel regression for country-	International issuance depends on bond

al. (2023)	and international corporate bond issuance in the Baltic countries from 2003 to 2022	countries (Estonia, Latvia, Lithuania)	level determinants and probit regression for firm-level factors. Qualitative analysis via surveys and interviews	size, equity ratio, GDP per capita, political stability. Domestic issuance is influenced by corruption perception and sovereign bonds' GDP share.
García et al. (2023)	Role of corporate boards in green bond issuance and environmental performance improvement post-issuance	Global	Logit model and difference-in-difference analysis with Heckman correction between 2013 and 2019	Green bond issuers often have better environmental scores and diverse boards. Certified green bonds are linked to greenwashing risks as firms with poor initial environmental performance use them to improve their image.
Baldi & Pandimiglio (2022)	The influence of ESG scoring and greenwashing risks on green bond yields for both public and corporate issuances	Global	Regression analysis using ESG scores, risk-free rates, and credit ratings	Higher ESG scores lower yields as investors accept reduced returns for sustainability. Public issuers and manufacturing firms face higher greenwashing risks. Policy suggestions include standardized taxonomies.
Wang and Wang (2022)	The relationship between ESG performance and green bond issuance in China	China	Probit and OLS regression models using ESG performance data from Huazheng and Wind databases	Strong ESG performance increases issuance. High financial performance can moderate this relationship by diverting resources. Governance factors like independent directors support issuance.
Nguyen et al. (2024)	Critical barriers to green bond issuance in Vietnam using advanced multi-criteria decision-making techniques	Vietnam	Fuzzy Delphi, DEMATEL, and DANP techniques	Policy barriers (weak regulations, tax incentives) and limited investor confidence in green projects are key challenges.

Source: compiled by the author

APPENDIX B
Interview questions

For companies:
General Perception:
1. What motivated your company to issue green bonds?
2. How would you assess the success of your green bond issuance in achieving both sustainability goals and financial objectives?

Financial Barriers:
3. What were the most significant financial challenges your company faced when issuing green bonds?
4. How did the financial burden of issuing green bonds compare to conventional bonds? What could help reduce the cost of issuance?

Regulatory Barriers:
5. What are the main regulatory barriers for companies seeking to raise green bonds?
6. How did local and global regulations influence your ability to issue green bonds? Which regulations were most supportive, and which were restrictive? What regulatory changes would make the process easier?

Market Perception and Ratings:
7. How did your company's credit rating and ESG score affect investor confidence and demand for your green bonds? What steps, if any, did your company take to enhance its ESG credentials before issuance?

Greenwashing Concerns:
8. Has your company encountered concerns about being perceived as engaging in greenwashing, and if so, how have you addressed them?
9. How did your company ensure transparency in project goals and the use of proceeds? How did third-party certifications or reporting standards play a role?

Issuance Size and Public Awareness:
10. How did the size of your green bond issuance impact investor interest, and what were the biggest challenges in attracting investors?
11. How did the coupon rate of your green bonds compare to conventional bonds, and how did it influence investor demand?
12. What strategies did you use to increase public awareness and investor interest in your green bonds? Did you face challenges in educating stakeholders, and if so, how did you address them?

Financial Constraints and Leverage:
13. How did your company's existing debt levels or financial structure impact its ability to issue green bonds?
14. How did high borrowing costs or a high debt-to-capital ratio affect your ability to issue green bonds?

Future Outlook and Policy:
15. Among the challenges we discussed (e.g., financial barriers, regulatory barriers, low credit rating or ESG score, greenwashing concerns, small issuance size, insufficient public awareness, leverage), which was the biggest obstacle your company faced when issuing green bonds?
16. What changes in market conditions, regulations, or investor demand would encourage more companies to issue green bonds?
17. Based on your experience, what lessons would you share with companies considering green bond issuance?

18. How could governments or financial institutions better support green bond issuers in your region?
19. Were there any other challenges your company encountered that we haven't discussed?

For arrangers:

Institutional Role & Issuer Fit:

1. What role does your institution play in green bond issuance? What kind of advisory support do you provide to companies during their green bond issuance?
2. What key criteria does your financial institution consider before advising or supporting a green bond issue? Are there minimum thresholds in terms of size, sector, or company profile?

Internal Limits & Risk Controls:

3. How much time and effort does it typically take to support a green bond issuance? What are the biggest cost or resource drivers for your institution?
4. How do you balance profitability when green bonds often involve additional work but may not yield financial benefits for the arranger?
5. What are the main internal challenges or risks your institution faces when supporting green bond issuance, and how do you mitigate them?
6. What challenges does your institution face in verifying green projects before and after issuance? How do you ensure that proceeds are used as intended?
7. How do you assess and manage reputational risk when working with a new or unknown issuer?
8. What role does your institution play in preventing greenwashing in the green bond market?

Building Market Trust:

9. What steps would you recommend companies take to increase investor confidence in their green bond frameworks?
10. How do you see investor demand for green bonds compared to conventional bonds? Have you faced difficulties in placing green bonds due to lack of investor interest?
11. What are the main barriers to investor confidence in green bonds in the Baltics, and how do credit ratings or ESG scores affect investor interest?

Placement & Financial Barriers:

12. How does the size of the green bond issuance affect your decision to support it? Are smaller issues harder to place?
13. How does the type of investor (institutional vs. retail) influence how you structure and advise on green bond issuance?
14. From your perspective, what are the biggest financial challenges companies face when issuing green bonds? How do the costs compare to conventional bonds?
15. How does an issuer's financial standing (leverage, liquidity, profitability) affect that you are actually going to support the green bond issuance
16. Are green bonds generally priced similarly to conventional bonds, or do you observe any pricing differences?

Policy, Support & Market Outlook:

17. What are the most complex regulatory barriers compared to conventional bonds? Do you think overregulation could discourage companies from issuing green bonds?
18. What regulatory or financial changes, in your opinion, could make green bond issuance more accessible to companies?
19. How much time do you spend educating companies, especially first-time issuers, on green expectations, frameworks, and investor communication?
20. What trends do you foresee in the green bond market in the Baltics over the next 5–10 years?
21. What advice would you give to companies considering their first green bond issuance?

Resümee

ROHEVÕLAKIRJADE EMITEERIMISE VÄLJAKUTSED: BALTI ETTEVÕTETE JUHTUMIUURING

Anhelina Honcharenko

Rohelised finantsinstrumendid, eelkõige rohevõlakirjad, on kujunenud oluliseks vahendiks globaalsete keskkonnaprobleemide lahendamiseks ja kestliku arengu toetamiseks. Rohevõlakirjad on fikseeritud tulumääraga väärtpaberid, mida kasutatakse keskkonnale kasulike projektide, näiteks taastuvenergia, keskkonnakestliku transpordi ja kliimakindla taristu rahastamiseks. Vaatamata rohevõlakirjade kasvavale tähtsusele maailmas, on akadeemilised uurimused Balti riikide ettevõtete rohevõlakirjade emiteerimise kohta piiratud.

Käesolev bakalaureusetöö uurib rohevõlakirjade emiteerimisega seotud väljakutseid kolme Balti ettevõtte ja kolme finantsasutuse (korraldaja) vaatenurgast. Varasemates uuringutes on tuvastatud mitmeid takistusi, sealhulgas kulupõhised barjäärid, regulatiivsed piirangud, madal krediidireiting, madal ESG-skoor, rohepesu risk, väike emissioonimaht, vähene avalikkuse teadlikkus ja finantsvõimenduse piirangud. Need uuringud tuginesid sageli kvantitatiivsetele meetoditele ning keskendusid suuresti suurtele ja arenenud majandustele, käsitledes Balti piirkonna spetsiifikat vaid vähesel määral. Käesolev töö püüab seda uurimislünka täita kvalitatiivse, intervjuupõhise analüüsiga. Uuringusse kaasatud ettevõtted valiti nende sektori, emissiooniaasta (2017–2025) ja päritoluriigi alusel. Finantsasutused, kellel on kogemusi Balti rohevõlakirjaturul, olid SEB ja LHV Pank. Poolstruktureeritud intervjuud analüüsiti temaatilise kodeerimise meetodil.

Intervjuude tulemused kinnitavad paljude teoorias käsitletud barjääride praktilist asjakohasust. Töö jagab väljakutsed kahte rühma. Esiteks ettevõttepõhised probleemid, mille hulka kuuluvad finantsraskused (eriti väikeste emissioonide puhul), krediidireitingu puudus, rohepesu risk, vähene teadlikkus rohevõlakirjadest ja finantsvõimenduse piirangud. Need probleemid sõltuvad sageli ettevõtte suurusest, kogemusest ja investorite profiilist ning on teoorias laialdaselt käsitletud.

Teiseks toob töö esile takistusi, mida ei ole teoorias detailselt kirjeldatud, kuid mis osutusid Balti emitentide jaoks oluliseks. Levinud probleemiks osutus sisemise ESG-ekspertiisi puudumine ettevõtte sees. See väljakutse ei kajastunud senises empiirilises kirjanduses ning väärib akadeemilises käsitluses suuremat tähelepanu. Samuti tõi töö välja sõltuvuse välistest nõustajatest, mis osutus korraldajate sõnul takistuseks edukale emissioonile ning on kirjanduses seni alauuritud.

Teised olulisemad probleemid Baltikumis hõlmavad regulatiivset ebakindlust, eriti seoses EL rohevõlakirjade standardiga. Tehnilise juhendamise puudumine, terminoloogilised

lüngad ning regulatiivse koormuse oht raskendavad emissiooniprotsessi. Investeeringutele ligipääs on piiratud. Kohalik institutsionaalne investoribaas on kitsas ning piiriüleseid emissioone takistavad väikesed emissioonimahud, madal likviidsus ja geopoliitilised riskid. Geopoliitilised ja poliitilised arengud on vähendanud investorite usaldust pikaajaliste finantsinstrumentide vastu selles piirkonnas.

Töö tulemused viitavad vajadusele pakkuda paremat tehnilist juhendamist, sihipärasemat toetust väiksematele emitentidele ning tugevdada turuosaliste vahelist koostööd Balti rohevõlakirjaturu arendamiseks. Uuring aitab paremini mõista, kuidas kestlik rahastus areneb ELi äärealadel ning annab praktilisi soovitusi nii poliitikakujundajatele kui ka tulevastele emitentidele Balti riikides.