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**Do Improvements in Environmental Performance have an Adverse Impact on  
Employment?**

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# Do Improvements in Environmental Performance have an Adverse Impact on Employment?

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## Research Motivation



- Continuous decline of toxics releases in the U.S.
- While the output level remains constant
- Decline of employment

### Research question:

- Do voluntary improvements in environmental performance lead to job loss?

## Literature Review

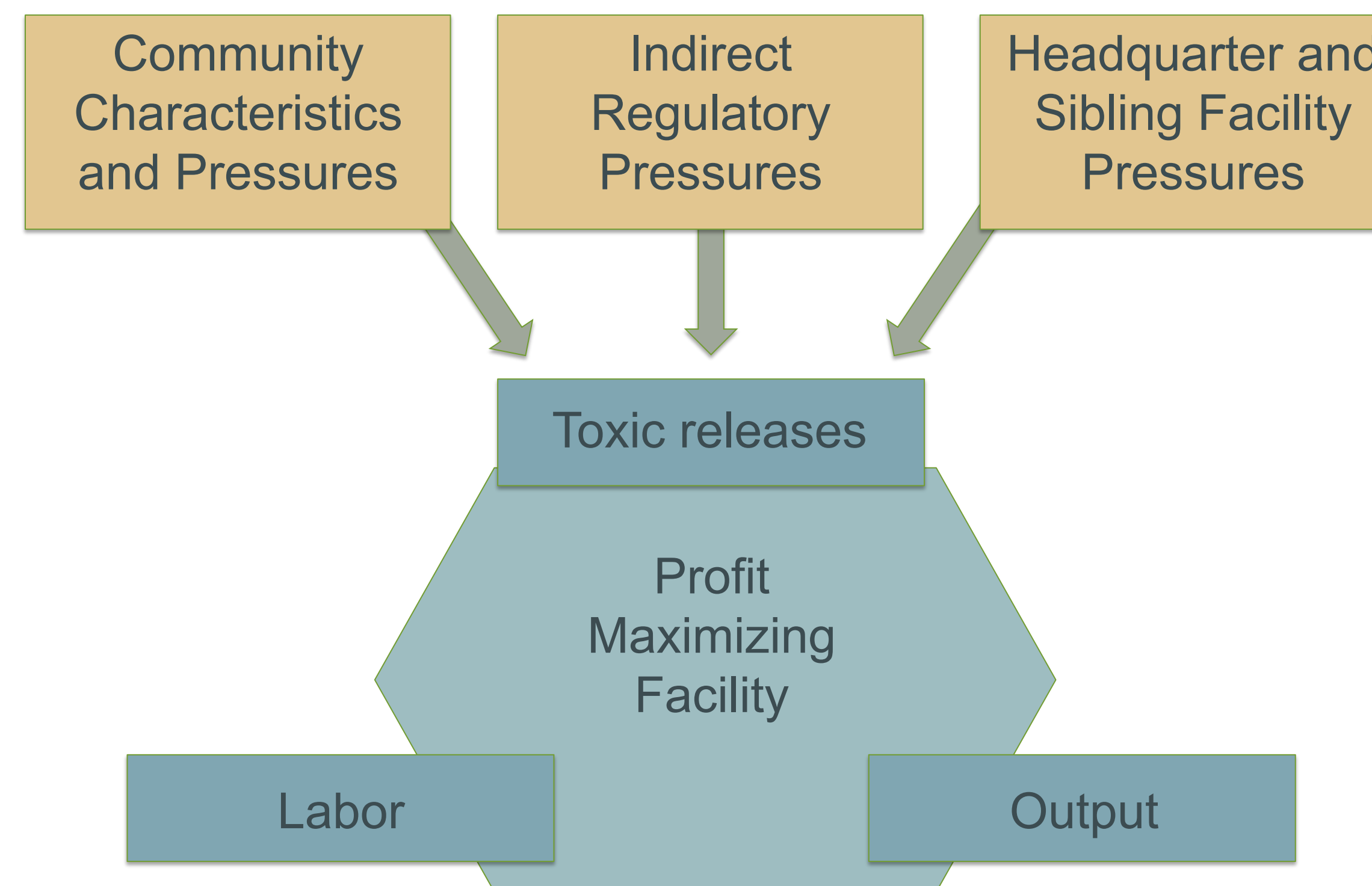
- Previous research focused on environmental regulation and the empirical results have been mixed.
  - Found reductions in employment (Walker 2011)
  - Found insignificant changes (Morgenstern et al. 2002; Cole and Elliot 2007)
- Little research on the impact of voluntary reduction of toxic releases on employment
  - Information disclosure policies allow the firms to utilize more flexible abatement methods
  - Voluntary reduction in pollution will only be undertaken if they are beneficial to the firm
  - Thus, their impact on employment might be different from command and control regulations.

## Research Objectives

- To analyze how voluntary pollution reduction affects employment
- To examine how the effect of pollution control on employment differs by the type of abatement method used
  - Reductions in releases at the end of the process
  - Waste management (e.g., recycling, treatment)
  - Pollution prevention

## Framework

- Consider a profit-maximizing facility that makes decisions on the quantity of toxic releases, labor, and output simultaneously
- If the facility emits more toxic releases than a threshold, the facility must report its emissions to the EPA, which will then be publically disclosed
- Toxic releases are not directly regulated by mandatory regulations
- However, external pressures, desire to increase efficiency and reduce other regulatory pressures could lead the facility to voluntarily reduce its emissions



- Possible abatement techniques in response to external pressures:
  - Reducing production levels or output
  - Disposal of pollution at the end of the pipe
  - Prevention of pollution before it is generated
  - Waste management techniques (e.g., recycling, treatment).

## Hypotheses

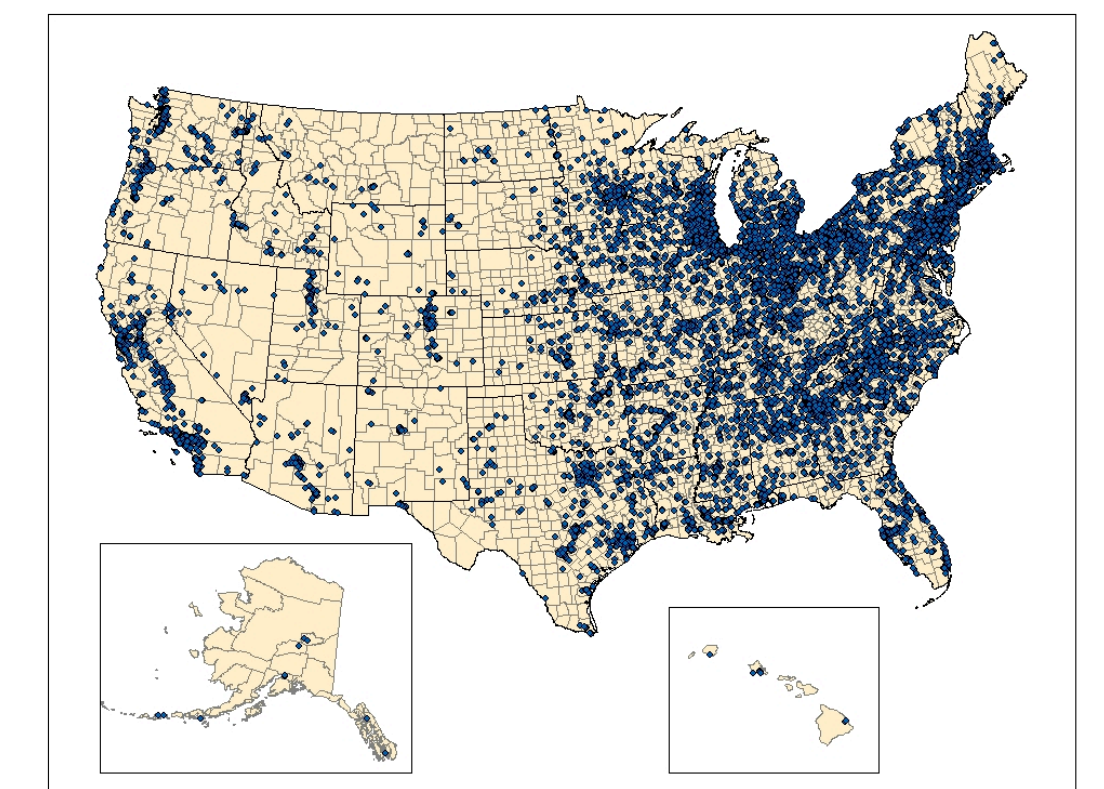
- Facilities were more likely to reduce toxic releases if they were larger, faced more stringent regulatory pressures, and were located near headquarters and areas with higher income
- Reduction in toxic releases will reduce employment because many facilities control pollution at the end of the process, which tends to be more costly
- The effect of reducing toxic releases on employment will be less negative if facilities use pollution prevention methods

## Methods

- Use Three Stage Least Squares model to estimate pollution reduction and employment simultaneously.
- Use five proxy variables for pollution control to capture various methods of abatement:
  - Toxic emissions
  - Emissions per unit of sales
  - Regulated toxic emissions
  - Regulated emissions per unit of sales
  - Waste management
- Use the following explanatory variables to control for external pressures that might lead a facility to change its pollution and employment.
  - Regulatory pressures (i.e., county nonattainment status, penalties from violating environmental regulation)
  - Community pressures (i.e., producing goods to consumers directly, League of conservation voters)
  - Pressures from other facilities (i.e., pollution reduction from sibling facilities, parent company headquarter location)

## Data

- Unique facility-level panel data set, which includes:
  - 10,824 facilities across the U.S.
  - 17 years (1995-2011)
  - 61 industries



## Results

### Total Toxic Emissions and Employment

VARIABLES	(1) Toxic Emissions (Log)	(2) Employment (Log)	(3) Emissions per unit of Sales (Log)	(4) Employment (Log)
Toxic Emissions (Log)		0.073***		
Emissions per unit of Sales (Log)				0.267***
TRI Report		-0.200***		0.0682***
Sales <sub>t-1</sub> (Log)	0.631***	0.721***		0.754***
Siblings' Pollution	4.09e-07***		8.77e-08***	
County Nonattainment Status	-0.169***	0.017***	-0.051***	0.020***
Penalties <sub>t-1</sub>	2.612***	-0.048***	0.386***	-0.006
State LCV Scores	-0.002***		-7.89e-04***	
Firm Ownership	0.209***	0.037***	-0.032***	0.056***
Final Goods	-5.400**		-0.284	
Income Per Capita (Log)	-1.156***	-0.099***	-0.095***	-0.129***
Unemployment Rate	-0.076***	9.80e-05	-0.004***	-0.002
Headquarter Location	-0.273***	-0.039***	-0.047***	-0.0432***
Constant	11.58***	-2.047***	1.305***	-1.860***
Observations	173,184	173,184	173,184	173,184
R-squared	0.201	0.812	0.170	0.813

\*\*\* p<0.01, \*\*p<0.05, \*p<0.1

Industry and year effects are included, but not reported.

### Percent and Absolute Changes in Employment

Changes in the number of employees due to a 1% decrease in Toxic Emissions<sup>a</sup>, Waste Management, or CAA Regulated Emissions<sup>b</sup>

	Percent	Level
Toxic Emissions <sup>a</sup>	-7.3%	-18 employees
Emissions per Unit of Sales <sup>a</sup>	-3.05%	-7 employees
Waste Management	10.8%	26 employees
CAA Regulated Emissions <sup>b</sup>	-6.9%	-17 employees
Regulated Emissions per Unit of Sales <sup>b</sup>	-3.382%	-8 employees

<sup>a</sup> The percent reductions calculated result from a 265.25 lbs reduction in toxic releases

<sup>b</sup> The percent reductions calculated result from a 219.65 lbs reduction in CAA regulated toxic releases

## Conclusions

- Reductions in toxic releases reduce facilities' employment
- However, the method of pollution reductions plays an important role in determining how facilities' employment changes.
  - Pollution prevention results in smaller reduction in jobs than controlling pollution at the end of the PIPE.
- Reductions in regulated emissions decreases jobs, which is likely due to the command and control regulations requiring costly pollution control methods.

### Citations:

- Cole, M., & Elliott, R. (2007). Do Environmental Regulations Cost Jobs? An Industry-Level Analysis of the UK. *The BE Journal of Economic Analysis & Policy*, 7(1).
- Morgenstern, R. D., Pizer, W. a., & Shih, J.-S. (2002). Jobs Versus the Environment: An Industry-Level Perspective. *Journal of Environmental Economics and Management*, 43(3), 412–436.
- Walker, W. R. (2011). Environmental regulation and labor reallocation: Evidence from the Clean Air Act. *The American Economic Review*, 101(3), 442-447.