The Emerging Greenium

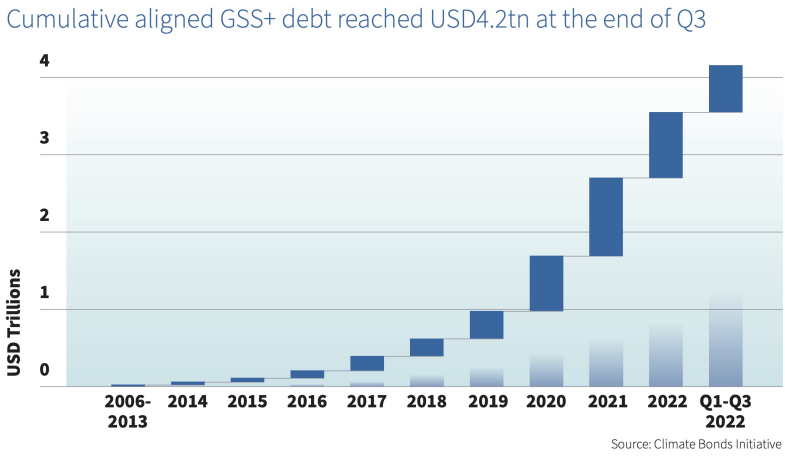
Midwest Finance Association

Kunal Sachdeva

March 9th, 2024

Consistent Growth in GSS+ Debt

Expected to Exceed $5 Trillion Dollars



Green Bonds Make up a Majority of These Bonds

Source: Climate Bonds Initiative

Why Does the Greenium Matter?

Help Firms and Governments Stretch Their Limited Budgets

Green Bond Proceeds

Power Bond Series 2015A
As of June 30, 2021

Project	Estimated Use of Proceeds	Prior Years Spending	FY 20-21 Spending	Remaining
Hydroelectric Powerhouse Controls Upgrade	$32,414	$32,414	$-	$2,163,084
Kirkwood Penstock Rehabilitation	2,667,250	1,789,614	-	1,755,272
Moccasin Penstock Rehabilitation	2,465,798	1,447,514	783,522	352,047
Mountain Tunnel HydroelectricConveyance	11,332,750	10,706,329	140,433	1,112,409
Oil Containment Upgrades for Holm & Kirkwood Hydroelectric Facilities	812,147	812,147	-	-
Other Powerhouse Projects - Holm Unit 2	13,394,890	12,919,402	9,345	1,381,507
Total	**30,200,000***	**27,707,419**	**933,300**	**1,559,281***

*Budget in excess of project fund deposit to come from other funding sources

Emerging Greenium – What Does This Paper Do?

Big Picture of the Paper

Do investors forego financial returns in exchange for non-pecuniary benefits in the United States municipal bond market?

1. Construct an identical non-green bonds from 2013 to 2022. Comparing 1,027 pairs of exact matches
   - → Procedure is the same as the "exact match" method by Larcker and Watts (2020)
   - → Issuance date, maturity date, ratings, call dates
   - → Also uses the source of repayment (revenue or general obligation) tax status

2. Explore possibly important CS relationships
   - → Considers state-level green preferences, underwriter discount, how green is the bond issuance, term structure

Summary of Key Results

Finds small, positive, greenium associated with municipal green bonds

"Our primary differences are studying an extended sample and observing very different results."

1. Finds a significant greenium after 2018, with an average of 2.3 basis points (bps)

2. In addition to issuance yields, underwriter discounts matter

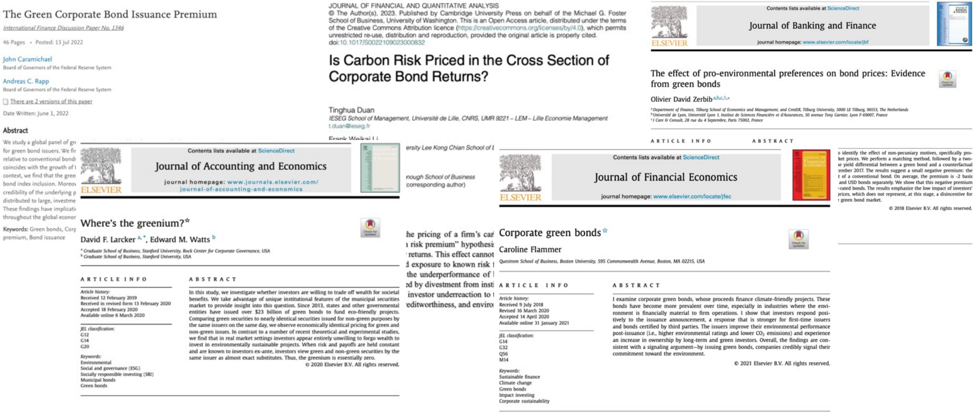
3. Documents significant cross-sectional heterogeneity
   → Investors are willing to pay is correlated with measures of state-level green preference and bond-level greenness

4. Term structure of greenium is downward sloped. In other words, greenium is higher for shorter-maturity bonds

>> ***How does this fit into the existing literature?***

Perspective on the Paper

Many paper's studying this question – underlines the importance!!!



The Green Corporate Bond Issuance Premium

International Finance Discussion Paper No. 1346

46 Pages • Posted: 13 Jul 2022

John Caramichael
Board of Governors of the Federal Reserve System

Andreas C. Rapp
Board of Governors of the Federal Reserve System

There are 2 versions of this paper

Date Written: June 1, 2022

Abstract

JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS
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Is Carbon Risk Priced in the Cross Section of Corporate Bond Returns?

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The effect of pro-environmental preferences on bond prices: Evidence from green bonds

Olivier David Zerbib

ARTICLE INFO

ABSTRACT

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Where's the greenium?

David F. Larcker, Edward M. Watts

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Socially responsible investing (SRI)
Municipal bonds
Green bonds

ABSTRACT

In this study, we investigate whether investors are willing to trade off wealth for societal benefits. We take advantage of unique institutional features of the municipal securities market to provide insight into this question. Since 2013, states and other governmental entities have issued over $23 billion of green bonds to fund eco-friendly projects. Comparing green securities to nearly identical securities issued for non-green purposes by the same issuers on the same day, we observe economically identical pricing for green and non-green issues. In contrast to a number of recent theoretical and experimental studies, we find that in real market settings investors appear entirely unwilling to forgo wealth to invest in environmentally sustainable projects. When risk and payoffs are held constant and are known to investors ex-ante, investors view green and non-green securities by the same issuer as almost exact substitutes. Thus, the greenium is essentially zero.

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Corporate green bonds

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ABSTRACT

I examine corporate green bonds, whose proceeds finance climate-friendly projects. These bonds have become more prevalent over time, especially in industries where the environment is financially material to firm operations. I show that investors respond positively to the issuance announcement, a response that is stronger for first-time issuers and bonds certified by third parties. The issuers improve their environmental performance post-issuance (i.e., higher environmental ratings and lower CO_2 emissions) and experience an increase in ownership by long-term and green investors. Overall, the findings are consistent with a signaling argument—by issuing green bonds, companies credibly signal their commitment toward the environment.

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Perspective on the Paper

Many paper's studying this question – underlines the importance!!!

Perspective on the Paper

Many paper's studying this question – underlines the importance!!!

Positive Greenium:

- Zerbib (2019, JBF)
  - → Negative yield premium of 2-bps on average
  - → Supranational, sub-sovereign and agency (SSA), municipal, corporate, financial and covered bonds
- Baker et al. (2022, ARFE)
  - → Green bonds, 5 to 9 basis points below yields paid by otherwise equivalent bonds.
- Wang and Wu (2024, WP)
  - → 5.4 basis points (bps) lower for green than for conventional bond offerings issued by the same issuer
- ...

Zero or Negative Greenium

- Larcker and Watts (2020, JAE)
  - → Greenium is essentially zero
  - → Data ended in 2018
- Tang and Zhang (2020, JCF)
  - → Greenium is essentially zero
  - → International data, data ends in 2017
- Flammer (2021, JFE)
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>> Is there anything new to say in the literature? (Yes)

Perspective on the Paper

Perfect Timing for the Paper

Earlier papers consider why they estimate zero greenium...

6. Alternative explanations for No greenium

6.1. Supply-demand explanations

In Section 5, we provide compelling evidence that the municipal market greenium is zero. This finding suggests that the marginal investor in the municipal market is not willing to forgo returns to invest in environmentally friendly assets. However, to the extent that the amount of green supply (here the issuance size of the green bond) exceeds the demand, this may confound our inferences. For a greenium to emerge, the amount of green demand must be sufficient to clear the entire supply of the issue at a higher price (lower yield and spread). That is, a green investor must be the marginal trading for this asset in order to observe greenium (if it exists).

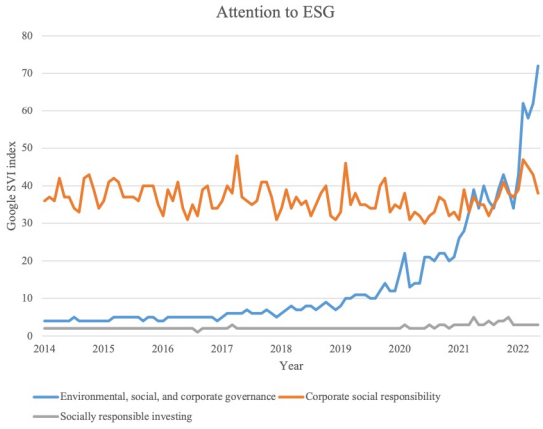
7.2. Discussion of the no pricing difference

The finding of no green bond premium warrants some discussion. First, is this finding consistent with industry practice? Intuitively, one might expect that green bond investors are willing to trade off financial returns for societal benefits. Yet, as it turns out, this is not the prevailing view among industry practitioners. For example, participants responding to a survey by the California State Treasurer's Office on green bonds unanimously stated that "their firms would not accept a lower yield for a green bond."[50] This was further confirmed by Larcker and Watts (2020, p. 4) in their interviews of several traders, portfolio managers, and investment bankers, who all shared that sentiment. I also conducted my own interviews of industry practitioners, including two fixed income analysts at asset management firms, a green bond research analyst at a leading financial institution, and the director of the sustainable division of one of the world's largest banks. They unanimously stated that they would not invest in green bonds if the returns were not competitive.

>> ***Great opportunity to both document the emerging greenium and explain the source better***

Comment 1A – What Led to the Emerging Greenium?

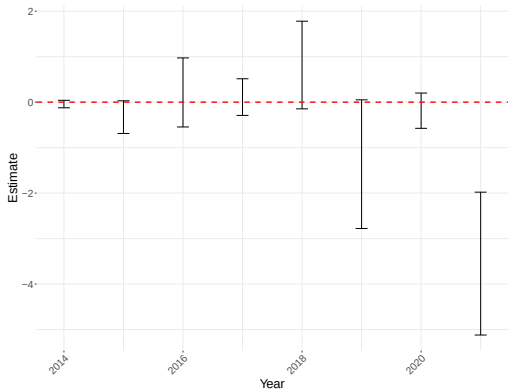
Is attention the driving force?



Comment 1A – What Led to the Emerging Greenium?

Is attention the driving force?

Estimates from table 2, panel A of the paper



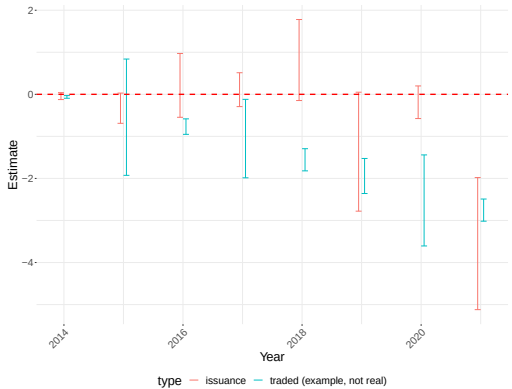
>> ***How can we better attribute this to attention?***

Comment 1A – What Led to the Emerging Greenium?

Is attention the driving force?

Case 1: Similar Evolution on the Secondary Market

- Suggest a story closer to the attention story
- Can also test this at the state level for green/brown states

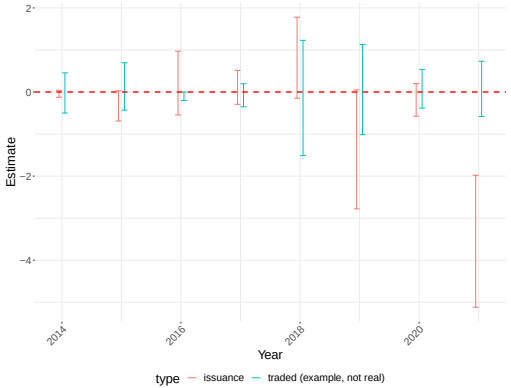


Comment 1A – What Led to the Emerging Greenium?

Is attention the driving force?

Case 2: Emerging greenium only for issuance

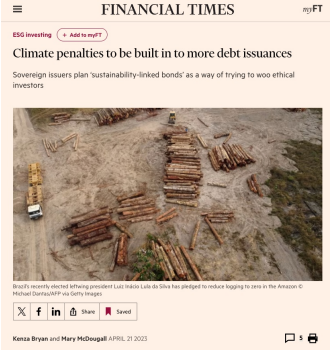
- Suggestive that either the issuance process, or the underlying bonds are the source of the emergence
  1. Does the first issuance drive the result (a la Flammer 2021).
  2. Is there a cross-subsidization between issuance of green vs. brown bonds issued at the same time?
  3. ... or some other channel?



Comment 1B – What Led to the Emerging Greenium?

Other Important Differences in Bonds?

We have seen an evolution of green bonds, evolution of standards



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Climate penalties to be built in to more debt issuances

Sovereign issuers plan 'sustainability-linked bonds' as a way of trying to woo ethical investors

Brazil's recently elected leftwing president Luiz Inácio Lula da Silva has pledged to reduce logging to zero in the Amazon © Michael Dantas/AFP via Getty Images

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Kenza Bryan and Mary McDougall APRIL 21 2023

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FINANCE

Bond Investors Challenge Wall Street Greenwashing

Investors avoid green bonds issued by companies like JPMorgan that they say don't meet sustainable investing standards

By Matt Wirz Follow

Nov. 2, 2021 7:00 am ET

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Sales of green bonds have boomed to around $250 billion annually from about $50 billion in 2015, according to the Climate Bonds Initiative. PHOTO: JONATHAN ERNST/REUTERS

FINANCIAL TIMES

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Green bonds + Add to myFT

New standards keep the greenwash off green bonds

European Union aims to define what counts as sustainable debt finance and bring in independent reviewers

Repsol, which operates this solar park in Badajoz, Spain, was the first oil company to issue a green bond © Angel Garcia/Bloomberg

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Andy Bounds APRIL 16 2023

1

>> ***It is possible that the covenants of green bond are different?***

Comment 1B – What Led to the Emerging Greenium?

Other Important Differences in Bonds?

Can you read/study some of the specific bonds?

Suggestion 1: Understand if there are other features that have been introduced?

- Is there time variation in the covenants that may drive the results?
- New features to limit greenwashing help further explain the emerging

Suggestion 2: Differences by Underwriter of Bonds

- There may be important differences by the underwriter (by time?).
- Providing evidence towards to source of the emergence is important

Comment 1C – What Led to the Emerging Greenium?

The size of greenium is positively related to:

- The state-level green preferences
- Related to bond-level greenness
- Downward-sloped term structure of greenium
- *Difference in underwriter discount was positive before 2018 and has become negative in recent years* ← **this**

$$TotalIssuanceCost = IssuanceYield + \frac{UnderwriterDiscount}{ModifiedDuration}$$

Comment 1C – What Led to the Emerging Greenium?

Underwriter Discount

	Underwriter discount difference (bps)					
Year	N	Mean	t-stat	% difference = 0	% difference < 0	% difference > 0
2014	38	0.105	1.00	97.37	0	2.63
2015	102	10.861	5.09	71.57	0	28.43
2016	108	3.284	1.15	54.63	8.33	37.04
2017	265	1.442	4.79	56.23	20.38	23.40
2018	136	0.524	1.72	82.35	10.29	7.35
2019	92	0.824	2.03	52.17	10.87	36.96
2020	69	-4.878	-4.15	47.83	30.43	21.74
2021-2022	174	-6.101	-3.99	28.74	37.36	33.91
2014-2018	649	2.958	4.82	66.26	11.86	21.88
2019-2022	335	-3.947	-4.64	39.10	28.66	32.24
Diff		-6.906	-4.85			

>> ***Suggestive that something is going on at the issuance level that matters***

Comment 1C – What Led to the Emerging Greenium?

Underwriter Discount

Panel B. Underwriter discount differences

	(1)	(2)	(3)	(4)
State green preferences (HIP)	0.0141			
	(0.33)			
Earth rating difference (HIP)		-0.118		
		(-1.36)		
Different use of proceeds (Mergent)			-25.65***	
			(-5.32)	
Different use of proceeds (Manual)				-23.15***
				(-4.57)
State FE	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	272	335	334	334
Adj R2	0.311	0.0459	0.413	0.373

>> ***Suggestive that something is going on at the issuance level that matters***

Comment 1C – What Led to the Emerging Greenium?

Underwriter Discount

October 2, 2008

Peter Taylor, Managing Director, Public Finance Department

Matthew Koch, Vice President, Public Finance Department

Introduction to Bond Math

Presentation to CDIAC

>> ***What goes into an underwriters discount (gross spread)***

Comment 1C – What Led to the Emerging Greenium?

Underwriter Discount

Issuance Expenses

Key Calculations from a Bond Sale

Borrower's Costs of Issuance	Components of Underwriters' Discount
Rating Agency Fees	Takedown
Issuer/ Authority Fee	Management Fee
Bond Counsel Fee	Underwriters' Counsel
Borrower's Counsel Fee	DTC
Trustee Fees	CUSIP
Auditor's Fee	BMA Assessment
Printing and Mailing Costs	Dalcomp
Miscellaneous and Contingency	Electronic Order Entry
	Dalcomp Wire Charge
	Cal PSA
	CDIAC
	Day Loan
	Out-of-Pocket and Closing Costs
	Verification Agent (if refunding)

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>> ***What about the underwriter discount has changed?***

Comment 1C – What Led to the Emerging Greenium?

Underwriter Discount

Can the paper shed more light on the variation in underwriting discount?

Suggestion 1: Talk to several bankers

- This is a very old school approach, often helps us find the ground truth quickly
- Understand both the choices of which bank to use, fee structure, especially when issuing multiple bonds

Suggestion 2: Think of the economics of lower underwriting fees

- It costs more to issue a green bond, so the discount is interesting
- Why would the difference in underwriting discount become negative?
    1. Is there a benefit to the bank for offering green bonds?
    2. Is there a cross-subsidization between the issuance of green vs. brown bonds issued simultaneously?

Excited for this paper!

Carefully Executed, Helps Bring New Insights

This paper expands on what we know

- Careful examination of the greenium, convinced that there is an emergence of a small but important premium
- The paper presents compelling evidence consistent with priors about where greenium comes from
- The ability to further rationalize the changing magnitudes of the greenium will make a large contribution