Transmission Effect of Insurers' Climate Risk Disclosures on Their Corporate Bond Investees' Environmental Friendliness

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Motivation

➢ ↑ **importance of climate risk in corporate decision-making**

↓

↑ **demand for information about climate risk**

- Equity institutional investors (*Krueger, Sautner, and Starks 2020*);
- Banks and bondholders (*Seltzer, Starks, and Zhu 2022*);

➢ **Current practice**: voluntary disclosure

- Lack of comparability and verifiability

Motivation (Cont.)

- **Initiatives for mandatory climate-related disclosure**
  - **June 5, 2021**: G7's appeal for mandatory climate-related disclosures (*John 2021*).
  - **March 2022**: SEC's proposal for mandated disclosure for U.S. public firms (*SEC 2022*).

- **June 14, 2021: Mike Kreidler--the Insurance Commissioner of Washington--state in his letter to SEC:**

  "…As the SEC considers putting rules in place regarding public company disclosure of risks related to climate change, ***I encourage you to review the experience that U.S. insurance regulators have already garnered with the insurance industry, given our decade-long disclosure requirements along the lines that SEC is now contemplating****."* (*Kreidler 2021*).

Research Question

U.S. National Association of Insurance Commissioners (NAIC)' Adoption of Climate Risk Disclosure Survey (CRDS)

Mandatory climate risk disclosure

by

INSURERS

Whether& How

Environmental Friendliness

by

CORP. BOND INVESTEES

Institutional Background – the CRDS

- **Starting in 2010, NAIC requires the largest insurers operating in the U.S. to respond to CRDS, about their approach to climate risk.**
  - to help regulators, investors, and other stakeholders better understand how insurers are managing climate risks and opportunities

- **8 Qs about how insurers manage climate risk in their investment**
  - **Q2:** Any climate change policy with respect to risk management and investment management?
  - **Q5:** Any consideration of the impact of climate change on its investment portfolios and any change of its investment strategy thus triggered?
  - **Q7:** How to engage its key constituencies on the topic of climate change?

Institutional Background – the CRDS (Cont.)

➢ Zurich American Insurance Company (Response to Q5):

Investment

"Zurich is making continued progress in integrating ESG factors, including climate change, into **security and asset selection processes across its investment portfolio**. Zurich is also thoroughly **assessing responsible investment practices** of its asset managers as part of its manager selection and monitoring processes.

Engagement

In addition to Zurich's established 'business-as-usual' ESG integration practices we have launched, during 2018 we:

• worked with a variety of partner organizations on methodologies that allow for **comprehensive assessment of exposure to physical and transition climate risk for equities, corporate bonds, real estate and infrastructure investments;**

Engagement

• …;

• **actively voted on shareholder resolutions regarding climate change disclosures or actions of investee companies;**

Investment

• …;

• **divested all equity holdings and put into run off fixed income investments from companies that generate >50% of their revenues from thermal coal mining or use >50% of coal in their energy generation mix…."**

Main Findings

- **↓ carbon emission intensity of investees with significant bond ownership by CRDS affected insurers:**
  - robust using alternative measures for (i) event window (ii) treatment and control investees and (iii) environmental friendliness.
- **More pronounced ✚ tive transmission effect:**
  - investees or their affected insurer investors are headquartered in states with **strong public climate risk attitudes**;
  - investees that are **close** to their affected insurer investors, have more affected insurers with **good ENV score** **or** **public parent** companies;
  - investees with **higher debt constraints/bond ratio**, **fewer non-affected insurer** in their headquarter state;
  - investees with **fewer** insurers face intense **competition** in underwriting.

Contribution

- **The effect of mandatory climate risk disclosure on investment relationships.**

  - French mandatory climate disclosure law
    - *M´esonnier and Nguyen (2020):* institutions reduce financing for fossil fuel firms;
    - *Ilhan et al. (2023):* climate-conscious institutional ownership value and demand firm-level climate risk disclosure;

  - **Our study:** the transmission effect of insurers' mandatory climate risk disclosure on the actions by their corporate bond investees' to reduce carbon emissions.
    - Difference: The above two papers look at the effect of the law on **investors' actions**, not **investees' environmental actions**.

Contribution (Cont.)

➢ The transmission effect of mandatory ESG-related disclosures

- **Wang (2023):** improved borrowers' environmental and social performance following the disclosure mandate on banks through the **lending** channel.

- **Our study:**
  - a setting specifically on climate risk disclosures;
  - an outcome directly linked to climate risk, carbon emissions;
  - some novel heterogeneity documented;
  - the investor-investee network;

Contribution (Cont.)

➢ The Policy Implication

- demonstrates the potential benefits of mandatory climate risk reporting and offers useful lessons for those seeking to extend these requirements.

- has the potential to inform policymakers both in the U.S. and elsewhere as they consider mandating climate risk disclosure across industries.

- highlights that the transmission effects of such disclosures should be carefully considered.

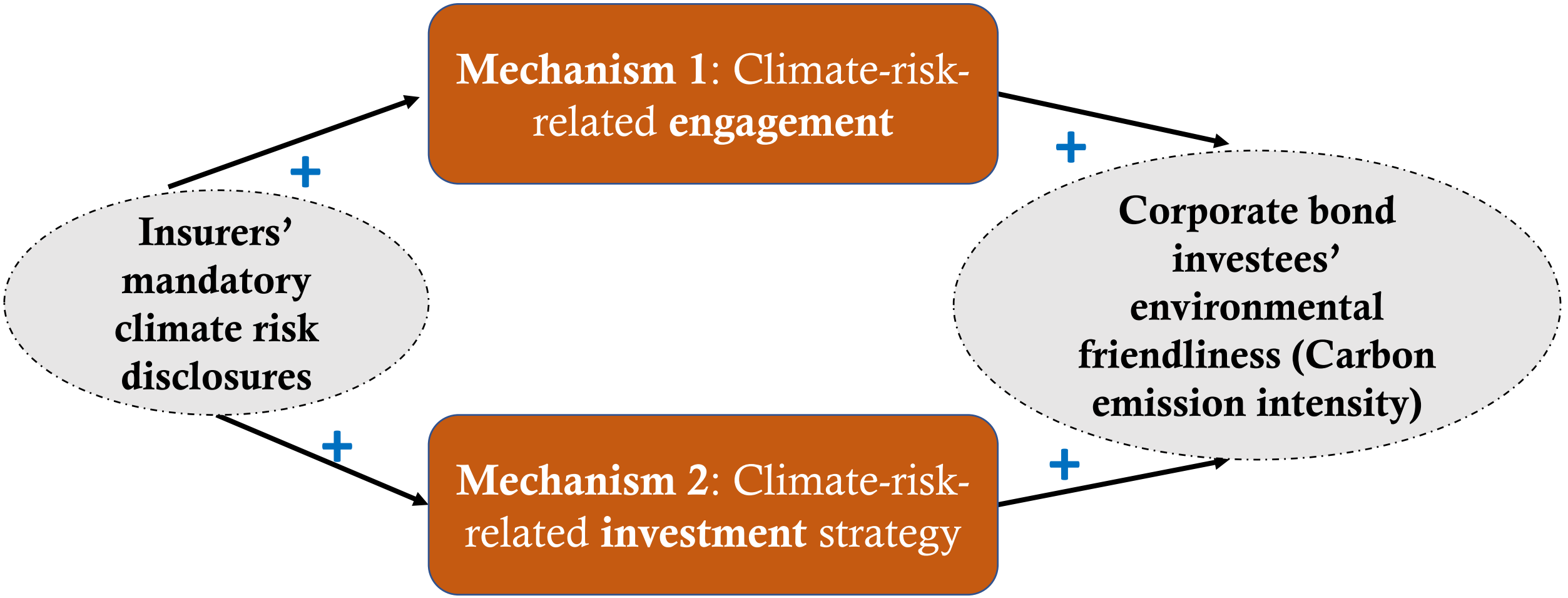
Hypothesis Development

➢ Insurers Monitoring Incentive:

- Insurers have strong monitoring incentives due to heavy investment in their bond investees
  * Using insurers' transaction data in the secondary bond market, prior studies document informed trading prior to material events, including:
    - the class action lawsuits (Billings, Klein, and Zur 2011)
    - M&As (Kedia and Zhou 2014)
    - earnings announcements (Wei and Zhou 2016).

  * Campbell et al. (2021): insurers' bondholding $\xrightarrow{+}$ investees' conservative financial reporting.

Hypothesis Development (Cont.)



Hypothesis Development (Cont.)

Engagement mechanism

- Regarding climate-related problems at investees: “Invest and Engage” > “Divestment”

“*Divestment is not the solution – it does not change the physical world as far as emissions are concerned*.”– former chief investment officer at **Zurich**

Azar, Duro, Kadach, and Ormazabal (2021): the big three investors are more likely to engage investee firms that exhibit higher carbon emissions in the past.

- CRDS requires disclosure on climate change engagement of key constituencies (Q7), increasing the pressure that insurers face to engage their corporate bond investees
- Treated investees improve their environmental performance after CRDS

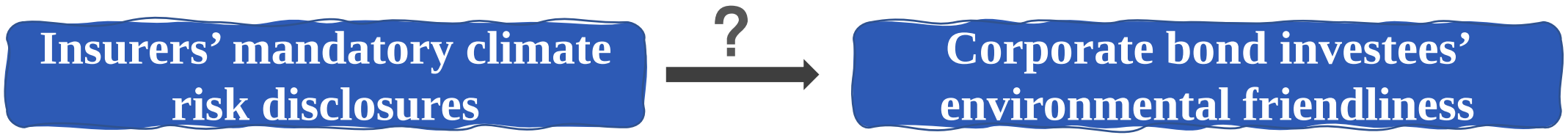
Hypothesis Development (Cont.)

Investment strategy mechanism

- **Ex-ante walk threat from existing insurer investors:**
  - Bharath et al. (2013): the threat of exit by institutional investors exerts a strong governance effect on the managers.
  - Identifying environmental unfriendly investees → Divestment → ⬇bond price →⬆cost of investees

- **Reduced future demand on bonds because insurers rely on ESG profile to invest, especially following CRDS adoption**
  - Insurers: the largest corporate bond investors
  - Many large insurers required to respond to the CRDS
  - More states adopt the survey → Increasing number of insurers affected
  - Mésonnier and Nguyen (2020) & Seltzer et al. (2022): affected institutional investors/insurers reduce their investment in firms with poor environmental profile

Hypothesis Development (Cont.)



- **UNCLEAR, given:**

  * divesting weaken the incentives of engagement
  * CRDS is qualitative and unaudited disclosures
  * both insurers and investees may greenwash

Data and Sample

➢Data resource

- **Corporate bond data:** Mergent Fixed Income Securities Database (FISD)
- **CRDS insurers identification:** NAIC Annual Statement Database
- **CRDS insurers bond holding:** eMAXX
- **Annual carbon emissions data:** S&P Global Trucost
- **Other info**: COMPUSTAT

Data and Sample (Cont.)

- **Sample period**
  - **Pre-CRDS** adoption (2008 – 2011) & **Post-CRDS** adoption (2016 – 2019)

Disclosing Year	Participating States	Nationwide Direct Written Premium Requirement	No. of Responses from P&C Insurers
2010	California	Insurer premium > $500M	13
2011	California	Insurer premium > $300M	22
2012	California, New York, and Washington	Insurer premium > $300M	428
2013	California, Connecticut, Minnesota, New York, and Washington	Insurer premium > $100M	685
2014	California, Connecticut, Illinois, Maryland, Minnesota, New Mexico, New York, and Washington	Insurer premium > $100M	743
2015	California, Connecticut, Minnesota, New Mexico, New York, and Washington	Insurer premium > $100M	760
2016	California, Connecticut, Minnesota, New Mexico, New York, and Washington	Insurer premium > $100M	759
2017	California, Connecticut, Minnesota, New Mexico, New York, and Washington	Insurer premium > $100M	740
2018	California, Connecticut, Minnesota, New Mexico, New York, and Washington	Insurer premium > $100M	738
2019	California, Connecticut, Minnesota, New Mexico, New York, and Washington	Insurer premium > $100M	736

Data and Sample (Cont.)

➢ CRDS Affected insurers

- Meeting compulsory disclosure criteria:
  - Nationwide direct written premium > $100m
  - Having business in any of the 6 CRDS-participating states
- Disclosing the CRDS in 2015

➢Treatment and Control Investees

- Final sample: **3,472** investee-year obs. (control: 1,707; treatment: 1,765)
- Treatment (control) group:
  - **% of bond held by affected insurers** in 2011 (the last year in the pre-adoption window)
  - above or at (below) the median (*Agarwal et al. 2018; Sani et al. 2021*)

Research Design

➢ Standard DID Model

$$Carbon\ Intensity_{i,t} = \beta_0 + \boldsymbol{\beta_1 Treat_i \times Post_t} + \gamma X_{i,t/i,t-1} + \theta_i + \delta_{j,t} + \varepsilon_{i,t} \qquad (1)$$

- $\boldsymbol{Treat_i}$= 1 for investees whose bonds held by affected P&C insurers in 2011 is at or above the median, and 0 o.w.
- $\boldsymbol{Post_t}$= 1 for period 2016-2019, and 0 for period 2008-2011.
- $\boldsymbol{Carbon\ Intensity_{i,t}}$: scope 1 carbon emissions / its revenue, log-transformed.
- θ_i *and* $\delta_{j,t}$ *are investee firm FEs and industry-year FEs.*
- $\boldsymbol{X_{i,t/i,t-1}}$: *Size*, *MB*, *ROA*, *Leverage*, *Capex*, *PPE*, *SalesGr*, *EPSGr*, *HHI*, *IO*, *Cash*, *DivPos*, *RD*, *AD*, following Bolton and Kacperczyk (2021).
- OLS and cluster SE at investee firm level.

Sample Distribution

Panel A: Sample distribution by year

		Control		Treatment		Full sample	
	Year	Freq.	Pct. (%)	Freq.	Pct. (%)	Freq.	Pct. (%)
Pre-adoption window	2008	207	12.13	217	12.29	424	12.21
	2009	210	12.30	221	12.52	431	12.41
	2010	215	12.60	223	12.63	438	12.62
	2011	221	12.95	224	12.69	445	12.82
Post-adoption window	2016	215	12.60	222	12.58	437	12.59
	2017	215	12.60	222	12.58	437	12.59
	2018	213	12.48	218	12.35	431	12.41
	2019	211	12.36	218	12.35	429	12.36
	Total	1,707	100.00	1,765	100.00	3,472	100.00

Descriptive Statistics

Variable	Mean	SD	Skewness	P25	P50	P75
Dependent variable						
Carbon Intensity	3.861	2.104	0.538	2.326	3.272	5.505
Independent variables of interest						
Treat	0.508	0.500	-0.033	0.000	1.000	1.000
Post	0.499	0.500	0.002	0.000	0.000	1.000
Control variables						
Size	9.484	1.254	0.196	8.56	9.391	10.363
MB	2.997	7.306	-1.195	1.462	2.355	3.960
ROA	0.047	0.077	-1.646	0.022	0.05	0.084
Leverage	0.321	0.163	0.728	0.210	0.303	0.411
Capex	0.055	0.050	2.383	0.022	0.040	0.071
PPE	8.049	1.677	-0.111	6.862	8.045	9.317
SalesGr	0.058	0.189	0.936	-0.025	0.045	0.122
EPSGr	-0.003	0.160	-1.211	-0.017	0.005	0.024
HHI	0.447	0.344	0.783	0.172	0.333	0.993
IO	0.647	0.324	-1.154	0.587	0.759	0.869
Cash	0.098	0.109	2.061	0.025	0.063	0.130
DivPos	0.792	0.406	-1.441	1.000	1.000	1.000
RD	0.025	0.054	2.980	0.000	0.000	0.020
AD	0.012	0.026	2.874	0.000	0.000	0.012

Baseline Analysis:

Economic significance:

Kim et al. (2022): **25%** reduction following the SEC's 2010 rule on climate change risk reporting in 10-Ks.

Wang (2023): **13.53%** improvement in response to bank lenders' ESG disclosure regulations

Variable	*Carbon Intensity*			
	2008-2011 versus 2016-2019		2007-2011 versus 2016-2020	
	(1)	(2)	(3)	(4)
Treat × *Post*	-0.163**		-0.170**	
	(-2.03)		(-2.11)	
Treat × *T2008*				-0.008
				(-0.24)
Treat × *T2009*		0.004		-0.003
		(0.08)		(-0.06)
Treat × *T2010*		-0.065		-0.074
		(-1.12)		(-1.23)
Treat × *T2011*		-0.087		-0.096
		(-1.42)		(-1.49)
Treat × *T2016*		-0.184**		-0.188**
		(-2.03)		(-2.08)
Treat × *T2017*		-0.161*		-0.162*
		(-1.72)		(-1.75)
Treat × *T2018*		-0.226**		-0.230**
		(-2.30)		(-2.36)
Treat × *T2019*		-0.237**		-0.241**
		(-2.31)		(-2.37)
Treat × *T2020*				-0.219**
				(-2.07)
Controls	Yes	Yes	Yes	Yes
Investee FEs	Yes	Yes	Yes	Yes
Industry-year FEs	Yes	Yes	Yes	Yes
Observations	3,472	3,472	4,381	4,381
Adjusted R-square	0.952	0.952	0.947	0.947

Cross-sectional Analyses: Public Pressure on Climate Risk

Variable	*Carbon Intensity*					
	Strong pressure based on investees being exposed to affected insurer investors headquartered in states with strong public climate risk attitudes		Strong pressure based on investees being headquartered in a state with strong public climate risk attitudes		Strong pressure based on investees being exposed to affected insurer investors headquartered in states with strong public climate risk attitudes and investees being headquartered in a state with strong public climate risk attitudes	
	No	Yes	No	Yes	No	Yes
	(1)	(2)	(3)	(4)	(5)	(6)
Treat × *Post*	-0.135	-0.251*	-0.174	-0.245*	-0.120	-0.459*
	(-1.05)	(-1.82)	(-1.16)	(-1.67)	(-1.32)	(-1.98)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Investee FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,453	1,505	1,560	1,207	2,872	346
Adjusted R-square	0.954	0.954	0.951	0.935	0.954	0.958
Diff. (p-value)	0.031		0.084		0.000	

Cross-sectional Analyses: Monitoring

Variable	*Carbon Intensity*					
	Geographic distance between investees and their affected insurer investors		Exposure to environmentally friendly affected insurer investors		Exposure to affected insurer investors with publicly listed parents	
	Far	Close	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
Treat × *Post*	-0.136	-0.324**	-0.108	-0.296**	-0.016	-0.272*
	(-0.85)	(-2.35)	(-0.80)	(-2.17)	(-0.14)	(-1.93)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Investee FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,294	1,286	1,477	1,472	1,494	1,493
Adjusted R-square	0.930	0.967	0.959	0.947	0.966	0.937
Diff. (p-value)	0.025		0.003		0.000	

Cross-sectional Analyses: Investees' Financing Dependence

Variable	*Carbon Intensity*					
	Likelihood of issuing debt to deal with risk of investment delay		Existing reliance on bond financing		Percentage of affected insurer investors in the investee's headquarter state	
	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
Treat × *Post*	-0.022	-0.355**	-0.009	-0.288***	-0.060	-0.293**
	(-0.16)	(-2.22)	(-0.07)	(-2.63)	(-0.37)	(-2.43)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Investee FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,130	1,151	1,629	1,615	1,184	1,540
Adjusted R-square	0.955	0.925	0.965	0.921	0.938	0.951
Diff. (p-value)	0.001		0.000		0.006	

Cross-sectional Analyses: Investees' Exposure to Insurers' Underwriting Competition

Variable	*Carbon Intensity*			
	Exposure to affected insurer investors with intense underwriting business competition; competition is measured by the number of insurers		Exposure to affected insurer investors with intense underwriting competition; competition is measured using the Herfindahl-Hirschman index	
	Low	High	Low	High
	(1)	(2)	(3)	(4)
Treat × *Post*	-0.341***	-0.085	-0.280**	-0.147
	(-3.36)	(-0.55)	(-2.46)	(-0.98)
Controls	Yes	Yes	Yes	Yes
Investee FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Observations	1,497	1,466	1,483	1,440
Adjusted R-square	0.959	0.952	0.957	0.949
Diff. (p-value)	0.000		0.051	

Robustness Tests: Alternative Research Designs

Variable	*Carbon Intensity*	
	Use of affected insurers' bond holdings in 2015	Use of affected insurers' bond holdings in 2011 and 2015
	(1)	(2)
Treat × *Post*	-0.143*	-0.244**
	(-1.92)	(-2.18)
Controls	Yes	Yes
Investee FE	Yes	Yes
Industry-year FE	Yes	Yes
Observations	3,895	2,489
Adjusted R-square	0.954	0.953

Further Analyses: Other Outcomes of Investees' Carbon Emissions

Variable	*Carbon Cost*	*Carbon Intensity S2*	*Carbon Intensity S3*
	(1)	(2)	(3)
Treat × *Post*	-0.169**	-0.073	-0.012
	(-2.13)	(-0.91)	(-0.42)
Controls	Yes	Yes	Yes
Investee FE	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes
Observations	3,472	3,472	3,472
Adjusted R-square	0.956	0.797	0.968

Conclusion

- CRDS adoption leads to reduced carbon emission intensity of investees with significant bond ownership held by affected insurers
- Our causal evidence is consistent with the view that investors' mandated climate risk disclosure generates a positive transmission effect on improving investees' environmental performance.
    - *M´esonnier and Nguyen (2020) and Ilhan et al. (2023):* French mandatory climate disclosure law
- We also extend the literature on the ESG effect of institutional investors: Instead of equity institutional investors, we focus on insurance companies.