

The Green Corporate Bond Issuance Premium

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Green corporate bonds have grown in importance

- Green corporate bond (GB) issuance has grown rapidly.
 - ▶ In 2021, GBs account for nearly 6% of global corporate bonds outstanding, up from less than 1% in 2014.
- Unclear whether and how GBs benefit **issuers** on the margin.

Our paper: Understand the potential for GBs to incentivize green investment.

- 1 Issuer perspective to quantify a potential “greenium” at issuance.
- 2 Understand the drivers of the greenium and how it is distributed.

Yield at issuance across international primary bond markets

- Primary market determines the interest rate paid by borrowing issuers.
- Comprehensive global panel dataset with information from international primary bond markets (about 125k bonds).
 - ▶ Capture entire bond market, not just green issuers.
- Issuance data from Bloomberg and Refinitiv from 2014-2021.
 - ▶ Yield spread at issuance over government benchmark yield curve.
 - ▶ Fixed-/zero coupon bonds; no distressed bonds; >\$500k notional.
 - ▶ GBs in USD (503) and EUR (663); conventional bonds from 23 currencies.

Empirical methodology: Fixed-effects regressions

- Understand the drivers of variation in bonds' yield spreads at issuance.
- Fixed-effects regression approach, comparable to Baker et al. (2022).
 - ▶ Larcker & Watts (2020) critique: Model includes nonlinearities as well as issuer- and bond-specific time variation.

For bond i and parent company f , our baseline model is as follows:

$$\text{Yield spread}_{i,f} = \alpha \mathbf{Green}_i + \beta \text{Controls}_{i,r,t}^T + \mu_{i,r,m,f}^T + \epsilon_{i,f} \quad (1)$$

- α captures the average greenium, holding other factors constant.
- $\text{Controls}_{i,r,t}^T$ contains bond- and macro-level controls and their interactions.
- $\mu_{i,r,t,f}^T$ contains bond-, firm-, and time-level FE and their interactions.
- Std. errors are clustered on the issuer parent and year-month levels.

Greenium on average about 8bps; no green halo

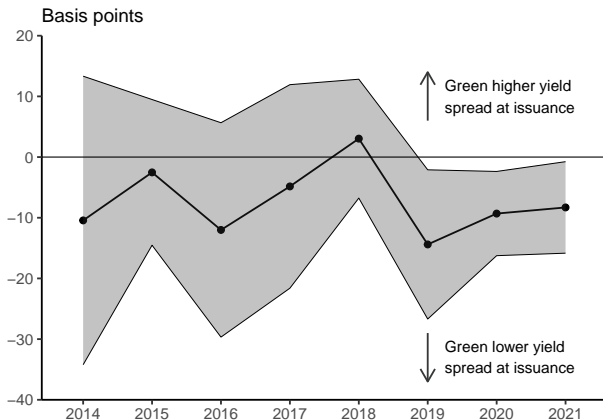
- We find a negative and highly significant coefficient on **Green_i**.
- On average, issuers pay an 8 basis points lower yield on GBs.
 - ▶ 5% cut in borrowing costs, relative to average sample yield spread.

	Yield spread (basis points)						
	(1)	(2)	(3)	(4)	(5)	(6)	
Green	-11.35*** (2.388)	-8.232*** (2.527)	-9.020*** (2.532)			-9.845*** (2.683)	-8.554*** (2.722)
Green issuer				-4.662* (2.530)	-0.509 (4.341)	-3.762 (2.611)	1.481 (4.537)
Baseline Controls	✓	✓	✓	✓	✓	✓	
Firm x Year FE		✓			✓		
Firm x Quarter FE			✓			✓	
Observations	126288	114836	102095	126288	114836	102095	
Adjusted R ²	0.759	0.807	0.831	0.759	0.807	0.831	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

Greenium emerges only as of 2019

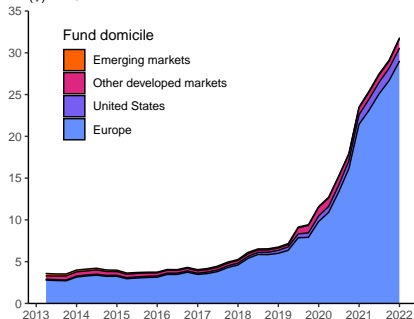
- Based on (1), we construct a time series of the greenium at issuance.
- Statistically significant greenium emerges as of 2019 at about 14 bps, tightens to 9 and 8 bps in 2020 and 2021.



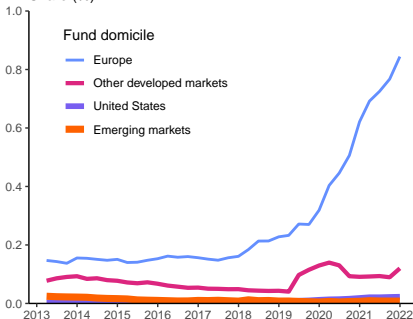
Greenium and the asset management industry

- The emergence of the greenium in 2019 coincides with the growth of the sustainable asset management industry following EU regulation.
 - ▶ We cannot conclude empirically that regulation caused greenium.

3A: Green bond fund AUM
(\$) Billion



3B: Green share of total fixed income AUM
Share (%)



Greenium linked to proxies of excess demand

- 1 We find that the greenium is linked to **bond oversubscription**:
 - ▶ Negative, significant relation between higher GB oversubscription rates and the greenium.
 - ▶ Estimates imply an average greenium of about 8 bps for an average log oversubscription of 1.48 in our sample.
- 2 We also find that **index inclusion** matters for specific bonds:
 - ▶ On average, inclusion in GB indexes (ICE, Solactive, and J.P. Morgan) in itself is not associated with a significant greenium.
 - ▶ Index inclusion by currency suggests that euro GBs receive a significant greenium of about 12 bps, while excluded euro GBs do not.
 - ▶ Included U.S. dollar GBs do not receive a greenium, while excluded dollar GBs receive a significant greenium.

Mixed results on governance, external review, credibility

- While GB governance and external review matter for the greenium, the credibility of the underlying projects has no effect.

	Yield spread (basis points)					
	(1)	(2)	(3)	(4)	(5)	(6)
Green		-7.090*** (2.381)		-7.926*** (2.587)		-6.117** (2.658)
Green × GBP Aligned	-7.090*** (2.381)					
Green × GBP Not aligned	-16.48 (12.78)	-9.389 (12.72)				
Green × External review			-7.926*** (2.587)			
Green × No external review			-7.124 (9.193)	0.802 (9.408)		
Green × No Refinancing					-6.117** (2.658)	
Green × Refinancing					-11.32* (6.235)	-5.203 (5.987)
Controls & Firm × Year FE	✓	✓	✓	✓	✓	✓
Observations	114836	114836	114836	114836	114361	114361
Adjusted R^2	0.807	0.807	0.807	0.807	0.806	0.806

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

Greenium distributed to large, investment grade issuers

- Instead, the greenium is unevenly distributed to large, investment grade issuers, primarily within the banking sector and developed economies.

	Yield spread (basis points)			
	(1)	(2)	(3)	(4)
Green	14.74 (26.70)	58.40** (28.18)		-9.793*** (3.063)
Green × Size	-1.201 (1.413)			
Green × Average issuer bond size		-3.473** (1.489)		
Green × Investment grade			-9.793*** (3.063)	
Green × High yield			-23.99 (18.28)	-14.20 (18.79)
Green × Not rated			-1.669 (3.278)	8.124 (4.904)
Controls & Firm × Year FE	✓	✓	✓	✓
Observations	114,879	114,879	114,879	114,879
Adjusted R^2	0.809	0.809	0.809	0.809

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.



Conclusions for issuers

- On average, GBs have 8 bps lower yield spread than conventional bonds.
 - ▶ GBs need to be sufficiently green beyond some minimum threshold.
 - ▶ Greenium is unevenly distributed to large, investment grade issuers in few industries from developed economies.
- Demand at issuance is an important driver of the greenium.
 - ▶ Greenium linked to bond index inclusion and bond oversubscription.
 - ▶ Part of the greenium could be due to supply and demand mismatch.
- This has implications for the role of GBs in incentivizing meaningful green investments throughout the global economy.