Media Attention and the Toxic Releases Inventory *

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This paper explores the relationship between the print media and toxic releases in the first wave of Toxic Releases Inventory (TRI) filings. It first studies the degree to which neighborhood characteristics like racial composition and income status associate with the number of newspaper articles written about a polluting establishment, controlling for the volume of pollution, industry and observable establishment characteristics. It follows up to study whether firms that receive media attention reduce pollution more than firms that do not. Neither a qualitative review of the articles nor regression results show any significant correlation between race or income and the likelihood of being included in media reports. A difference-in-difference approach shows a statistically significant decrease in the toxic releases of firms that received media attention compared to those that did not.

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Since 1987, all U.S. manufacturing facilities with at least 10 employees and producing more than 500 lbs of each of the 320 listed chemicals, must annually report an inventory of toxic releases to the EPA. Information about these releases is then publically disseminated through the Toxic Releases Inventory (TRI). The logic of such a reporting requirement is that negative publicity imposes a cost on firms and provides incentives to reduce the production of or prevent the release of toxic chemicals. This paper studies the role of the national print media activity in generating such negative publicity. Specifically, it studies the role the media played when the TRI program was first implemented. With limited preconceived notions about the polluting behavior of facilities around the early years of TRI reporting, media responses at this time provide a rare opportunity to isolate and study the behavior of the media to new pollution news and study how firms responded to a sudden wave of media attention.

This paper takes two perspectives on the relationship between media attention and toxic releases. It first studies the degree to which neighborhood characteristics like racial composition and income status associate with the number of newspaper articles written about a polluting establishment, controlling for the volume of pollution, industry and observable establishment characteristics. The results will show little association between non-white neighborhoods and media reporting. The empirical analysis then uses a difference-in-difference approach to show that firms that receive media attention reduce pollution dramatically more than firms that do not. Furthermore, establishments in non-white neighborhoods are more likely to reduce pollution.

The results contribute to the research on "environmental justice," the concept that environmental risks and hazards should be equitably distributed regardless of race, color or

income. Prior studies on environmental justice don't incorporate the media and instead typically focus directly on the behavior of and location decisions of individuals and firms (Boer et al. 1997, Wolverton 2009, Zimmerman 1993). There are a number of reasons to believe that neighborhood characteristics like income or racial composition will affect the media's decision to report on a particular polluting establishment. Choices over what to report are influenced by the preferences and worldviews of reporters, editors and the newspaper owner (Bennett 1988, Entman and Rojeck 2000, Groseclose and Milyo 2005, Wilson and Gutiérrez 1995). If reporters or editors have a liberal stand on public policy issues, they may be more likely to cover issues related to the poor and racial minorities. On the other hand, the motive of profit maximization might lead them to report less on these neighborhoods. The largest media audience in the U.S. is white and middle-class (Larson 2006, Shirley 1992). Reporting about poor and minority neighborhoods may not appeal to readers. Furthermore, the costs of reporting about toxic releases in high-income neighborhoods might be lower. If higher income neighborhoods are more vocal about their disamenities (and therefore more responsive to reporters) and lower income neighborhoods attach less weight to environmental quality, it is likely that pollution in higher income neighborhoods will get more attention.

To the extent that media activity is associated with neighborhood characteristics, the second objective of this paper is to explore how media activity might affect toxic releases. If media attention imposes costs, firms have incentives to change their subsequent behaviors. Prior research on the TRI has explored numerous ways that the requirement to report releases affects firms, but to our knowledge no study has focused on the relationship

between TRI-related media attention and firm behaviors.[1] The difference-in-difference approach used in this study aims to provide insight into this relationship. Although the results should not be interpreted causally, they do show that firms which receive media attention behave differently from the ones that do not.

The remaining sections present a background of the TRI program and its association with environmental justice, the data, measures and the empirical strategies. Two sections discuss results. One identifies the association between media attention and neighborhood characteristics, and the other shows results on how the emissions behavior of firms with media attention differs from those without.

1. Background

The TRI program was formulated under the Emergency Planning & Community Right-To-Know Act (EPCRA) of 1986, against the backdrop of a chemical accident at Union Carbide's chemical plant in Bhopal, India in 1984. EPCRA mandates that all U.S. manufacturing facilities, with at least 10 employees and producing more than 500 lbs of each of the 320 listed chemicals, must annually report to the EPA. The EPA collects this information and catalogs it for public dissemination via its TRI database.

The first wave of TRI reports, which reported about pollution in 1987, was made publicly available on 19th June, 1989. Shortly thereafter, the Natural Resources Defense Council (NRDC) and the National Wildlife Federation (NWF) published two specialized reports on the top polluters in 1987 (Natural Resources Defense Council, 1989; Dean,

[1] TRI appears to affect investors through the stock market (Hamilton 1995a, Khanna 1998, 1999), encourage enrollment in voluntary environmental management programs (Arora and Cason 1995, 1996; King and Lenox, 2001; Khanna 2002) and influence the location decisions of the firms (Wolverton 2009, Sadd et al. 1999, Anderton et al. 1994, Davidson and Anderton 2000). Dasgupta et al. (2006) show that environmental news and a firm's awareness of such media attention are predictors for firm performance in South Korea.

106 1989).[2] These publications, along with the original TRI reports, generated significant media
107 activity including articles in major newspapers like *USA TODAY*, *The Boston Globe*, *The*
108 *Washington Post* and *The New York Times*. Of the 326 facilities in our dataset that received
109 some sort of media attention, 137 facilities come from the top 500 establishments reported
110 in NWF's report identifying the "Toxic 500".

111 Reading print media stories about the first wave of TRI reports along with related
112 articles from the same period reveals several facts that are relevant to our investigation.
113 First, the press did express an interest in the links between pollution, citizen action groups,
114 and socio-economic characteristics of affected populations. For example, *The New York*
115 *Times* published a number of articles about economically disadvantaged communities
116 affected by pollution, and about the work of grass roots activists (e.g. Suro 1989). The head
117 of the National Wildlife Foundation contributed editorials calling for environmentalism to
118 "embrace the poor" (Hair 1990). This interest is consistent with the emerging focus on
119 environmental injustice (United Church of Christ 1987, United States General Accounting
120 Office 1983). It is directly relevant to our study since facilities subject to TRI reporting
121 requirements tend to be located in minority neighborhoods and these facilities also tend to
122 have higher toxic releases (Wolverton 2009, Arora and Cason 1999).[3]

123 Second, numerous articles indicated that the TRI findings "shocked" federal officials
124 and surprised company executives. Event studies on the impact of the TRI reports on the
125 financial market show that publicly traded TRI firms experienced negative abnormal returns

[2] The second wave of TRI reports, released in April 1990, also generated substantial print media attention. Once again, an environmental advocacy group, Citizen Action, used the data to generate a filtered list of highly polluting facilities.

[3] This does not mean polluting firms seek out minority neighborhoods. Most studies find that the racial composition of neighborhoods does not explain firm location decisions, but that this decision is often influenced by the income status and the political mobilization of the neighborhood (e.g. Davidson and Anderton 2000, Been and Gupta 1997, Kriesel et.al 1996, Hamilton 1995b and Gamper-Rabindran 2006).

126 on the day following the first TRI report (Hamilton 1995a). The release of data was viewed
127 as a significant problem for several large polluting companies. The trade journal, *Chemical*
128 *Week*, cited "non-regulatory pressures, such as local and community concerns" as driving the
129 industry's environmental performance (Rotman 1989: p. 66). In fact, the firms with largest
130 negative abnormal stock returns were also the ones that reduced their toxic emissions more
131 than their industry peers (Konar and Cohen 1997).
132
133 **2. Data**
134 This study uses pollution data from the TRI database, socio-economic characteristics
135 from the 1990 U.S. Population Census, media attention data from the Lexis-Nexis Academic
136 Universe database, and company level information about the TRI establishments from the
137 Compustat North America from Standard and Poor's database. The TRI database contains
138 detailed information about toxic releases of all U.S manufacturing facilities that submit toxic
139 release reports to the TRI. There is a two-year gap between the data-reporting date and the
140 date EPA publicly disseminates this information. The first TRI report was available on 19th
141 June, 1989 and contained information about the toxic releases of almost 24,000 polluting
142 facilities in 1987. The 1987 data were later removed from the TRI database, since there was
143 a great deal of variance in how facilities measured toxic releases and because two chemicals,
144 that were released in large quantities, were later removed from the list of toxic substances.
145 Since a part of this study focuses on media response to reported releases (regardless of the
146 accuracy of the underlying reports), the 1987 data is nonetheless appropriate.[4]

[4] These data, while no longer of the TRI database, are still available through the EPA's Office of Pollution Prevention and Toxics library. In the portions of this paper where we study the association between media attention and changes in toxic releases, we disregard the 1987 TRI emission figures and focus on later years.

Media attention data is collected from the news archives at the Lexis-Nexis Academic Universe database, using a combination of keywords for the database search: 'Toxic Release Inventory' or 'worst polluters' or 'pollution' or 'Toxic 500' or 'National Wildlife Federation' for the time period June, 1989 to April, 1990. This search produces slightly less than 1000 returns, which we read and sorted. We identified those articles that had specific information about TRI facilities. Because this study is at the facility level, articles discussing TRI only at the parent company level or at the state and county levels were dropped. This selection left 73 articles which identified 350 facilities with toxic releases in 1987. Of these 326 facilities could be matched to information from the TRI database.

The articles from the database search contain a variety of reports on the TRI program. Given that the first TRI report was closely followed by the publication of the "*Toxic 500*" by the National Wildlife Federation (Dean, 1989) and the "*A Who's Who of American Toxic Air Polluters*" by the Natural Resources Defense Council (NRDC, 1989), most of the newspaper and newswire reports made references to these reports. Table 1 provides summary statistics for the 73 articles. Most of the articles came from the wire services; the most prominent among them is States News Service, which produced a series of articles identifying top polluters in specific states and counties and reported about 97 of the TRI facilities. Among the major newspapers *USA Today*, which has a nationwide circulation, reported on 75 TRI facilities. Many of the articles released immediately following the publication of EPA data focus on identifying the largest polluters in given geographic areas (States, Counties, or Metropolitan areas). Later articles are more likely to focus on particular facilities or large emitters of specific toxic substances. Finally, 11 articles written almost a year after the release of the initial data respond to a new event: the imposition on regulatory

fines on companies for non-reporting of TRI emissions. Since these articles appeared to be closely based on EPA press releases, and unlikely to correspond to neighborhood characteristics, they were excluded (and not included in the counts cited above).

A striking fact is that none of the articles focused on, or even mentioned, the income and racial characteristics of the neighborhoods close to facilities with toxic releases. Although there is evidence that the media had interest in the connection between pollution and socio-economic characteristics, the articles we reviewed present no evidence that this link influenced reporting decisions. Table 2 describes neighborhood characteristics of zip codes with and without TRI facilities and with and without media attention. While neighborhoods with a TRI facility are clearly different – with larger nonwhite populations and higher population densities – the socioeconomic characteristics of neighborhoods that receive media attention are largely similar to the characteristics of neighborhoods with at least one TRI facility but no media attention. Our empirical work will support the conclusion that links between race or income and articles written in the print media, while occasionally statistically significant, are quantitatively small.

Data on the neighborhood characteristics of the TRI facilities are gathered from the 1990 U.S Population Census at the U.S. zip code level. Merging the datasets produces over 19,000 facilities in nearly 7,000 zip codes. Of these, 326 facilities (in 295 zip codes) received media attention.[5] We use the Compustat North America from Standard and Poor's database to collect financial information about the TRI facilities. Even though the TRI database provides information about the parent company, there was no unique identifier common to

[5] This list of facilities includes 59 for which the zip code could not be matched directly to Census data. These missing zip codes are located in the middle of a larger zip code area and typically represent locations where the U.S postal service allocates a separate zip code to a company for ease of delivering mail. In such cases we replaced the missing zip code with the zip code that envelops it.

the TRI files and the Compustat database to merge the datasets digitally. So the Compustat information had to be linked manually. In the portion of the paper that estimates the treatment effect of media attention on future emissions, we therefore limit our dataset to the top 500 publicly traded establishments in terms of toxic releases.[6] Of these, 137 received media attention in 1989.

Table 3 shows descriptive statistics at the facility level. The first two columns show summary statistics for the full set of TRI facilities. Since some estimations include only the top 500 facilities in terms of total releases, the third and fourth columns show summary statistics for this subset of facilities. An ALCOA facility in Port Comfort, Texas, that was unfortunate enough to be labeled the country's "biggest polluter," received the most media attention; 16 out of 73 different news articles reported about this particular facility.

3. Measures and Empirical Strategy

This section describes the measures of media attention, pollution, income, and race, as well as control variables. It also outlines an empirical strategy for first determining whether neighborhood characteristics affect media attention and then investigating how subsequent releases vary according to the degree that firms receive media attention.

3.1 Neighborhood Characteristics and Media Attention

We estimate media attention to the i-th facility (M_i) as a function of pollution measures (X_i^P), industry classifications (X_i^I), geographical region (X_i^R), and a vector of social-economic characteristics of the facility's neighborhood (X_i^S)

[6] Limiting the sample in this way is of course problematic. We conducted numerous sensitivity analyses (see Saha 2010 for details), and results are not sensitive to sample selection.

$$M_i = f(X_i^P, X_i^I, X_i^R, X_i^S) + \varepsilon_i \quad (1)$$

There is no standard measure or index for media attention, the dependent variable in equation (1). We construct two different measures: the number of articles mentioning a facility and a weighted total of the number of words written about a facility. The number of articles attaches equal weight to all facilities. If several facilities were mentioned in one article, the measure treats this as identical to an article reporting exclusively about a single facility. Short articles are treated equally to longer, in depth, pieces. The weighted measure, total article words, is designed to account for these limitations. If n facilities are mentioned in one article with m words, then each facility is assigned a weighted measure of (m/n) words per facility.

For both choices of dependent variable, the measure will contain a large number of zero counts. For the count measure of articles, we use a zero-inflated negative binomial regression (Demaris 2004).[7] This technique assumes that the zeros are generated by two different processes and a first-stage logit estimation is used to correct for the excess zeros. The weighted words measure of media attention is continuous and strictly non-negative. Hence, we use Tobit regression when estimating equation (1) with this dependent variable.

The pollution vector measures the amount of toxic wastes (in pounds) released in the air, water, injected underground, released on land, and transferred offsite. Although these measures are closely correlated, they are included separately (rather than as an index) since media attention might be sensitive to the type of pollution. The vector also includes a

[7] A Vuong likelihood ratio test for model selection on the dispersion parameter produces a test statistic significantly different from zero.

measure for the number of Form-R's, a reporting form used to report about a particular toxic chemical or toxic category, proxies for risks associated with pollution. The greater the numbers of Form-R's, the more different types of chemicals have been released.

The vectors for industry and region consist of the six industry measures and four regional measures shown in Table 3. The chemical industry in particular was the subject of media attention due to public concern about ozone-depleting chemicals. The socio-economic characteristics vector consists of the log of income and measures for the proportion of the population (at the zip code level) that is either Hispanic, or nonwhite but not Hispanic. The omitted category is the percentage of non-Hispanic white residents. We test the null hypothesis that media attention is non-discriminatory with respect to income status and racial composition of the neighborhood. We include the logarithm of the population density (*POPN*) as a control variable since facilities in densely populated neighborhoods might be subject to increased reporting.

3.2 Firm Responses to Media Attention

Our second estimation is a difference-in-difference estimation with year effects to isolate the degree that the facilities which received media attention decreased the quantity of their toxic releases relative to those that did not receive attention:

$$y_{it} = \alpha + \beta_2 M_i + \beta_3 After_t M_i + \sum_{j=1990}^{1995} \beta_j Year_j + X\beta + \varepsilon_{it} \quad (2)$$

In equation (2), the dependent variable is the logarithm of the i^{th} facility's releases in period *t*. The indicator variable, media attention, M_i, is the treatment. The post-treatment

years are captured by the indicator variable, $After_t$. This variable, along with variables identifying specific years (1990-1995), controls for factors that may affect the toxic releases of all facilities, whether or not they receive media attention. The coefficient of interest, the interaction term (β_3), captures the treatment effect of media attention. The vector $\boldsymbol{X}$ is a set of control variables that includes all the controls used in equation (1) (except the pollution vector X_i^P) plus firm characteristics that are measured at the parent company level. Firm characteristics (from the Compustat North America) include the logarithm of the average cost of goods and services which is used as a proxy for the input prices and other costs incurred by the firm, logarithm of total sales, and the logarithm of research and development expenditures per unit sales (a measure of the ability to innovative).

Ideally, a treatment variable is randomly assigned and that the treatment is an unexpected shock to the firms. Random assignment would ensure that other characteristics (both observed and unobserved) that affect a facility's behavior have a similar distribution for both treated and untreated facilities. An unexpected treatment ensures that the response is observed after the treatment and that he effect is not mitigated by facilities taking actions in the anticipation of receiving negative media attention.

It is obvious from equation (1) and table 3 that media attention is not randomly assigned. There are some features at the neighborhood and establishment level that we hypothesize to be associated with media attention. Furthermore, observable characteristics like size, the quantity of releases, and industry differ by treatment. It is likely that unobserved characteristics are also correlated to the treatment. While these issues mean that we will not interpret any statistically-significant coefficients as indicating causality, we do believe that our treatment represents a largely unexpected shock. Many of the news

articles in our data set quote company officials as "surprised" or "shocked" by their status as a top polluter. Event studies on the stock market reaction to the first wave of TRI reports show that reports also provided unexpected information to market participants; there was a significant drop in the stock prices of TRI companies and stockholders experienced abnormal negative returns. Hamilton (1995a) translates this average loss to $4.1 million in stock values for TRI firms.

4. Results

4.1 Media Response to TRI

Table 4 reports the coefficient estimates along with standard errors clustered by zip code. The far left column reports coefficient estimates for the zero-inflated negative binomial model with the number of articles as the dependent variable. The far right column reports Tobit coefficients with the weighted count of words as the dependent variable. For both estimations, the variables of interest are *INCOME*, *NONWHITE* and *HISPANIC*. The results show no statistically significant difference in the likelihood that poor or minority neighborhoods receive media attention. Modest changes in the racial composition or income of a neighborhood would have little or no discernable impact on the number or length of articles written about a particular facility. Facilities located in the *NORTHEAST*, home to several major newspapers indexed by Lexis-Nexis, were more likely to be the subject of reporting. Facilities in the petroleum industry are less likely to receive media attention. The quantity of releases in nearly any form, along with the number of chemicals released by a facility, is positively associated with media attention.

4.2 Media Attention and Firm Responses

The data used for estimating equation (2) contain 500 establishment-level observations, of which 137 received media attention. Facilities are distributed in 426 zip codes clusters, 130 of which include facilities with media attention. Figure 1 shows the average annual emissions of firms with and without media attention. The vertical line indicates the treatment year, 1989. Annual toxic releases for both types of establishments were decreasing both before and after the treatment year. Firms with media attention were more likely to be high emitters and, as a group, reduced their releases more rapidly. However, the figure reveals no distinctive change in the rate of decline in toxic releases for facilities with media attention after 1989.

The first column of Table 5 presents the estimates of the difference-in-difference model described by equation (2). The interaction term $(After_t M_i)$ measures the difference in the changes in toxic releases over time. Results show that there has been a sizeable and statistically-significant decrease in the toxic releases of facilities with media attention in the years following the first publication of the TRI report. Compared to the pre-treatment years, facilities with media attention experienced a 54% decrease in releases over and above the decrease experienced by facilities without media attention. These estimates, which are surprisingly large, clearly show that facilities with media attention behave differently from the ones that did not receive any media attention.

In addition to the declines in toxic releases, Table 5 shows that wealthier neighborhoods along with those that had larger non-white or Hispanic populations, had fewer toxic releases. The magnitudes of the coefficients are small, but the estimates are

326 statistically highly significant, and the results are broadly consistent with other studies on
327 environmental justice.

328 While the results in the first column of Table 5 are intriguing, it is important to
329 remember that a difference-in-difference approach where the treatment group is selected
330 endogenously does not indicate causality.[8] Unobserved characteristics may be correlated
331 with both the decision to report about a facility and the level of releases. For example,
332 establishments receiving media attention may well have also been receiving the attention of
333 regulators.[9] Facilities with high releases may also represent older, less efficient
334 manufacturing plants that were due for broad improvements even without media attention.
335 So it is quite likely that some of the link between media attention and reductions in toxic
336 releases are related in some non-causal way.

337

338 *4.21 Alternative Specifications*

339 Given the concerns about robustness and endogeneity, we explore several alternative
340 specifications for estimating the relationship between media attention and toxic releases.
341 None of these estimations, which are reported in the remaining columns of table 5, solve the
342 endogeneity problem. However, they do give insight into the degree that results are robust.
343 Overall, the alternative specifications show a consistent negative relationship between the
344 toxic releases and media attention, controlling for the overall downward trend in releases.
345 The results are not always statistically significant, however. Given the relatively small
346 sample of facilities that received media attention, alternative specifications, which typically

[8] We were unable to find a satisfactory instrument. See Saha 2010 for discussion of a number of potential candidates.
[9] In fact, a number of articles in our data cite establishments for failing to submit TRI reports. While these establishments are generally small and not among the sample of large emitters used to estimate equation 2, such reporting failures are often discovered because of regulatory attention for some other matter.

reduce the sample even more, produce larger and less precisely measured confidence intervals.

The right-hand columns of Table 5 evaluate the robustness of the results to different measures of media attention and to an alternative estimation technique. Column 2 disregards as media attention any newspaper or wire articles that mention more than 5 facilities; a number of articles consisted of little more than a list of "biggest polluters" by state or region. Column 3 redefines equation 2 to account for three separate treatment effects: facilities that receive attention from newspapers, facilities that receive attention from newswires, and facilities that receive attention from both. Indicator variables for each of these three treatments are individually interacted with the measure "after." Column 4 uses a matching estimator to compare facilities with media attention to otherwise similar facilities without media attention.[10]

Columns 2-4 show that results are sensitive to how media attention is measured. When we discard articles that include long lists of facilities, the magnitude of the coefficient on the interaction term drop sumwhat, from -.54 to -.45. It is now significant only at the 5% level. When we distinguish by type of media attention, attention from newswires has a strongly negative correlation to the change in toxic releases, but the magnitude of the coefficient is smaller for facilities appearing in just newspapers or in both types of news sources. The fact that both of these latter two coefficients are insignificant most likely reflects the limitations of small sample (only 39 of 500 facilities received attention from just newspapers). As a final check of robustness, we use a matching estimator. This allows us to compare the facilities with media attention to otherwise similar facilities that did not get

[10] The estimate in table 5 is the average treatment effect of media attention on changes in future toxic releases between 1988 and 1990 using a Logit estimator and "nearest neighbor" matching.

media attention. Although it is statistically insignificant, the average treatment effect, -.47, is similar in magnitude to the difference in difference estimator from column 1.

Overall, Table 5 allows some broad conclusions. Facilities that receive media attention diminish their releases more than facilities without media attention. The magnitude of that difference is quite large: 54% in column 1. The magnitude is sensitive, however, to exactly how media attention is measured and to the type of estimator used. Furthermore, the observable characteristics of facilities with media attention are different from those without media attention. This raises the possibility that unobserved characteristics, which are correlated with media attention, might be driving decisions about toxic releases. From the estimations, we cannot be sure that media attention *causes* firms to reduce their toxic releases

However, having acknowledged the limitations of a difference-in-difference approach, it is worth highlighting that the texts of the article in our database *do* often point to a causal relationship. Articles frequently include quotations by company spokespersons, who would highlight plans for reducing releases. In fact, large emitters of toxic releases, like Monsanto, Union Carbide and Dow, announced initiatives, specifically in response to the negative publicity associated with the TRI, to drastically reduce production of toxic substances (Newsweek 1989; Rotman 1989).

5. Conclusion

The unconventional nature of the TRI program and the success attributed to it in reducing toxic emissions over two decades have made it a popular alternative to traditional environmental regulations. Although the media have played an important role in

392 disseminating TRI-based information, economists have neglected to study the role of the
393 media in this regulatory framework. Looking back at media attention generated at the time
394 the program was introduced, this study investigates the role that the TRI played in
395 generating media responses and how firms receiving media attention behaved differently
396 from those that did not.

397 The role of the print media is particularly interesting when viewed through the prism
398 of environmental justice, since the TRI data has shown that poor and minority
399 neighborhoods are disproportionately exposed to toxic releases. Racial composition and
400 income status of the neighborhood matter very little in media reporting of TRI-related
401 pollution news. However, the results reported here show that firms with media attention
402 reduce toxic releases more than the untreated firms. Facilities in minority neighborhoods
403 decreased emissions more than facilities in mostly white neighborhoods. Firms with media
404 attention also tend to reduce emissions more in densely populated neighborhoods than
405 other firms without media attention.

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526 **Table 1: Articles Related to Toxic Release Inventory**

Total Articles (excluding those focused on noncompliance)	**73**
Focused on biggest polluters nationwide	15
Focused on biggest polluters in State	19
Focused in metropolitan area, county or other sub-state geographical region.	27
Without geographic focus	12
Reference to NWF or NRDC reports	51
Company spokesperson from at least one polluting facility quoted	29
Emphasis on reductions in toxic releases	3
Newspaper articles	19
Newswire articles	54
Median number of facilities cited per article	4
Median words per article	618
Articles focused on fines for noncompliance (excluded)	11

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530 **Table 2: Summary Statistics by Zip Code**
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	Zip codes identified in 1990 US Census	Zip codes with TRI facility	Zip codes with TRI facility receiving media attention
Total number of zip codes	29,290	7,003	295
Mean (across zip codes) values for:			
Percentage of population that is nonwhite & not Hispanic	14.11	22.73	24.74
Percentage of population that is Hispanic	4.41	7.76	6.58
Median household income	$27,274	$27,447	$26,370
Population density (per square mile)	3.45	8.94	5.69

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534 **Table 3: Summary Statistics by facility**

	Full Sample		Top 500 Facilities	
	Facilities not receiving media attention.	Facilities receiving media attention	Facilities not receiving media attention	Facilities receiving media attention
Total	**18,797**	**326**	**363**	**137**
Mentioned in 1 article		242		85
Mentioned in 2 articles		45		24
Mentioned in 3-4 articles		28		21
Mentioned in 5-6 articles		8		4
Mentioned in 7+ articles		3		3
Chemicals	3,510	111	64	73
Primary Metals	1,511	45	115	22
Paper	631	27	114	23
Petroleum	315	10	132	5
Transportation	944	21	135	2
Other manufacturing	11,886	112	125	12
Northeast	4,089	78	114	23
Midwest	6,422	66	112	25
South	5,480	151	60	77
West	2,806	31	125	12
Annual Sales (million $)			10,560	14,867
Cost of Inputs (million $)			7,412	10,279
R&D (millions $)			341	568

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Table 4: Predictors of Media Attention for 1987 Toxic Releases

VARIABLES	*Articles*	Inflate	*Wwords*
AIR	0.0633***	-2.5262***	29.4223***
(in pounds)	(0.013)	(0.559)	(8.097)
WATER	-0.0034**	-0.0746**	-0.3416
(in pounds)	(0.001)	(0.033)	(0.358)
LAND	0.0084***	-0.3312**	4.7917***
(in pounds)	(0.002)	(0.149)	(0.652)
UNDER	0.0100***	-0.0872	2.5644***
(in pounds)	(0.003)	(0.086)	(0.884)
OFFSITE	0.0494***	-0.2665***	24.6061***
(in pounds)	(0.013)	(0.068)	(4.993)
FORMR	0.0209***	-0.0275**	19.1371***
(Number of Form-Rs)	(0.007)	(0.012)	(3.512)
CHEMICALS	0.1012		25.7722
(Dummy Variable)	(0.166)		(26.142)
PRIMARY METALS	0.3762*		74.5444**
(Dummy Variable)	(0.204)		(35.421)
PAPER	-0.1507		126.182***
(Dummy Variable)	(0.236)		(38.042)
PETROLEUM	-0.9964***		-199.4569**
(Dummy Variable)	(0.361)		(95.511)
TRANSPORTATION	-0.0912		71.4192*
(Dummy Variable)	(0.249)		(37.278)
POPN	0.0167		-2.1714
(Logarithm of Population Density)	(0.040)		(6.107)
INCOME	0.2758		0.7906
(Logarithm of Median Household Income)	(0.219)		(32.967)
HISPANIC	0.0022		-0.4266
(Percentage of Total Population)	(0.005)		(0.891)
NONWHITE	0.0050		-0.0034
(Percentage of Total Population)	(0.003)		(0.491)
NORTHEAST	0.4710*		75.5536**
(Dummy Variable)	(0.242)		(37.316)
MIDWEST	-0.3099		-34.5987
(Dummy Variable)	(0.238)		(35.911)
SOUTH	0.1605		72.7050*
(Dummy Variable)	(0.222)		(39.258)

Columns 1 and 2 report values for a zero-inflated negative binomial with the coefficient estimates in column 1 and column 2 reporting the estimates of the probit model to predict whether or not media attention is a certain zero. The Vuong test statistic for ZINB vs. standard negative binomial is z = 9.15. Column 3 reports results from Tobit estimation with the number of words (weighted by the number of facilities mentioned in each article) as the dependent variable. All estimations show robust standard errors clustered by zip code in parentheses. There are 7,003 zip code clusters. . Total number of observations =19,123. *** p<0.01, ** p<0.05 and * p<0.1.

Figure 1: Annual Mean Emissions of Top 500 TRI facilities by Media Attention, 1988-1995

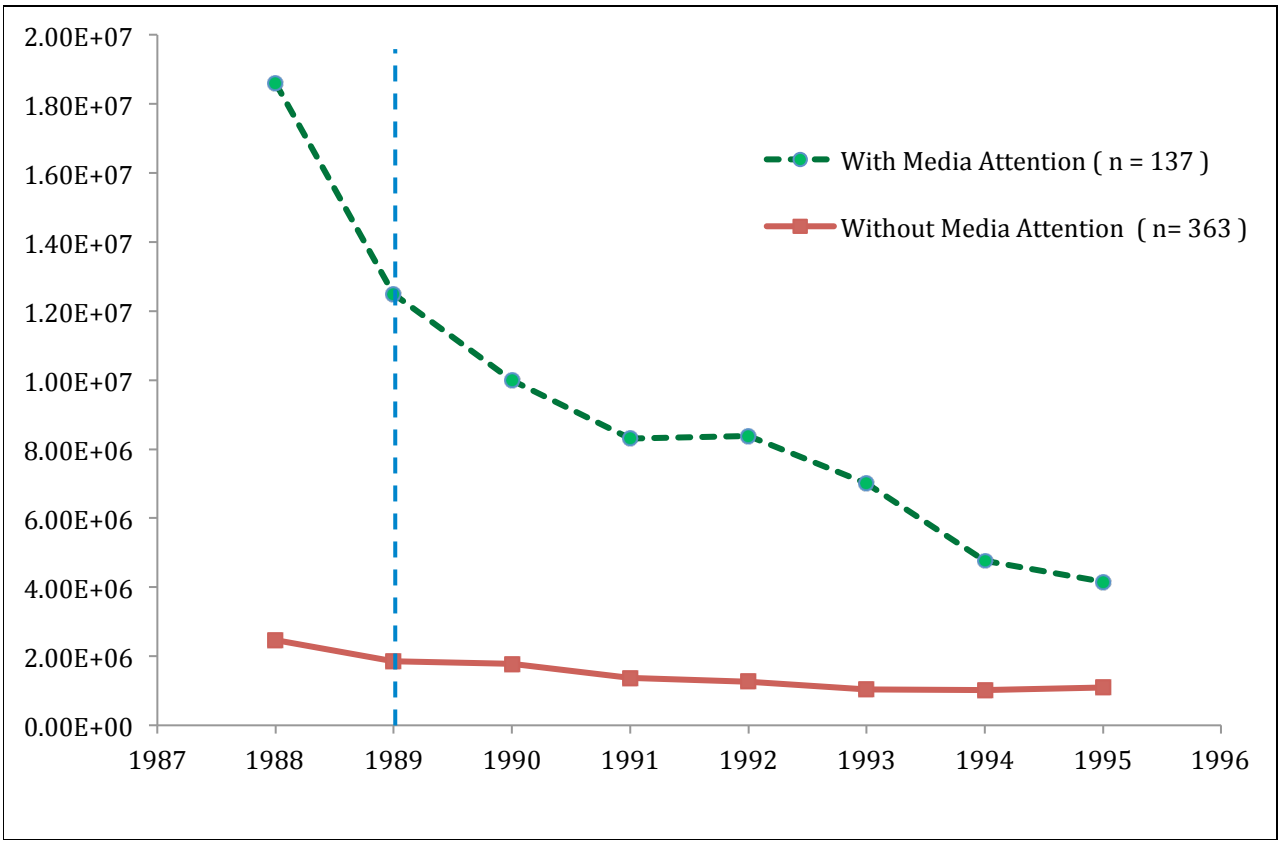

Table 5: Difference-in-Difference Estimation Results

	1	*2*	*3*	*4*
MEDIA ATTENTION	1.790*** (0.184)	1.666*** (0.203)	--	
MEDIA ATTENTION : Average Treatment Effect				-.468 (.351)
NEWSWIRE	--	--	1.680*** (0.224)	
NEWSPAPER	--	--	1.366*** (0.523)	
BOTH PAPER & WIRE	--	--	-0.478 (0.699)	
*MEDIA ATTENTION * POST1989*	-0.540*** (0.201)	-0.454** (0.218)	--	
*NEWSWIRE*POST89*	--	--	-0.467* (0.240)	
*NEWSPAPER*POST89*	--	--	-0.197 (0.563)	
*BOTH*POST89*	--	--	-0.425 (0.752)	
NONWHITE (% of Total Pop.)	-0.010*** (0.002)	-0.010*** (0.002)	-0.010*** (0.002)	
HISPANIC (% of Total Pop.)	-0.003 (0.003)	-0.003 (0.003)	-0.003 (0.003)	
MEDIAN INCOME	-0.292** (0.128)	-0.271** (0.132)	-0.311** (0.131)	
POP DENSITY	-0.178*** (0.024)	-0.189*** (0.023)	-0.173*** (0.023)	
CHEMICAL INDUSTRY	0.712*** (0.117)	0.739*** (0.102)	0.712*** (0.102)	
PRIMARY METALS	1.053*** (0.144)	1.116*** (0.129)	1.044*** (0.129)	
PAPER	1.085*** (0.124)	1.080*** (0.119)	1.095*** (0.119)	
PETROLEUM	1.665*** (0.138)	1.664*** (0.169)	1.677*** (0.169)	
TRANSPORTATION	1.090*** (0.197)	1.118*** (0.285)	1.054*** (0.284)	
NORTHEAST	-0.765*** (0.136)	-0.777*** (0.145)	-0.768*** (0.144)	
MIDWEST	0.125 (0.133)	0.123 (0.126)	0.123 (0.125)	
SOUTH	0.372*** (0.126)	0.344*** (0.116)	0.379*** (0.115)	
ANNUAL SALES (LOG)	0.132*** (0.031)	0.125*** (0.031)	0.132*** (0.031)	
AVG. COST OF INPUTS (LOG)	0.363* (0.226)	0.308 (0.208)	0.385* (0.208)	
RND INTENSITY (LOG)	0.071 (0.051)	0.063 (0.055)	0.080 (0.055)	
Observations R-Squared	3430 0.22	3430 0.21	3430 0.22	

Columns 1-3 report results from difference in difference estimations, including year indicators for 1990-95. Column 1 uses the full sample of establishments. Column 2 excludes media attention for any articles mentioning more than 5 facilities. Column 3 identifies separate treatment effects by type of media. Column 4 reports the average treatment effect of media attention on changes in future toxic releases between 1988 and 1990 using a Logit estimator and "nearest neighbor" matching. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1