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Corporate Sustainable Bonds: Determinants of the Greenium

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Agenda

- 1. Introduction to Sustainable Bonds and the Greenium Phenomenon**
- 2. Research Design**
- 3. Results and Deduction of Determinants**

1. Introduction to Sustainable Bonds and the Greenium Phenomenon

Sustainable bonds are one of the most promising financing instruments to channel more capital into sustainable projects.

Definition of Sustainable Bonds / ESG Bonds

Sustainable bonds (ESG bonds) are bond instruments with an exclusive allocation of proceeds to projects or activities with discernible sustainable benefits.*

* Following the ICMA „Principles“

Use-of-Proceeds Bonds

Green Bonds

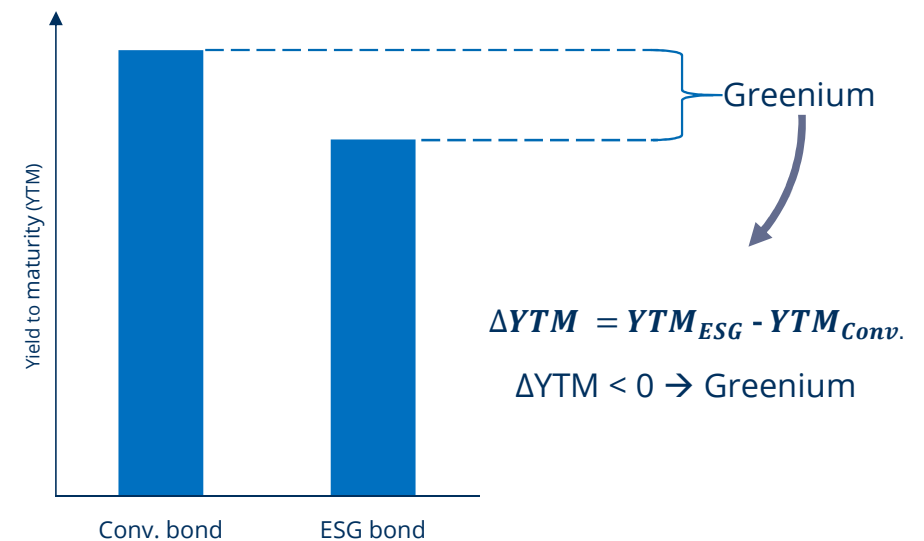
Social Bonds

Sustainability Bonds

General Purpose Bonds

Sustainability-linked Bonds

Schematic Depiction of the Greenium Phenomenon



Source: own illustration

The greenium is a yield discount on sustainable bonds compared to their conventional twin bonds.

2. Research Design

The aim of this study is to derive overarching determinants of greenium by empirically analysing observable characteristics of corporate ESG bonds for greenium variations.

The Research Question

Which bond- and company-specific determinants affect the greenium of corporate ESG bonds, and what recommendations for action can be derived from this?

The Hypotheses

Existence of the greenium:

H0: ESG bonds are issued at a lower primary market yield than their conventional twins.

Observable characteristics:

The greenium differs depending on...

H1: ESG bond type

H2: External reviews

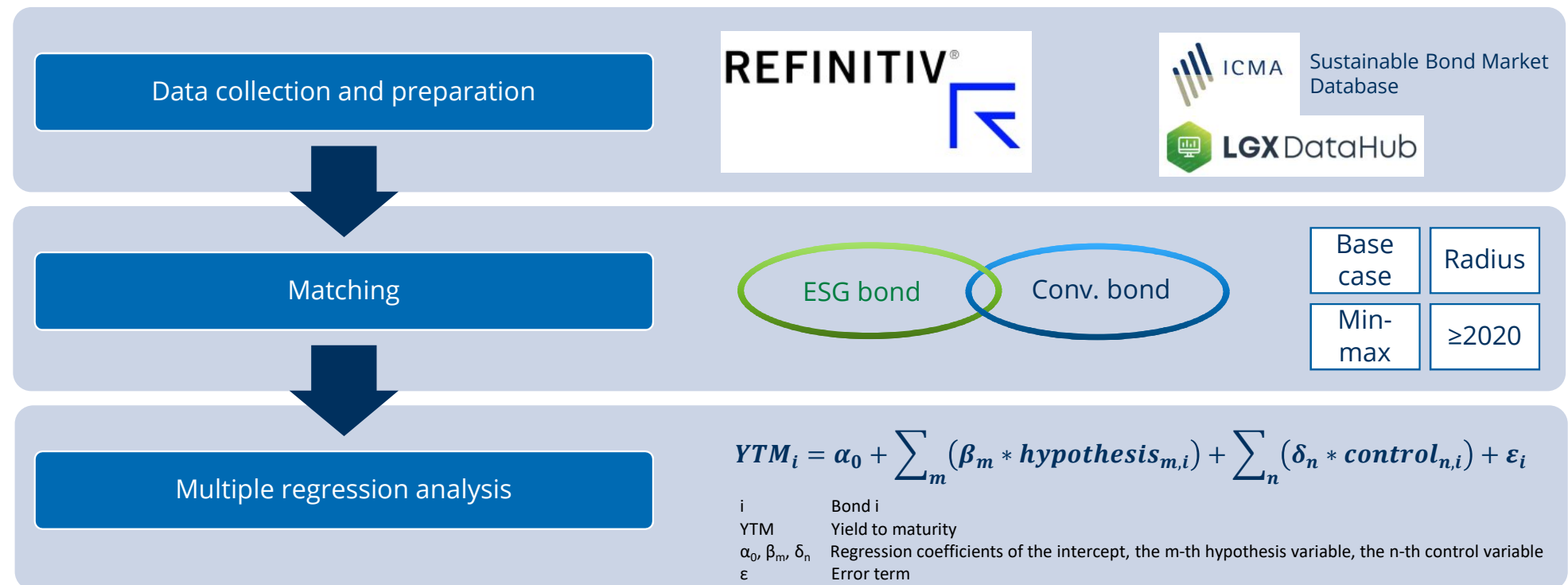
H3: ESG issuance frequency

H4: Economic sector

H5: ESG rating

A three-stage methodology was employed to approximate the counterfactual condition, enabling the determination of the isolated effect of the analysed characteristic.

The Three-Step Econometric Causal Analysis



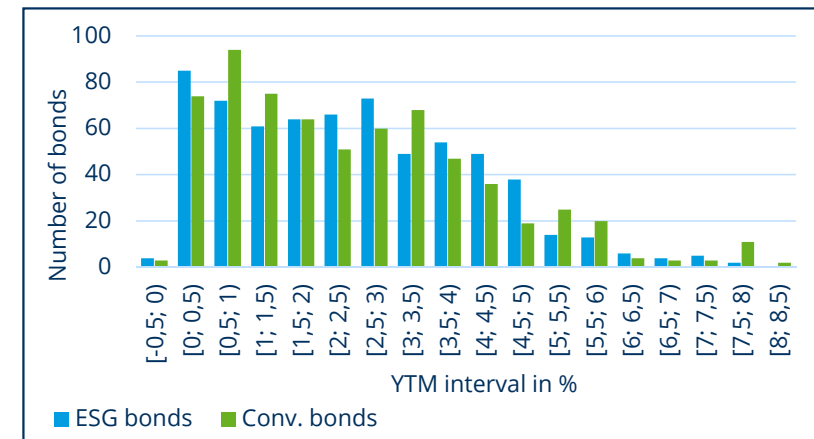
3. Results and Deduction of Determinants

The greenium exists and is time-varying.

Aggregated regression results for H0

	H0.1 Base Case	H0.2 Radius	H0.3 Min- Max	H0.4 ≥2020
ESG Bond	-0,088	-0,060	-0,088	-0,146
Observations	1.318	1.302	1.318	962
R ²	0,884	0,901	0,884	0,874
Adj. R ²	0,882	0,899	0,881	0,870
P(F-Statistic)	0,000	0,000	0,000	0,000
Residual Standard Error	0,356	0,265	0,357	0,427
		p<0,10	p<0,05	p<0,01

Comparison of the YTM after matching



Source: own illustration

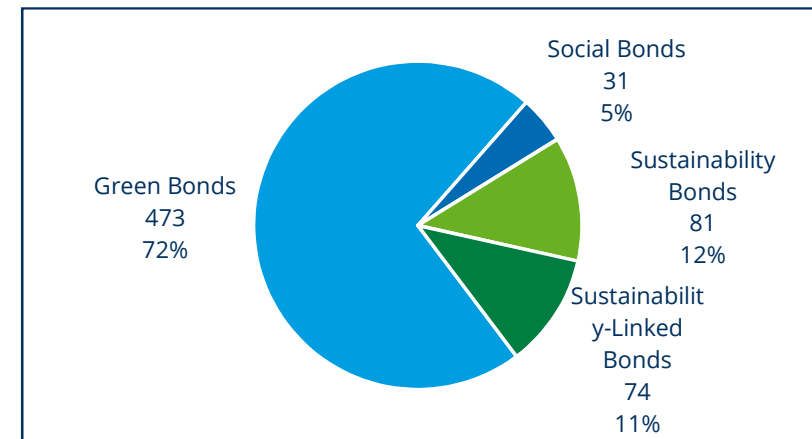
- Greenium is significant for all cases.
- Mean greenium between -6 bps and -9 bps (H0.1–H0.3).
- Greenium increase to -14.6 bps in later market stage (H0.4) indicates time-variation.

The greenium differs depending on the ESG bond type.

Aggregated regression results for H1

	H1.1 Base Case	H1.2 Radius	H1.3 Min- Max	H1.4 ≥2020
Green Bond	-0,093	-0,059	-0,093	-0,162
Social Bond	0,013	0,058	0,012	-0,010
Sustainability Bond	-0,002	0,022	0,000	-0,019
Sustainability-Linked Bond	-0,193	-0,230	-0,196	-0,226
		p<0,10	p<0,05	p<0,01

Descriptive Statistics for H1



Source: own illustration

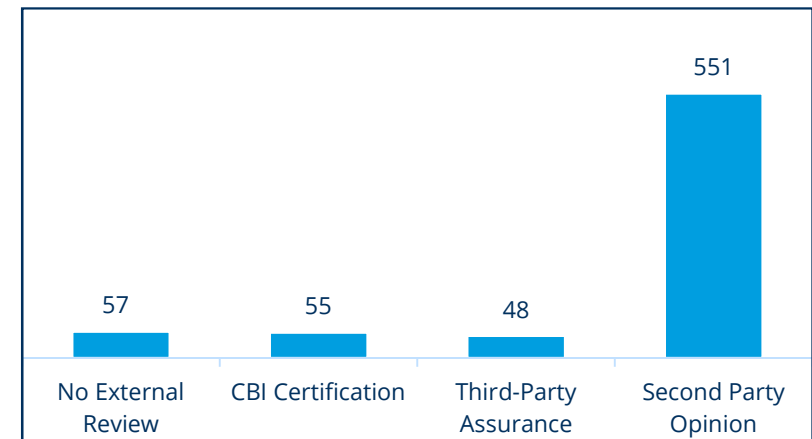
- Significant greenium only for green bonds and sustainability-linked bonds (SLBs).
- Green bonds may benefit from extensive market familiarity.
- SLBs focus on a holistic sustainability development and offer a performance commitment, ensuring a financial benefit.
- Social bonds still play a subordinate role in the corporate ESG bond market.

Second Party Opinions serve as an effective tool for reducing information asymmetries between issuers and investors.

Aggregated regression results for H2

	H2.1 Base Case	H2.2 Radius	H2.3 Min- Max	H2.4 ≥2020
Second Party Opinion	-0,081	-0,076	-0,082	-0,136
Third-Party Assurance	-0,128	-0,056	-0,124	-0,107
CBI Certification	0,039	0,054	0,038	-0,011
ESG x No External Review	-0,104	-0,001	-0,105	-0,180
		p<0,10	p<0,05	p<0,01

Descriptive Statistics for H2



Source: own illustration

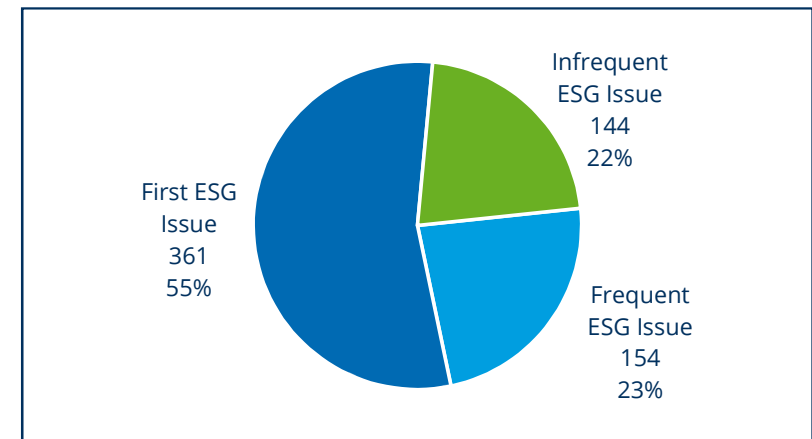
- Significant greenium exclusively for Second Party Opinions (SPOs).
- External reviews underscore the credibility of disclosed information and enhance investor trust.
- Investors favor the more comprehensive yet subjective assessment by SPOs.
- SPOs gained a dominant market share over the last years.

Frequent ESG bond issuance does not effectively reduce information asymmetries.

Aggregated regression results for H3

	H3.1 Base Case	H3.2 Radius	H3.3 Min- Max	H3.4 ≥2020
ESG x Frequent ESG Issue	-0,083	0,010	-0,085	-0,158
ESG x Infrequent ESG Issue	-0,053	-0,031	-0,053	-0,129
ESG x First ESG Issue	-0,104	-0,105	-0,104	-0,146
		p<0,10	p<0,05	p<0,01

Descriptive Statistics for H3



Source: own illustration

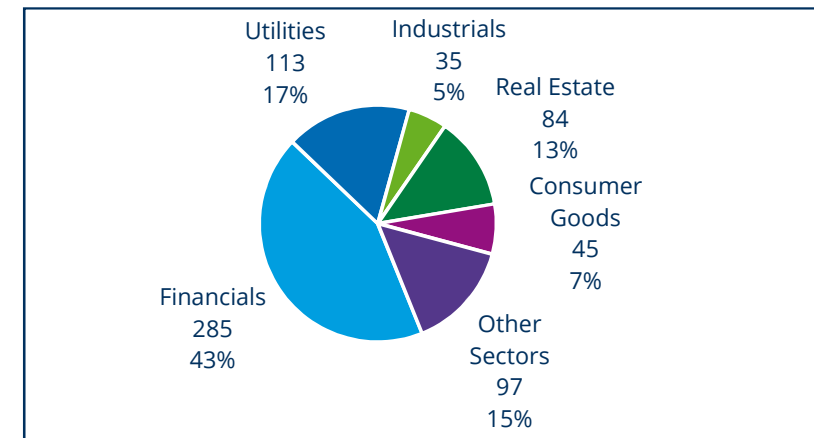
- ESG first issue was valued as a credible commitment to sustainability by investors in the early market phases.
- Signaling effect of ESG first issues diminished, when ESG bonds became more widespread.
- Greenium no longer significantly differs based on the ESG bond issuance frequency.

The greenium is more pronounced in business models with transparent fund allocation and in emerging ESG bond market sectors.

Aggregated regression results for H4

	H4.1 Base Case	H4.2 Radius	H4.3 Min- Max	H4.4 ≥2020
ESG x Financials	-0,065	-0,013	-0,064	-0,140
ESG x Utilities	-0,140	-0,218	-0,137	-0,172
ESG x Industrials	-0,330	-0,382	-0,329	-0,395
ESG x Real Estate	0,200	0,023	0,195	0,184
ESG x Consumer Goods	-0,237	-0,494	-0,238	-0,263
ESG x Other Sectors	-0,189	0,085	-0,189	0,263
		p<0,10	p<0,05	p<0,01

Descriptive Statistics for H4



Source: own illustration

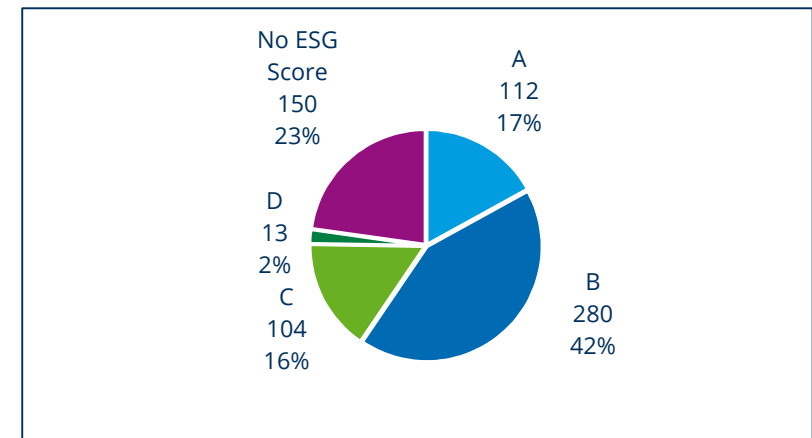
- Financials yield the lowest greenium, potentially due to their business model of external credit financing.
- Activities in the fossil fuel business may increase the greenwashing risk for utilites, leading to a below-average greenium.
- Emerging ESG bond market sectors (industrials, consumer goods) yield the highest greenium.
- No definitive conclusion can be drawn for the real estate industry and 'other sectors'.

Investors consider ESG ratings and ESG performance in their investment decisions.

Aggregated regression results for H5

	H5.1 Base Case	H5.2 Radius	H5.3 Min- Max	H5.4 ≥2020
ESG x ESGC Grade A	-0,220	-0,229	-0,222	-0,275
ESG x ESGC Grade B	-0,098	-0,036	-0,099	-0,146
ESG x ESGC Grade C	-0,104	-0,094	-0,104	-0,188
ESG x ESGC Grade D	0,385	0,040	0,391	0,298
ESG x No ESGC Grade	-0,002	-0,010	-0,001	-0,077
		p<0,10	p<0,05	p<0,01

Descriptive Statistics for H5



Source: own illustration

- Significant greenium exclusively for ESG leaders (ESGC grade A or B).
- The greenium expands with improvements in the ESG rating, i.e. the issuer's sustainable management and performance.
- Greenwashing risk potentially increases financing costs of D-rated companies.
- ESG bonds are predominantly issued by ESG leaders.

Based on these outcomes, two overarching determinants affecting the occurrence and magnitude of a greenium become apparent.

Deduction of Determinants

Transparent information disclosure

- Explicit and truthful communication regarding the use of funds.
- Monitoring and reporting system to assess sustainability performance and progress.
- Comprehensive third-party review.

Sustainable corporate management

- Incorporation of ESG considerations into the corporate decision making process.
- Alignment with ESG standards and ESG bond market standards.

Companies can actively enhance their greenium by communicating clearly about the intended use of proceeds and aligning with ambitious sustainability goals.

Recommendations for Action

Companies

- Author/revise a holistic corporate ESG strategy.
- Financing strategy as an integral part of ESG strategy.
- Implement a monitoring and reporting system.
- Seek external verification by SPOs.
- Reserve use-of-proceeds bonds exclusively for larger, easily communicable projects.
- For all other activities, use SLBs.

Policy makers

- Revise and enhance existing project categories for use-of-proceeds bonds.
- For SLBs, establish clear criteria for sustainable performance targets and key performance indicators.
- Establish guidelines for the content of SPOs.

Thank you for your attention.

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Back-up Slides

Matching Variables and Matching Criteria

Matching variable	Matching criteria
Issuer	Identical
Currency	Identical
Bond rating	Identical
Repayment type	Identical
Date of issuance	Max. 3 years difference
Volume	Max. difference by factor 4
Tenor	Max. difference by factor 1,5 Max. 3 years difference

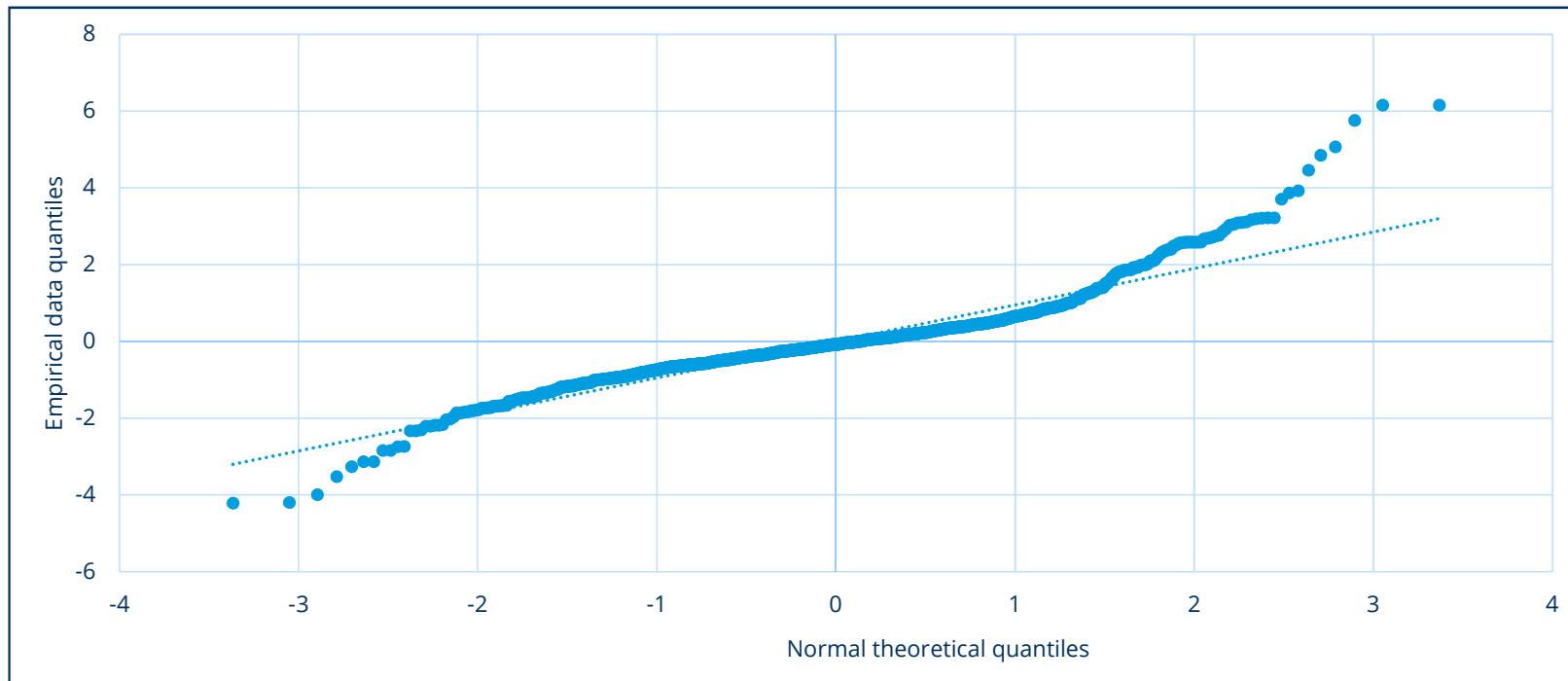
Control Variables

Variable(s)	Description of Variable(s)
Risk-free Rate	Risk-free interest rate, in percent
(GOBC – HW00)	Difference in option-adjusted spreads of the ICE BofA Global Corporate Index (GOBC) and the ICE BofA Global High Yield Index (HW00) as an indicator of market sentiment and volatility, in percent
Bond Ratings	Binary coded dummy variables for each level of the rating scale (AAA, AA+, ..., C, D; with BBB+ as reference category)
Tenor	Maturity of the bond, in years
Amount Issued [bUSD]	Issue volume of the bond, in billion USD
Currency	Binary coded dummy variables for each currency considered in the model (EUR, CNY, CAD, CHF, GBP, JPY; USD as reference category)
Ordinary Call	Binary coded dummy variable describing whether the bond has a call option
Eurobond	Binary coded dummy variable describing whether the bond was issued as a eurobond (1), or as a national bond (0)
Private Placement	Binary coded dummy variable describing whether the bond was issued as a private placement (1) or as a public offering (0)
ECB	Binary coded dummy variable describing whether the bond is eligible for the ECB bond purchase program

Testing of the Regression Prerequisites

Normal Distribution of Residuals

Quantile-Quantile Plot for H0.1

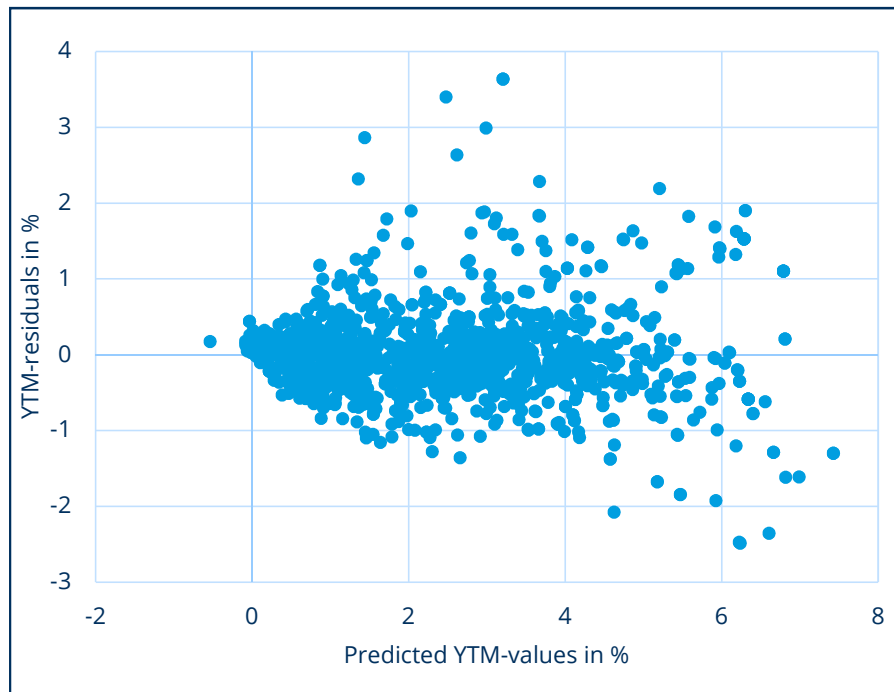


Source: own illustration

Testing of the Regression Prerequisites

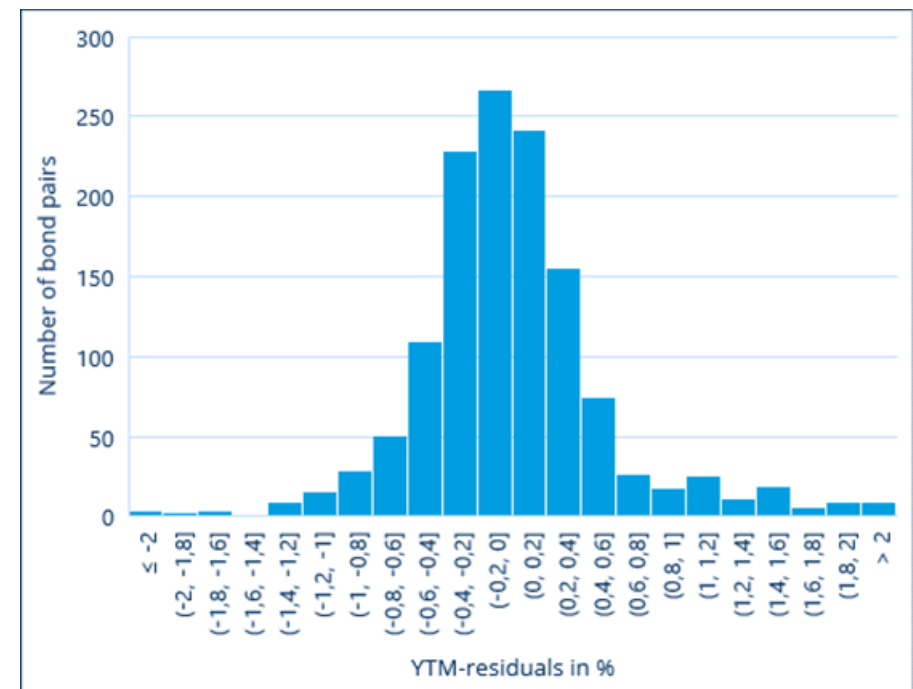
Homoscedasticity

Scatter Plot of Residuals for H0.1



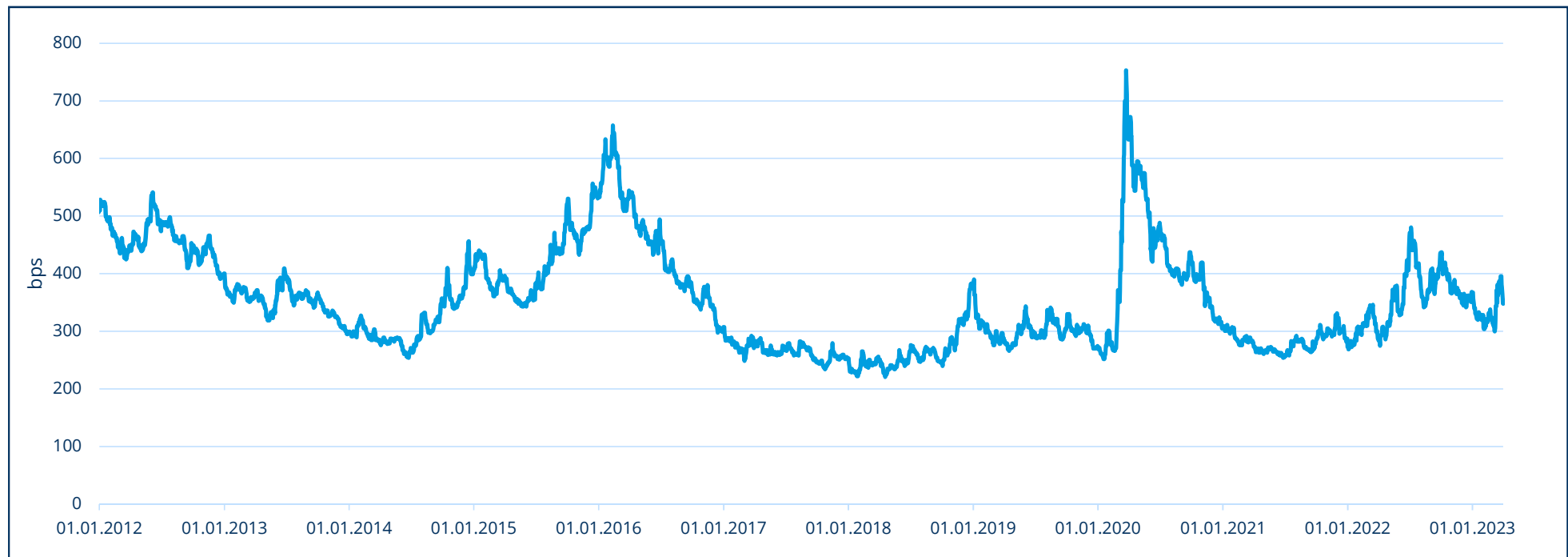
Source (both): own illustration

Histogram of residuals for H0.1



Market Volatility Indicator (G0BC-HW00)-spread

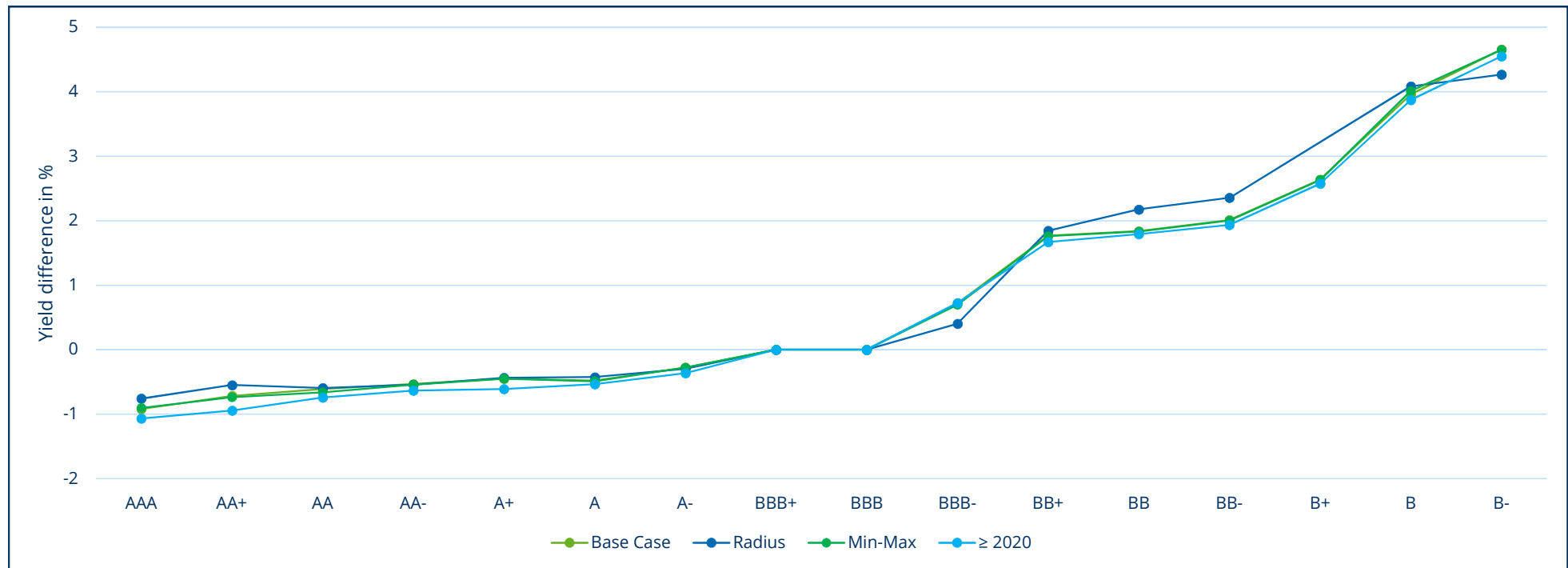
Historical trend of the (G0BC-HW00)-spread



Source: own illustration

Plausibility Check: Bond Ratings

Regression coefficients of the bond ratings as yield differences relative to the reference category BBB+



Source: own illustration