When Green Meets Green

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The Green Transition and Bank Financing

- Climate change is threatening the future of the globe

- Extreme weather conditions attracted policymakers' interest and urged the need for action

- **The Paris Agreement** (2016) aims to limit the increase in average global temperatures within $1.5°C$ to those prevailing before the Industrial Revolution

- OECD estimates that "\$6.9 trillion a year is required up to 2030 to meet climate and development objectives"

- At the same time, banks and firms privately undertake various initiatives such as climate related disclosures or sustainability commitments

- Q: How do these private efforts—in combination with regulatory policies—affect pricing of bank credit?

Research Question and Preview of the Results

- We investigate whether and how *environmental consciousness* (greenness for short) of firms and banks is reflected in the pricing of bank (syndicated) credit

- Finding: **green firms enjoy cheaper loans—however, only when borrowing from green banks—the "*green meets green*" effect—but only after the Paris Agreement (after 2015)**

- Thus, our finding suggests that for environmental attitudes of bank and firms to affect loan pricing the regulatory actions maybe required

Green Firm Proxy

- **Carbon Disclosure Project** (CDP)

- Since 2008, CDP annually collects self-reported information about firms' carbon emissions and other environmental information, such as governance and investments related to climate-related issues within the organization

- Our CDP sample covers the period between 2010-2018 during which the CDP collected environmental data on about 6000 firms worldwide

- **We classify firms as green if they disclose to CDP as green because they measure, manage, and disclose their climate impact**

Green Bank Proxy

- **United Nations Environment Programme Finance Initiative** (e.g., Fatica et al.,2019; Delis et al., 2020);

- "Partnership between UNEP and the global financial sector to mobilize private sector finance for sustainable development"

- *Principles for Responsible Banking*: aims to "transform the banking industry to enable it to play a leading role in achieving [goals of] the Paris Climate Agreement"

- About 160 members

- **Bank is classified as "Green" if it is a member of UNEPFI**

Data

- **Loan-level data** from LPC DealScan—syndicated loans, 2011-2019
  - 71000 loan facilities granted to $\sim$16500 companies
  - $\sim$5000 facilities are granted to $\sim$1250 green firms
  - restricted to lead arranger(s): $\sim$700 banks with 94 being green

- **Firm and bank fundamentals** are from Compustat Global and North-America, Orbis Global and BankFocus

Green vs. Brown Firms

	Green		Brown		
	Mean	Std.Dev.	Mean	Std.Dev.	Δ
Log Total Assets	9.65	1.49	7.52	1.55	-2.14***
ROA	4.21	6.54	2.93	6.89	-1.28***
Leverage	3.09	5.37	3.57	8.77	0.47**
Interest Coverage Ratio	14.20	27.27	16.88	40.43	2.68***
Listed	0.67	0.47	0.53	0.50	-0.14***
Observations	1,122		4,073		5,195

Green vs. Brown Banks

	Green		Brown		
	Mean	Std.Dev.	Mean	Std.Dev.	Δ
Log Total Assets	13.45	1.14	12.24	2.04	-1.21***
ROA	0.54	0.52	0.62	0.59	0.09
Capital Ratio	15.29	2.64	15.63	3.44	0.34
NII/OR	50.98	14.96	53.08	17.09	2.10
Observations	79		595		674

The Green Meets Green and Loan Spreads Regression

$$AISD_{i,b,t} = \beta_0 + FE_{t,i,b} + \beta_1 FGreen_{i,t-1} + \beta_2 BGreen_{b,t-1}$$
$$+ \beta_3 FGreen_{i,t-1} \times BGreen_{b,t-1} + \gamma' X_{i,b,t-1} + \epsilon_{i,b,t}$$

- $AISD_{i,b,t}$ is the all-in-spread-drawn of loan facility i, issued by the syndicate's lead arranger(s)/bank b in year t

- $FGreen_{i,t-1}$ is 1 if firm i discloses info to CDP in year $t-1$, and 0 otherwise

- $BGreen_{b,t-1}$ proxies bank/facility b greenness at time $t-1$:

    - *facility-level*: the unit of observation b is the loan facility: average of the lender controls in case of multiple lead arrangers
    - *lead arranger-level*: the unit of observation b is a single bank

The Green Meets Green Effect and the Paris Agreement

- For the GMG effect to be present, the public awareness of climate transition risk needs to be sufficiently high

- The Paris Agreement—the world's first comprehensive climate agreement—raised public awareness of climate-related risks and increased the soft commitment of policy-makers to a stricter enforcement of climate policy

- Split the sample into before and after the Paris Agreement: loans with the origination date preceding December 12, 2015 are "Before Paris" and all other loans are "After Paris"

Results: Green Meets Green with Paris Sample Split

	All-in-Spread-Drawn							
	(facility-level data)				(lead arranger-level data)			
	(1) Before Paris	(2) After Paris	(3) Before Paris	(4) After Paris	(5) Before Paris	(6) After Paris	(7) Before Paris	(8) After Paris
FGreen	1.420 (5.705)	11.798* (6.398)			-9.852 (8.359)	8.092 (7.159)		
BGreen	40.096*** (7.939)	35.991*** (12.410)	62.045*** (17.232)	11.951 (19.603)	18.169* (10.273)	30.656*** (11.863)	68.698*** (13.250)	51.218*** (14.187)
FGreen×BGreen	5.031 (18.081)	-50.045*** (14.188)	3.339 (37.027)	-70.915* (37.419)	19.464 (19.259)	-61.611*** (18.069)	8.912 (31.607)	-58.086** (26.984)
Loan characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower characteristics	Yes	Yes	No	No	Yes	Yes	No	No
Lender characteristics	Yes	Yes	Yes	Yes	No	No	No	No
Year fixed effects	Yes	Yes	No	No	No	No	No	No
Borrower country fixed effects	Yes	Yes	No	No	Yes	Yes	No	No
Borrower x time fixed effects	No	No	Yes	Yes	No	No	Yes	Yes
Lender x time fixed effects	No	No	No	No	Yes	Yes	Yes	Yes
Adj. R^2	.586	.563	.732	.742	.695	.699	.892	.860
Observations	5,524	3,584	9,606	7,394	17,076	9,797	39,827	28,443
Mean AISD	245.714	225.626	339.722	318.269	223.109	216.270	289.780	293.407
SD. AISD	146.264	136.289	171.194	172.392	155.940	146.118	170.865	171.757
Mean BGreen	.179	.181	.263	.254	.250	.221	.253	.239
SD. BGreen	.327	.338	.378	.378	.249	.262	.258	.274

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- **Endogenous Firm-Bank Matching:** IV approach to tackle reverse causation concerns that could arise due to the anticipation of a Paris-impact.

- **Paris Falsification test:** We cannot replicate similar findings using random Paris Accord signature dates

Conclusion:

- Employing data on syndicated loans over the period 2011-2019, we find that firms showing environmental consciousness (i.e., green firms) enjoy more favorable terms of about 50-60bps compared to brown firms when borrowing from a green bank

- This green-meets-green effect is observed after the Paris Agreement, which is consistent with the impact of increased awareness of the importance of green transition risks
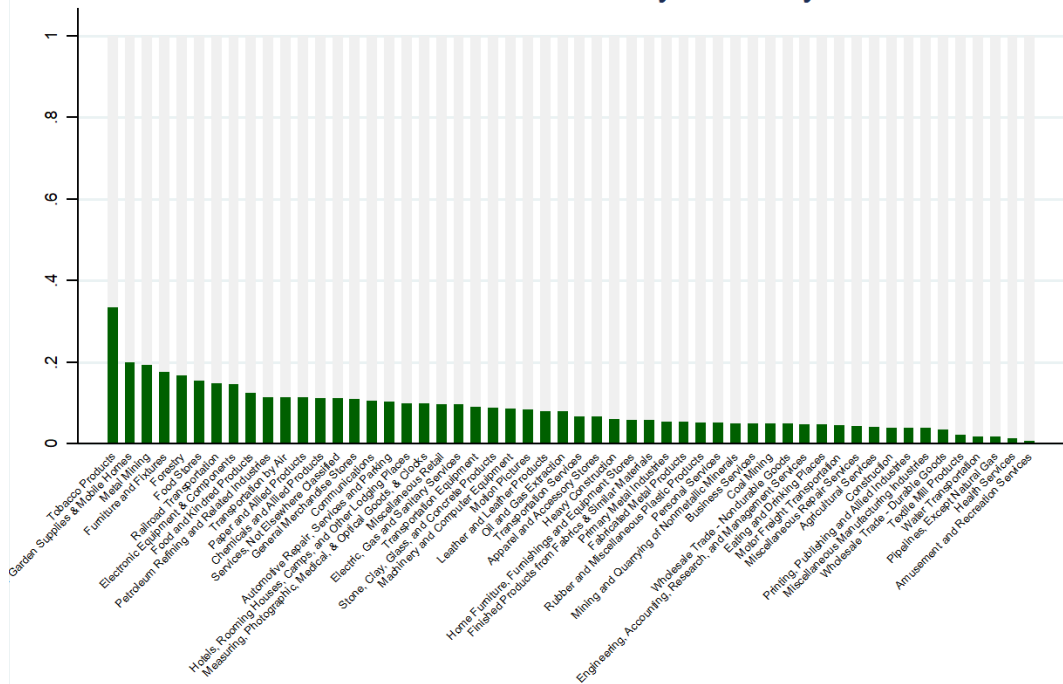
Results: Green Meets Green and Loan Spreads

	All-in-Spread-Drawn			
	(facility-level data)		*(lead arranger-level data)*	
	(1)	(2)	(3)	(4)
FGreen	5.196		1.659	
	(4.407)		(3.763)	
BGreen	40.346***	49.244***	16.730*	58.914***
	(6.919)	(13.188)	(9.816)	(9.871)
FGreen×BGreen	-17.878	-35.885	-9.829	-17.274
	(12.018)	(29.346)	(9.260)	(23.382)
Loan characteristics	Yes	Yes	Yes	Yes
Borrower characteristics	Yes	No	Yes	No
Lender characteristics	Yes	Yes	No	No
Year fixed effects	Yes	No	No	No
Borrower country fixed effects	Yes	No	Yes	No
Borrower x time fixed effects	No	Yes	No	Yes
Lender x time fixed effects	No	No	Yes	Yes
Adj. R^2	.565	.736	.674	.879
Observations	9,117	17,012	26,906	68,305

Summary Statistics

	Min	Max	Mean	Std.Dev.	Obs
Loan characteristics:					
All-in-Spread-Drawn (AISD)	5.00	800.00	237.78	142.71	9,117
AISD | $FGreen = 1$			204.26	145.44	1,973
AISD | $BGreen = 1$			331.69	162.47	1,028
Log Loan Amount	7.97	24.51	19.45	1.79	9,117
Maturity (months)	1.00	432.00	59.03	21.75	9,117
Concentration (N leads)	1.00	54.00	2.84	4.76	9,117
Secured	0.00	1.00	0.71	0.46	9,117
Covenant	0.00	1.00	0.53	0.50	9,117
Nonbank	0.00	1.00	0.01	0.10	9,117
Relation loan	0.00	1.00	0.48	0.50	9,117
$BGreen \neq 0$	0.05	1.00	0.61	0.33	2,677
Borrower characteristics:					
Log Total Assets	0.01	14.74	8.00	1.82	9,117
Leverage	0.12	103.31	3.85	8.64	9,117
ROA	-18.63	22.47	3.04	6.60	9,117
Interest Coverage Ratio	-99.20	233.00	14.71	35.76	9,117
Listed	0.00	1.00	0.52	0.50	9,117
Lender characteristics:					
(Avg) Total Assets	6.26	14.86	13.97	1.03	9,117
(Avg) Capital ratio	9.06	25.80	15.67	1.83	9,117
(Avg) ROA	-0.66	3.48	0.63	0.44	9,117
(Avg) NII/OR	4.67	90.48	46.60	9.12	9,117

CDP by Industry

% of Green Firms by Industry

Green-Meets-Green and Loan Spreads: Matching Estimator

	Multivariate-distance		Propensity-score	
	(1) Before Paris	(2) After Paris	(3) Before Paris	(4) After Paris
Panel A: Matched across loan, firm & bank characteristics				
Δ AISD	57.720*** (17.275)	-21.230* (11.756)	67.769*** (17.674)	-28.476** (13.919)
N treated	126	101	118	94
N control	1,101	747	1,266	660
Panel B: Additionally matched on pair-level determinants				
Δ AISD	28.278 (18.986)	-43.557** (19.109)	27.755 (23.571)	-46.725** (21.654)
N treated	107	77	101	74
N control	333	312	335	316

Green-Meets-Green and Loan Spreads: IV estimation

	First Stage		Second Stage	
	(lead arranger-level data)			
	(1) BGreen	(2) FGreen x BGreen	(3) AISD	(4) AISD
L.BGreen	.156*** (.011)	-.013*** (.003)		
FGreen		.112*** (.008)	19.156*** (6.579)	25.463*** (7.367)
FGreen x L.BGreen		.283*** (.014)		
BGreen			82.568*** (29.009)	78.962 (68.378)
FGreen x BGreen			-119.071*** (24.670)	-140.580*** (31.163)
Loan characteristics	Yes	Yes	Yes	Yes
Borrower characteristics	Yes	Yes	Yes	Yes
Lender characteristics	Yes	Yes	Yes	No
Year fixed effects	Yes	Yes	Yes	No
Borrower country fixed effects	Yes	Yes	Yes	Yes
Borrower x time fixed effects	No	No	No	No
Lender x time fixed effects	No	No	No	Yes
Adj. R^2	.4950	.6835	.2030	.1002
Observations	7,160	7,160	7,160	9,797