

“Glossy Green” Banks

The Disconnect Between Sustainability Disclosures and Lending Activities

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The opinions in this presentation are those of the authors and do not necessarily reflect the views of the European Central Bank or the Eurosystem.

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- Banks increasingly emphasize their env. activities in their investors' reports and voluntary disclosures
 - Many benefits: better ESG ratings, more loyal customers, lower cost of capital

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 - Many benefits: better ESG ratings, more loyal customers, lower cost of capital
- But are banks environmentally-themed disclosures credible or do they just contain unsubstantiated claims to symbolically comply with new institutional demands?

This Paper

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1. Use ChatGPT to extract information on whether a bank is discussing the sustainability of its lending policies in annual and sustainability reports
2. Examine the relation between environmental disclosures and bank lending to firms
 - To brown and green industries
 - To borrowers with different level of emissions
 - To borrowers that describe their business as green based on the EU taxonomy

Main Findings

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Mechanism

- No evidence that their loans are funding the **transition loans** to green technologies

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- Banks extend credit to **existing brown borrowers**, especially if they are **financially underperforming**

⇒ **Banks overemphasize their climate goals while continuing their relationships with polluting borrowers**

Data and Methodology

Data

Loan-level credit registry: AnaCredit

- Harmonized loan-level data on all Eurozone commercial loans outstanding (above EUR 25,000)
- Loan size, interest rate, maturity
- Focus on the sample of newly issued loans 2014–2020

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Green and Brown Loans

- **Industry-level emissions (Eurostat):** Greenhouse gas emission data by country, industry (NACE-2) and year Standardized by industry value added.
- **Firm-level emissions for large borrowers (Urgentem):** Firm-level Scope 1 and Scope 2 emission intensities
- **Firm-level business descriptions (S&P Capital IQ):** Classification of brown and green activities based on EU taxonomy for sustainable activities for 150,105 public and private companies

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Additional data

- Orbis: Firm size, ROA, R&D, Investment, Sales, EBIT etc.
- Science Based Targets initiative (SBTi): Emission reduction targets by firms
- FINREP: Supervisory banking information

Environmental disclosures

- We process 1,397 documents to construct our proxy for banks' environmental disclosures
 - 623 annual reports, 273 sustainability reports, 57 integrated reports, and 61 nonfinancial reports
 - Other more tailored disclosures (383 documents) that banks use to communicate their sustainability efforts and performance (e.g., sustainability facts and figures, climate change report, report on greenhouse gas emissions, impact report, responsible investments report)

Environmental disclosures

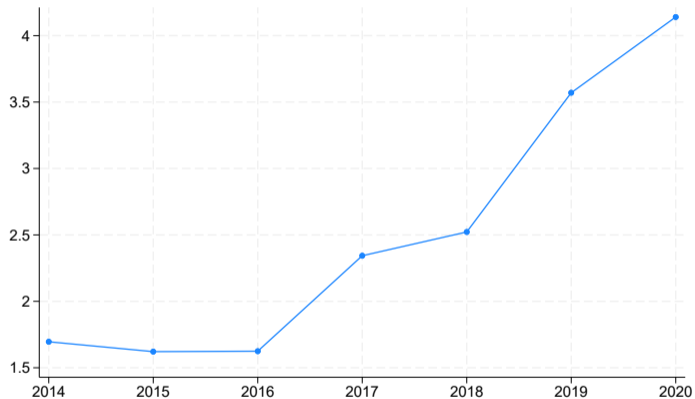
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- We use on OpenAI's GPT 3.5 to evaluate banks' disclosures
 - Prompt: *"Pretend you are an investor. The following text is an excerpt from a bank's annual report: [. . .] Based on this text only, please answer the following question. Are the bank's lending policies environmentally sustainable? There are three choices: "YES", "NO", or "UNKNOWN" if the text contains no relevant information."*

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$$\text{Environmental disclosures}_{i,t} = \frac{\text{Number of words in the "YES" paragraphs}}{\text{Total number of words in the bank's reports}}$$

Environmental disclosures over time (in %)



Volume of banks' claims about the sustainability of their lending policies increased by over 100% over this period

Environmental disclosures and bank characteristics

	Environmental disclosures						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GRI standards	0.0084*** (0.00304)	0.0098*** (0.00292)	0.00548 (0.00382)	0.00388 (0.0037)	0.00332 (0.00409)	0.0083*** (0.00284)	0.00647** (0.00301)
Integrated reporting	0.0142* (0.00742)	0.0111 (0.00775)	0.00628 (0.00729)	0.0140 (0.0087)	0.00311 (0.00757)	0.0146** (0.00715)	0.0112 (0.00761)
SBTi signatory		0.0160** (0.00728)					
MSCI Env score			0.002*** (0.00068)				
Sustainalytics Env score				0.0003*** (0.0001)			
Bloomberg Env score					0.0005*** (0.00014)		
ESG Corporate Knights						0.0243** (0.0109)	
Green bond issuance							0.0415*** (0.0827)
Bank balance sheet controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	622	622	462	457	359	622	622
R ²	0.285	0.309	0.260	0.245	0.268	0.328	0.327

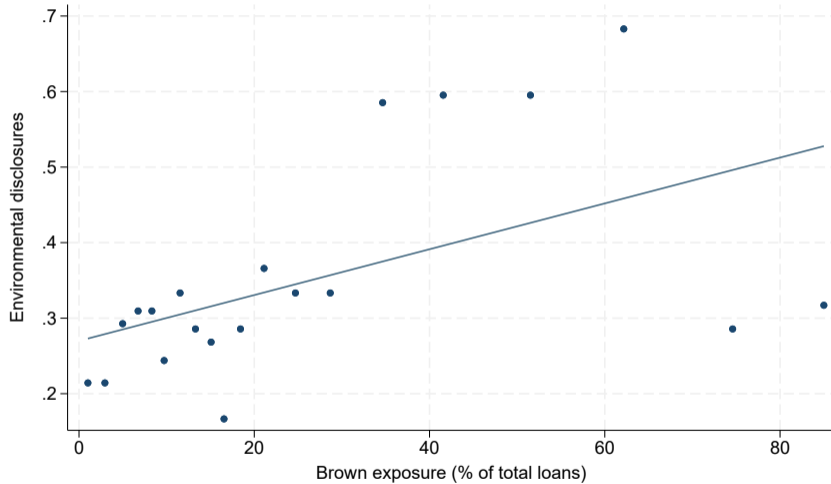
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Environmental disclosures and banks' exposure to brown industries



Banks with more extensive environ. disclosures have a larger proportion of loans to brown industries

Empirical strategy

$$\text{LoanAmount}_{f,b,i,c,t} = \alpha_b + \alpha_{i,c,t} + \beta_1 (\text{Brown}_{i,c,t} \times \text{High Env. Reporter}_{b,t}) + \beta_2 \text{High Env. Reporter}_{b,t} + \gamma X_{b,t} + \epsilon_{f,b,i,c,t}$$

- **Loan Amount** $_{f,b,i,c,t}$: log amount of newly issued credit to firm f in industry i , country c by bank b in year t
- **Brown** $_{i,c,t} = 1$ if the ratio of carbon emissions to gva of industry i in country c ranks in the top quintile
- **High Environmental Reporter** $_{b,t} = 1$ if bank's b environmental disclosures rank in the top quintile in year t
- **Control for demand for credit**: industry-country-time FE or firm-time FE
- **Control for bank characteristics**: bank FE, bank controls (size, leverage, Tier 1 capital) or bank-time FE

If banks with more extensive environmental disclosures engage in greener lending practices: $\beta_1 < 0$

Environmental disclosures and lending

Banks' environmental disclosures and new loans to brown industries

	Loan Amount		
	(1)	(2)	(3)
High environmental reporter	-0.0712 (0.0577)	-0.0935* (0.0555)	
Brown	-0.221*** (0.0266)		
High environmental reporter × Brown	0.160*** (0.0349)	0.110*** (0.0233)	0.0783*** (0.0209)
Bank controls	Yes	Yes	-
Bank FE	Yes	Yes	-
Firm FE	Yes	No	No
Time FE	Yes	-	-
Industry-Country-Time FE	No	Yes	Yes
Firm-Time FE	No	No	No
Bank-Time FE	No	No	Yes
N	2,822,338	3,740,323	3,740,250
R ²	0.705	0.200	0.207

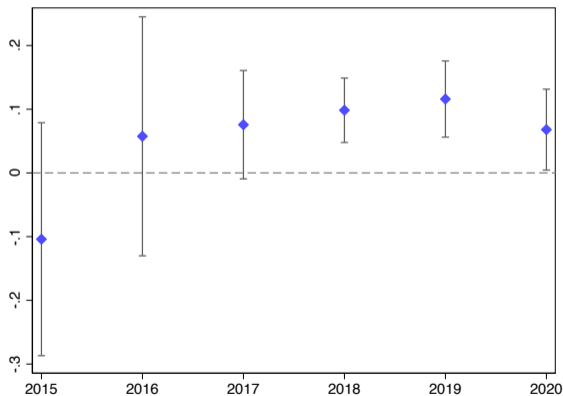
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Brown	-0.221*** (0.0266)				
High environmental reporter × Brown	0.160*** (0.0349)	0.110*** (0.0233)	0.0783*** (0.0209)	0.0494** (0.0207)	0.0331* (0.0196)
Bank controls	Yes	Yes	-	Yes	-
Bank FE	Yes	Yes	-	Yes	-
Firm FE	Yes	No	No	-	-
Time FE	Yes	-	-	-	-
Industry-Country-Time FE	No	Yes	Yes	-	-
Firm-Time FE	No	No	No	Yes	Yes
Bank-Time FE	No	No	Yes	No	Yes
N	2,822,338	3,740,323	3,740,250	828,689	828,074
R ²	0.705	0.200	0.207	0.792	0.797

High environmental reporters extend 3.3% more credit to firms in brown industries compared to other banks.

Banks' environmental disclosures and new loans to brown industries

$$\text{LoanAmount}_{f,b,i,c,t} = \alpha_{b,t} + \alpha_{i,c,t} + \sum_k \beta_k (\text{Brown}_{i,c,t} \times \text{High Env. Reporter}_{b,t}) + \gamma X_{b,t} + \epsilon_{f,b,i,c,t}$$



Banks' environmental disclosures and new loans to green industries

	Loan Amount				
	(1)	(2)	(3)	(4)	(5)
High environmental reporter	-0.0420 (0.0675)	-0.0695 (0.0557)		-0.0390 (0.0450)	
Green	-0.0580 (0.0456)				
High environmental reporter × Green	-0.0242 (0.0346)	-0.0280 (0.0201)	-0.00883 (0.0179)	-0.0126 (0.0251)	0.00169 (0.0240)
Bank controls	Yes	Yes	-	Yes	-
Bank FE	Yes	Yes	-	Yes	-
Firm FE	Yes	No	No	-	-
Time FE	Yes	-	-	-	-
Industry-Country-Time FE	No	Yes	Yes	-	-
Firm-Time FE	No	No	No	Yes	Yes
Bank-Time FE	No	No	Yes	No	Yes
N	2,822,338	3,740,323	3,740,250	828,689	828,074
R ²	0.704	0.200	0.207	0.792	0.797

- No evidence that emphasizing the environment in public reporting is associated with greener lending
- Banks do not appear to compensate their brown loans by lending to firms in green industries

Alternative proxies: Borrower-Level GHG emissions

	Loan Amount				
	(1)	(2)	(3)	(4)	(5)
High environmental reporter	-0.193 (0.148)	-0.336** (0.157)			
GHG emissions	-0.00129** (0.000598)	0.000742** (0.000368)	0.000929** (0.000387)		
High environmental reporter × GHG emissions	0.0000882 (0.000557)	0.00118** (0.000559)	0.00106* (0.000609)		
Bank controls	Yes	Yes	-		
Bank FE	Yes	Yes	-		
Firm FE	Yes	No	No		
Time FE	Yes	-	-		
Industry-Country-Time FE	No	Yes	Yes		
Firm-Time FE	No	No	No		
Bank-Time FE	No	No	Yes		
N	3,765	3,637	3,454		
R ²	0.652	0.540	0.577		

Using granular emission data available for larger firms (Urgentem):

- Banks with extensive environmental disclosures extend **more credit to borrowers with higher emissions** when controlling for credit demand using **interactions of country, industry and year FEs**
- 1 s.d increase in the intensity of firm's GHG emissions is associated with a 20% higher lending by high env. reporters compared to other banks

Alternative proxies: Borrower-Level GHG emissions

	Loan Amount				
	(1)	(2)	(3)	(4)	(5)
High environmental reporter	-0.193 (0.148)	-0.336** (0.157)		-0.216 (0.133)	
GHG emissions	-0.00129** (0.000598)	0.000742** (0.000368)	0.000929** (0.000387)		
High environmental reporter × GHG emissions	0.0000882 (0.000557)	0.00118** (0.000559)	0.00106* (0.000609)	0.000459 (0.000542)	0.000403 (0.000579)
Bank controls	Yes	Yes	-	Yes	-
Bank FE	Yes	Yes	-	Yes	-
Firm FE	Yes	No	No	-	-
Time FE	Yes	-	-	-	-
Industry-Country-Time FE	No	Yes	Yes	-	-
Firm-Time FE	No	No	No	Yes	Yes
Bank-Time FE	No	No	Yes	No	Yes
N	3,765	3,637	3,454	2,989	2,786
R ²	0.652	0.540	0.577	0.790	0.807

Using granular emission data available for larger firms (Urgentem):

- We do **not observe any statistically significant differences** in lending to firms with high emissions by banks with extensive environmental disclosures when controlling for credit demand using interactions of **firm and year FEs**
- **High environmental disclosures are far from being associated with greener, or less brown, lending policies**

New relationships

$$\text{Entry}_{f,b,i,c,t} = \alpha_b + \alpha_{i,c,t} + \beta_1(\text{Brown}_{i,c,t} \times \text{High Env. Reporter}_{b,t}) + \beta_2 \text{High Env. Reporter}_{b,t} + \epsilon_{f,b,i,c,t}$$

	Entry				
	(1)	(2)	(3)	(4)	(5)
High environmental reporter	0.0452** (0.0219)	0.0381 (0.0244)		0.0401** (0.0173)	
Brown	-0.000804 (0.0106)				
High environmental reporter × Brown	-0.0125 (0.0205)	-0.00408 (0.00763)	-0.00629 (0.00585)	-0.00291 (0.00840)	-0.0105* (0.00579)
Bank controls	Yes	Yes	-	Yes	-
Bank FE	Yes	Yes	-	Yes	-
Firm FE	Yes	No	No	-	-
Time FE	Yes	-	-	-	-
Industry-Country-Time FE	No	Yes	Yes	-	-
Firm-Time FE	No	No	No	Yes	Yes
Bank-Time FE	No	No	Yes	No	Yes
N	340,664	344,817	344,669	339,288	339,050
R ²	0.0694	0.0266	0.0652	0.0890	0.142

Some evidence that high environmental reporters try to reduce new lending exposures to brown borrowers

Bank-level results

$$Y_{b,i,c,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{c,t} + \beta_1(\text{Brown}_{i,c,t} \times \text{High Env. Reporter}_{b,t}) + \beta_2 \text{High Env. Reporter}_{b,t} + \gamma X_{b,t} + \epsilon_{f,b,i,c,t}$$

	Credit Share					
	(1)	(2)	(3)	(4)	(5)	(6)
High env. reporter	-0.0022* (0.00125)	-0.0007 (0.00160)		0.0008 (0.00118)	0.0019 (0.00158)	
Brown	-0.0028*** (0.000876)	-0.0003 (0.00140)	-0.0009 (0.00133)			
High env. reporter × Brown	0.0115*** (0.00328)	0.0090*** (0.00336)	0.0070** (0.00336)			
Green				-0.0001 (0.00079)	0.0002 (0.00082)	0.00004 (0.00078)
High env. reporter × Green				-0.00396** (0.00171)	-0.0040** (0.00172)	-0.0033** (0.00164)
Bank Controls	Yes	Yes	-	Yes	Yes	-
Bank FE	Yes	Yes	-	Yes	Yes	-
Industry FE	Yes	-	-	Yes	-	-
Time FE	Yes	-	-	Yes	-	-
Country FE	Yes	-	-	Yes	-	-
Country-Time FE	No	Yes	Yes	No	Yes	Yes
Industry-Time FE	No	Yes	Yes	No	Yes	Yes
Bank-Time FE	No	No	Yes	No	No	Yes
N	93,963	93,959	93,874	93,963	93,959	93,874
R ²	0.346	0.353	0.349	0.346	0.353	0.349

- Bank-level: high environmental reporters extend more credit to **brown** industries
- Overall: Environmental statements do not reflect their lending strategies across brown and green sectors

Additional results & robustness

Additional credit margins:

- Interest rate [Details](#)
- Loan maturity [Details](#)
- Relationship termination [Details](#)

Alternative Proxy for high/low emissions borrowers:

- Business description using Capital IQ [Details](#)

Robustness:

- Post 2018 period [Details](#)
- Disclosures as continuous variable [Details](#)
- Leads and lags [Details](#)

Channels

Funding of transition to greener technologies

Brown lending of banks with extensive environmental disclosures may not indicate greenwashing if banks lend to brown firms to finance **transition to technologies with lower emissions**

Funding of transition to greener technologies

Brown lending of banks with extensive environmental disclosures may not indicate greenwashing if banks lend to brown firms to finance **transition to technologies with lower emissions**

Data challenges:

- Short time period to see the impact on GHG emissions

Funding of transition to greener technologies

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Data challenges:

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Our approach:

1. Switching to greener technologies requires **high investment and R&D**

- Test whether high env. reporters lend more to brown borrowers that invest more and make more R&D than other firms in their industries

Funding of transition to greener technologies

Brown lending of banks with extensive environmental disclosures may not indicate greenwashing if banks lend to brown firms to finance **transition to technologies with lower emissions**

Data challenges:

- Short time period to see the impact on GHG emissions

Our approach:

1. **Switching to greener technologies requires high investment and R&D**
 - Test whether high env. reporters lend more to brown borrowers that invest more and make more R&D than other firms in their industries
2. **Young new entrants are more likely to innovate and disrupt old technologies**
 - Test whether high env. reporters lend more to brown borrowers that are younger
3. **Firms can set science-based targets with a clearly-defined commitment path to reduce emissions**
 - Test whether high env. reporters lend more to brown borrowers who are SBTi signatories
4. **Textual analysis of business description of firms using Capital IQ**
 - Test whether high env. reporters lend more to green businesses in brown industries

Funding of transition to greener technologies

$$\text{LoanAmount}_{f,b,i,c,t} = \alpha_{b,t} + \alpha_{f,t} + \beta_1(\text{Brown}_{i,c,t} \times \text{High Env. Reporter}_{b,t}) + \beta_2(\text{Brown}_{i,c,t} \times \text{Proxy}_{f,t}) \\ + \beta_3(\text{High Env. Reporter}_{b,t} \times \text{Brown}_{i,c,t} \times \text{Proxy}_{f,t}) + \epsilon_{f,b,i,c,t}$$

	Loan Amount					
	R&D		Investment		Young Firm	
	(1)	(2)	(3)	(4)	(5)	(6)
High env. reporter × Brown	0.0713*** (0.0173)	0.0384* (0.0220)	0.0715*** (0.0189)	0.0346 (0.0247)	0.0645*** (0.0190)	0.0430* (0.0236)
High env. reporter × Proxy	0.161 ((0.265)	0.211 (0.141)	0.0274 (0.0603)	-0.0145 (0.0169)	0.0867 (0.0793)	0.0458 (0.0284)
High env. reporter × Brown × Proxy	-0.509 (0.522)	-0.487** (0.229)	-0.00095 (0.0506)	0.0257 (0.0272)	0.0387 (0.0617)	-0.0452 (0.0443)
Industry-Country-Time FE	Yes	-	Yes	-	Yes	-
Firm-Time FE	No	Yes	No	Yes	No	Yes
Bank-Time FE	Yes	Yes	Yes	Yes	Yes	Yes
N	2,218,763	683,941	2,084,272	667,548	2,291,896	687,031
R ²	0.208	0.792	0.210	0.791	0.215	0.792

Funding of transition to greener technologies

	Loan Amount			
	SBTi		Green Business	
	(1)	(2)	(3)	(4)
High env. reporter × Brown	-0.0478 (0.0685)	0.0337 (0.0324)	0.0614* (0.0369)	0.0274 (0.0254)
High env. reporter × Proxy	1.001*** (0.348)	0.481** (0.228)	0.154 (0.178)	0.0608 (0.0520)
High env. reporter × Brown × Proxy	-1.492** (0.671)	-0.395 (0.636)	0.0694 (0.187)	0.0623 (0.0622)
Industry-Country-Time FE	Yes	-	Yes	-
Firm-Time FE	No	Yes	No	Yes
Bank-Time FE	Yes	Yes	Yes	Yes
N	395,068	122,212	1,151,259	308,230
R ²	0.314	0.816	0.255	0.810

No evidence that high environmental reporters are more likely to support transition financing

Relationship strength and loan opacity

	Loan Amount							
	Exposure		(3)	(4)	(5)	(6)	(7)	(8)
	(1)	(2)						
High env. reporter × Brown	0.0105 (0.0462)	0.0246 (0.0233)						
High env. reporter × Proxy	0.0160 (0.0791)	0.0875 (0.0971)						
High env. reporter × Brown × Proxy	0.181*** (0.0657)	0.108** (0.0487)						
Industry-Country-Time FE	Yes	-						
Firm-Time FE	No							
Bank-Time FE	Yes	Yes						
N	1,626,362	408,934						
R ²	0.194	0.797						

- High env. reporters lend more to brown borrowers if they have extended a larger share of their loans in the past
- Banks are reluctant to discontinue established credit relationships with brown borrowers.

Relationship strength and loan opacity

	Loan Amount							
	Exposure		Large Firms		(5)	(6)	(7)	(8)
	(1)	(2)	(3)	(4)				
High env. reporter × Brown	0.0105 (0.0462)	0.0246 (0.0233)	0.0767** (0.0313)	0.0346* (0.0184)				
High env. reporter × Proxy	0.0160 (0.0791)	0.0875 (0.0971)	-0.0987 (0.0854)	-0.0204 (0.0563)				
High env. reporter × Brown × Proxy	0.181*** (0.0657)	0.108** (0.0487)	-0.118* (0.0713)	0.00458 (0.0284)				
Industry-Country-Time FE	Yes	-	Yes	-				
Firm-Time FE	No	Yes	No					
Bank-Time FE	Yes	Yes	Yes	Yes				
N	1,626,362	408,934	2,218,763	683,941				
R ²	0.194	0.797	0.410	0.792				

- High environmental reporters extend more loans to **small borrowers in brown industries**.
- Loans to small borrowers are the most opaque part of a bank's assets
 ⇒ **Incomplete disclosures are less likely to be noticed by investors and stakeholders**

Lending to low-quality firms and the brownness of banks' portfolios

	Loan Amount							
	Exposure		Large Firms		High Leverage		Low Int. Coverage Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High env. reporter × Brown	0.0105 (0.0462)	0.0246 (0.0233)	0.0767** (0.0313)	0.0346* (0.0184)	0.0838*** (0.0263)	0.000759 (0.0284)	0.0838*** (0.0263)	0.000759 (0.0284)
High env. reporter × Proxy	0.0160 (0.0791)	0.0875 (0.0971)	-0.0987 (0.0854)	-0.0204 (0.0563)	0.0140 (0.0610)	0.0756*** (0.0288)	0.0845 (0.120)	0.0175 (0.0169)
High env. reporter × Brown × Proxy	0.181*** (0.0657)	0.108** (0.0487)	-0.118* (0.0713)	0.00458 (0.0284)	0.0297 (0.0681)	0.117*** (0.0372)	0.0298 (0.103)	0.176*** (0.0551)
Industry-Country-Time FE	Yes	-	Yes	-	Yes	-	Yes	-
Firm-Time FE	No	Yes	No	Yes	No	Yes	No	Yes
Bank-Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,626,362	408,934	2,218,763	683,941	1,859,253	625,353	1,797,872	658,799
R ²	0.194	0.797	0.410	0.792	0.222	0.792	0.195	0.790

- Discrepancies between actual lending vs. environmental reporting is accentuated by banks' propensity to continue lending to **financially unhealthy brown borrowers**
- High environmental reporters renew loans to brown borrowers that could otherwise experience distress

⇒ Relationship with low-quality brown borrowers hinders banks' ability to reduce their environmental impact

Cross-sectional differences in institutional and bank-specific characteristics

	Loan amount							
	Low Tier 1 capital		Large bank		Post Paris agreement		Audited sustain. report	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High env. reporter × Brown	0.0412** (0.0189)	0.0214 (0.0290)	-0.0487 (0.0565)	-0.168** (0.0837)	-0.0447 (0.0660)	0.132 (0.0953)	0.0816*** (0.0312)	0.0257 (0.0236)
High env. reporter × Brown × Factor	0.0807** (0.0399)	0.0215 (0.0340)	0.136** (0.0543)	0.205** (0.0840)	0.129* (0.0731)	-0.101 (0.0947)	-0.0146 (0.0425)	-0.00180 (0.0546)
Industry-Country-Time FE	Yes	-	Yes	-	Yes	-	Yes	-
Bank-Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Time FE	No	Yes	No	Yes	No	Yes	No	Yes
N	3,740,250	828,074	3,740,250	828,070	3,740,250	828,070	3,740,250	828,070
R ²	0.207	0.797	0.207	0.797	0.207	0.797	0.207	0.79

- Disconnect between env. disclosures and lending are most pronounced for **banks with low capitalizations**
- Undercapitalized banks that have particularly strong incentives to engage in zombie lending (Peek and Rosengren, 2005; Giannetti and Simonov, 2013)

Conclusion

- Banks that stress more the environment in their disclosures lend more to high-emission borrowers
- No evidence that their loans may be favoring the transition to green technologies
- Banks extend credit to existing brown borrowers, especially if they are financially underperforming
- Regulating the content of bank disclosures is necessary to increase their informativeness and limit greenwashing practices