The Real Effects of Environmental Activist Investing

Lakshmi Naaraayanan (London Business School)
Kunal Sachdeva (Rice)
Varun Sharma (London Business School)

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Environmental Activism

What is it and why is it important?

- Shareholders engaging with the board to improve corporate environmental behaviors
- Driven by non-pecuniary benefits, differs from investor activism that aims to improve financial and operational performance
- Alternative to disinvestment campaigns, which are increasing in popularity and may come at lower future expected returns[1]

Research question: Does environmental activism have any real effects? What are the externalities? And, how do firms respond?

[1] sustainable funds attracting US$33 billion in net flows in first quarter of 2020

This Paper

Fills the gap in our understanding about effectiveness of environmental activism and provides evidence that investors can:

[A] Improve Firm's Environmental Impact

- Toxic Chemical Releases, Stack-air Emissions, Greenhouse Gas

[B] Generate Positive Externalities on Local Economies

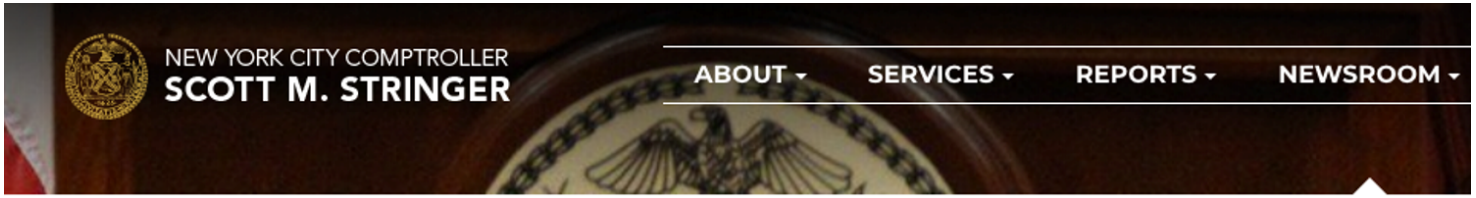
- Cancer-causing pollution, Improvements in Air Quality, Reduce Intensity

[C] Firms Taking Steps to Achieve These Changes

- Waste Management, Abatement Initiatives

» Investors delegate their pro-social preferences onto firms

Boardroom Accountability Project



Newsroom / Press Releases & Statements / Comptroller Stringer, NYC Pension Funds Launch Nation...

Comptroller Stringer, NYC Pension Funds Launch National Campaign To Give Shareowners A True Voice In How Corporate Boards Are Elected

NOVEMBER 6, 2014

New York City Pension Funds File 75 Proxy Access Shareowner Proposals to Kick Off the Boardroom Accountability Project

NEW YORK, NY – On Thursday, New York City Comptroller Scott M. Stringer, on behalf of the $160 billion New York City Pension Funds, announced a groundbreaking initiative to give shareowners the right to nominate directors at U.S. companies using the corporate ballot. By submitting proxy access shareowner proposals to 75 companies at once, the New York City Pension Funds are taking a major first step to roll out proxy access across the market. The resolutions, known collectively as the Boardroom Accountability Project, seek to give shareowners a choice in the election of directors of publicly held companies.

Targeting Mandates

The New York Times

Effort Begins for More Say on Directors

By Gretchen Morgenson

Nov. 5, 2014

"Resolutions were filed at companies where we see risks associated with climate change, board diversity and excessive CEO pay. ***Especially when it comes to the environment, business as usual is no longer an option.*** *To effect true change, you need the ability to hold entrenched and unresponsive boards accountable and that is what we are seeking to do"*

-Scott M. Stringer, New York City Comptroller

Empirical Strategy

Difference-in-differences

$$Y_{i,c,t} = \beta_1 I\left(Post_{i,t}\right) + \beta_2 I\left(Post_{i,t}\right) I\left(Environment_i\right) + \delta_{ic} + \delta_{ct} + \varepsilon_{i,c,t}$$

Propensity score matching: Guided by target selection model, match targeted with counterfactual firms:

- Russell 3000 constituents as candidate counterfactual firms
- Match within the same FF12 industry, using firm size, return on assets, market-to-book ratio, and ASSET4 score
- Robust to matching across numerous alternate specifications

Confirm BAP's targeting strategy with NYCPS Assistant Comptroller

Pre-trend FFI Target Selection

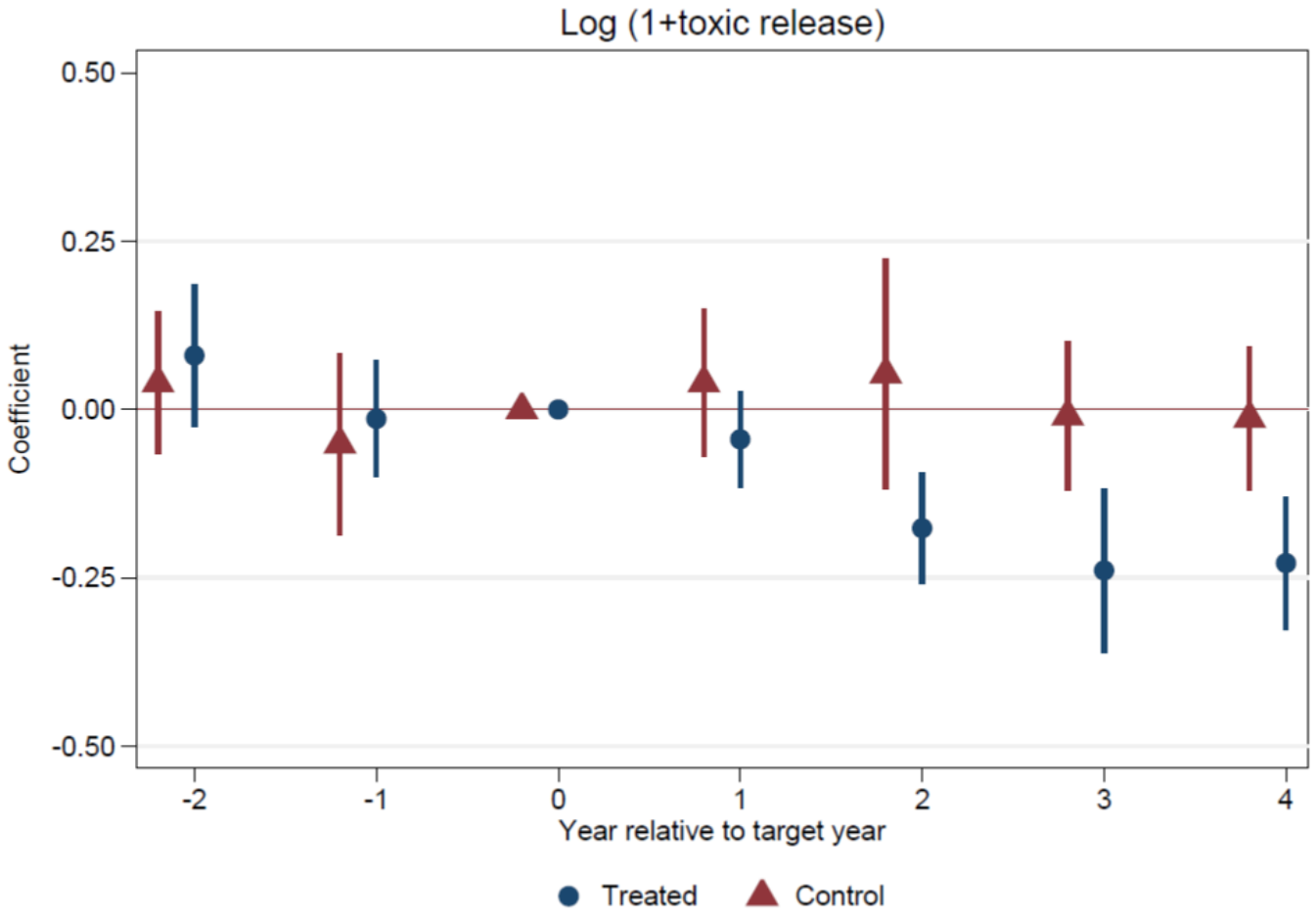
Target vs. Control: Fossil Fuel and Utilities

Targeted		*Control*	
Company	*Ticker*	*Company*	*Ticker*
A. Fossil Fuel			
Chevron Corp	CVX	Marathon Petroleum	MPC
ConocoPhillips	COP	HollyFrontier Corp	HFC
Hess Corp	HES	Valero Energy Corp	VLO
Murphy Oil	MUR	Valvoline Inc.	VVV
B. Utilities			
American Electric Power	AEP	Oklahoma Gas & Electric	OGE
CMS Energy	CMS	NextEra Energy	NEE
Xcel Energy	XEL	Edison International	EIX
NRG Energy	NRG	Portland General Electric	POR

Novel Data Sets

- BAP and NYCPS
  - [1] Equity portfolio using FOIA; [2] Information on the specific reason for the firms to be targeted
- EPA Databases
  - [3] Toxic Release Inventory (TRI); [4] Pollution Prevention(P2); [5] Risk-Screening Environmental Indicators (RSEI); [6] Greenhouse Gas Reporting Program (GHGRP); [7] Air Quality System (AQS); [8] Integrated Risk Information System (IRIS);
- Other Databases
  - [9] Energy Information Administration (EIA); [10] Fossil Free Index; [11] ASSET4; [12] Compustat/CRSP; [13] ISS

BAP and Reduction in Toxic Releases



Source: Toxic Release Inventory, EPA

[A] Toxic Release — Large Reduction, Primarily On-Site

$$Y_{i,c,t} = \beta_1 I\left(Post_{i,t}\right) + \beta_2 I\left(Post_{i,t}\right) I\left(Environment_i\right) + \delta_{ic} + \delta_{ct} + \varepsilon_{i,c,t}$$

Dependent variable	Panel A: Toxic chemical release		
	Log(1+Release/COGS $_{t-1}$)		
	Total	On-site	Off-site
	(1)	(2)	(3)
Post	0.003	0.006	0.005
	(0.043)	(0.038)	(0.011)
Post × Environment	-0.050***	-0.059***	0.005
	(0.019)	(0.015)	(0.007)
Plant × Chemical fixed effects	Yes	Yes	Yes
Chemical × Year fixed effects	Yes	Yes	Yes
R^2	0.82	0.83	0.73
Observations	59,983	59,983	59,983

Source: Toxic Release Inventory, EPA

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Reduction by 13%, relative to the sample mean

Source: Toxic Release Inventory, EPA

[A] Toxic Release — Driven by Stack Air Emissions

Dependent variable	Panel B: Medium of release		
	Log(1+Release/COGS $_{t-1}$)		
	Stack air	Fugitive air	Surface water discharges
	(1)	(2)	(3)
Post	0.012	0.006*	0.001
	(0.015)	(0.003)	(0.002)
Post × Environment	-0.036***	-0.007***	-0.002**
	(0.008)	(0.002)	(0.001)
Plant × Chemical fixed effects	Yes	Yes	Yes
Chemical × Year fixed effects	Yes	Yes	Yes
R^2	0.81	0.77	0.73
Observations	59,983	59,983	59,983

Source: Toxic Release Inventory, EPA

[A] Toxic Release — Driven by Stack Air Emissions

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Plant × Chemical fixed effects	Yes	Yes	Yes
Chemical × Year fixed effects	Yes	Yes	Yes
R^2	0.81	0.77	0.73
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» Do these reductions come from gases that affect global warming?

Source: Toxic Release Inventory, EPA

[A] Toxic Release — Greenhouse Gas Emissions

Dependent variable	Log(1+Emissions/Output $_{t-1}$)		
	Methane	Carbon dioxide	Nitrous oxide
	(1)	(2)	(3)
Post	0.001	0.008	0.000
	(0.001)	(0.016)	(0.002)
Post × Environment	-0.003**	-0.025*	-0.003**
	(0.001)	(0.015)	(0.001)
Plant × Gas fixed effects	Yes	Yes	Yes
Gas × Year fixed effects	Yes	Yes	Yes
R^2	0.44	0.78	0.43
Observations	11,494	11,494	11,494

Source: GHGRP, EPA and EIA

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Plant × Gas fixed effects	Yes	Yes	Yes
Gas × Year fixed effects	Yes	Yes	Yes
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Observations	11,494	11,494	11,494

» Do these changes have positive externalities on the local economy?

Source: GHGRP, EPA and EIA

[B] Local Economy — Biological Impact

Dependent variable	Log(1+Release/COGS $_{t-1}$)					
System affected	Respiratory	Developmental	Nervous	Hematologic	Urinary	Hepatic
	(1)	(2)	(3)	(4)	(5)	(6)
Post	0.073	0.033**	0.028*	0.026*	0.046	0.015
	(0.106)	(0.016)	(0.016)	(0.015)	(0.031)	(0.009)
Post × Environment	-0.076***	-0.035**	-0.028*	-0.024*	-0.023	-0.019*
	(0.022)	(0.014)	(0.015)	(0.013)	(0.015)	(0.010)
Plant × Chemical fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Chemical × Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.92	0.88	0.92	0.90	0.91	0.95
Observations	5,632	3,600	7,761	2,920	3,235	2,248

Source: Integrated Risk Information System, EPA

[B] Local Economy — Air Quality Monitor Data

Dependent variable	Daily Average Measurement				
	Carbon monoxide	Ozone	Sulfur dioxide	Nitrogen dioxide	Particulate matter <2.5 μm
	(1)	(2)	(3)	(4)	(5)
Post	0.079*	-0.383	-0.097	0.163*	-0.083
	(0.044)	(0.376)	(0.089)	(0.091)	(0.095)
Post × Environment	0.084	-0.135**	-0.228***	-0.015	-0.179***
	(0.148)	(0.061)	(0.082)	(0.034)	(0.060)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Plant fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.22	0.13	0.26	0.40	0.18
Observations	32,767	27,769	85,556	26,864	47,778

Source: Air Quality System Database

[B] Local Economy — Air Quality Monitor Data

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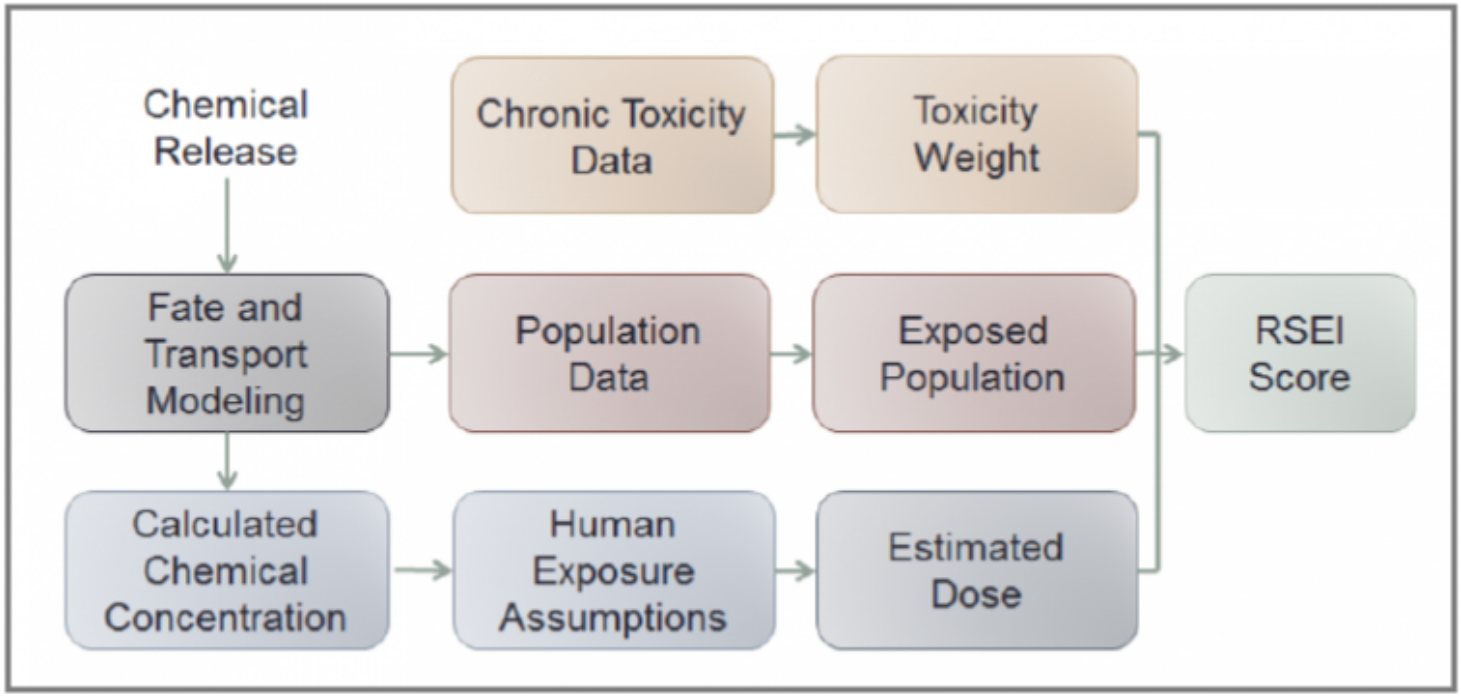
R^2	0.22	0.13	0.26	0.40	0.18
Observations	32,767	27,769	85,556	26,864	47,778

» How do we consider the affected population?

Source: Air Quality System Database

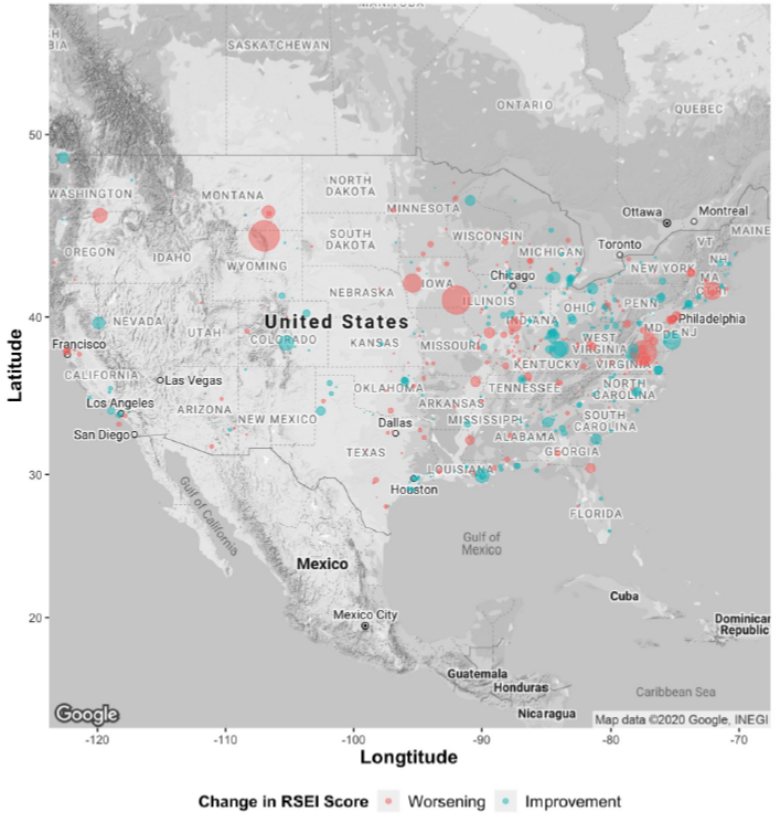
[B] Local Economy — Risk-Screening Environmental Indicators

$$RSEI \approx Toxicity \times Population \times Dosage$$

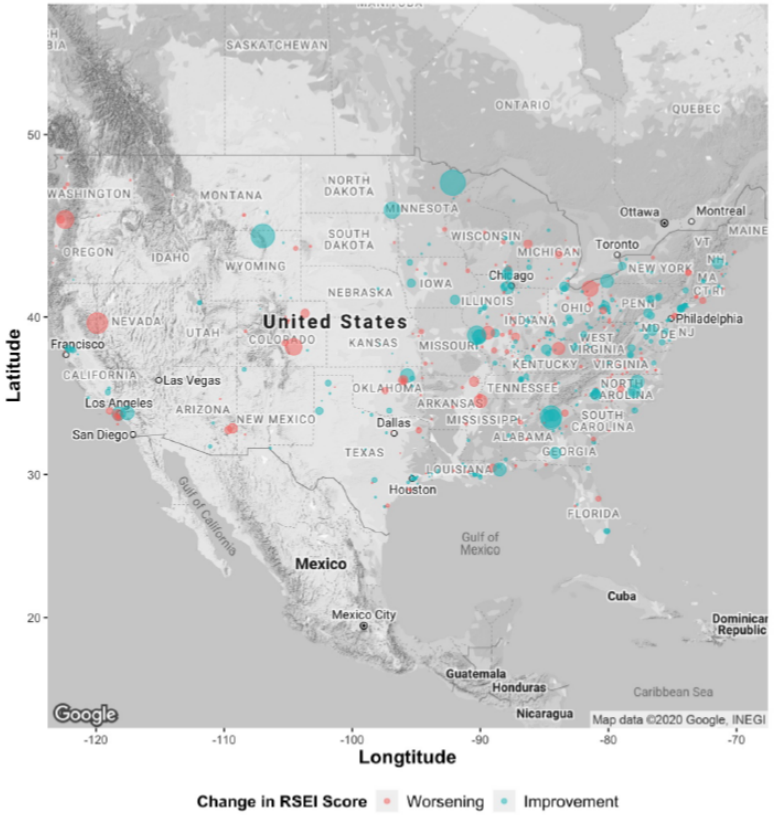


Source: Risk-Screening Environmental Indicators, EPA

[B] Local Economy — local-level change in polluting activity



(a) Pre-period



(b) Targeting-period

Source: Risk-Screening Environmental Indicators, EPA

[B] Local Economy — Externalities Around Targeted Plants

Reduction in Intensity of Pollution Around Targeted Plants

Dependent variable	Total score	Toxic Concentration	Number of Chemicals	Number of Releases
	(1)	(2)	(3)	(4)
Post × Environment	-0.197*	-0.257**	-0.255**	-0.295**
	(0.114)	(0.117)	(0.129)	(0.130)
Year fixed effects	Yes	Yes	Yes	Yes
Census Block fixed effects	Yes	Yes	Yes	Yes
R^2	0.06	0.07	0.08	0.14
Observations	3,040	3,040	3,040	3,040

- Far from the investor base (NYC!), suggesting an important externality from environmental activist investing
- Harmful effects on respiratory related ailments

Source: Risk-Screening Environmental Indicators, EPA

[B] Local Economy — Externalities Around Targeted Plants

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Census Block fixed effects	Yes	Yes	Yes	Yes
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Observations	3,040	3,040	3,040	3,040

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- Harmful effects on respiratory related ailments

» How are firms achieving these improvements?

Source: Risk-Screening Environmental Indicators, EPA

[C] Sources of Reduction — Anecdotal Evidence

Chevron Corporation

- "...reduce natural gas flaring and venting and the resulting GHG emissions."

Devon Energy Corporation

- "...we've replaced high-bleed natural gas pneumatic controllers on hundreds of wells in Wyoming, Oklahoma, New Mexico and Texas..."

Hess Corporation

- "We have reduced our absolute Scope 1 and 2 emissions from 10.8 million tonnes of CO2e to 3.9 million tonnes, or 64 percent
- ...we have reduced our cumulative flaring intensity by 41 percent through 2018..."

[C] Sources of Reduction — Effectiveness of Waste Management

Source: EPA

[C] Sources of Reduction — Waste Management

Dependent variable	Panel A: Sources of reduction	
	Log (1+ Release/COGS $_{t-1}$)	
	High impact	Low impact
	(1)	(2)
Post	0.050	0.006
	(0.055)	(0.007)
Post × Environment	-0.121***	-0.011***
	(0.031)	(0.003)
Plant × Chemical fixed effects	Yes	Yes
Chemical × Year fixed effects	Yes	Yes
R^2	0.83	0.74
Observations	59,983	59,983

Source: Toxic Release Inventory, EPA

[C] Sources of Reduction — Waste Management

Dependent variable	Panel A: Sources of reduction	
	Log (1+ Release/COGS $_{t-1}$)	
	High impact	Low impact
	(1)	(2)
Post	0.050	0.006
	(0.055)	(0.007)
Post × Environment	-0.121***	-0.011***
	(0.031)	(0.003)
Plant × Chemical fixed effects	Yes	Yes
Chemical × Year fixed effects	Yes	Yes
R^2	0.83	0.74
Observations	59,983	59,983

» How do firms reduce production-related waste?

Source: Toxic Release Inventory, EPA

[C] Sources of Reduction — Abatement Initiatives

Improvements come from operational efficiency

A. Spill and Leakage Prevention

B. Good operating practices

	Panel B: Abatement efforts	
Dependent variable	Log (1 + Number of initiatives)	
Initiative	Spill prevention	Operations
	(1)	(2)
Post	-0.002	-0.009*
	(0.002)	(0.005)
Post × Environment	0.006**	0.004*
	(0.003)	(0.002)
Plant × Chemical fixed effects	Yes	Yes
Chemical × Year fixed effects	Yes	Yes
R^2	0.92	0.91
Observations	42,065	42,065

Source: Pollution Prevention, EPA

[C] Sources of Reduction — Production

Does reduction in economic activity drive this?

- Firms that produce less, mechanically release fewer emissions

Dependent variable	Production ratio	
	(1)	(2)
Post	0.014	0.040
	(0.042)	(0.041)
Post × Environment	-0.001	-0.012
	(0.018)	(0.017)
Plant × Chemical fixed effects	Yes	Yes
Chemical × Year fixed effects	Yes	Yes
Sample	All	Cont. Reporting
R^2	0.25	0.16
Observations	40,704	27,849

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Dependent variable	Production ratio	
	(1)	(2)
Post	0.014	0.040
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Plant × Chemical fixed effects	Yes	Yes
Chemical × Year fixed effects	Yes	Yes
Sample	All	Cont. Reporting
R^2	0.25	0.16
Observations	40,704	27,849

Short-term Financial Performance

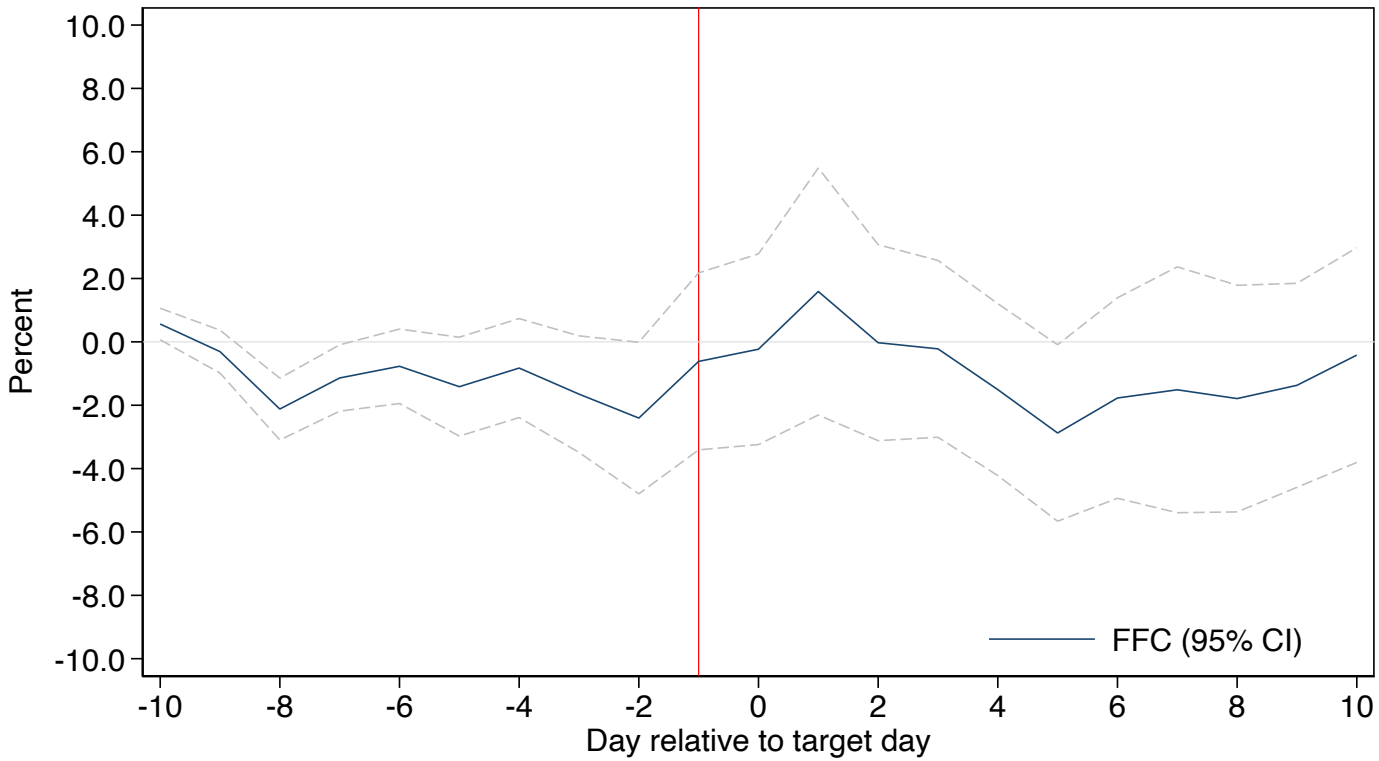
Dependent variable	Return on Assets	Profitability	Altman's Z-score
	(1)	(2)	(3)
Post	-0.012	-0.067*	-0.209
	(0.018)	(0.034)	(0.193)
Post × Environment	-0.001	0.014	0.072
	(0.020)	(0.033)	(0.155)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
R^2	0.26	0.28	0.74
Observations	910	910	910

Short-term Financial Performance

Dependent variable	Return on Assets	Profitability	Altman's Z-score
	(1)	(2)	(3)
Post	-0.012	-0.067*	-0.209
	(0.018)	(0.034)	(0.193)
Post × Environment	-0.001	0.014	0.072
	(0.020)	(0.033)	(0.155)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
R^2	0.26	0.28	0.74
Observations	910	910	910

» How do investors perceive the BAP campaign?

Stock Price Reactions to the BAP Campaign



Ruling Out Alternative Explanations (1 of 2)

Category	Tests
A) Indirect Effects Link	1) Spillovers Effect 2) Proxy Access Targeting
B) Reporting Biases Link	3) Air Quality Monitors 4) Large Plants
C) Propensity Score Matching Link	5) Level of Chemical Release 6) Trend in Chemical Release 7) Fama-French 48
D) Sample Restrictions Link	8) Utility Firms 9) Exclude Chapter 11 Firms 10) Exclude Zeroes 11) Continuous Reporting

Ruling Out Alternative Explanations (2 of 2)

Category	Test
E) Scaling Link	12) Plant-Level Output 13) Share of releases 14) Sales_{t-1} 15) Total Assets_{t-1} 16) COGS_t 17) No Scaling
F) Additional Link	18) Jackknife 19) Parent-firm Clustering 20) Aggregation at the plant-level 21) SIC4-year fixed effects 22) Controlling for firm performance

Ruling Out Alternative Explanations (2 of 2)

Category	Test
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» Are the results specific to the size and influence of BAP?

External Validity

Targeted firms are responding to environmental activism

Dependent variable	Log(1+Release/COGS $_{t-1}$)		
	Total	On-site	Off-site
	(1)	(2)	(3)
Post	0.092**	0.093***	0.009
	(0.037)	(0.031)	(0.009)
Post × Environment	-0.191***	-0.180***	-0.003
	(0.054)	(0.046)	(0.018)
Plant × Chemical fixed effects	Yes	Yes	Yes
Chemical × Year fixed effects	Yes	Yes	Yes
R^2	0.80	0.82	0.76
Observations	50,888	50,888	50,888

Source: ISS and Toxic Release Inventory

Voice vs. Exit

Previous literature has focused on negative-selection (divestment campaigns). However, environmental activist investing may play an important tool to change corporate environmental behaviors:

- Reduction in cancer-causing pollution and greenhouse gas emissions through preventative efforts
- Important positive effects on local economies
- Suggestive that investors can delegate pro-social preferences

Engagement is an important tool in addressing climate change risks!

Robustness: Additional

	Toxic chemical release								
	Total			On-site			Off-site		
	Post	Post × Env	Obs.	Post	Post × Env	Obs.	Post	Post × Env	Obs.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel D: Additional robustness									
(13) State-year fixed effects	0.066	-0.076***	59,983	0.066	-0.073***	59,983	0.003	-0.006	59,983
	(0.046)	(0.022)		(0.041)	(0.018)		(0.009)	(0.008)	
(14) Jackknife estimation	0.003	-0.050	59,983	0.006	-0.059**	59,983	0.005	0.005	59,983
	(0.050)	(0.031)		(0.043)	(0.026)		(0.016)	(0.013)	
(15) Clustering: Parent-firm	0.003	-0.050	59,983	0.006	-0.059**	59,983	0.005	0.005	59,983
	(0.054)	(0.034)		(0.046)	(0.028)		(0.016)	(0.012)	
(16) Aggregation at the plant-level	0.116	-0.545***	4,742	0.074	-0.322***	4,742	-0.012	0.022	4,742
	(0.187)	(0.137)		(0.106)	(0.075)		(0.059)	(0.048)	
(17) SIC4-year fixed effects	-0.029	-0.033*	59,912	-0.020	-0.046***	59,912	-0.001	0.010	59,912
	(0.050)	(0.019)		(0.045)	(0.014)		(0.013)	(0.008)	
(18) Controlling for firm performance	0.061	-0.069**	57,512	0.044	-0.063***	57,512	0.024**	-0.007	57,512
	(0.051)	(0.016)		(0.044)	(0.015)		(0.012)	(0.006)	

Back

Source: Toxic Release Inventory (TRI), EPA