

The World's Largest Open Access Agricultural & Applied Economics Digital Library

## This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search http://ageconsearch.umn.edu aesearch@umn.edu

Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

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

Camila Stark, University of Illinois, Currently at NREL, camilatstark@gmail.com Madhu Khanna, University of Illinois Xiang Bi, University of Florida

Selected Poster prepared for presentation at the 2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association Joint Annual Meeting, San Francisco, CA, July 26-28

Copyright 2015 by Stark, Khanna, and Bi. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

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

## Camila Stark<sup>1\*</sup>, Madhu Khanna<sup>1</sup>, Xiang Bi<sup>2</sup>

#### **Research Motivation** Sales Employment 5.0E+07 4.0E+07 3.0E+07 2.0E+07 1.0E+07 **D** 0.0E+0 1999 2001 2003 2005 2001 2009 2011 1995 1991 1999 2001 2003 2005 2001 2009 2011 **Toxic Releases**



- 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 réleases, 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

## <sup>1</sup>University of Illinois Urbana Champ



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

#### Methods

- Use Three Stage Least Squares model to estimate pollution reduction and employment simultaneousl
- Use five proxy variables for pollution control to cap 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 external pressures that might lead a facility to char pollution and employment.
  - Regulatory pressures (i.e., county nonattainment statu penalties from violating environmental regulation) Community pressures (i.e., producing goods to consu directly, League of conservation voters)
  - Pressures from other facilities (i.e., pollution reduction sibling facilities, parent company headquarter location)

baign <sup>2</sup> Unive	ersity of Florida	*Currently	at NRE	L	
			Data		
arter and Facility sures	<ul> <li>Unique fac panel data includes:</li> <li>10,824 fa the U.S.</li> <li>17 years</li> <li>61 indus</li> </ul>	cility-level set, which acilities across (1995-2011) tries			
	Results				
	Total T	oxic Emissio	ons and E	Employme	
	VARIABLES	(1) Toxic Emissions (Log)	(2) Employment	(3) Emissions per u Sales (Log)	
	Toxic Emissions (Log) Emissions per unit of Sale	<u>(L0g)</u>	0.073***	Sales (Log)	
ternal	(Log) TRI Report Sales <sub>t-1</sub> (Log) Siblings' Pollution County Nonattainment Sta Penalties <sub>t-1</sub> State LCV Scores Firm Ownership Final Goods Income Per Capita (Log) Unemployment Rate Headquarter Location Constant	$\begin{array}{r} 0.631^{***} \\ 4.09e-07^{***} \\ 10.169^{***} \\ 2.612^{***} \\ -0.002^{***} \\ 0.209^{***} \\ -5.400^{**} \\ -1.156^{***} \\ -0.076^{***} \\ -0.273^{***} \\ 11.58^{***} \end{array}$	-0.200*** 0.721*** 0.017*** -0.048*** 0.037*** -0.099*** 9.80e-05 -0.039*** -2.047***	8.77e-08*** -0.051*** 0.386*** -7.89e-04** -0.032*** -0.284 -0.095*** -0.004*** -0.047*** 1.305***	
	Observations B. squared	173,184	173,184	173,184	
s if nd nt d of ent will	Percent a         Changes in the         Waste Manager         Toxic Emission         Emissions per         Waste Manage         CAA Regulated         Regulated Em         Sales <sup>β</sup> <sup>α</sup> The percent re <sup>β</sup> The percent re	<b>nd Absolute</b> number of employees a <u>ment, or CAA Regulate</u> $ment, or CAA Regulatems^{\alpha}r Unit of Sales\alpharemented Emissions\betauissions per Unit ofeductions calculated resreleases$	Changes due to a 1% decr $dEmissions^{\beta}$ Percent -7.3% -3.05% 10.8% -6.9% -3.382% sult from a 265.2 sult from a 219.6	in Employees rease in <i>Toxic Em</i> <u>Level</u> -18 employees -7 employees 26 employees -17 employees -8 employees 25 lbs reduction in 55 lbs reduction in	
	Conclusions				
e ly. oture	<ul> <li>Reductions i</li> <li>However, the important rol changes.</li> <li>Pollution p controlling</li> </ul>	in toxic releas e method of po e in determini revention resul pollution at the	ses reduce ollution red ng how fac ts in smalle end of the	<ul> <li>facilities'</li> <li>ductions pl</li> <li>cilities' em</li> <li>er reduction</li> <li>PIPE.</li> </ul>	
for nge its	is likely due requiring cos	to the comma stly pollution (	and and control me	ontrol reguestion trol reguest	
us,	Cole, M., & Elliott,	Cole, M., & Elliott, R. (2007). Do Environmental Regulations			
imers n from	& Policy, 7(1). Morgenstern, R. D., Pizer, W. a., & Shih, JS. (2002). Jobs V Environment: An Industry-Level Perspective. <i>Journal of E</i> <i>Economics and Management</i> , 43(3), 412–436. Walker, W. R. (2011). Environmental regulation and labor reg				

Walker, W. R. (2011). Environmental regulation and labor reallocation: Evidence from the Clean Air Act. *The American Economic Review*, 101(3), 442-447.





# ment

per unit of Log)

(4) Employment (Log)

)8\*\*\* \*\*\* \*\*\* )//\*\*\* )\*\*\* \*\*\* |\*\*\* 7\*\*\*

0.0682\*\*\* 0.754\*\*\* 0.020\*\*\* -0.006 0.056\*\*\*

0.267\*\*\*

-0.129\*\*\* -0.002 -0.0432\*\*\* -1.860\*\*\*

173,184 0.813

#### ployment

E Emissions<sup> $\alpha$ </sup>,

loyees yees oyees loyees

yees

on in toxic on in CAA

es' employment plays an employment

tion in jobs than

ses jobs, which egulations

ns Cost Jobs? An Economic Analysis os Versus the of Environmental