

Mesurer de la décarbonation: Le cas des obligations vertes

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du conseil national de l'information statistique
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Perspective des investisseurs

- 2 objectifs principaux
 - Se couvrir par rapport aux risques carbone (transitions et physiques)
 - Financer la transition vers une économie décarbonée
- Quelles politiques publiques sont efficaces?
 - In fine les émissions de carbone sont un étalon du succès
 - On peut les mesurer ou les projeter
- Outils indirects dont l'efficacité doit être évaluée
 - Les taxonomies (publiques ou ESG)
 - Les obligations vertes

Limites des taxonomies

([A taxonomy of sustainable finance taxonomies](#),
Ehlers, Gao et Packer, 2021)

- Les taxonomies existantes
 - N'incluent pas de mesure de performance / décarbonation
 - Ne prévoient pas de mode de vérification des gains / décarbonation

- Voies d'amélioration
 1. Liens explicites avec des objectifs de soutenabilité
 2. Alignement avec les objectifs de Paris 2015
 3. Transparence et supervision / certifications et vérifications
 4. Imposer le reporting d'impact pour les obligations vertes

Etude de cas / obligations vertes

(basé sur [Growth of the green bond market and greenhouse gas emissions](#),
Demski, Dong, McGuire et Mojon, BIS QR March 2025)

- Les politiques de décarbonation ont-elles un impact sur les émissions d'obligations vertes?

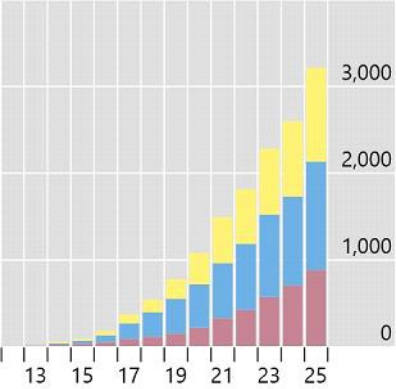
- Les émetteurs d'obligations vertes réduisent-ils leurs émissions de carbone?

Green bond market has grown exponentially amid tightening of climate policies

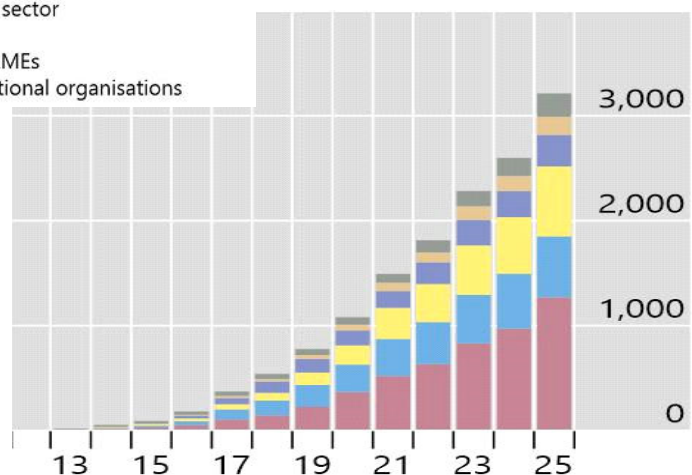
Green bond volumes have increased exponentially¹

US dollars

Graph 1

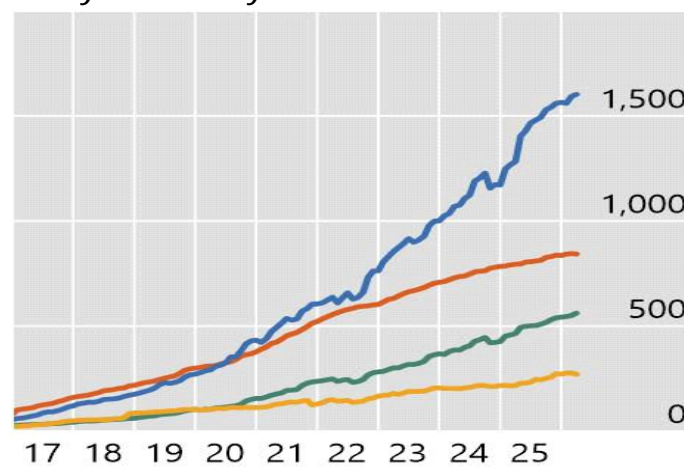


- Non-financial corporations
- Financial institutions
- Official sector
- Other EMEs
- International organisations



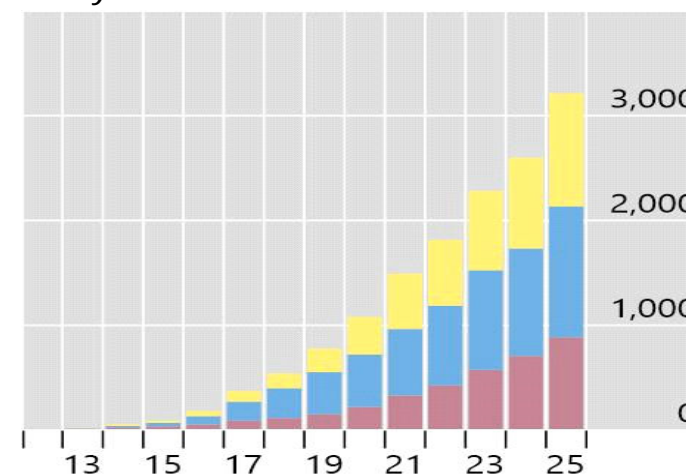
- Euro area
- United States
- Other AEs
- China
- Other EMEs
- International organisations

B. By currency



- EUR
- USD
- CNY
- Other

C. By issuer sector



- Non-financial corporations
- Financial institutions
- Official sector

¹ Amount outstanding is calculated using total cumulative issuance minus cumulative amount matured as of a given year.

Sources: Climate Bonds Initiative; Dealogic; Environmental Finance Bond Database; S&P Trucost; authors' calculations.

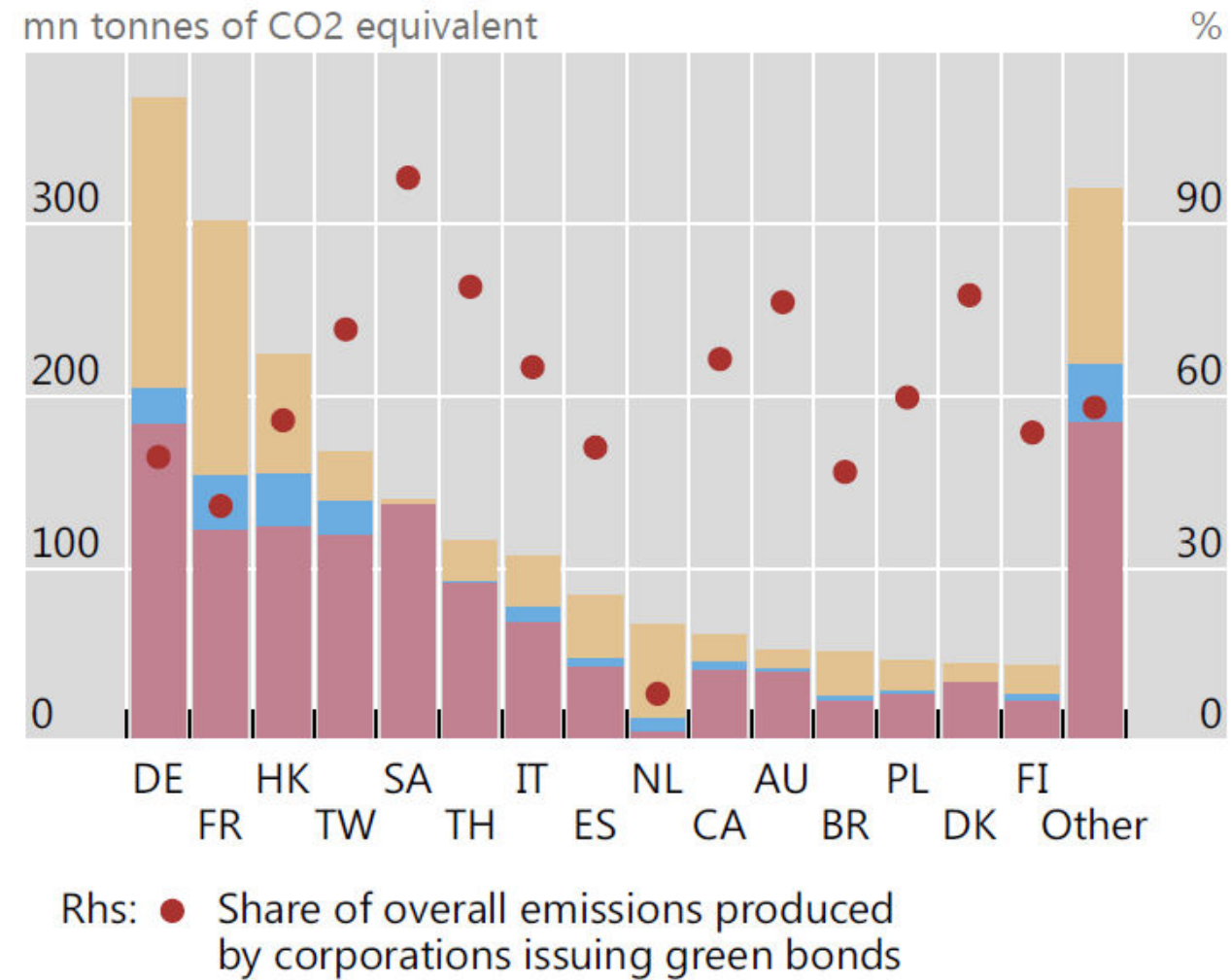
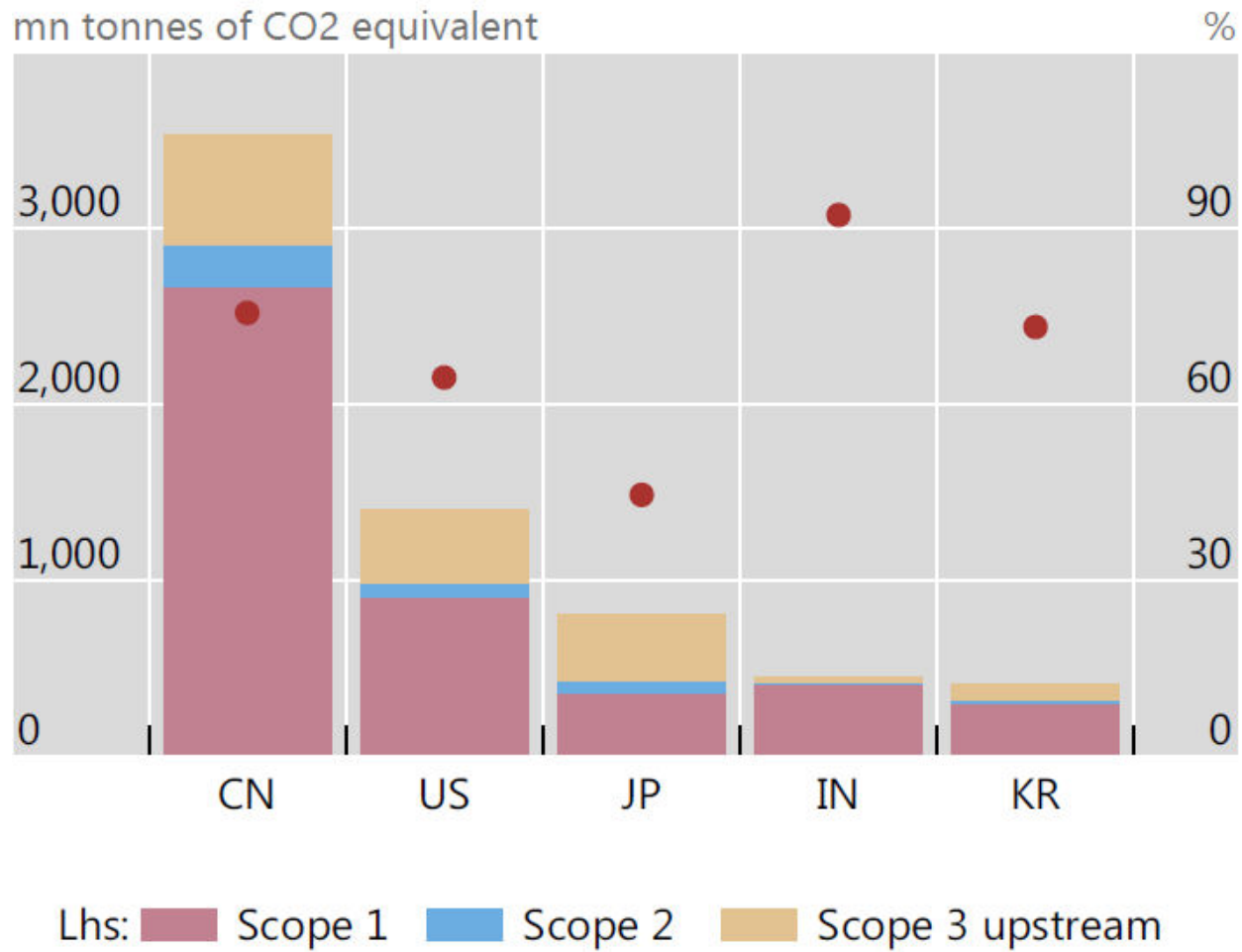
The Climate Actions and Policies Measurement Framework

Sectoral policies		Cross-sectoral policies	International policies
Sector	Market-based instruments Non-market-based instruments	GHG emissions targets: - Net zero target - NDC target Public RD&D expenditure: - Six categories (energy efficiency, renewables, etc) Fossil fuel production policies: - FFS reform for fossil fuel production - Bans and phase-outs of fossil fuel extraction - Policies to reduce fugitive methane emissions Climate governance: - Independent climate advisory body	International cooperation: - Climate treaties - Climate initiatives - Emissions pricing from aviation or shipping International public finance: - Banning export credits for unabated coal plants - Banning public finance of fossil fuels abroad GHG emissions and data reporting: - Reporting and accounting - UNFCCC evaluation of biennial reports - Submissions of key UNFCCC documents
Electricity	- Carbon pricing - RES support - Bans and phase-outs of coal power plants - Air pollution standards for coal plants - Planning for renewables		
Transport	- Carbon pricing - Congestion charge - Fuel economy standards - Energy labels - Bans and phase-outs of ICE - Public rail investment - Motorway speed limits		
Industry	- Carbon pricing - Financing mechanism for EE - MEPS appliances - Energy labels - Building energy codes - Bans and phase-outs of fossil-based heating		
Buildings	- Carbon pricing - Financing mechanism for EE - MEPS industrial motors - Energy efficiency mandates		

Data

- 11874 green bonds from 3352 different issuers from 2015 to 2024
 - “green bonds” if at least 1 data provider identifies the bond as “green”
 - 39 countries
- GHG emissions at the “firm/issuer” level as it appears in “S&P Trucost”
 - We use either Scope 1 and Scope 1, 2 and “3 upstream” emissions
 - Coverage
 - Share GHG emissions in “S&P Trucost” ~45% up to 2016; ~75% since 2018
 - 2/3 are due to energy intensive sectors
 - Market value of firms equity add up to USD 100 trillion
- Energy intensive sectors issued ~ 20% of green bonds in 2022

GHG emitted by corporations in 2022, by headquarter country and type



Purpose

- Do climate action public policies influence the issuance of green bonds?
- Do green bond issuers emit less or reduce their carbon emissions when compared to their peers?

Stricter climate policies are correlated with larger green bond market growth

Table 1

	Green bond gross issuance			Green bond issuance share		
	(1)	(2)	(3)	(4)	(5)	(6)
Aggregate policy	2.41***			2.50*		
International policy		0.58			-0.14	
Cross-sectoral policy		0.11			0.73	
Sectoral policy		2.94***			2.96**	
Sectoral policy: market-based			2.11***			3.06***
Sectoral policy: non-market-based			1.23**			0.42
Observations	420	420	420	420	420	420
Within R-squared	0.59	0.59	0.59	0.35	0.35	0.35
Overall R-squared	0.74	0.74	0.74	0.45	0.45	0.45

***/**/* indicate statistical significance at the 1/5/10% level. Regressions include country and year fixed effects. Green bond gross issuance is in logs. Policy variables are standardised to a normal distribution and lagged by one year. Control variables are GDP growth, GDP per capita, debt market size, market capitalisation and renewable energy share in electricity.

Source: Authors' calculations.

Correlations of climate policies and green bond issuance differ across sectors

Table 2

	Green bond gross issuance: financial			Green bond gross issuance: non-financial			Green bond gross issuance: official		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Aggregate policy	2.59***			2.86***			1.04		
International policy		1.23**			0.93*			0.98*	
Cross-sectoral policy		0.17			0.21			1.17**	
Sectoral policy		2.90***			2.85***			1.03	
Sectoral policy: market-based			2.14***			2.39***			0.90
Sectoral policy: non-market-based			1.50**			1.24**			0.70
Observations	420	420	420	420	420	420	420	420	420
Within R-squared	0.50	0.50	0.50	0.54	0.54	0.54	0.27	0.27	0.27
Overall R-squared	0.71	0.71	0.71	0.69	0.69	0.69	0.52	0.52	0.52

***/**/* indicates statistical significance at the 1/5/10% level. The regression includes country and year fixed effects. Green bond gross issuance is in logs. Policy variables are standardised to a normal distribution and lagged by one year. Control variables include GDP growth, GDP per capita, debt market size, market capitalisation and the share of renewable energy in electricity use.

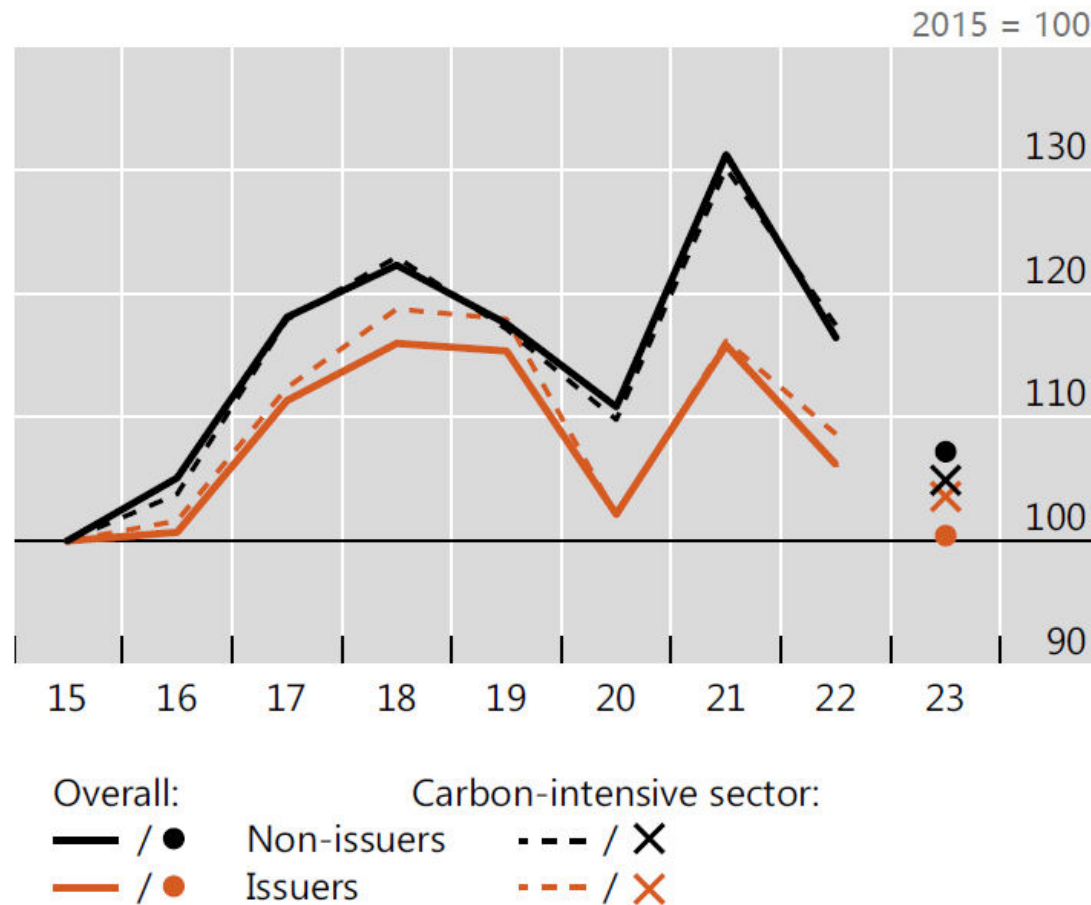
Source: Authors' calculations.

Purpose

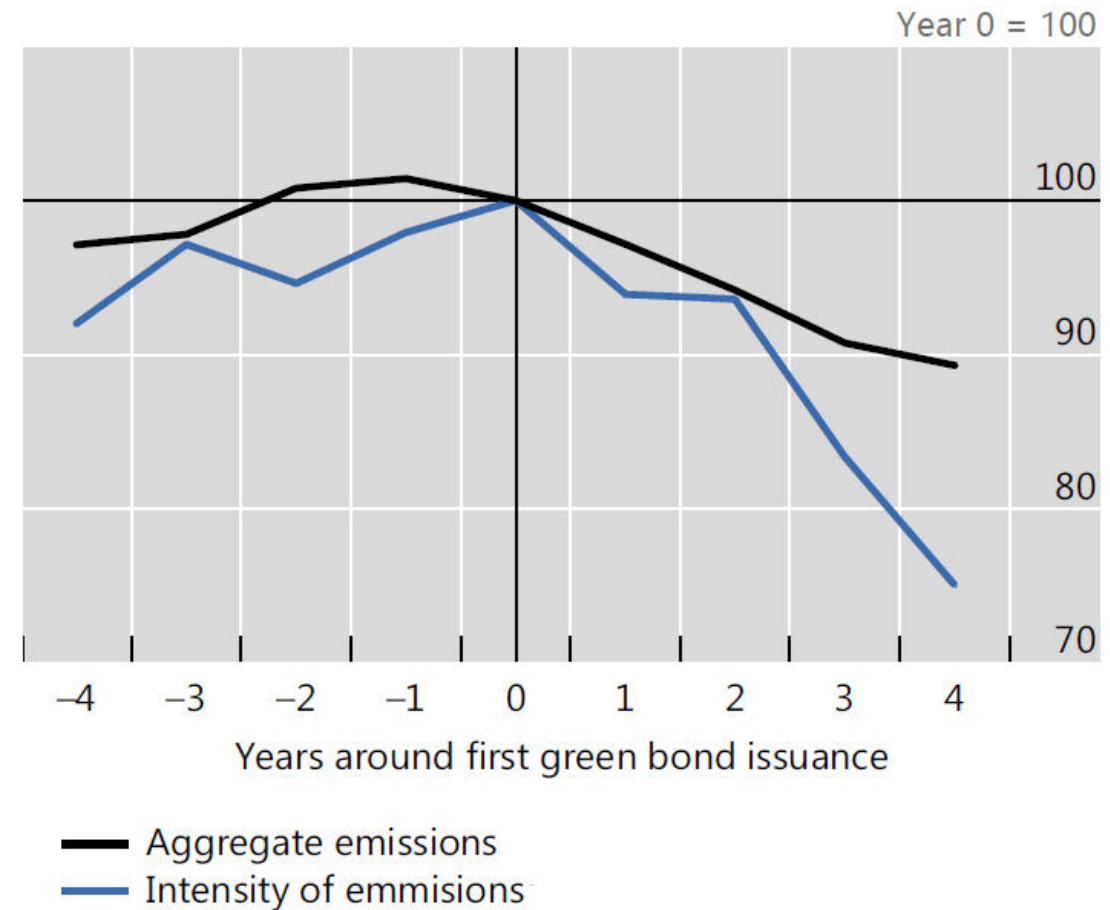
- Do climate action public policies influence the issuance of green bonds?
- Do green bond issuers emit less or reduce their carbon emissions when compared to their peers?

Milder growth of GHG emissions for green bond issuers, and reduced emissions following green bond issuance

A. Aggregate emissions, by issuer type



B. Emissions following initial green bond issuance



Green bond issuance leads a reduction in “brown” firms’ GHG emissions

Firms’ GHG emissions intensity decline following the issuance of green bonds

Table 3

	Full sample scope 1	Full sample scope 1–3	Carbon-intensive sectors	Other sectors	GHG intensity in top 20%	GHG intensity in bottom 20%
	(1)	(2)	(3)	(4)	(5)	(6)
Green bond (issue year)	–85.4	–89.5	–358.1*	8.2	–492.6	–6.9
Green bond (1 year)	–154.5**	–152.4**	–630.6**	12.3	–779.2**	–2.6
Green bond (2 years)	–174.5**	–146.9	–728.5**	35.9	–903.1*	73.8
Green bond (3+ years)	–182.6*	–159.7	–928.8***	71.3**	–1,263.0**	26.5
Observations	6,174	6,174	1,816	4,288	1,205	1,171
Within R-squared	0.002	0.002	0.013	0.004	0.014	0.012
Overall R-squared	0.92	0.92	0.91	0.83	0.89	0.35

***/**/* indicates statistical significance at the 1/5/10% level. The regression also includes log firm asset, firm fixed effects, country-year and industry-year fixed effects. The dependent variable is emissions intensity of scope 1 emissions for column (1), and scope 1–3 emissions for other columns.

Source: Authors’ calculations.

Main results of the econometric analysis

- Positive correlation between policy stringency and the size of countries' green bond markets
 - For all sectors, international policies (e.g., participation in key international climate initiatives) appear to coincide with greater issuance of green bonds
 - Cross-sectoral policies (e.g., setting GHG emissions targets) correlate with green bond issuance only for the official sector, while sectoral policies (e.g. Carbon pricing) relate to issuance only for the financial and non-financial sectors.
- Green bond issuance is associated with a significant reduction in firms' subsequent GHG emissions
 - It is the heavy emitters that reduce their GHG emissions after issuing green bonds

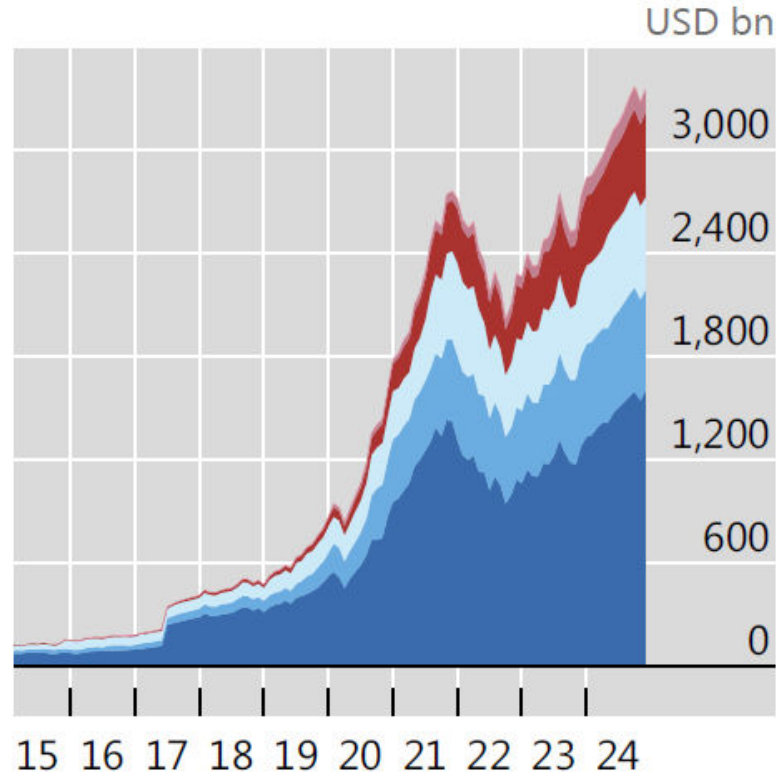
Principales conclusions

- Croissance exponentielle des obligations vertes depuis l'Accord de Paris de 2015
 - Émises par États souverains, municipalités, institutions financières et ENF
- L'émission accrue d'obligations vertes a suivi des politiques d'émissions plus strictes visant à réduire les émissions au niveau national.
- L'émission d'une obligation verte est devenue un bon indicateur de la réduction des émissions des entreprises, notamment pour les entreprises des secteurs à forte intensité de carbone ou celles qui étaient de gros pollueurs.

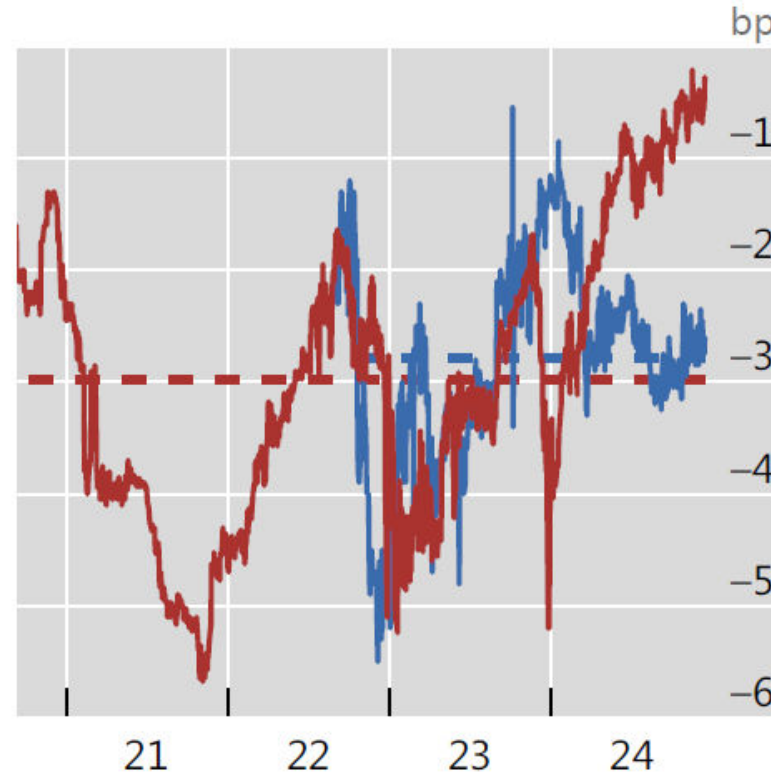
Appendix

Some characteristics of green financial instruments

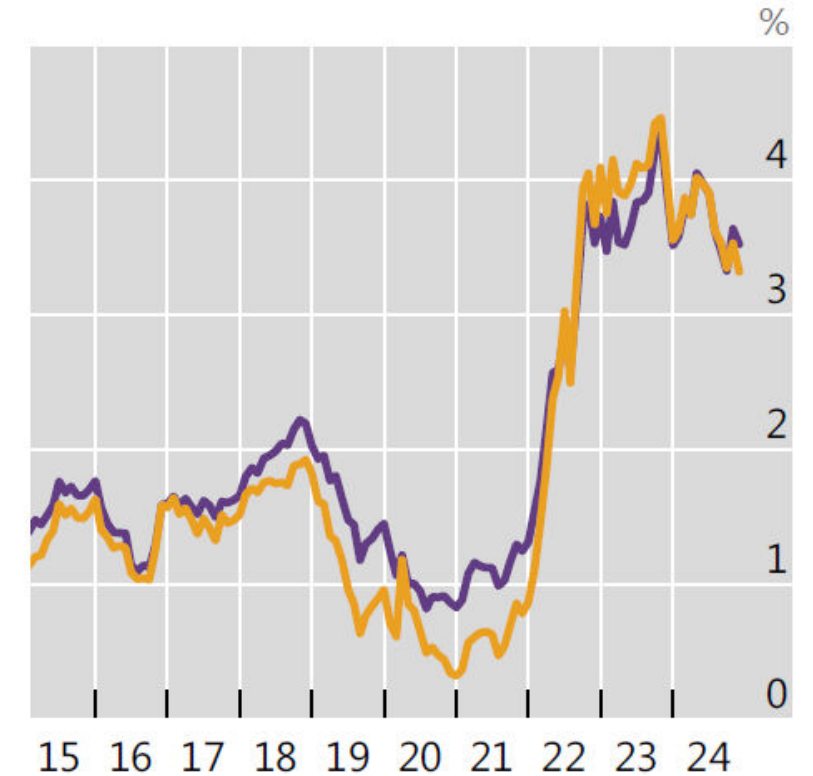
A. AUM in ESG funds



B. Sovereign green bond premium



C. Historical yields on green bonds



Mutual funds: ETFs:
■ Equity ■
■ Bond ■
■ Other ■

Yield: Period average:
— Germany - - -
— Denmark - - -

— Green
 — Overall