

Pollution Redemption in Case of In-kind Settlements

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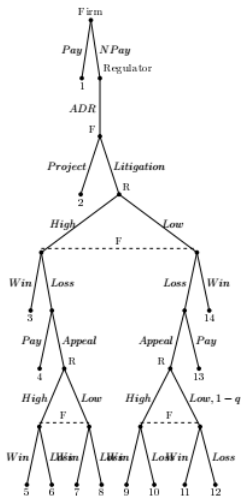
Motivation

- In the United States, the enforcement of environmental regulations impact nearly every industrial plant.
- Violations of the EPA statutes are costly.
- Regulator's priorities include enforcement of harmful for human health and environment violations.
 - Social environmental justice
- The main problem with enforcement of environmental regulations is imperfect information regarding firms' costs, benefits, etc.
- As a result, EPA employs different strategies to increase compliance.
 - Inspections, warnings, and fines
 - Supplemental environmental projects

Settlement Agreements

- All violations of environmental laws fall under one of the EPA's statutes:
 - Clean Air Act, Clean Water Act
 - Safe Drinking Water Act, Resource Conservation and Recovery Act, etc.
- Compliance can be achieved through the following:
 - Paying a penalty
 - Supplemental environmental projects as a part of agreement
 - Provide a tangible environmental or public health benefit
 - Provide a link to the violations being resolved
 - Are voluntary and not administered by EPA
 - Should be brought up by the defendant (firm)
 - EPA has a right to reject the SEP
 - Going to the court

Tree



Note: Based on current EPA litigation procedures.

Question

- Do SEPs lead to higher levels of compliance?
- What private information firms reveal when taking on SEP?

Literature Review

- **Theoretical literature on enforcement:**
 - Polinsky and Rubinfeld (1986) developed an optimal public enforcement model incorporating settlements and litigation costs.
 - Arora and Gangopadhyay (1994) explained the voluntary overcompliance with environmental regulations through the duopoly market.
 - Goldlücke and Schmitz (2018), Polinsky and Shavell (1989)
- **Empirical literature on enforcement:**
 - Campa and Muehlenbachs (2021) find that the in-kind settlements provide more leniency and lead to positive public reaction including in the stock market.
 - Evans (2016) have established relationships between levels of enforcement and compliance.
 - Brady, Evans and Wehrly (2019), Kang and Silveira (2021)

In This Paper

- I intend to examine the effect of conducting a SEP on firm's compliance history.
 - Firms at different times experience settlement agreements, hence I employ stacked event study.
- Findings:
 - No evident effect of SEP on compliance levels

Data Sources

- 1 Integrated Compliance Information System (ICIS-Air)
 - Contains facility characteristics: violation history, enforcement history, industry classification, and location
 - 2 Integrated Compliance Information System (ICIS-FE& C)
 - Legal case outcomes, penalties, SEPs, settlements amounts
- I combine the annual compliance data with the plant legal enforcement history to build a plant level panel from 2001 to 2019.

Summary Statistics

	SEP plants (1)	Other plants (2)
Federal penalty (\$)	255,699.5 (618,286.4)	137,868.2 (722,489.6)
State penalty (\$)	30,879.29 (170,495.0)	15,534.56 (157,724)
SEP amount (\$)	518,129.0 (890,446.6)	-
<i>N</i>	647	4,957

Notes: The table shows mean values for key variables for plants that conducted SEP in column (1) and the rest of plants in column (2). The timeframe is 2001 - 2019 using data from ICIS databases. Standard errors are in parenthesis.

Group Summary Statistics

	Diff in SEP (1)	Diff in Other (2)	Group Diff (3)
Compliance (%)	0.00874	0.00127	0.00747
Penalty (\$)	15353.875	7752.51	7601.365
HPV	-0.05839	-0.04633	-0.01203
FRV	-0.0119551	0.0308104	-0.0427655
<i>N</i>	5,786	44,815	

Notes: The table shows mean values for key variables before and after the enforcement cases. The timeframe is 2001 - 2019 using data from ICIS databases.

Stacked Event Study Estimation

- For the primary empirical analysis I estimate the following stacked D.I.D. model:

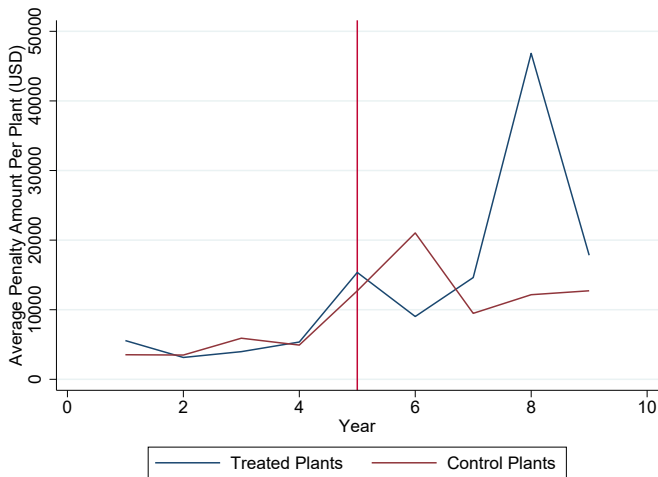
$$Compliance_{i,t} = \alpha_0 + \alpha_1 \cdot Treat_i \cdot Post + \gamma_i + \delta_t + \varepsilon_{i,t}$$

- $Treat_i$ takes a value of zero if a plant never conducted a SEP.
- $Compliance_{i,t}$ takes value of zero if a plant is in violation.
- $Post$ takes a value of one every year after the case settlement year.
- γ_i is the plant fixed effect.
- δ_t is the year time dummy.

Identification

- Identification in the D.I.D. framework implies that the treated and control plants would have parallel damage trends in the absence of treatment.
- Plants that conducted supplemental environmental projects would have trended the same way as plants that settled their violations through payment of fines.

Penalties Before and After the Settlements



Note: Plants covered by Clean Air Act, 2001-2019.

Results

	(1) Compliance	(2) Penalties	(3) Log(Penalties)
<i>Treat · Post</i>	-0.0526 (0.0317)	7616.007 (8529.815)	0.3746 (0.3469)
<i>N</i>	50,601	50,601	50,601
Unique plants	5,659	5,659	5,659
State FE	Y	Y	Y
Year FE	Y	Y	Y

Notes: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Extensions

Future work will consist of:

- Extending the sample to other ISIC datasets: CWA, SDWA, etc.
- Extending analysis using more detailed quarterly level panel data
- Extending analysis using alternative control group matching treated plants to control plants based on industry
- Running robustness checks

Conclusion

- Environmental injustice is another form of inequality.
- SEP provides a way to obtain environmental and public health protection that may not otherwise have occurred in the settlement of an enforcement action.
- Understanding the reasons why firms engage in SEPs is beneficial for regulators to develop successful enforcement policies.
- Future work will shed greater understanding on the efficiency of SEPs.