

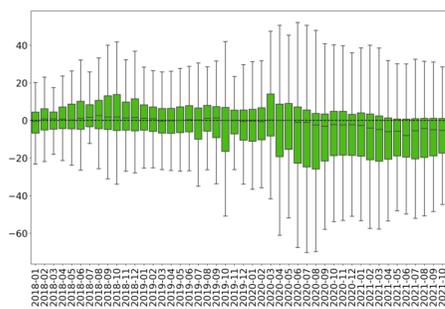
Pricing of Green Bonds – Drivers and Dynamics of the Greenium

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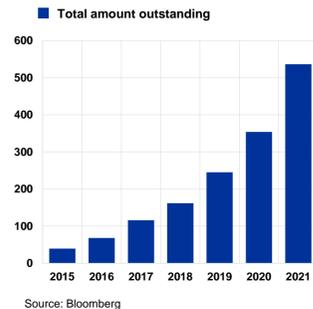
Motivation

- **Green bonds** differ from conventional bonds as their proceeds are exclusively used to **finance green projects**
- The **green bond market has grown rapidly** in recent years
- Green bonds **can help finance the transition** if green bonds **benefit from cheaper funding**

Distribution of spread between green and conventional bonds (basis points, 2018 - 2022)



Rapid growth of euro area green bond market (EUR billion, amount outstanding)



Source: Bloomberg

The paper in a nutshell

Research question: Do green bonds trade at a greenium (i.e. tighter spreads) compared to conventional bonds?

This paper:

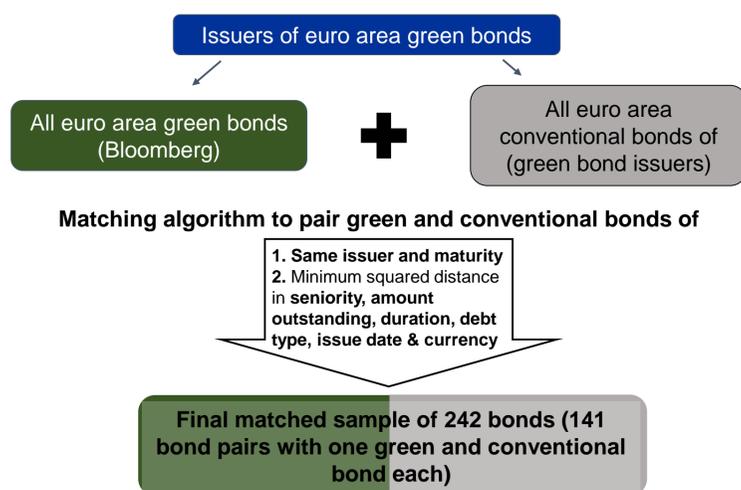
1. Compares the pricing of green and conventional bonds cross sectionally and over time
2. Evaluates the effect of bond and issuer credibility on the greenium
3. Analyses which types of investors are willing to pay a greenium

Study design:

Uses a matching algorithm to pair green bonds with similar conventional bonds of the same issuer

Panel regression (bond-day-level) of option-adjusted spread (OAS) on green bonds dummy variable and controls

Data and Matching algorithm



Result 1: Green bonds trade at a greenium

Bond Panel regression:

$$OAS_{it} = \alpha_{fe} + \beta Green_i + \gamma X_i + \delta M_t + \epsilon_{it}$$

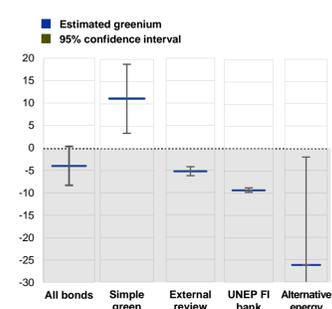
- **OAS_{it}**: Option-adjusted spread of bond i at time t
- **Green_i**: dummy variable equal to 1 for a green bond and 0 for a conventional bond
- **afe**: Fixed effects - issuer, debt type, currency, seniority, coupon type
- **X_i**: Bond-level control variables – probability of default, bid-ask spread, outstanding amount, coupon rate, duration, ECB collateral eligibility
- **M_t**: Macro variables – short-term interest rate, 10y bund yield, VIX index

➔ **Greenium estimate of 4 bps** (for entire matched sample and period)

Result 2: Only credible bonds trade at a greenium

1. **Only credible green bonds exhibit a greenium**
 - Green bonds need to be **verified by third-party** to trade at lower spreads
2. **Only bonds of credible issuers exhibit a greenium**
 - Bonds which are issued by **greener firms** are **rewarded with a greenium** (alternative energy sector, banks signed up for the United Nations Environment Finance Initiative-UNEPFI)

Greenium estimates in euro area secondary bond markets by category (Basis points, difference between in OAS)



Result 3: The greenium develops over time and is driven by retail demand

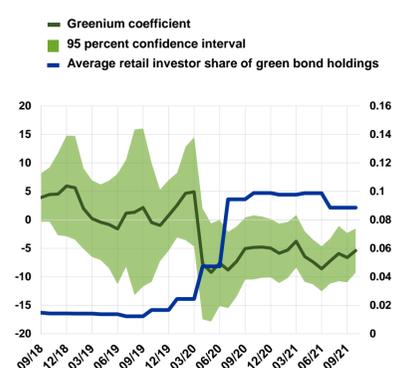
1. The greenium evolves over time

- The greenium is only present and statistically significant from Q2 2020

2. This trend is driven by retail investors' demand in green bonds

- Bonds that are mostly held by retail investors trade at tighter spreads, suggesting that **retail investors are willing to pay more** for green bonds than conventional bonds

Greenium estimates in euro area secondary bond markets by category (lhs: Basis points, rhs: share of amt. outstanding)



Conclusion and policy implications

1. **Green bonds trade at a greenium**
2. **Green bonds' credibility matters**
3. **Demand factors** drive part of the greenium

Policy Implications

- ⇒ Mandatory EU GBS can **help avoid greenwashing and protect** smaller investors
- ⇒ **Issuers may be interested** in higher standards to attract new investors