Governance Externalities of Climate-Related Disclosures: Evidence from Facility Emissions

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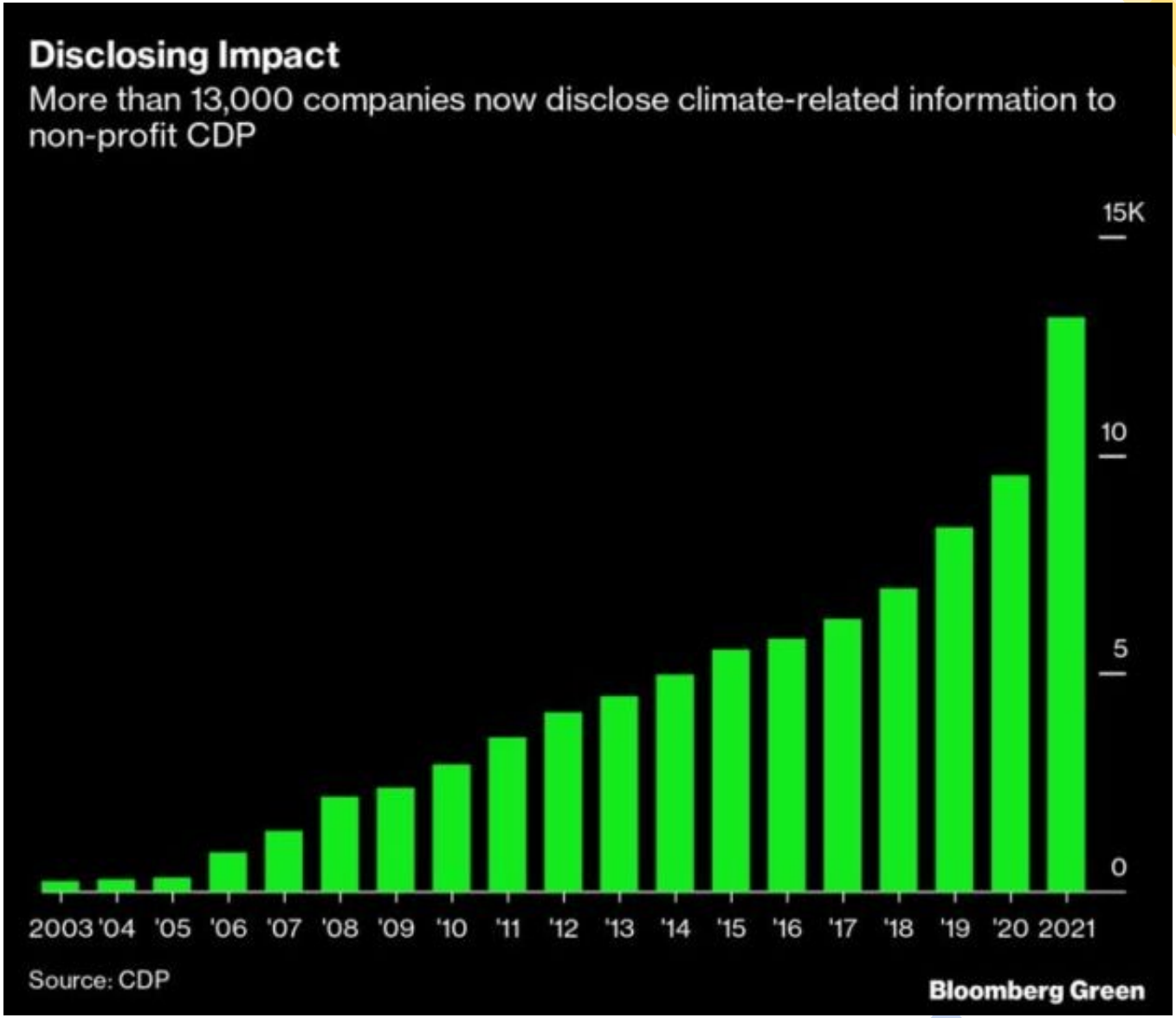
May 25th, 2022


Disclosing Impact
More than 13,000 companies now disclose climate-related information to non-profit CDP
15K
10
5
0
2003 '04 '05 '06 '07 '08 '09 '10 '11 '12 '13 '14 '15 '16 '17 '18 '19 '20 2021
Source: CDP
Bloomberg Green

Background

SEC Chair Gensler says investors want mandatory disclosure on climate risks

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KEY POINTS

- The SEC chief wants the agency to develop a climate-disclosure rule this year.
- He said prior SEC guidelines on climate disclosure were voluntary and resulted in inconsistent disclosures.
- "Companies and investors alike would benefit from clear rules of the road," he said.

Gary Gensler, chairman of the Commodity Futures Trading Commission (CFTC), speaks during a Senate Banking Committee hearing in Washington, D.C., U.S., on Tuesday, July 30, 2013.

Source: CNBC (July 28th, 2021)

Motivation

- Disclosure on climate-related issues increases transparency, allowing investors to better allocate capital and monitor firms' greenhouse gas emissions.

- Recent research also finds that mandatory greenhouse gas disclosure results in reduced emissions, consistent with the real effects of disclosure.

- Are there externalities to existing disclosures that can help inform regulators about the scope of the pending disclosure requirements?

Research Question

- Does a firm's climate-related disclosure have governance externalities on its geographic peers?

- Do the governance externalities vary with county- and firm-level characteristics?

Hypothesis 1

- For CSR disclosures to have real effects, informed stakeholders must exert meaningful pressure on firms to alter their sustainability behavior (Christensen et al. 2021)

- Several studies take advantage of the recent U.K reporting mandate and show that GHG disclosures lead to lower emissions (e.g., Jouvenot and Krueger 2020; Tomar 2021; Downar et al. 2021)

- Extant research in finance and economics shows firms within close proximity are likely to experience similar outcomes due to endogenous interactions of local residents (e.g., Pirinsky and Wang 2006; Barker and Loughran 2007; Kedia and Rajgopal 2009; Moretti 2010; Greenstone et al. 2010; Dougal et al. 2015)

- Residents in the same geographic areas are likely to consume the same information and a firm's climate-related disclosure is likely to raise residents' awareness of environmental issues, leading to monitoring externalities.

H1: A firm will reduce its greenhouse gas emissions from its local plants after its geographic peer initiates climate-related voluntary disclosures.


“
We’re committed to carbon neutrality – it’s the right thing for our customers, the planet and Ford. Ninety-five percent of our carbon emissions today come from our vehicles, operations and suppliers, and we’re tackling all three areas with urgency and optimism.”
Bob Holycross, Vice President, Chief Sustainability, Environment and Safety Officer

Environment Overview

We're aiming to achieve carbon neutrality by 2050.

Climate change is a global challenge that affects us all. Its implications are profound, so we've set ourselves a long-term ambition to achieve carbon neutrality for our vehicles, facilities and suppliers by 2050, aligned with approved science-based targets. We are the only full-line U.S. automaker to stand with California in seeking stronger greenhouse gas (GHG) standards and to align our carbon reduction targets with the Paris Agreement.

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

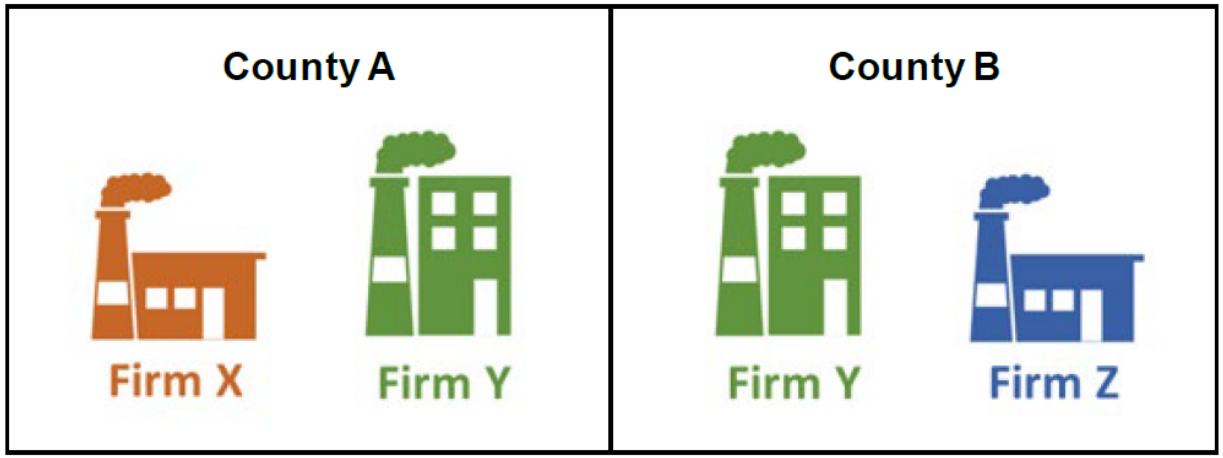
We're leading the electrification revolution.

We are doubling our planned investment in electrification and offering electrified versions of our most popular nameplates, including our new, all-electric Mustang Mach-E launched in late 2020, our E-Transit coming in 2021 and an all-electric F-150 in mid-2022. We have recently announced that by 2030, our passenger vehicles in Europe will be all-electric, while two-thirds of commercial vehicle sales are expected to be all-electric or plug-in hybrid.

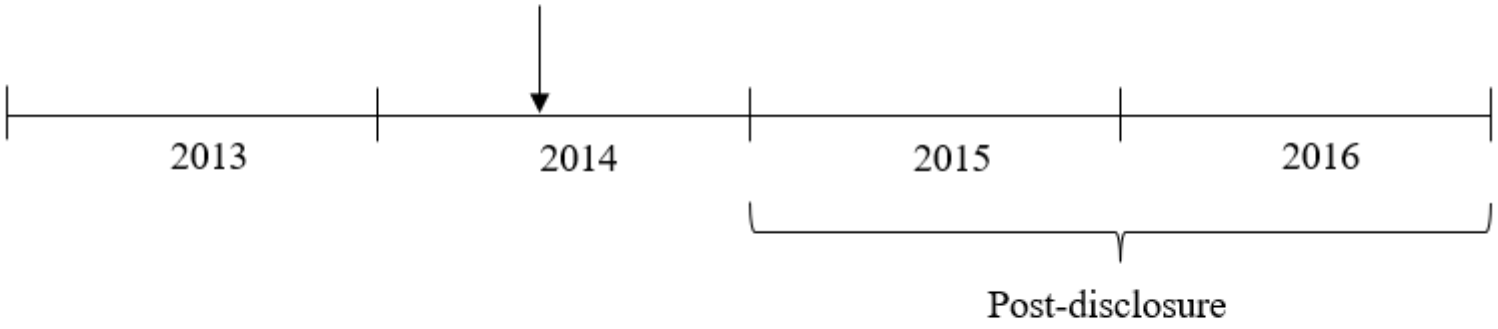
We're positively impacting the world around us.

Our operations will seek to create a positive impact in the local ecosystem. We are managing energy responsibly and moving toward 100 percent local, renewable

Identification Strategy



Firm X that owns a local facility in County A discloses greenhouse gas emissions for the first time



Firm Y's local facility in County A is affected by Firm X's disclosure

Figure 1 Time Trend of Greenhouse Gas Emissions (plant-level)

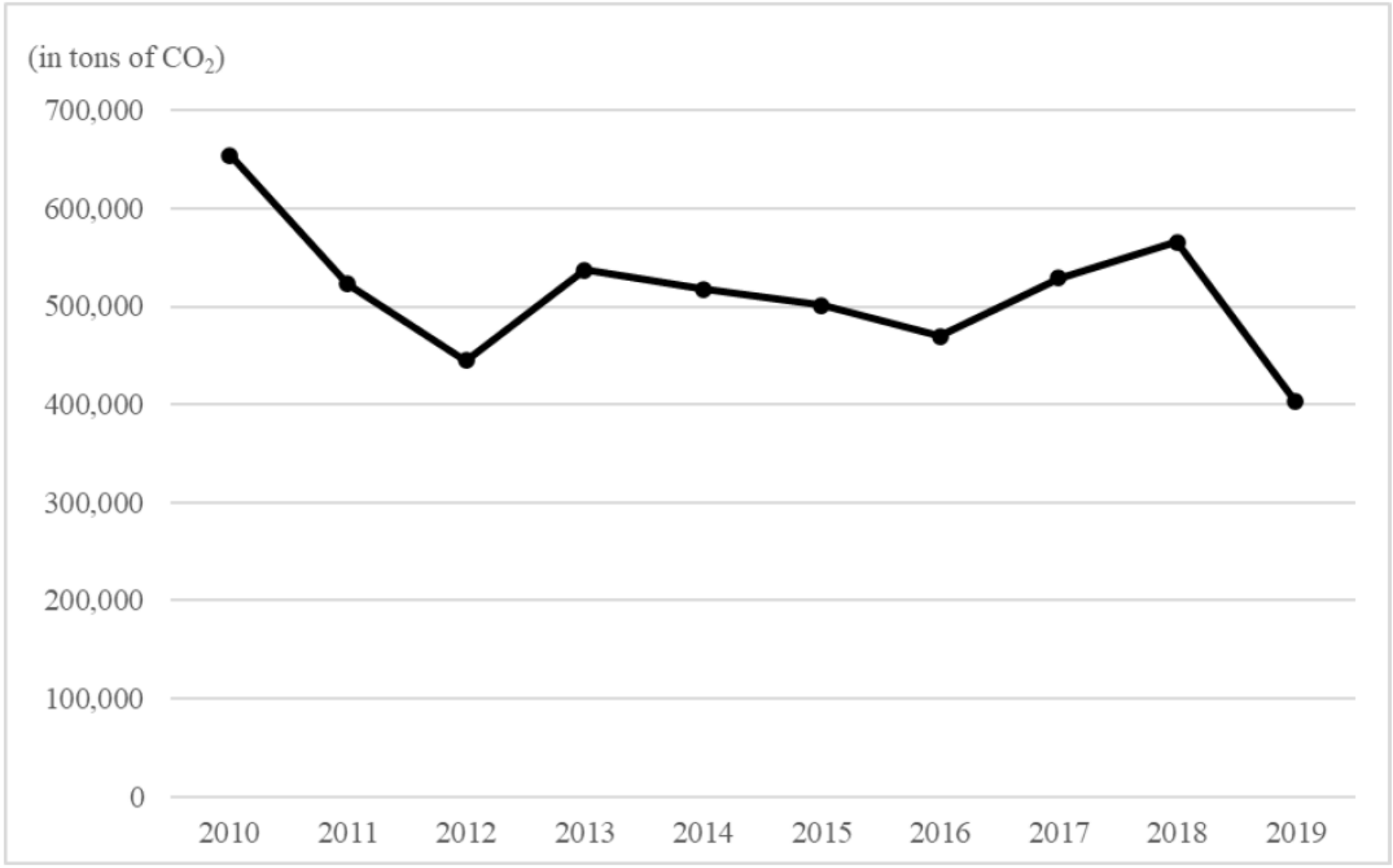
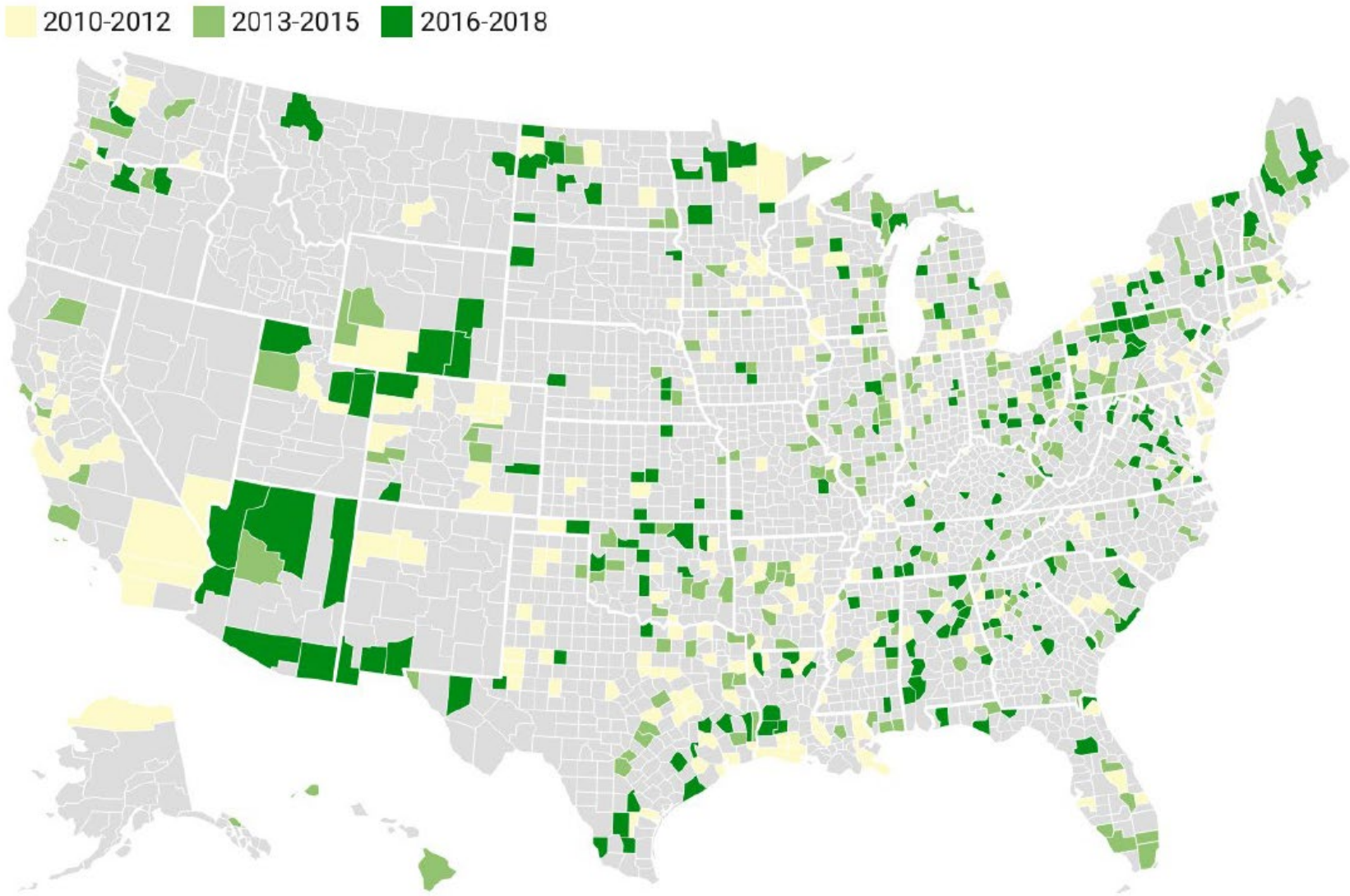


Figure 2 Geographical Distribution of Climate-Related Disclosures



	The number of unique counties	The number of firm-years	The number of facility-years
Compustat-EPA-S&P Trucost (2010-2019)	706	2,195	11,493
Exclude firms with missing firm-level characteristics	(0)	(44)	(93)
Exclude facilities with missing county-level characteristics	(14)	(22)	(118)
Exclude facilities owned by firms with voluntary GHG disclosures	(56)	(668)	(4,978)
Final Sample	636	1,461	6,304

Panel B Number of Counties and Facilities in Each of Pre- and Post-Disclosure Period

	Pre-Disclosure Period (*Peer Disclosure* = 0)		Post-Disclosure Period (*Peer Disclosure* = 1)	
Year	Number of counties	Number of facilities	Number of counties	Number of facilities
2010	443	838	0	0
2011	444	814	32	63
2012	352	627	97	204
2013	200	323	122	281
2014	143	214	193	404
2015	174	279	185	366
2016	153	239	214	381
2017	140	214	208	380
2018	25	27	179	296
2019	0	0	232	354
Total	2,074	3,575	1,462	2,729

Panel B Sample Distribution by Industry

Industry description	The number of facility-years	The average amount of greenhouse gas emissions
Business Equipment	122	69,838
Chemicals	375	365,731
Consumer Durables	30	30,640
Energy	950	444,961
Health	14	89,039
Manufacturing	803	210,571
Finance	128	99,548
Consumer Non-Durables	169	153,086
Others	1,607	376,013
Shops	86	332,032
Utilities	2,020	922,959
Total	6,304	519,580

Dependent Variable =	(1) *Emission*	(2) *Emission*
Peer Disclosure	-0.107**	-0.127***
	(0.046)	(0.048)
Total Assets	0.[illegible]4	0.[illegible]0
	[illegible]	[illegible]
ROA		
Leverage		
Sales Growth	0.003	0.000
	(0.035)	(0.032)
Tangible Assets	0.066	-0.139
	(0.341)	(0.394)
R&D Expenses	0.063	-2.066
	(0.652)	(1.643)
Population	1.240***	0.722
	(0.460)	(0.545)
Unemployment	-0.024***	-0.030***
	(0.007)	(0.008)
Observations	6,304	6,304
R-squared	0.886	0.889
Facility FE	Yes	Yes
Year FE	Yes	No
Industry-Year FE	No	Yes

10.1% reduction in greenhouse gas emissions

11.9% reduction in greenhouse gas emissions

Placebo Test

Peer Disclosure ^{Placebo}	= An indicator variable that equals one for a facility if it is located in a county that has not been affected by climate-related disclosures while at the same time at least one of sibling facilities belonging to the same firm is located in affected counties, and zero otherwise.

- If decrease in emissions is driven by firm-wide effect, we would find a negative coefficient on *Peer Disclosure* ^{Placebo}.

Dependent Variable =	(1) *Emission*	(2) *Emission*
Peer Disclosure ^{Placebo}	0.029	0.050
	(0.040)	(0.031)
Total Assets	0.056	0.015
	(0.050)	(0.076)
ROA	0.485***	0.358*
	(0.171)	(0.184)
Leverage	0.271*	0.286
	(0.154)	(0.202)
Sales Growth	0.003	-0.000
	(0.034)	(0.032)
Tangible Assets	0.081	-0.118
	(0.337)	(0.393)
R&D Expenses	0.095	-2.055
	(0.641)	(1.638)
Population	1.240***	0.726
	(0.461)	(0.548)
Unemployment	-0.025***	-0.031***
	(0.007)	(0.008)
Observations	6,304	6,304
R-squared	0.886	0.888
Facility FE	Yes	Yes
Year FE	Yes	No
Industry-Year FE	No	Yes

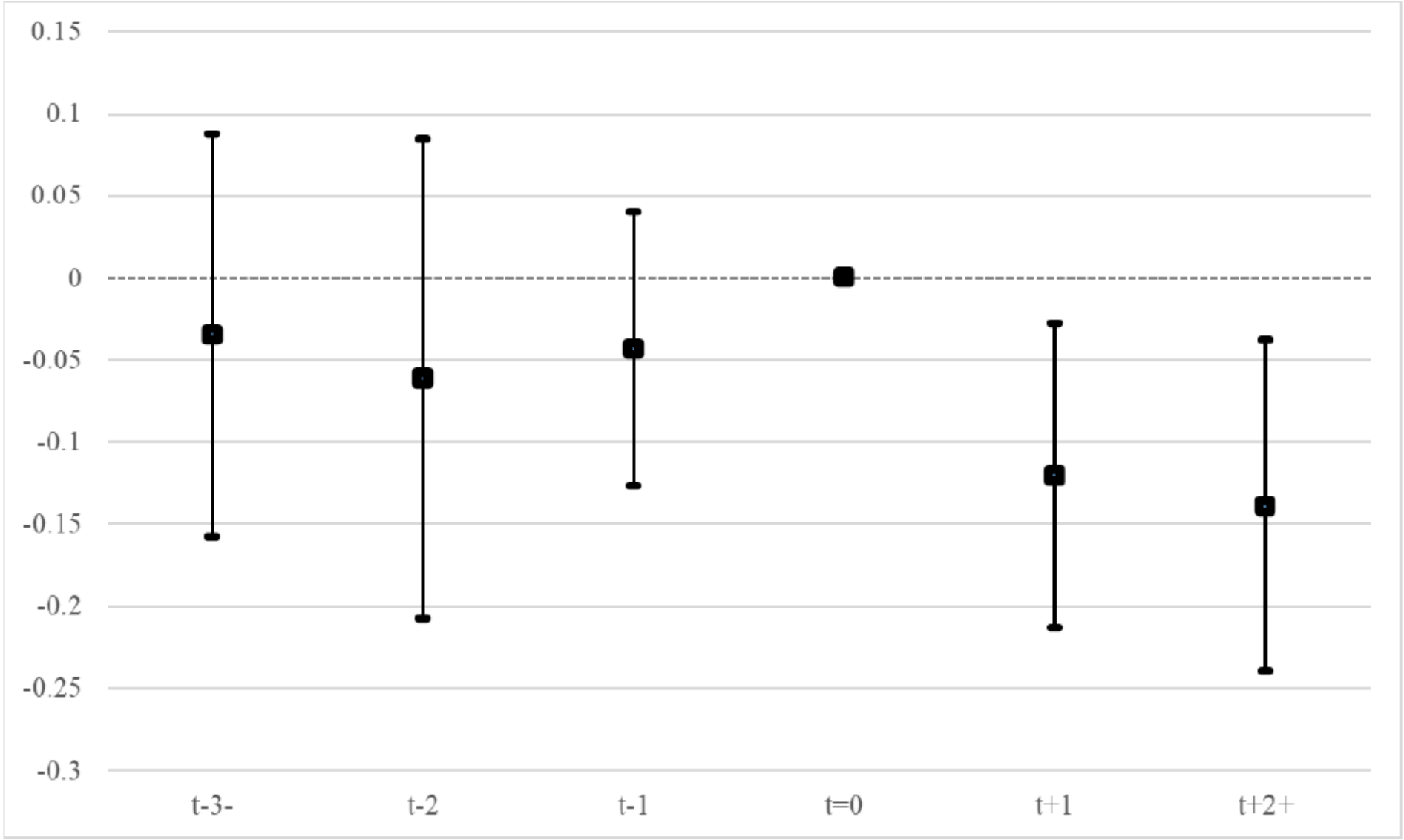
Dynamic Analysis

- We also conduct a dynamic analysis to address the concern that our results are driven by location-specific shocks.

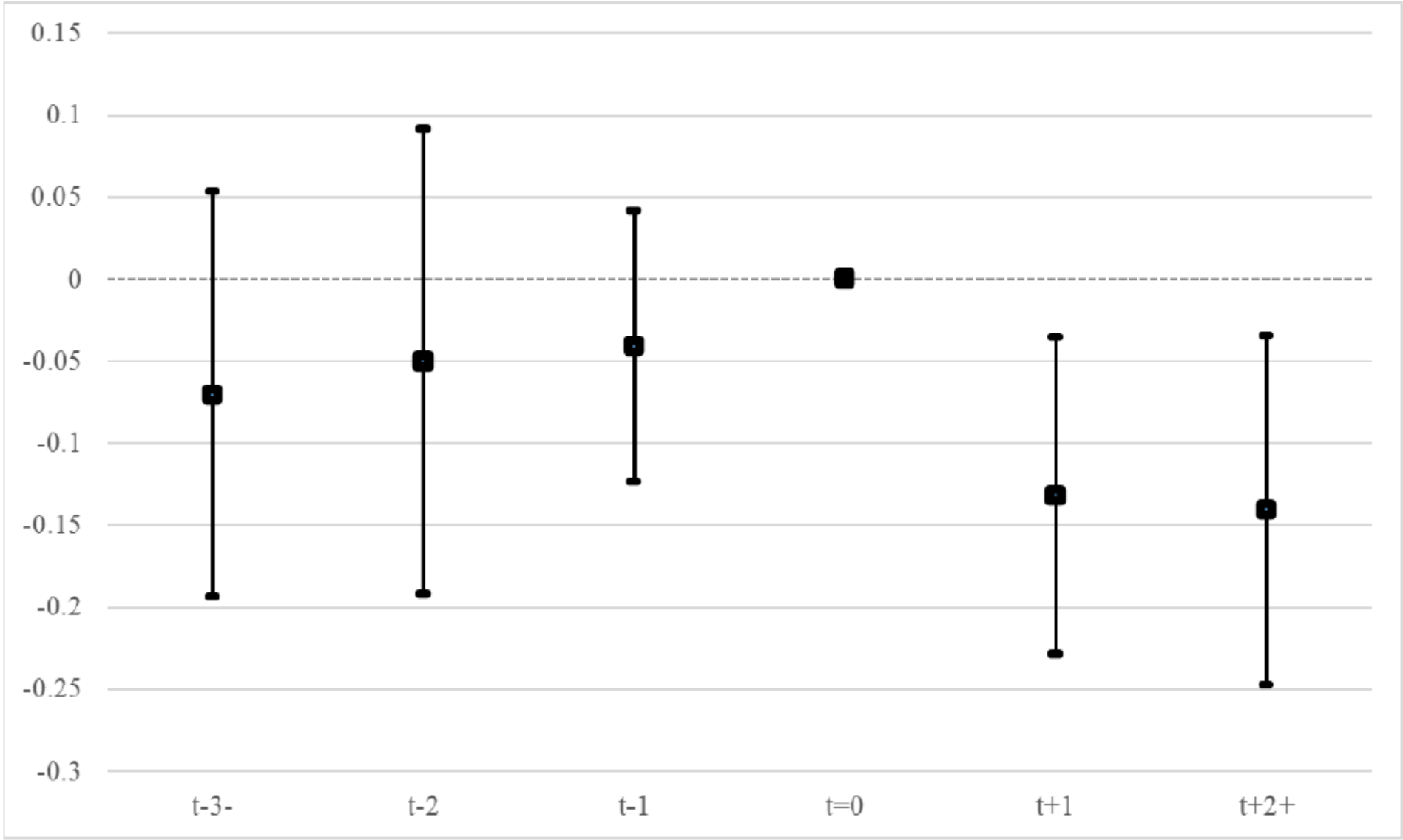
- If decrease in emissions is driven by climate-related disclosure, we should only observe the effect "after" a geographic peer initiates disclosure.

$$\begin{aligned} Emission_{i,t} = {} & \alpha + \beta_1 Peer\ Disclosure^{Pre\text{-}3}{}_{c,t} + \beta_2 Peer\ Disclosure^{Pre\text{-}2}{}_{c,t} + \beta_1 Peer\ Disclosure^{Pre\text{-}1}{}_{c,t} \\ & + \beta_4 Peer\ Disclosure^{Post+1}{}_{c,t} + \beta_5 Peer\ Disclosure^{Post+2}{}_{c,t} \\ & + \gamma Firm\text{-}level\ Controls_{j,t-1} + \delta County\text{-}level\ Controls_{c,t-1} \\ & + Fixed\ Effects + \varepsilon_{i,t} \end{aligned} \quad (2)$$

Panel A



Panel B



Hypothesis 2

- Differences in environmental knowledge and actions across different regions are explained by residents' education and income levels (Arcury and Christianson 1993)

- Wealthier and more educated individuals can potentially better process and interpret climate-related information, raising their awareness about environmental issues in the region.

H2a: The reduction in greenhouse gas emissions as stated in H1 will be greater when county residents have higher income levels.

H2b: The reduction in greenhouse gas emissions as stated in H1 will be greater when county residents have higher education levels.

Cross-Sectional Analyses

$$Emission_{i,t} = \alpha + \beta_1 Peer\ Disclosure^{High}_{c,t} + \beta_2 Peer\ Disclosure^{Low}_{c,t} + \beta_3 High_{c,t} + \gamma Firm\text{-}level\ Controls_{j,t-1} + \delta County\text{-}level\ Controls_{c,t-1} + Fixed\ Effects + \varepsilon_{i,t} \quad (3)$$

County Income = The average dollar amount of county-level personal income.

County Education = The proportion of the county-level population with a high school diploma or higher, averaged over a five-year window between 2015 and 2019.

Dependent Variable =	(1) *Emission*	(2) *Emission*
Peer Disclosure $^{High\ Income}$	-0.171***	-0.206***
	(0.059)	(0.066)
Peer Disclosure $^{Low\ Income}$	-0.045	-0.051
	(0.054)	(0.052)
High Income	0.009	0.023
	(0.053)	(0.055)
Total Assets	0.050	0.007
	(0.049)	(0.074)
ROA	0.477***	0.342*
	(0.167)	(0.179)
Leverage	0.277*	0.291
	(0.155)	(0.203)
Sales Growth	0.001	-0.003
	(0.035)	(0.032)
Tangible Assets	0.066	-0.125
	(0.338)	(0.387)
R&D Expenses	0.089	-2.205
	(0.659)	(1.726)
Population	1.386***	0.855
	(0.488)	(0.577)
Unemployment	-0.024***	-0.028***
	(0.008)	(0.008)
Observations	6,304	6,304
R-squared	0.886	0.889
P-value of *Disclosure* $^{High\ Income}$ = *Disclosure* $^{Low\ Income}$	0.051	0.021
Facility FE	Yes	Yes
Year FE	Yes	No
Industry-Year FE	No	Yes

Dependent Variable =	(1) *Emission*	(2) *Emission*
Peer Disclosure $^{High\ Edu.}$	-0.218***	-0.256***
	(0.071)	(0.079)
Peer Disclosure $^{Low\ Edu.}$	-0.016	-0.021
	(0.052)	(0.045)
Total Assets	0.054	0.014
	(0.048)	(0.069)
ROA	0.473***	0.325*
	(0.164)	(0.174)
Leverage	0.261*	0.278
	(0.150)	(0.197)
Sales Growth	0.002	-0.002
	(0.033)	(0.030)
Tangible Assets	0.069	-0.111
	(0.329)	(0.376)
R&D Expenses	0.202	-2.090
	(0.657)	(1.718)
Population	1.443***	0.900
	(0.480)	(0.560)
Unemployment	-0.023***	-0.028***
	(0.007)	(0.008)
Observations	6,304	6,304
R-squared	0.886	0.889
P-value of *Disclosure* $^{High\ Edu.}$ = *Disclosure* $^{Low\ Edu.}$	0.015	0.005
Facility FE	Yes	Yes
Year FE	Yes	No
Industry-Year FE	No	Yes

Hypothesis 3

- Shareholders are likely to exert more pressure on firms if they perceive a higher risk from climate issues.

- On the other hand, managers are likely to be more myopic if investors are more focused on short-term earnings at the expense of long-term sustainability.

H3a: The reduction in greenhouse gas emissions as stated in H1 will be greater for firms with higher exposure to climate risks.

H3b: The reduction in greenhouse gas emissions as stated in H1 will be smaller for firms with higher transient institutional ownership.

Cross-Sectional Analyses

$$Emission_{i,t} = \alpha + \beta_1 Peer\ Disclosure^{High}_{c,t} + \beta_2 Peer\ Disclosure^{Low}_{c,t} + \beta_3 High_{c,t} + \gamma Firm\text{-}level\ Controls_{j,t-1} + \delta County\text{-}level\ Controls_{c,t-1} + Fixed\ Effects + \varepsilon_{i,t} \quad (3)$$

County Income	= The average dollar amount of county-level personal income.
County Education	= The proportion of the county-level population with a high school diploma or higher, averaged over a five-year window between 2015 and 2019.
Climate Change Exposure	= Exposure to climate change, measured as the relative frequency of bigrams related to climate change in the transcript of analyst conference calls. Specifically, the number of bigrams related to climate change is divided by the total number of bigrams in the transcript of analyst conference calls, averaged across the four conference calls each year, and multiplied by 10^3 (Sautner et al. 2020).
Transient Institution	= The proportion of shares outstanding held by transient institutional investors (Bushee 2001).

Dependent Variable =	(1) *Emission*	(2) *Emission*
Peer Disclosure $^{High\ Exposure}$	-0.186***	-0.179***
	(0.062)	(0.065)
Peer Disclosure $^{Low\ Exposure}$	-0.004	-0.027
	(0.065)	(0.054)
High Exposure	0.121	0.130*
	(0.075)	(0.072)
Total Assets	0.090	0.162*
	(0.073)	(0.088)
ROA	0.492**	0.250
	(0.208)	(0.215)
Leverage	0.286*	0.235
	(0.156)	(0.161)
Sales Growth	0.034	0.011
	(0.038)	(0.035)
Tangible Assets	0.373	0.498
	(0.346)	(0.423)
R&D Expenses	-2.378	-7.436
	(5.280)	(6.067)
Population	1.818***	1.000*
	(0.603)	(0.514)
Unemployment	-0.028***	-0.032***
	(0.011)	(0.012)
Observations	5,291	5,291
R-squared	0.885	0.888
P-value of *Disclosure* $^{High\ Exposure}$ = *Disclosure* $^{Low\ Exposure}$	0.049	0.064
Facility FE	Yes	Yes
Year FE	Yes	No
Industry-Year FE	No	Yes

Dependent Variable =	(1) *Emission*	(2) *Emission*
Peer Disclosure $^{High\ Transient}$	-0.045	-0.061
	(0.047)	(0.040)
Peer Disclosure $^{Low\ Transient}$	-0.209***	-0.232***
	(0.066)	(0.071)
High Transient	-0.051	-0.073
	(0.048)	(0.056)
Total Assets	0.077	0.031
	(0.048)	(0.064)
ROA	0.552***	0.427**
	(0.187)	(0.200)
Leverage	0.326*	0.334
	(0.173)	(0.227)
Sales Growth	-0.008	-0.009
	(0.031)	(0.027)
Tangible Assets	-0.011	-0.280
	(0.339)	(0.393)
R&D Expenses	-2.793	-6.522**
	(4.068)	(3.182)
Population	1.190**	0.779
	(0.492)	(0.599)
Unemployment	-0.022***	-0.029***
	(0.007)	(0.008)
Observations	5,950	5,950
R-squared	0.886	0.889
P-value of *Disclosure* $^{High\ Transient}$ = *Disclosure* $^{Low\ Transient}$	0.013	0.005
Facility FE	Yes	Yes
Year FE	Yes	No
Industry-Year FE	No	Yes

Analysis using Private Firms to Rule Out Capital Market Incentives

Dependent Variable =	Including facilities not matched with Compustat *	
	(1) *Emission*	(2) *Emission*
Peer Disclosure	-0.074***	-0.082***
	(0.025)	(0.026)
Population	0.470	0.263
	(0.295)	(0.262)
Unemployment	0.003	0.004
	(0.007)	(0.007)
Observations	14,634	14,634
R-squared	0.847	0.850
Facility FE	Yes	Yes
Year FE	Yes	No
Industry-Year FE	No	Yes

Additional analyses that didn't make it into this version of the paper

1. Are plants reducing emissions because they learn from their disclosing peers?
   - Split sample based on disclosing firms' emissions reduction but find no significant difference between the two groups

2. Are the results driven by variation in EPA enforcement levels?
   - Additional control for whether there was an EPA enforcement action for the facility

3. Additional cross-sectional tests suggest results are stronger for counties with more local news coverage and when there is greater damage from climatic disasters

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Press Release

SEC Proposes Rules to Enhance and Standardize Climate-Related Disclosures for Investors

FOR IMMEDIATE RELEASE
2022-46

Washington D.C., March 21, 2022 — The Securities and Exchange Commission today proposed rule changes that would require registrants to include certain climate-related disclosures in their registration statements and periodic reports, including information about climate-related risks that are reasonably likely to have a material impact on their business, results of operations, or financial condition, and certain climate-related financial statement metrics in a note to their audited financial statements. The required information about climate-related risks also would include disclosure of a registrant's greenhouse gas emissions, which have become a commonly used metric to assess a registrant's exposure to such risks.

"I am pleased to support today's proposal because, if adopted, it would provide investors with consistent, comparable, and decision-useful information for making their investment decisions, and it would provide consistent and clear reporting obligations for issuers," said SEC Chair Gary Gensler. "Our core bargain from the 1930s is that investors get to decide which risks to take, as long as public companies provide full and fair disclosure and are truthful in those disclosures. Today, investors representing literally tens of trillions of dollars support climate-related disclosures because they recognize that climate risks can pose significant financial risks to companies, and investors need reliable information about climate risks to make informed investment decisions. Today's proposal would help issuers more efficiently and effectively disclose these risks and meet investor demand, as many issuers already seek to do. Companies and investors alike would benefit from the clear rules of the road proposed in this release. I believe the SEC has a role to play when

Related

- Propos
- Fact Sl

Source: SEC Website (March 22nd, 2022)

Summary of Results

- Local plants decrease their emissions after another firm with plants in the same county (i.e., geographic peer) initiates climate-related disclosures.
- The effect is stronger among counties with higher income and education levels.
- The effect is stronger among firms with higher exposure to climate risk and weaker among firms with higher transient institutional ownership.
- Results robust to various tests that address potential alternative explanations.

Conclusion

- Climate-related disclosures have governance externalities on geographic peers.
- Our results thus inform regulators of the potential scope of the proposed disclosure requirements.

THANK YOU!