

Do firms respond to calls for environmental improvements made by retail investors?

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Motivation

- Demand side forces of environmental performance.
 - Rising influence of retail investors.
- Key driver: New digital platforms that have empowered retail investors.
 - Unlike institutional investors, retail investors are not constrained by fiduciary duty (Benabou and Tirole).
- Role of questioning on investor platforms.
 - Does it matter “how” the demands are made.



Research question

Do firms respond to retail investors' demand to reduce environmental violations?



Challenges in testing demand-side forces:

- Selection effects in archival data.
- Limited ways in which retail investors can access firms (e.g., IR hotlines).

Investor online platform

- Interactive investor online platform administered by the Shenzhen Stock Exchange (EasyIR) and Shanghai stock exchange (eHudong).
- *Objective*: Enhance the general public's access to listed firms.
 - Creates a direct communication channel between investors and firms.
- *Interface*: Each firm has a community page where investors can directly interact and post questions.
- *Active usage*: By the end of 2017, there have been more than 2.4 million posts made by 170,746 unique users on the platform.



Notable features of the platform

- User base: dominated by retail investors.
 - Test whether the general public can pressure firms through these platforms.
- All posts and firm's responses are visible to the public in real-time.
 - vs. IR hotlines: limited to one-on-one interactions.
- Firms are required (by the stock exchange) to read and respond to all posts.
 - Pros: Observe firm's responses and can rule out the possibility that non-disclosure is because firms are “unaware” of the requests.
 - Cons: Impose challenges in generalizing the findings to other settings.



Structure of the analyses

1. Track responses on the platform

- Do firms respond to retail investors' pressures made on the platform?
- Does the quality of the response vary by the basis in which requests are made?

2. Tracking the subsequent violation rates

- Do the future violation rates vary by the types of intervention?

3. How far reaching is the intervention?

- Time horizon: short term vs. long term
- Spillover to other establishments
- Firm-types
- Region with more concern about environment

4. Supplementary: Subsequent disclosure

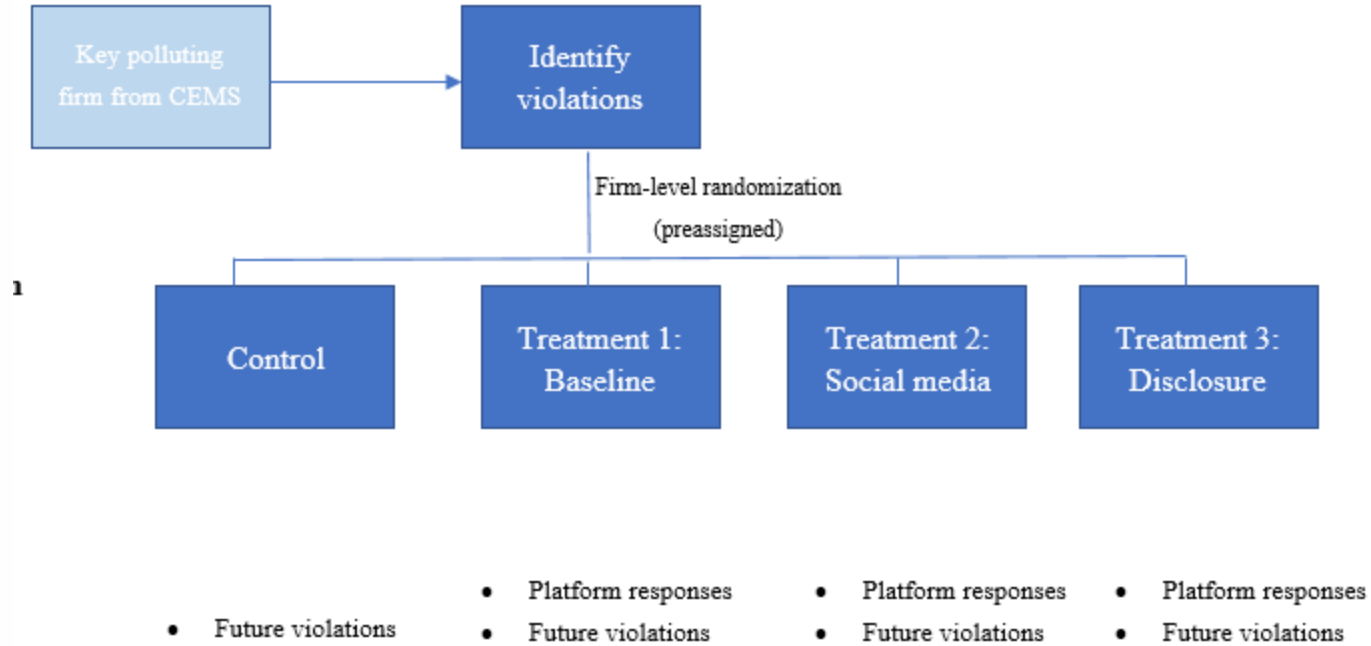


The sample: identifying the violators

- China's Continuous emission monitoring system (CEMS)
 - Real-time monitoring system tracking of key pollutants.
 - Key polluters data monitored in real time by local EPAs.
 - Starting 2014, local EPAs required to publicly disclose the emission data on their webpage.
- Our sample: Key polluters owned by public firms.
 - 4,007 establishments from 1,304 listed firms (as of Jan 2022)
- Randomized (at the firm-level) before the violation occurs.
 - One control group and 3 different treatment groups.



Experiment design



Treatment condition and contextualization

- Treatment condition: Request violating firms to provide the reason for and rectify the violation.
- 3 types of treatment
 - **Baseline treatment (30%)**: When a firm violates the pollution standards, we post on the platform alleging the violation, and ask the firm to provide reasons and ask them to rectify the violation.
 - **Social media treatment (30%)**: In addition to the baseline, we make firms aware of the fact that we will disseminate on the firm's social media account (and we follow up by doing so).
 - **Disclosure (30%)**: In addition to the baseline, we ask firms to disclose, in its annual report, its plans for controlling future pollution levels.



Implementation: Staggered posting in the month of the violation




- Violating establishments collected by the Institute of Public Environmental Affairs (IPE)
- On average, firms response within 14.5 days the questions are posted.
- No significant relation with timeliness of the violation and the response quality.

Table 1.B: Violation rates

Groups	(1) # of establishments	(2) Firms	(3) # of violations	(4) Violation-rate (=(3)/(1))
Total	2,634	1,124	727	27.60 %
Control (10%)	325	108	87	26.77 %
Baseline (30%)	757	334	238	31.44 %
Disclosure (30%)	774	345	212	27.39 %
Social Media (30%)	778	337	190	24.42 %
Spillover sample	551	N/A	148	26.86%



Table 2: Responses on the platform for treatment firms



	No-explanation	General response	Targeted
Type of responses	No-explanation	General response	Targeted response
Definition	Firms merely acknowledge that it received the question but provides no further explanation. Firms are in denial.	Firms mentioning corporate-wide plans to control pollutions in general.	Firms provide a specific explanation for the violation and plans to prevent it reoccurrence in the future.

Examples



No-explanation

Dear investors, Hello, thank you for your attention and suggestions to the company and its subsidiaries.

General response

Hello, The company has always attached great importance to environmental protection work and strictly abides by environmental protection laws, regulations, and relevant regulatory requirements. In recent years, it has continued to increase investment in environmental protection, continuously improves the level of environmental protection governance, and actively fulfils its social responsibilities. Thank you for your attention and suggestions.

Targeted

Dear investors, Hello! Our company attaches great importance to your feedback. Regarding the sewage online monitoring data of its subsidiary China Resources Sanjiu (Huangshi) Pharmaceutical Co. Ltd., the chemical oxygen demand concentration abnormally exceeded the standard in March this year. After verification, the main reason was: interference at the wastewater sampling port that affected the detection. ... After discovering the data anomaly, Huangshi Sanjiu took emergency measures as soon as possible and immediately filed a record with the local environmental protection



Table 2: Responses on the platform for treatment firms

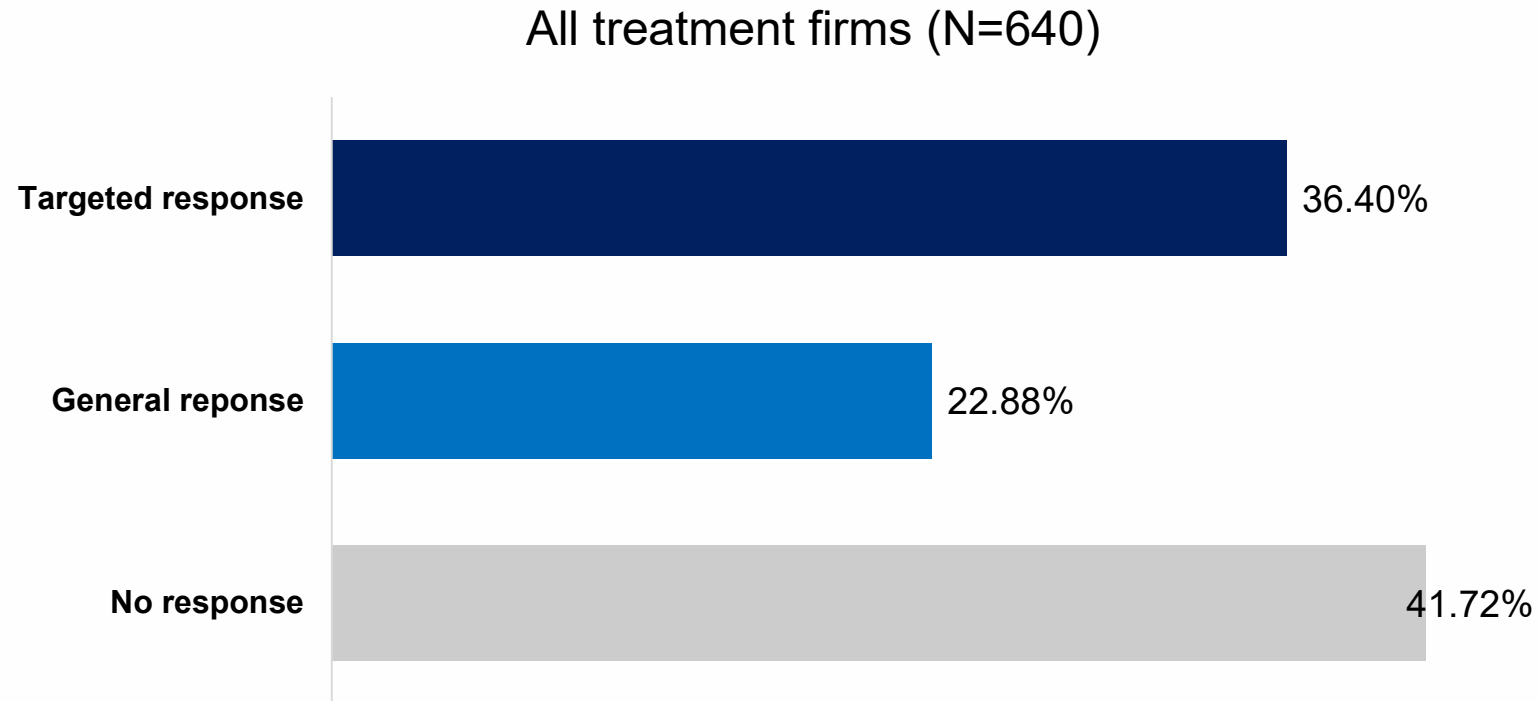


Table 2.B: Responses on the platform by treatment type
 Baseline (N=238) Social media (N=190)

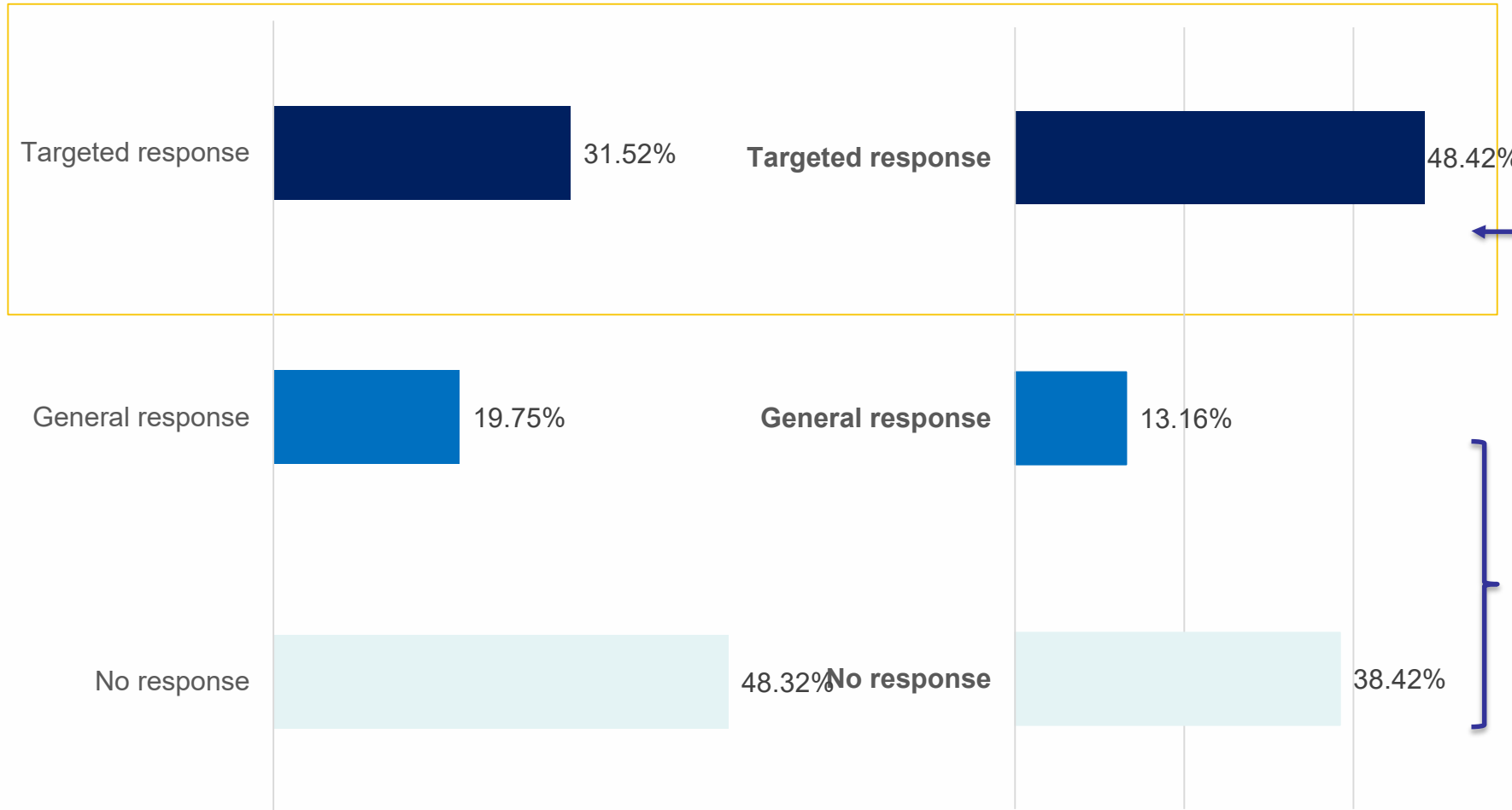
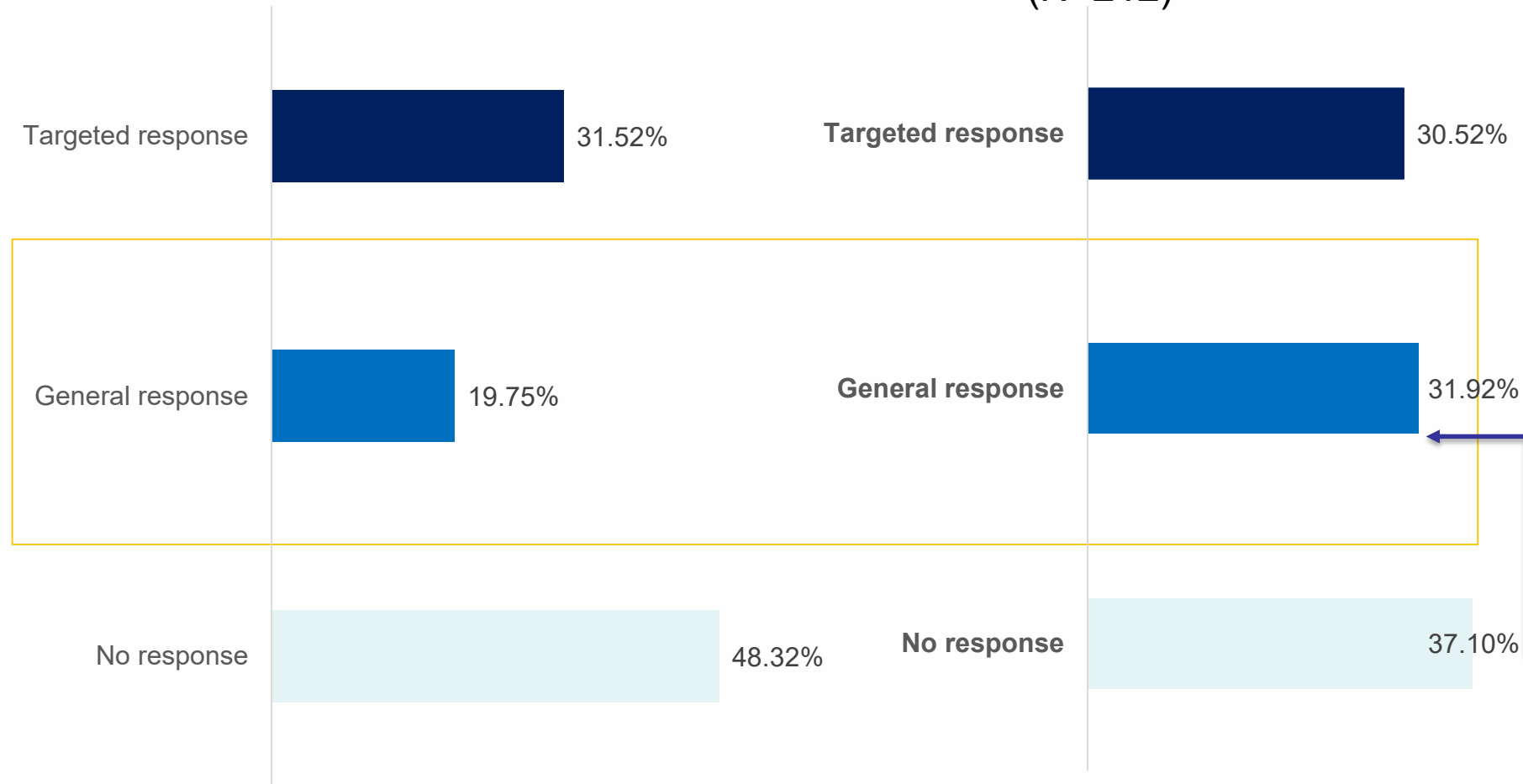
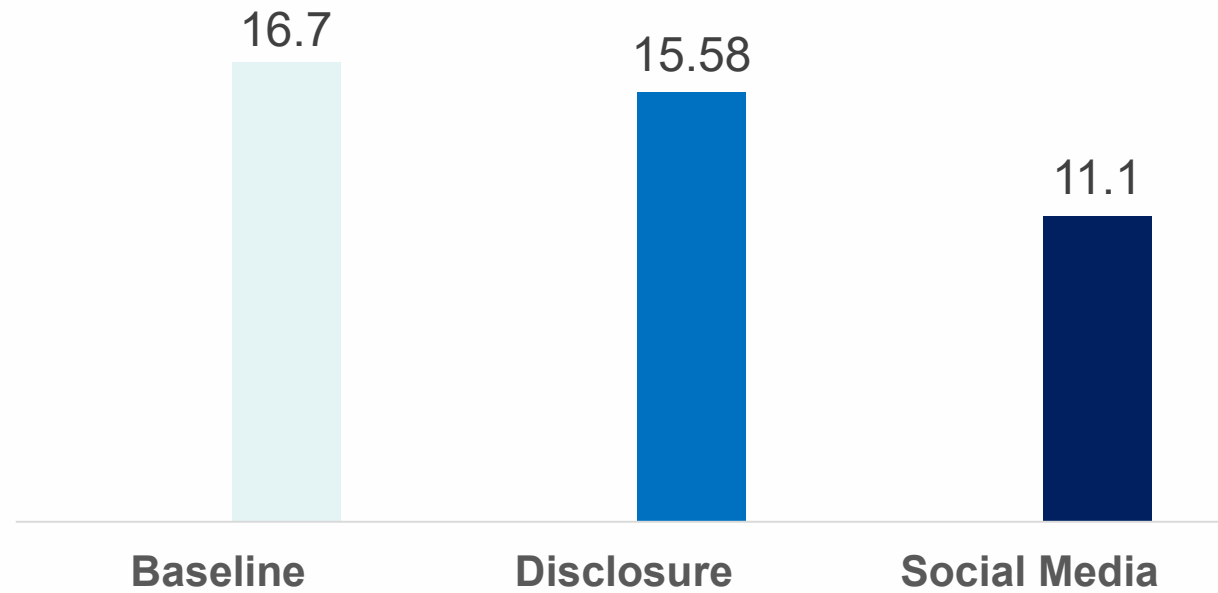


Table 2.B: Responses on the platform by treatment type
 Baseline (N=238) Disclosure (N=212)



Tables 2.C: Response time by treatment type



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- Future pollution levels
- Does it vary by the types of intervention?

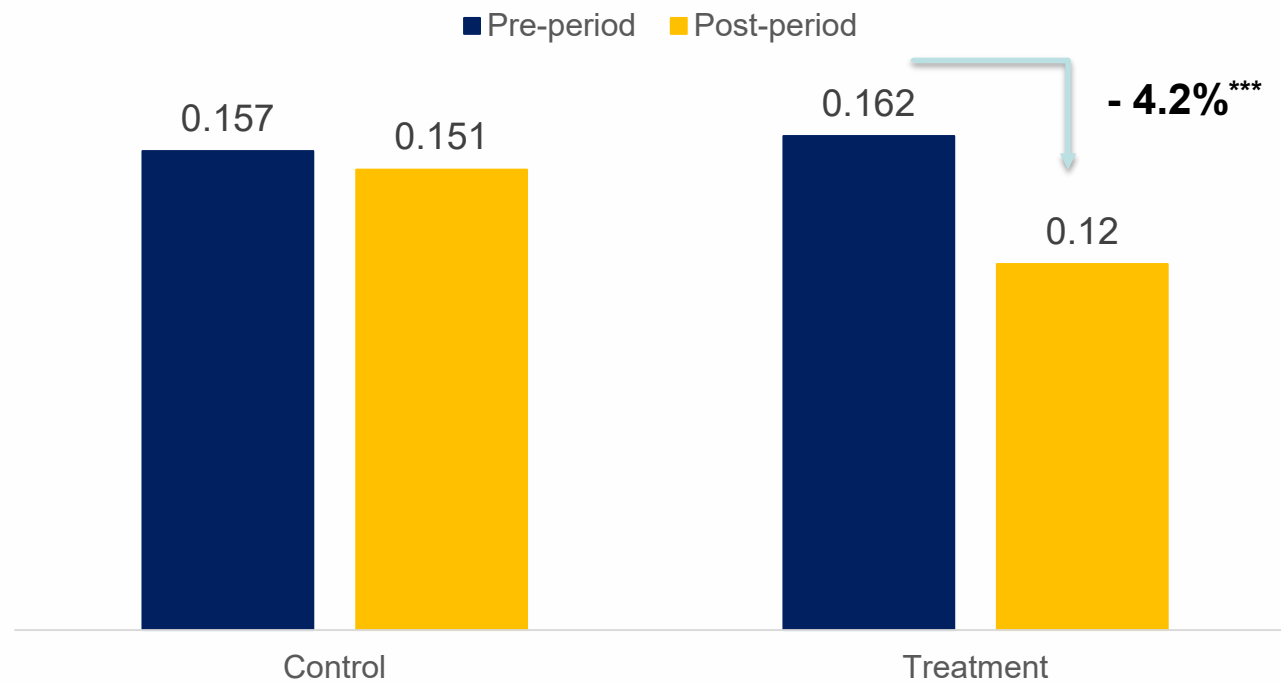
3. How far reaching is the intervention?

- Time horizon: short term vs. long term
- Spillover to other establishments and other pollutants
- Firm-types

4. Supplementary: Subsequent disclosure



Tables 3: Online appeals and subsequent violations



Tables 3.B: Effect on subsequent violation by type of questions

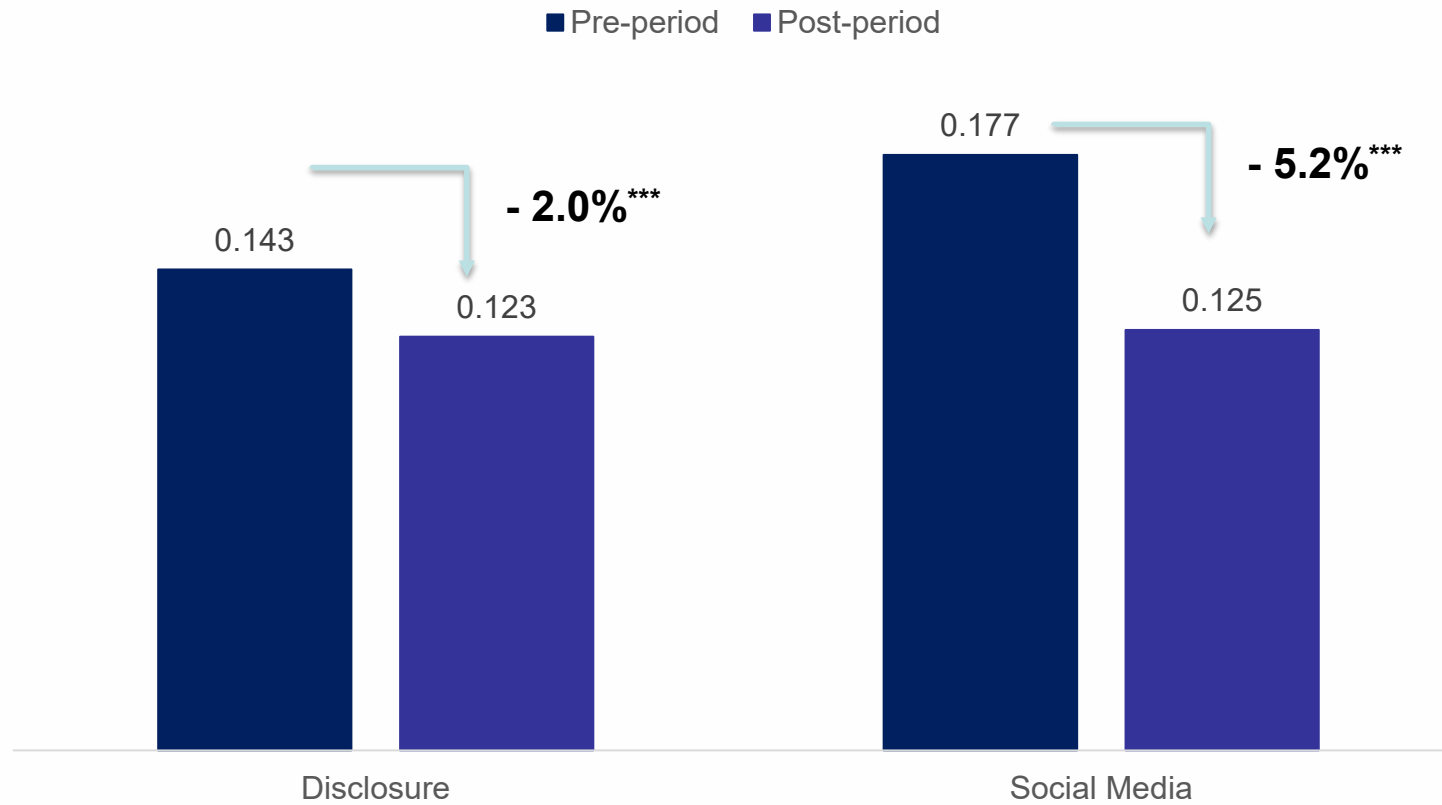


Table 3.B Online appeals and subsequent violation rates

Dependent Variable:	Violation			
	(1)	(2)	(3)	(4)
Treat * Post	-0.025*** (-4.75)		-0.018*** (-3.33)	
Baseline* Post		-0.026*** (-4.50)		-0.019*** (-3.09)
Disclosure* Post		-0.019*** (-3.19)		-0.010* (-1.70)
Social Media* Post		-0.030*** (-5.19)		-0.025*** (-4.28)
Post	0.000 (0.08)	0.000 (0.08)	-0.008 (-1.46)	-0.008 (-1.48)
H0: B-D=0		-0.007** (3.59)		-0.009** (4.72)
H0: B-S=0		0.004 (0.61)		0.006 (1.65)
# of Observations	348,485	348,485	348,485	348,485
Adjusted R-squared	0.462	0.462	0.470	0.470
Establishment FE	Yes	Yes	Yes	Yes
Day FE	Yes	Yes		
Province-day FE			Yes	Yes



Table 4 Social media activities and subsequent violation rates

Dependent Variable:	Violation	
	(1)	(2)
Baseline* Post	-0.026*** (-4.50)	-0.019*** (-3.09)
Disclosure* Post	-0.019*** (-3.19)	-0.010* (-1.70)
No response on Social Media * Post	-0.027*** (-4.65)	-0.022*** (-3.75)
Response on Social Media * Post	-0.077*** (-6.41)	-0.072*** (-6.14)
Post	0.000 (0.08)	-0.008 (-1.48)
H0: B-D=0	-0.007* (3.60)	-0.009** (4.73)
H0: B-NS=0	0.001 (0.04)	0.003 (0.50)
H0: B-RS=0	0.051*** (18.04)	0.053** (21.21)
# of Observations	348,485	348,485
Adjusted R-squared	0.462	0.470
Establishment FE	Yes	Yes
Day FE	Yes	
Province-day FE		Yes



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4. Supplementary: Subsequent disclosure



Tables 5.B Time horizon

Dependent Variable:	Violation			
	(1) Short-term	(2) Long-term	(3) First Round	(4) Other Round
Baseline* Post	0.001 (0.12)	-0.034*** (-4.90)	-0.038*** (-5.82)	-0.002 (-0.34)
Disclosure* Post	0.000 (0.01)	-0.024*** (-3.40)	-0.023*** (-3.65)	-0.008 (-1.12)
Social Media* Post	-0.021*** (-2.99)	-0.033*** (-4.95)	-0.033*** (-5.28)	-0.024*** (-3.02)
Post	-0.020*** (-2.96)	0.004 (0.67)	0.003 (0.58)	0.001 (0.21)
H0: B-D=0	0.001 (0.03)	-0.010** (5.35)	-0.015*** (9.67)	0.006 (1.04)
H0: B-P=0	0.022*** (16.14)	-0.001 (0.02)	-0.005 (0.83)	0.022*** (10.08)
# of Observations	307,579	331,958	322,594	276,393
Adjusted R-squared	0.443	0.473	0.487	0.314
Establishment FE	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes

Tables 7 Spillover

Dependent Variable:	Violation			
	(1)	(2)	(3)	(4)
Treat * Post	-0.017*** (-2.95)		-0.025*** (-4.78)	
Spillover* Post			-0.021*** (-3.27)	-0.021*** (-3.27)
Baseline* Post		-0.019*** (-2.96)		-0.027*** (-4.53)
Disclosure* Post		-0.010 (-1.57)		-0.019*** (-3.22)
Social Media* Post		-0.022*** (-3.47)		-0.030*** (-5.22)
Post	-0.006 (-1.08)	-0.006 (-1.09)	0.001 (0.17)	0.001 (0.17)
H0: T-S=0			-0.004 (1.03)	
H0: B-D=0		-0.009** (5.68)		-0.008* (3.55)
H0: B-P=0		0.003 (0.36)		0.003 (0.61)
# of Observations	348,485	348,485	420,430	420,430
Adjusted R-squared	0.497	0.497	0.463	0.463
Firm-Establishment FE	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes



Tables 8.A Cross sectional I: SOE

Dependent Variable:	Violation			
	(1) Non-SOE	(2) SOE	(3) Non-SOE	(4) SOE
Treat * Post	-0.030*** (-3.73)	-0.018** (-2.12)		
H0: S-NS=0		-0.012		
Chi^2		(0.77)		
Baseline* Post			-0.036*** (-4.18)	-0.009 (-1.02)
H0: S-NS=0			0.027***	
Chi^2			(4.78)	
Disclosure* Post			-0.022** (-2.56)	-0.015 (-1.44)
H0: S-NS=0			0.007	
Chi^2			(0.28)	
Social Media* Post			-0.029*** (-3.53)	-0.032*** (-3.19)
H0: S-NS=0			-0.033	
Chi^2			(0.04)	
Post	0.002 (0.23)	-0.002 (-0.23)	0.002 (0.23)	-0.002 (-0.24)
# of Observations	222,589	125,896	222,589	125,896
Adjusted R-squared	0.453	0.477	0.453	0.477
Firm-Establishment FE	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes



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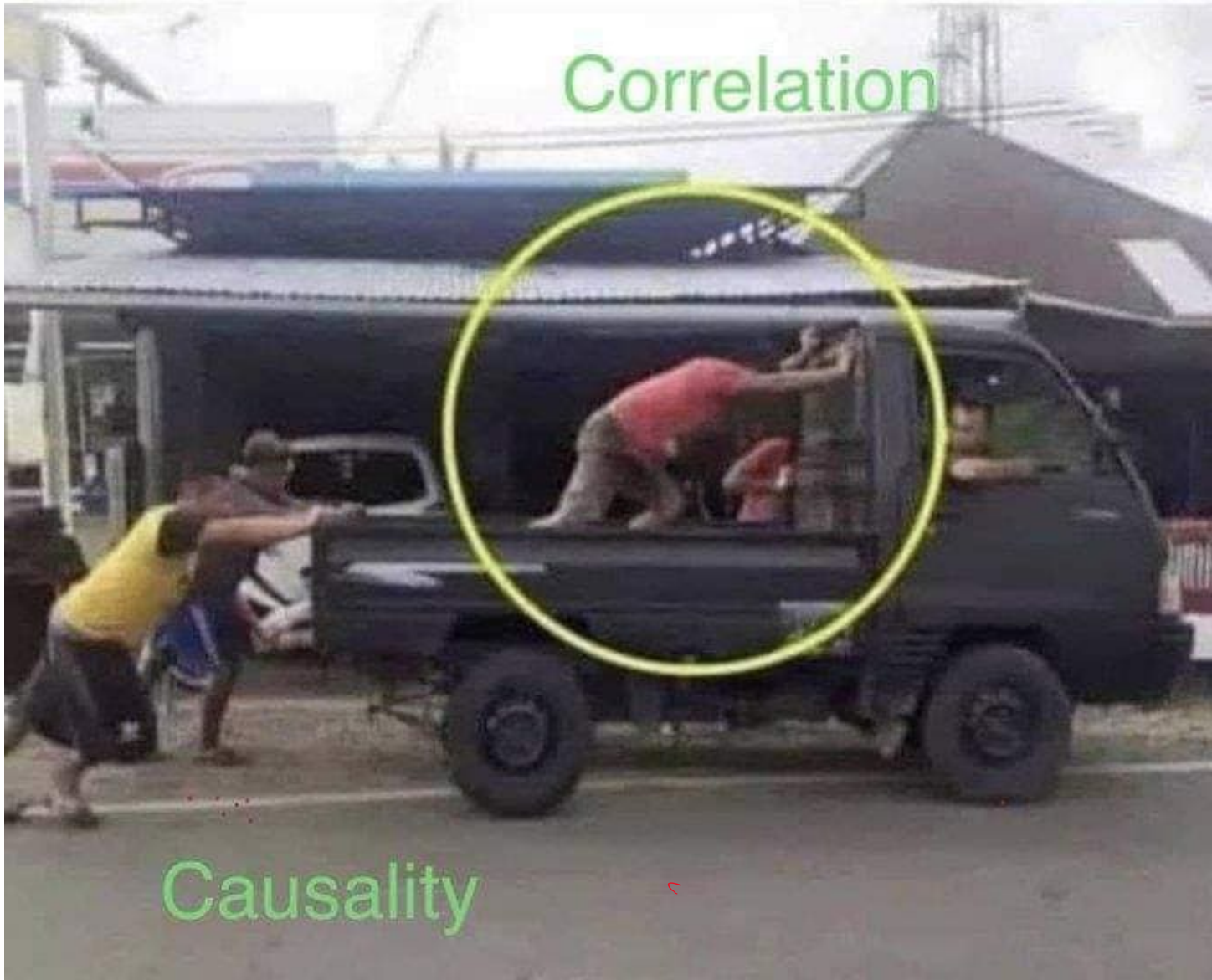


Tables 6 Subsequent disclosure

	Total	Firms disclosing environmental inputs in 2022 Annual Report	%	Difference in Percentage
Control	34	1	2.94	T-C
Treatment	424	77	18.16	15.22** (2.27)
By different questions:				
Baseline	151	23	15.23	Difference D/S-B
Disclosure	144	35	24.31	9.08** (1.96)
Social Media	129	19	14.73	-0.50 (0.12)

Conclusion

- Demands from retail investors can reduce subsequent environmental violations of firms.
- Amplifying the publicity of the appeal through social media leads to the greatest reduction in subsequent violations.
- Significant within-firm spillover effects to other establishments



We think we are standing on the ground because we are working in the field.



Thank you!

