The EU Taxonomy and the Syndicated Loan Market

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Motivation

Broadly:

– What are the benefits of green investments to companies?

– How do capital providers respond to corporate greenness?

Two roles of market investors advocated by the **Paris Agreement**

- Article 2.1(c): Making finance flows consistent with a pathway towards (1) low greenhouse gas emissions and (2) climate-resilient development.

- First role of financial investors is well documented in the literature, knowledge on the second role less unclear.

Specifically in this paper:

– What are the economic consequences of EU Taxonomy-aligned activities for debt markets?

  – (Data to be updated)

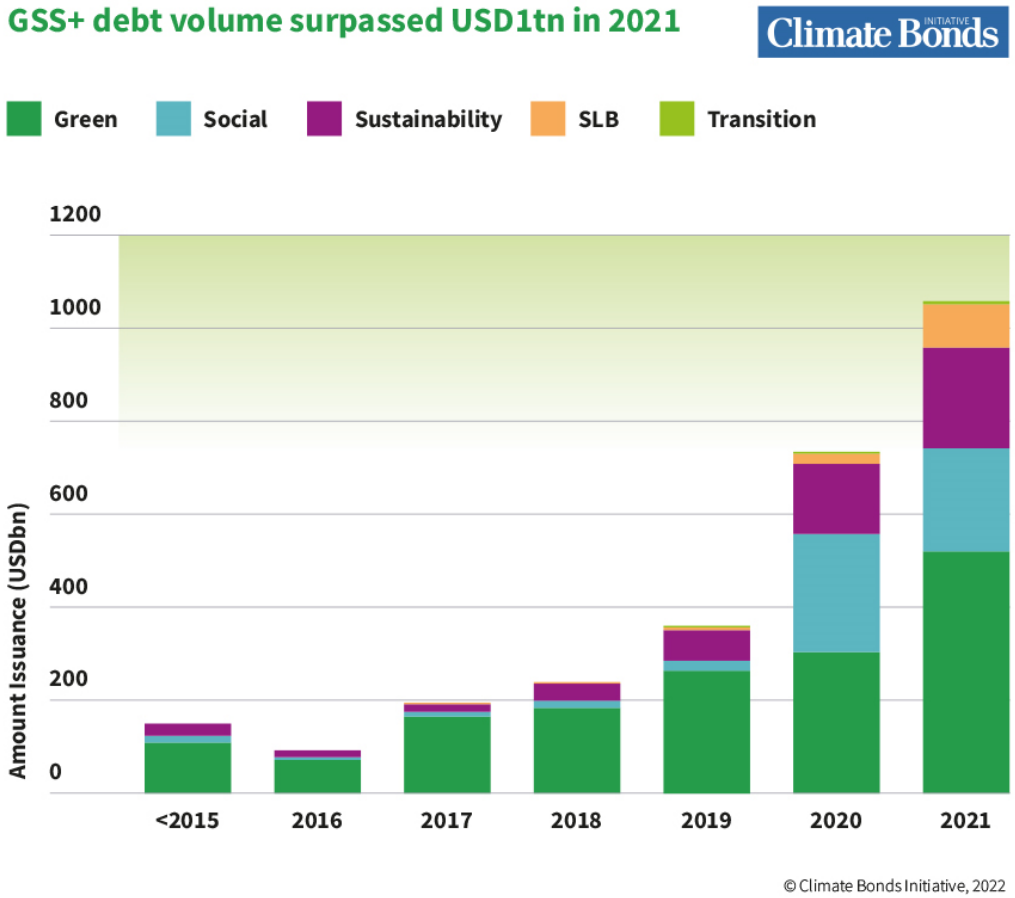
Green Taxonomy: What and why

Classification system, establishing a list of environmentally sustainable economic activities and products

Benefits:

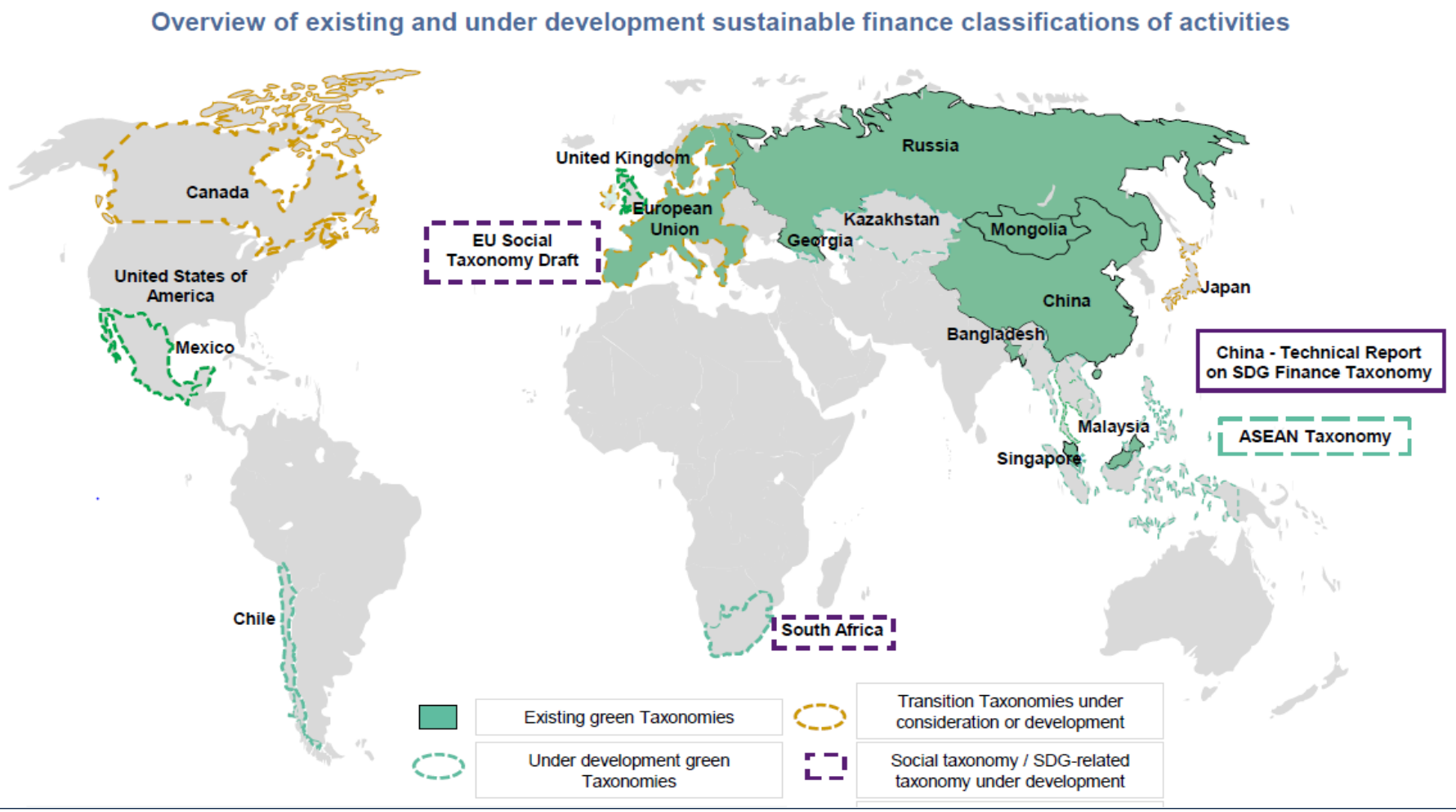
– Direct finance toward sustainable, resource-efficient activities

– Transparency and comparability of eco-friendly activities for investors, customers, and regulators



An Overview

A Global Phenomenon: the multiplication of Taxonomies worldwide



Mandatory uses of the Taxonomies

In the EU, larger investee companies will have a duty to disclose their alignment with the Taxonomy. The proposal for the European Green Bond Standard requires that issuers must allocate 100% of the proceeds raised by their bond to economic activities that meet the EU Taxonomy. Investors must refer to the criteria when marketing green products.

In China, the use of Green Industry Guiding Catalogue is mandatory for sustainable financing purposes (e.g., green bonds, supply of green credits).

The EU Taxonomy Regulation

Large companies	Large financial and non-financial companies that fall under the scope of the Non-Financial Reporting Directive will have to disclose to what extent the activities that they carry out meet the criteria set out in the EU Taxonomy.
Financial investors	• Financial market participants (such as asset managers) will have to disclose to what extent the activities that their financial products fund meet the EU Taxonomy criteria.
Companies	• Disclosure on green revenue and green expenditure will provide the market with information on (1) companies whose activities comply with the EU Taxonomy criteria (through disclosure of share revenue from Taxonomy-aligned activities) and (2) companies that are taking steps to get there (through disclosure of green expenditure).

Specific research questions

- Have banks **priced in some of the *intended* effects** of Taxonomy-aligned business activities (*prior to the Taxonomy being effective*)?
- What are the **underlying mechanisms** driving debt market effects of Taxonomy-aligned business activities?
- How do firms adjust their **capital structure** given the debt effects of Taxonomy-aligned business activities?

Summary of main findings

- Banks charge a *lower* interest rate on loans to firms with more Taxonomy-aligned *transitional* revenue ("green revenue")
  - ➢ not to those which generate more *enabling* revenue that helps reduce climate risk of other businesses;
- Two channels explain the results:
  - ➢ climate risk management
  - ➢ lenders' green preferences
- Green revenue associated with beneficial real environmental and financial effects.
  - ➢ Firms with more green revenue reduce emissions more and develop more green innovation
  - ➢ Firms with more green revenue have more long-term debt and are more likely to raise finance through bank loans

Contributions

- Bank lending effects of climate change
  - ➢Physical climate risk: Correa, He, Herpfer, and Lel (2021)
  - ➢Regulatory climate risk: Ivanov, Kruttli, and Watugala (2021)
  - ➢Transitional climate risk: Kacperczyk and Peydro (2021), Ehlers, Packer and de Greiff (2022), Anginer, Hrazdil, Li and Zhang (2021)
  - ➢ We focus on climate resilience reflected by the Taxonomy-aligned green revenue
- Policy implications
  - ➢Taxonomy captures meaningful heterogeneity across firms in terms of their climate-related risks and opportunities
  - ➢Some of the Taxonomy effects may have already been priced in
  - ➢However, the eventual effect of the Taxonomy might be larger than what we have documented.

Taxonomy-aligned revenue data

- S&P TruCost EU Taxonomy Revenue Share dataset
  - Matches the NACE codes of EU Taxonomy-aligned activities with the business activities classified by the North American Industry Classification System (NAICS).
  - Calculates the proportion of firm revenue generated by NAICS-based business segments with *transitional* or *enabling* activities.
  - Data cover 15,000+ listed firms, 98% of global market cap.
- Primary measures
  - Transitional revenue ("green revenue"): Fraction of revenue associated with economic activities that make a substantial contribution to climate change mitigation based on a firm's own activities
  - Enabling revenue: Fraction of revenue arising from economic activities that enable other firms to contribute to the EU's climate change objectives (i.e., they manufacture components or provide services that improve the environmental performance of other activities)

Syndicated loan data

- Global syndicated loan facilities: DealScan database
  - Loan spread, loan amount, loan maturity, loan covenants etc.
  - Loan spread: fees and the spread that the borrower pays in basis points over the LIBOR for each dollar drawn down under loan commitment
- Final sample: 14,424 loan facilities between 2005 and 2018 with borrowers located in 36 countries.

- Baseline regression:

$$Loan\ Spread_{i,j,c,t} = \alpha + \beta Transitional\ Rev_{j,c,t} + \boldsymbol{\delta}' X_{i,c,t}$$

- Loan purpose, country and year fixed effects are also included. Standard errors clustered at the country-year level.

T1 Summary statistics

Variables	# Obs.	Mean	Std. Dev	5%	Median	95%
Loan Spread$_{i,j,c,t}$	14,424	159.1	107.1	30.0	137.5	370.0
Transitional Rev$_{j,c,t}$	14,424	0.227	0.379	0.000	0.000	1.000
Enabling Rev$_{j,c,t}$	14,424	0.138	0.309	0.000	0.000	1.000
Log Scope 1 Emissions$_{j,c,t}$	12,910	11.750	2.878	7.453	11.442	17.167
Log Scope 2/3 Emissions$_{j,c,t}$	12,910	12.635	1.953	9.443	12.655	15.864
Log Loan Amount$_{i,j,c,t}$	14,424	19.762	1.379	17.287	19.856	21.822
Log Loan Maturity$_{i,j,c,t}$	14,424	3.814	0.612	2.565	4.111	4.443
Log Loan Covenants$_{i,j,c,t}$	14,424	0.714	1.073	0.000	0.000	3.000

T2 Baseline results

Dependent Variable	*Loan Spread*$_{i,j,c,t}$						
	Full Sample	Full Sample	Full Sample	Full Sample	2005-2007	2008-2011	2012-2018
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Transitional Rev$_{j,c,t-1}$	-16.396***	-15.110***	-15.777***	-14.854**	-13.817***	-18.327***	-17.073***
	(-3.119)	(-3.202)	(-5.13)	(-6.671)	(-5.109)	(-5.181)	(-3.966)
Enabling Rev$_{j,c,t-1}$		6.102*					
		(-3.598)					
Loan deal variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm level control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan Purpose Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	No	No	Yes	Yes	No	No	No
Industry x Year Fixed Effects	No	No	No	Yes	No	No	No
# Obs.	14,424	14,424	14,424	14,424	2,699	5,156	7,737
Adj. R2	0.496	0.496	0.559	0.669	0.54	0.491	0.462

One-standard-deviation increase in transitional revenue (0.379) leads to 6 bps increase in loan cost:
1) 4% increase relative to the sample mean;
2) 0.54 million per loan facility; 0.74 billion in total

T3. Robustness tests

Dependent variable	Panel A: Long Term Effect of Transitional Revenue		Panel B: Controlling for Carbon Emissions		Panel C: EU and Non-EU Countries	
	Loan Spread$_{i,j,c,t}$					
	Full Sample (1)	Full Sample (2)	Full Sample (3)	Full Sample (4)	EU (5)	Non-EU (6)
Transitional Rev 3y$_{i,j,c,t}$	-16.319***					
	(3.154)					
Transitional Rev 5y$_{i,j,c,t}$		-16.480***				
		(3.186)				
Transitional Rev$_{i,j,c,t}$			-14.307***	-12.957***	-25.056***	-13.757***
			(3.485)	(3.512)	(7.326)	(3.338)
Log Scope 1 Emissions$_{j,c,t}$			2.414***			
			(0.478)			
Log Scope 2/3 Emissions$_{j,c,t}$				1.425*		
				(0.732)		
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Loan Purpose Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
# Obs.	14,424	14,424	12,910	12,910	2,356	12,068
Adj. R2	0.496	0.496	0.502	0.5	0.537	0.507

T4. Other loan characteristics

Dependent variable	Loan Covenants$_{i,j,c,t}$	Loan Maturity$_{i,j,c,t}$	Collateral$_{i,j,c,t}$	Loan Amount$_{i,j,c,t}$
	(1)	(2)	(3)	(4)
Transitional Rev$_{j,c,t-1}$	0.064	0.339	-0.113***	-161.881***
	(0.049)	(1.079)	(0.016)	(33.139)
Other Controls	Yes	Yes	Yes	Yes
Loan Purpose Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	14,424	14,424	14,424	14,424
Adj. R2	0.378	0.287	0.263	0.426

T5 Panel A. First channel: Risk management

Panel A: Regulatory Climate Risks

	High Environmental Policy Stringency		Low Environmental Policy Stringency
Dependent Variable	Loan Spread$_{i,j,c,t}$		Loan Spreads$_{i,j,c,t}$
	(1)		(2)
Transitional Rev$_{i,j,c,t-1}$	-34.854***		-12.159
	(7.056)		(4.306)
Other Controls	Yes		Yes
Loan Purpose Fixed Effects	Yes		Yes
Year Fixed Effects	Yes		Yes
Country Fixed Effects	Yes		Yes
# Obs.	2,700		7,854
Adj. R2	0.520		0.561
Chi2 Test Statistic		8.67***	
(p-value)		(0.003)	

T5 Panel B. First channel: Risk management

Panel B: Physical Climate Risks

	High Climate Change Vulnerability	Low Climate Change Vulnerability
Dependent Variable	Loan Spreads$_{i,j,c,t}$	Loan Spreads$_{i,j,c,t}$
	(1)	(2)
Transitional Rev$_{i,j,c,t-1}$	-21.925***	-11.703**
	(3.479)	(5.923)
Other Controls	Yes	Yes
Loan Purpose Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Country Fixed Effects	Yes	Yes
# Obs.	8,841	4,357
Adj. R2	0.545	0.502
Chi2 Test Statistic (p-value)	4.90** (0.0268)	

Table 6. First channel: Risk management

Dependent variables	Loan Spread$_{i,j,c,t}$		
	Full sample	Credit rating < BBB	Credit rating >= BBB
	(1)	(2)	(3)
Treat$_c$ × Post$_{c,t}$ × Transitional Rev$_{j,c,t-1}$	-72.758***	-100.815***	12.780
	(26.402)	(25.652)	(66.153)
Transitional Rev × Post $_{c,t}$	31.386**	25.216**	-19.235
	(12.611)	(12.237)	(15.446)
Treat$_c$ × Post $_{c,t}$	38.297***	54.452***	22.495
	(11.224)	(15.276)	(16.063)
Treat× Transitional Rev	12.342	1.242	60.745
	(22.499)	(30.971)	(53.907)
Transitional Rev$_{j,c,t-1}$	36.967**	44.569***	-76.744***
	(14.355)	(16.991)	(27.742)
Post $_{c,t}$	-6.483	-3.424	4.697
	(6.131)	(6.716)	(4.810)
Treat$_c$	-3.302	40.329**	-43.295*
	(10.644)	(20.110)	(21.792)
# Obs.	1,893	1,340	547
Adj. R2	0.697	0.751	0.789

Table 7. Second channel: Green preferences

Dependent variables	Loan Spread$_{i,j,c,t}$			
	EP Lenders	Non-EP Lenders	PRI Lenders	Non-PRI Lenders
	(1)	(2)	(3)	(4)
Transitional Rev$_{i,j,c,t-1}$	-20.440***	-12.200**	-53.800***	-13.441***
	(3.132)	(5.732)	(13.344)	(3.166)
Loan Purpose Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	8,602	5,822	1,234	13,190
Adj. R2	0.510	0.512	0.500	0.505
Chi2 Test Statistic	1.07			7.35***
(p-value)	(0.301)			(0.007)

T8. Environmental response

Dependent Variable	Emission Reduction$_{j,c,t}$	Green Innovation$_{j,c,t}$
	(1)	(2)
Transitional Rev$_{j,c,t-1}$	0.026***	0.034***
	(0.006)	(0.005)
Other Controls	Yes	Yes
Industry Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Country Fixed Effects	Yes	Yes
# Obs	30,508	30,508
Adj. R2	0.295	0.151

T9. Financial response

Dependent Variable	*Long Term Debt*$_{j,c,t}$	*Bank Loans*$_{j,c,t}$
	(1)	(2)
Transitional Rev$_{i,j,c,t-1}$	0.034***	0.009*
	(0.006)	(0.005)
Size$_{j,c,t}$	0.031***	-0.040***
	(0.002)	(0.003)
ROA$_{j,c,t}$	-0.003	0.018
	(0.017)	(0.020)
Leverage$_{j,c,t}$	0.322***	-0.059***
	(0.013)	(0.014)
PPE$_{j,c,t}$	0.117***	0.024**
	(0.010)	(0.010)
Tobin Q$_{j,c,t}$	-0.006***	-0.005**
	(0.002)	(0.002)
Industry Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Country Fixed Effects	Yes	Yes
# Obs	48,921	48,921
Adj. R2	0.293	0.261

Conclusion

- We demonstrate that, *in the past*, firms with larger revenue shares of Taxonomy-aligned transitional activities paid lower interest rates;

- Effects are more pronounced for firms in countries with greater regulatory and physical climate risk exposure, and when lending institutions have green preferences.

Thank you for the comments and suggestions!