
Evaluating Fairness in Environmental Regulatory Enforcement

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In November 2011, investigative journalists from the Center for Public Integrity (CPI) and National Public Radio (NPR) completed a series of reports, entitled *Poisoned Places*, which chronicled the experience of several communities confronting exposure to hazardous substances from large industrial air pollution sources (CPI/NPR 2011). In their reporting, the journalists uncovered an internal “watch list” compiled by the Environmental Protection Agency (EPA), which included hundreds of facilities, most of which were high-priority violators (HPVs) of the Clean Air Act (CAA).¹ HPV facilities are major air polluters, such as large manufacturing facilities and power plants, that are failing to meet core CAA obligations, usually pollution performance standards. From the EPA’s perspective, the watch list is a management tool to help the agency identify: “recidivist and chronically noncomplying facilities whose violations have not been formally addressed by either the state or the EPA” (EPA 2008). From an outsider’s perspective, the list reads as an inventory of the “worst-of-the-worst” sources of illegal air pollution, or, alternatively, a list of facilities that have not received sufficient attention from the government agencies responsible for enforcing the CAA. Of course, both could be true as well.

The watch list published in July 2012 included 340 facilities, more than half of which were in just four states (33 in Illinois, 62 in Louisiana, 48 in Ohio, and 32 in Texas). A quick analysis suggests that these facilities were often located in poor and minority communities. Whereas the average percentage of African-Americans and Hispanics in ZIP codes across the country is 7.7 percent and 8.7 percent, respectively, the averages based on the location of the watch-list facilities were 15.7 percent and 11.8 percent, respectively. The percentage of the communities living in poverty

was about 2.5 points above the national average for facilities included on the watch list.²

The CPI/NPR team concluded that a major part of the problem was that the EPA and state environmental agencies were failing to pursue aggressive enforcement of these repeat offenders, and as a result, the communities living nearby were suffering from severe pollution burdens with potentially significant adverse health effects. To the extent to which these communities were low-income, minority, or both, this might reflect an environmental injustice. In fact, in one of the segments of the report, a high-ranking EPA official acknowledged as much. The segment featured a local community's efforts to bring attention to the toxic emissions from Tonawanda Coke, a foundry coke and coal tar manufacturer located in Tonawanda, New York. For years, community residents complained to federal and state officials about what they believed were excessive and illegal emissions of benzene and other chemicals from the plant. In addressing the slow government response, Judith Enck, administrator of the EPA regional office with jurisdiction over New York, said, "If this was in an affluent city where thousands of people lived, I think there would have been more of a laser-like focus on this earlier" (Shogren, Lombard, and Bartlett, 2011). This is a revealing statement from such a high-ranking EPA official. Given the fact that Tonawanda is not a prototypical "environmental justice" community (it is 98 percent white and economically working class), it raises the question of whether this example of government inattention is more egregious in minority and poor areas.

To be sure, environmental justice advocates have long alleged that minority and low-income communities experience disproportionate environmental hazards, in part, because of biased enforcement of pollution control and public health laws (Bryant 1995; Bullard, 1993; Bullard & Johnson 2000; Collin 1993). A couple of statements from Robert Bullard are illustrative: "Institutional racism influences decisions on local land use, *enforcement of environmental regulations*, industrial facility siting, management of economic vulnerability . . ." (emphasis added) (Bullard 1993). And, in a statement quite similar to that made by Enck (although it came twenty years earlier), Bullard commented: "People say decisions are made based on risk assessment and science. The science may be present, but when it comes to implementation and policy, a lot of decisions appear to be based on the politics of what's appropriate for that community. And

low-income and minority communities are not given the same priority, nor do they see the same speed at which something is perceived as a danger and a threat” (quoted in Lavelle and Coyle 1992).

Do EPA and state enforcement officials less vigorously enforce pollution control laws when facilities are located in poor and minority communities? Specifically, do they conduct less compliance monitoring, impose lighter administrative sanctions, or both with firms that have been found to be violating major environmental statutes? And did the environmental justice policies adopted in the early 1990s result in fewer disparities of this sort?

We address these and other related questions in this chapter. We begin with a review of existing studies that examine inequities in environmental enforcement, and then describe the federal government’s policy response in the area of compliance assurance and enforcement. We then conduct original statistical analysis of enforcement of the federal CAA to determine if this policy response resulted in beneficial changes in government efforts at both the federal and state level. Overall, we find that the policy reforms did not create large changes to EPA or state enforcement efforts, and in some cases, disparities seemed to worsen. We conclude that, at least in the case of the CAA, the policy attention to equity concerns did not generate a shift in enforcement attention to facilities located in poor and minority communities. In the concluding section of the chapter, we discuss the implications of these findings and evaluate whether recent EPA policy efforts are likely to be more effective in the future.

Past Research on Enforcement Disparities

Over the past twenty-five years, social scientists have devoted significant effort to identifying and quantifying the degree to which poor and minority communities experience disproportionate environmental burdens. This literature, summarized in chapter 1 and referenced throughout the book, has become increasingly sophisticated, and there has accumulated considerable evidence of race- and class-based environmental burdens in facility location and exposure to pollution (Ringquist 2005).

Much less attention has been given to the question of whether there are systematic race- and class-based disparities in the enforcement of environmental laws. This is somewhat surprising given the repeated claims that

poor and minority communities are often overlooked by regulators. As is discussed in more detail in chapter 8, some studies have examined outcomes from judicial proceedings in cases where polluters were penalized for violating major environmental statutes. A study by Lavelle and Coyle (1992), published in the *National Law Journal*, concluded that there were significant disparities. Examining federal district court decisions from 1985 to 1991 that involved violations of air pollution, water pollution, and hazardous waste laws, Lavelle and Coyle concluded that, on average, fines were about \$50,000 lower when facilities were located in minority and poor areas. These findings were, and continue to be, widely cited by environmental justice advocates.

Subsequent research, however, has concluded that the Lavelle and Coyle study was severely flawed. As pointed out by Evan Ringquist (1998), the study selected a short time frame (with no clear rationale), computed average penalties across vastly different types of programs, failed to include control variables to account for factors other than demographics that might explain outcomes, and finally, did not employ tests of statistical significance. In an original analysis that addressed these concerns, Ringquist (1998) found no real race- or class-based disparities in either average penalty amounts in total or in average penalty amounts per violation. In fact, over some time periods that he considered, the average penalty amounts were *higher* for facilities in low-income and minority areas.

Studies of judicial outcomes examine decisions made at the end of what can be a very long regulatory enforcement process. It can take many years for a case where a firm has been accused of committing major violations of a statute such as the CAA or the Clean Water Act (CWA) to reach a judicial decision. In fact, most cases never reach this stage; instead, they are resolved through out-of-court negotiated settlements, which are then usually formalized in consent decrees. Thus, even if there are no race- or class-based disparities in judicial decisions, such disparities may still exist at earlier stages of the enforcement process. For example, government inspectors may pursue less intense compliance monitoring of regulated facilities when they are located in poor and minority communities. Inspections are the principal means by which government agencies detect noncompliant behavior, and the EPA has long pursued a deterrence strategy to discourage regulated entities from violating their environmental obligations (Rechtschaffen and Markell 2003). Similarly, government

agencies may elect to impose less severe administrative sanctions against noncompliant firms in these communities. That is, even if agencies detect significant violations, they may treat similar violations differently. Such unequal enforcement may, at least in part, explain observed inequitable patterns of facility location and pollution burdens. For example, firms may be more inclined to site a new facility in a given jurisdiction if a government agency has a reputation for lenient enforcement in that area. Moreover, less stringent enforcement of facilities in poor and minority areas may contribute to higher observed levels of pollution in these communities if facilities in these areas are failing to comply with their pollution control obligations.

We have found some evidence in our previous work of race- and class-based inequities in regulatory enforcement. Studying state enforcement of the CAA, CWA, and the Resource Conservation and Recovery Act (RCRA), Konisky (2009a) found that over the period between 1985 and 2000, states performed fewer inspections and imposed fewer punitive actions in poor and low-income counties. Similar differences did not emerge regarding race or ethnicity. Konisky and Schario (2010) investigated whether the pattern of disparities identified at the county level were also present when bringing the unit of analysis down to the facility level. Studying large water pollution sources, they found mixed evidence. In some of their regression models, they estimated lower likelihoods of inspections for facilities in large poor and Hispanic communities, but *higher* likelihoods of inspections directed at facilities in large African-American communities. Results were similarly mixed for administrative sanctions. In Konisky and Reenock (2013b), we found that facilities located in Hispanic and lower-class communities were both more likely to be significant violators of the CAA and less likely to be characterized as such by state regulatory officers.

Numerous other studies of regulatory enforcement have tested for race- and class-based disparities, with mixed results. Several studies have found that inspections of facilities regulated under the CWA are less likely when the facilities are located in an area with a high percentage of low-income populations (Earnhart 2004a, b; Helland 1998; Scholz and Wang 2006), but others have found that facilities in poorer areas are characterized by more regulatory activity (Gray and Shadbegian 2004, 2012). With respect to punitive actions, some studies have found that facilities

in areas with large poor populations tend to be associated with fewer punitive enforcement measures under both the CAA and the CWA (Gray and Shadbegian 2004), but other research does not reveal statistically significant differences (Gray and Shadbegian 2012). With respect to race and ethnicity, one study estimated a negative association between the percentage of African-American and Hispanic residents in an area and the likelihood of a CWA inspection (Scholz and Wang 2006). Other studies have found that CWA-regulated facilities located in areas with more minorities are not differentially targeted by enforcement officials (Gray and Shadbegian 2012), and may in fact see more enforcement (Gray and Shadbegian 2012).

In sum, the evidence is mixed. The varied results may be explained by any number of reasons, ranging from the heterogeneity in programs and time periods studied to data measurement and statistical modeling strategies. Moreover, even if the studies finding disparities are correct, one cannot conclude with certainty that they are due to overt government discrimination. Although one cannot rule out this possibility, it is not the only plausible explanation. Several scholars have suggested that the likely mechanism at work is political capacity (Gray and Shadbegian 2012; Hamilton 1995; Hamilton and Viscusi 1999; Konisky and Reenock 2013b). Firms located in communities that can effectively overcome collective action problems and advocate for strong enforcement are more likely to demand and secure government attention toward regulated entities in their areas. We know from decades of research in political science that minorities and individuals with low socioeconomic status tend to participate less in the political process through actions such as voting, signing petitions, attending local meetings, or writing letters to members of Congress (e.g., Leighley and Vedlitz 1999; Rosenstone and Hansen 1993; Verba and Nie 1972; Verba, Schlozman, and Brady 1995). Communities consisting of large numbers of poor and minority citizens, thus, may be less likely to mobilize and apply pressure on government agencies. It is also important to note, however, that when these communities do successfully mobilize, they can mitigate some of these effects. In our recent study of the CAA from 2001 to 2004 (Konisky and Reenock 2013b), we found that facilities are less likely to violate the law and regulatory officials are more likely to detect compliance in communities with more local environmental justice advocacy organizations.

Sorting out the mechanisms behind patterns of enforcement inequities is beyond the scope of this chapter. Our focus instead is on the question of whether government enforcement efforts changed as a response of the policies put in place in the early 1990s to address concerns that pollution control laws were not being equally enforced. Before we move to this analysis, we first describe these policies and identify their possible influence on EPA and state enforcement priorities.

The Federal Policy Response

In response to the growing evidence of environmental inequities, an increasingly active and impatient environmental justice movement began to demand a federal policy response. As has been described in earlier chapters of this book, administrative reforms, such as Executive Order 12898 on Environmental Justice (EO 12898) signed by President Bill Clinton in 1994, sought to bring attention to environmental justice throughout the decision making of the federal bureaucracy, particularly the EPA. The reforms specifically endorsed the use of enforcement tools as a remedy for environmental inequities. EO 12898, for instance, directed federal agencies to “promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations.” The Environmental Justice Strategy developed by the EPA in 1995 declared the need to work with state governments to “identify and respond to any regulatory gaps in the protection of covered populations” and, more generally, address environmental equity concerns in their regulatory and enforcement programs (Browner 1995). In addition, the National Environmental Justice Advisory Council (NEJAC) called on the EPA and the states to strengthen their enforcement efforts in minority and low-income communities (NEJAC 1995). And, finally, EPA lawyers in 1994 determined that the agency had “broad authority” under existing environmental statutes to address environmental justice issues through enforcement measures (Kuehn 2000).

Despite the explicit endorsement of an environmental justice-based enforcement strategy, there has been almost no scholarship studying its efficacy (Konisky 2009b is an exception). Did these administrative actions lead to more intense surveillance and stricter penalties for facilities located in poor and minority communities? The answer to this

question is not obvious. On one hand, EO 12898 and the other administrative reforms put in place in the mid-1990s did not carry the force of law. The EPA and state agencies responsible for enforcement of federal environmental laws were (and remain today) under no legal obligation to shift compliance monitoring resources to facilities located in poor and minority communities, or to ratchet up the severity of punitive sanctions at these facilities when they uncover violations. The policy initiatives put in place during the early 1990s, therefore, represent a relatively weak policy intervention, and there may not be a strong reason to expect that they resulted in a major shift in regulatory enforcement efforts. On the other hand, the EPA was under considerable pressure from the environmental justice community to take equity concerns seriously. It is certainly possible that the new initiatives sent a strong signal from the highest levels of the Clinton administration that they expected the EPA to act, including through enforcement actions.

Moreover, the potential effects do not end with the EPA. Much of the U.S. pollution control system is designed such that states are either required (e.g., via CAA State Implementation Plans) or can request permission (e.g., CWA NPDES permit programs) to implement and enforce major programs. EPA delegates program *primacy* to states that have demonstrated that they have at least as stringent regulatory programs enacted into state law. The federal government carries out oversight of state efforts and retains the right to withdraw primacy if it believes that state efforts are failing to meet federal standards (the EPA operates programs in states without primacy). Within this system, states have extraordinary discretion to choose how much effort they would like to exert toward enforcing federal programs (Konisky 2007; Sigman 2003).

The relevant question here is whether federal environmental justice policy led to a change in state enforcement activity. This may have happened in an indirect way. By raising the profile of equity concerns, the Clinton administration made environmental justice a clear priority. Even if these initiatives were only symbolic, they may still have led states to make equity an important part of their own agendas. The EPA also attempted to more directly influence the states through the use of financial mechanisms. The agency, for example, created a grants program to provide financial assistance to state and tribal governments interested in taking actions to reduce inequities or to build institutional capacity to

address environmental justice issues. The EPA also made federal funding to states contingent on their compliance with the agency's regulations regarding Title VI of the Civil Rights Act, which extended to state permitting of facilities regulated under federal pollution control laws for those states delegated the authority to implement these programs (Ringquist and Clark 1999).

Evaluating Policy Change

Before we proceed to testing for the presence of policy effects in the context of enforcement of the CAA, it is important to specify the standards that we will use to evaluate them. Assessing policy effects in this case is less straightforward than it might at first seem. The reason is that we do not know *ex ante* what enforcement patterns existed during the pre-policy period. It is often assumed that the pre-policy period was characterized by extreme disparities in EPA and state compliance monitoring, punitive sanctions, or both. This is reflected in assertions from environmental justice advocates and from some researchers writing in the academic literature, and was at least implied by the language of EO 12898 itself. But it is also possible that no such disparities existed in the pre-policy period. It is even possible that facilities in poor and minority communities were already subject to more intense enforcement activity before the environmental justice reforms were put in place. As noted previously, there is no consensus in previous empirical studies to rely on. Because of the multiple possible baseline conditions, there is no single test from which we can conclude that the reforms had a beneficial effect, no effect, or perhaps even a detrimental effect.

In the analysis that follows, we examine the presence of disparities in both the pre- and post-policy periods more systematically, taking into consideration the multitude of factors related to facility-level enforcement decisions. We will refer to two types of disparities: negative and positive. Negative disparities are cases where government agencies performed relatively fewer enforcement efforts in environmental justice target communities than in nontarget communities (we define these communities next). Positive disparities are cases where government agencies conducted relatively more enforcement in these target communities. The other possible outcome, of course, is no disparities, in which case government agencies

are carrying out enforcement similarly across these communities. The case of no disparities suggests that facilities in low-income and minority communities are not being systematically neglected, at least compared to wealthier and nonminority communities, when it comes to regulatory enforcement. In the next sections, we summarize the results of these tests (twelve in total) for each combination of agency (EPA or state), action (inspection or punitive action), and environmental justice community (African American, Hispanic, or poor).

Analyzing Policy Effects in the Clean Air Act

The environmental justice initiatives coming out of the Clinton administration during the first half of the 1990s were not program-specific. Rather, they aimed to raise the profile of environmental inequities throughout the activities of the EPA, as well as other federal agencies. Given our focus on enforcement of pollution control laws, it is appropriate to consider a major federal statute such as the CAA.

Research Design

To analyze the effects of federal environmental policy on enforcement, we used a simple interrupted time series research design. Interrupted time series is a quasi-experimental method that is frequently used to analyze the effects of a policy intervention (see Shadish, Cook, and Campbell 2002 for an overview). Specifically, we estimated a statistical model that examines EPA and state regulatory enforcement of the CAA as a function of (1) a set of demographic characteristics that identify environmental justice communities; (2) a policy variable that signifies the period before and after the environmental justice policies were put in place; and (3) a group of control variables to capture other correlates of regulatory enforcement outcomes.³ Of central interest in this model were the tests of the effects of the policy intervention on both EPA and state enforcement behavior in facilities located in environmental justice communities.⁴

Data

To investigate whether federal and state regulatory enforcement patterns changed in response to the federal policies put in place during the mid-1990s, we needed to first identify a set of regulated facilities. In the

analysis described next, we considered all currently active major air polluters regulated by the CAA.⁵ Major sources of air pollution are required to obtain a Title V operating permit; they typically include facilities that have the potential to emit at least 100 tons per year of any criteria air pollutant. Major air sources also include facilities that emit hazardous air pollutants above certain thresholds as determined by EPA guidelines. In the analysis that follows, there were about 12,800 such facilities in the United States.⁶

Enforcement Measures The dependent variables we analyzed are CAA enforcement actions taken by either the EPA or state governments. Historical enforcement data are available from the EPA's Integrated Data for Enforcement Analysis (IDEA) database, from which we created four separate measures: EPA inspections, EPA punitive actions, state inspections, and state punitive actions. For each major air source, we created a dichotomous measure of whether the EPA (or state) performed an inspection or took a punitive action against it in a given year (years in which an action was recorded were coded as 1, and years without were coded as zero). *Inspections* mean the principal actions taken by the EPA and state governments to determine the compliance status of regulated facilities, and they usually (although not always) include emissions tests and assessments of pollution control technologies. *Punitive actions* include measures taken to bring noncompliant firms back into compliance, which include both informal actions (such as notifications of violation) and formal actions (such as administrative orders, consent decrees, and civil penalties). The unit of analysis, therefore, was a facility-year, and we considered the period from 1990 to 2008. (Summary statistics for all variables are displayed in table A7.1 in the appendix.)

Because our measures of enforcement activities were binary (either an action was taken at facility in a given year or it was not), we used a logistic regression model, and we did so separately for EPA inspections, EPA punitive actions, state inspections, and state punitive actions.

Environmental Justice Communities We employed a standard suite of demographic measures to characterize communities. Of most importance are three variables we used to distinguish communities that we would expect to have been targeted by the EPA and state governments

for additional enforcement attention in light of the federal environmental justice initiatives. To define these “environmental justice communities,” we first located each of the 12,800 major air sources in geographical space using latitude and longitude information from the EPA’s Geospatial Data Access Project. Then, to measure the demographic characteristics of the population living around each of these facilities, we used an areal apportionment method (Mohai and Saha 2006, 2007; Konisky and Schario 2010).⁷ Specifically, we used geographic information system (GIS) software to identify the demographic information for people living within 1 mile of each facility.⁸ We did this separately for 1990, 2000, and 2010, and then we employed linear interpolation to impute the values for the inter-decennial census years. The output, then, was an annual measure of the percentage of the population living around each facility that was poor, African-American, and Hispanic.⁹

There remains no agreed-upon standard for what constitutes a “poor” or “minority” community in the environmental justice context. In the analysis that follows, we defined target communities as ones in the top decile of African-American, Hispanic, and poverty populations, based on the measurement of demographics discussed previously.¹⁰ Using this threshold, the target communities were those with 39 percent, 32 percent, and 27 percent or more of their populations being African-American, Hispanic, or poor, respectively.¹¹ Within these communities, the population demographic statistics for each targeted group had mean values of 58 percent, 52 percent, and 34 percent, with standard deviations of 15 percent, 16 percent, and 6.6 percent, respectively. Designating target communities in this way reflects the approach stated by the EPA in its environmental justice strategy that it would direct more enforcement attention to poor and minority communities.

Policy Intervention To capture the federal policy intervention, we created a dummy variable coded 1 for the years 1995 and later, and 0 for prior years. Using 1995 as our policy cutoff point allowed us to test for the effects of the federal environmental justice initiatives during the period after the policies were announced.¹² Because we were interested in whether the policy led to enhanced enforcement effort in target communities, we created a two-way interaction term for each community indicator and the policy intervention variable.

Control Variables We included a variety of control variables in our regression analysis to guard against making incorrect inferences. First, we included several additional demographic variables, including continuous measures of the percentage of African Americans, Hispanics, and the poor in the population; median household income; and the percentage of the tract population with at least a high school education. These were measured using the same procedure as described previously for the community demographic attributes. In addition, we controlled for possible heterogeneity across firms. We included controls for different types of major air polluters by creating a series of dummy variables representing different industrial sectors: utilities, manufacturing, mining, and oil and gas.

Our models also included measures of air pollution severity in the area in which the facility is located, in addition to economic and political conditions. To capture pollution severity, we used information from the EPA *Green Book* on county-level nonattainment status. Each year, the EPA designates every county in the United States as in either in attainment (full or partial) or nonattainment with National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants. The measure we used was a simple dichotomous variable of whether the county in which the major air source was located was in nonattainment for at least one of the six pollutants. In terms of economic conditions, we used the county-level unemployment rate derived from Bureau of Labor Statistics data. State political conditions are measured with three variables: an indicator variable for whether the governor of the state was a Democrat (coded 1 for yes, and zero for no), the percentage of Democrats in the state legislature across both chambers, and state citizen ideology using the revised 1960–2008 citizen ideology series developed by Berry et al. (1998). Finally, the regression models also included dummy variables for presidential administrations to account for national-level differences that come with different EPA regimes, dummy variables for each of the ten EPA regional offices, and lagged (by one year) measures of facility-level enforcement actions.

Did CAA Enforcement Change after the Policy Reforms?

We focus the discussion of our statistical findings on the question of whether the EPA and states directed more enforcement attention to poor

and minority communities in the post-policy period. First, we briefly note that the models themselves perform reasonably well in predicting the relevant enforcement action.¹³ In addition, on the whole, the control variables (whether task factors, political features, or firm-level characteristics) relate to the relevant actions in line with expectations from the literature.¹⁴ State actions, particularly punitive actions, appear to be, on average, more sensitive to local- and state- level factors compared to EPA actions.

The complete regression results are reported in table 7A.2 in the appendix. Here, we present the model estimates of the differences in the predicted probability of inspections and punitive actions for a given target community relative to a nontarget community. Predicted probabilities provide a useful way to assess the substantive effects from our statistical model. We do this for both the pre-policy period and the post-policy period, since we are interested in determining changes in the overall pattern of enforcement directed at facilities in African-American, Hispanic, and poor communities relative to the rest of the communities where facilities are located. Figure 7.1 displays these quantities for EPA enforcement actions, and figure 7.2 displays them for state enforcement actions. In the graphs, positive disparities are cases where the 95 percent confidence interval is fully above zero, negative disparities are cases where the 95 percent confidence interval is fully below zero, and no disparities are cases where the 95 percent confidence interval includes zero.

Beginning with the EPA, our analysis indicates that, in the post-policy period, the EPA was more likely to inspect firms in African-American communities but less likely to inspect facilities in Hispanic communities compared to all other communities. There was no difference for poor communities. These results are displayed in the top panel of figure 7.1. With respect to EPA performance on punitive actions (bottom panel of figure 7.1), all of the tests in the post-reform era suggest no differential treatment across environmental justice target and nontarget communities.

To fully assess any policy effects, it is also necessary to examine patterns of enforcement during the pre-policy period. Doing so is revealing in a couple of ways. First, we find that there was a higher likelihood of an EPA inspection at facilities in an African-American community *even before* the policy reforms were put in place. In addition, in terms of punitive sanctions, the EPA was no less likely to impose a sanction at a violating firm

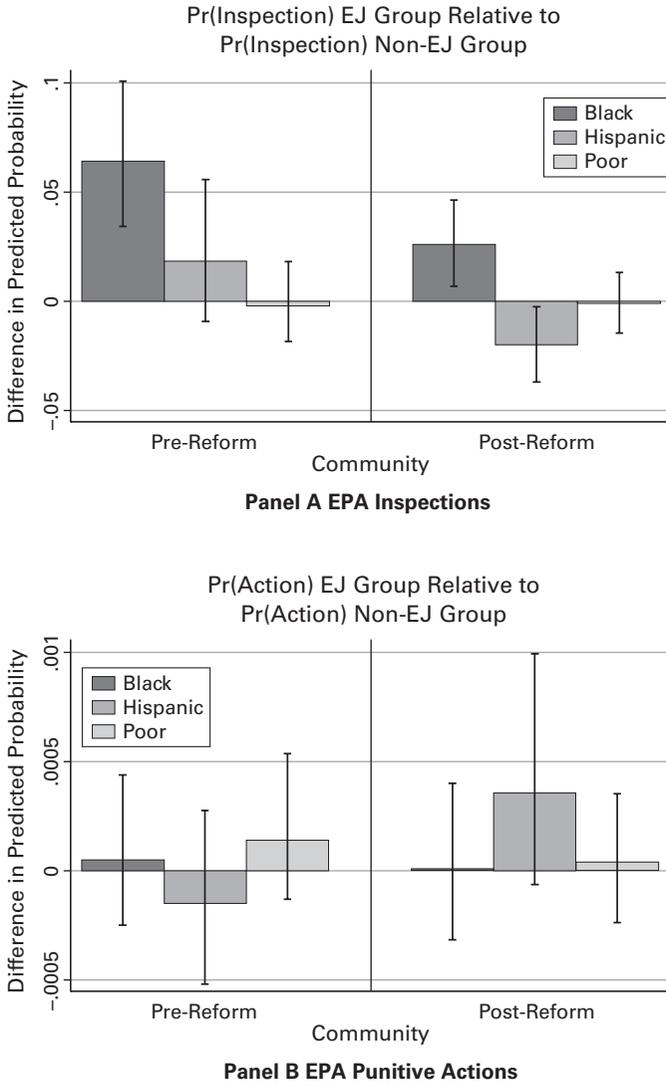


Figure 7.1 Impact of Policy Reforms on EPA CAA Enforcement. Panel A: EPA Inspections; Panel B: EPA Punitive Actions

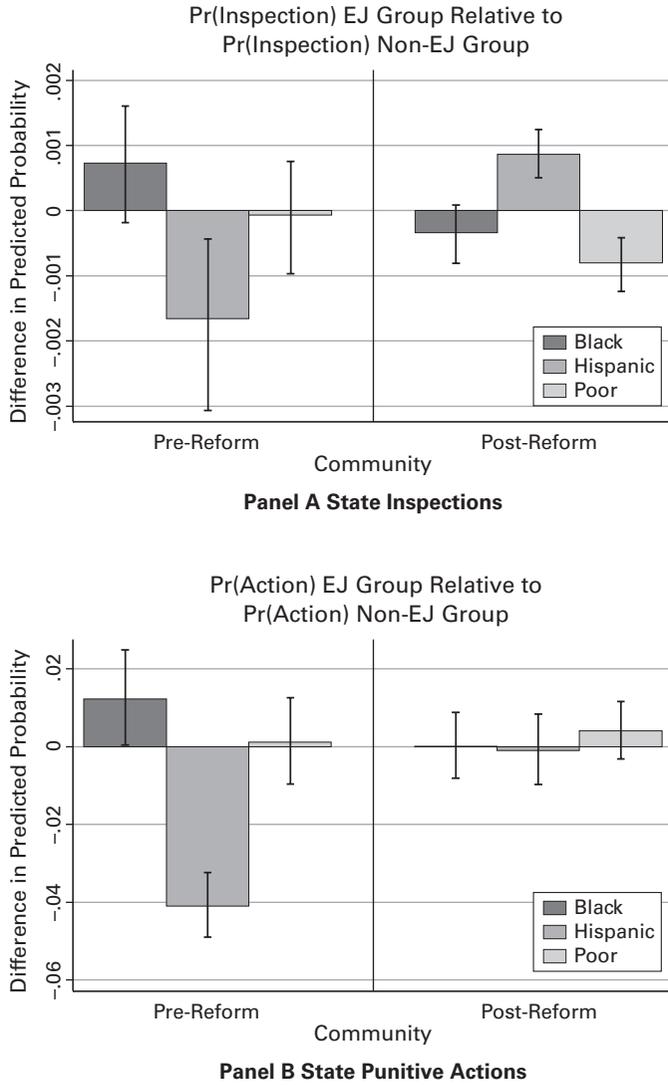


Figure 7.2 Impact of Policy Reforms on State CAA Enforcement. Panel A: State Inspections; Panel B: State Punitive Actions

in African-American, Hispanic, or poor communities before the reforms than it was in all other communities. In sum, for inspections and punitive actions, there were actually *no* preexisting negative disparities in EPA actions. The only difference in enforcement patterns between the pre- and post-policy period, thus, was for facilities in Hispanic communities, and in this case, these facilities actually fared *worse* in 1995 and beyond.

Switching attention to state agencies, we see a somewhat different pattern. With respect to inspection activity, as displayed in the top panel of figure 7.2, states were more likely to inspect a major air polluter in the post-policy period in Hispanic communities but less likely to do so at a facility located in a community with a high level of poverty or African-American residents. In the case of state punitive actions, the lower panel in figure 7.2 suggests no difference in the predicted probability of an action in any of the environmental justice target communities. At first glance, then, there does not seem to be much evidence that state agencies targeted more enforcement to poor and minority communities (with inspections in Hispanic areas being the lone exception) after receiving the policy signal from the federal government.

Again, however, we must also consider the patterns of state activity before the policy reforms. Doing so shows positive gains, but only with respect to Hispanic communities. From 1990 to 1994, states were less likely to perform inspections and carry out punitive sanctions at facilities located in Hispanic communities, whereas in the post-policy period, they were *more* likely to conduct inspections and *no less* likely to use sanctions. The results were more mixed for African-American and poor communities. In a couple of cases—inspections at facilities in African-American communities and punitive actions in poor communities—there is no evidence of different patterns before and after the environmental justice policies were put in place. However, in two other cases—inspections in poor communities and punitive actions in African-American communities—the evidence suggests that enforcement intensity may have actually *decreased* in the post-policy period. The magnitude of this shift for poor communities, while statistically significant, was negligible, shifting to a post-policy difference of a 0.0008 lower probability of inspecting firms in poor versus nonpoor communities. The change for African-American communities was larger, but nevertheless substantively small. Relative to firms in non-African-American communities, firms in African-American

communities moved from a 0.012 pre-policy difference in the probability of receiving a punitive action to no difference.

To put all of these findings in context, the largest substantive effect associated with the EPA's environmental justice policies estimated here was for firms in Hispanic communities regarding state punitive actions. Our results suggest that prior to the policy, firms in non-Hispanic communities had an estimated probability of receiving a punitive action from a state agency of approximately 0.07, while firms in Hispanic communities faced an estimated probability of only 0.03 for receiving a similar action—a more than 57 percent difference. In the post-policy era, this difference was erased, shifting to the statistical equivalent of “no detectable difference.” This fairly substantial policy effect greatly exceeds the more common effect sizes estimated for all other statistically significant findings. In short, outside of the policy effect for the Hispanic communities noted previously, the estimated substantive effects of the federal policy initiatives, when we detected any, were, on the whole, unremarkable.

To this point, we have assumed that the EPA and states identify environmental justice target communities solely on the basis of demographics. Given that one of the goals of the federal environmental justice policy reforms was to direct more government attention to poor and minority communities that were overburdened by pollution, we also conducted an analysis taking this into account. Specifically, we estimated the same set of regression models, but this time we used a three-way interaction term, where the environmental justice community and policy variable was also multiplied by total toxic emissions (aggregated to the ZIP code) using data from the EPA's Toxics Release Inventory (TRI). The coefficient on this term allows for our test of policy effects to be conditional on the level of toxic emissions in the area. We do not report the results here due to space limitations, but in brief, we did not find evidence that the EPA and states targeted facilities in high-toxic emissions areas any differently.

Putting the results of the analysis together, what can we say about the effects of the policy reforms on enforcement of the CAA? Recall from the discussion earlier in the chapter that we characterize a shift toward more enforcement as a beneficial outcome, a shift toward less enforcement as a detrimental outcome, and a case of little meaningful change as no difference. As summarized in table 7.1, of the twelve tests conducted in our main analysis, seven suggest that the policy had no impact, two suggest a beneficial impact, and three suggest a detrimental impact.

Table 7.1
Estimated Policy Outcomes

	Post-Policy Period		
Pre-Policy Period	<i>Negative Disparity</i>	<i>No Disparity</i>	<i>Positive Disparity</i>
<i>Negative Disparity</i>	0	1	1
<i>No Disparity</i>	2	6	0
<i>Positive Disparity</i>	0	1	1

It appears, therefore, that the policies put in place to address environmental justice had minimal impact—that is, by and large, there was not much discernible change in agency enforcement efforts in poor and minority communities. However, this does not necessarily mean that EPA enforcement was biased in these areas, as often alleged by environmental justice advocates. Rather, the EPA on the whole was already carrying out enforcement in target communities in a similar way as in nontarget communities. In fact, in the case of African-American communities, the agency was devoting more attention to major air polluters in these areas. The one exception to this general pattern is that enforcement effort did decline with respect to facilities in Hispanic communities, although we do not attribute this outcome to the policy reforms themselves. Moreover, the policy reforms do not appear to have had much of an effect on how state administrative agencies carried out their enforcement efforts. Although the reforms appear to have driven up enforcement of facilities in Hispanic communities, enforcement of facilities in African-American and poor communities at best stayed the same, but in some cases, it seemed to have become less intense.

Implications for Future Policy

An important question in any policy analysis or program evaluation is: What constitutes success? In some situations, the answer may be straightforward, but that is not necessarily the case in the context of environmental justice. For some people, enhanced levels of government attention to pollution sources located in poor and minority communities may qualify. According to this view, what is required is that these communities receive not just equal attention, but that they receive extra attention to remedy

past inequities. This would be consistent with some notions of corrective justice. For others, success may come by simply eliminating any existing disparities. That is, all that is necessary is equality of treatment. In the language of this chapter, the first perspective would judge policy success as the presence of increased positive disparities in EPA and state enforcement of the CAA for environmental justice communities, whereas the second would characterize success as the reduction or elimination of disparities. One could argue for either characterization, and there is likely significant variance among stakeholders in the environmental justice advocacy community as to what a successful program's goals ought to include.

Depending on one's view of success, therefore, one could interpret our results in different ways. If success equates to the EPA and state agencies dedicating disproportionate enforcement toward facilities located in poor and minority communities, then EO 12898, the EPA's environmental justice strategy, and the other reforms of the mid-1990s largely failed. In only one of the twelve tests was EPA's policy associated with a post-policy change toward positive disparities. If, however, the goal is to erase disparities, our results suggest a more optimistic picture. In two-thirds of the cases, during the post-policy period, EPA or state enforcement rates were similar, regardless of the community's demographics. Both sets of agencies treated facilities located in poor and minority communities similar to those in nonpoor and nonminority communities, all else equal. It is important to note, however, that in just one of these cases did this reflect a movement from a pattern of negative disparities in the pre-policy period.

Although these conclusions clearly emerge from our data analysis, it is important to recognize several limitations of our study. First, we have analyzed only one federal pollution control law (albeit an important one). EPA and state enforcement responsibilities extend to many other areas of pollution control, ranging from water to hazardous waste. Without direct investigation of these and other areas of policy, we cannot reach conclusions about the overall policy effects on regulatory enforcement. Moreover, the analysis studied enforcement activity only through 2008, so it does not account for changes (positive or negative) in more recent years. The findings regarding state agencies, however, are generally consistent with a previous analysis of enforcement of the CWA and the RCRA, which also found little evidence that states gave more attention to facilities in poor and minority communities (Konisky 2009b).

Second, we have evaluated enforcement activity solely on the basis of the amount (or, more precisely, the probability) of an enforcement action being directed at regulated facilities. One could reasonably argue that the amount of enforcement activity may not reflect an efficient use of government enforcement resources when it comes to mitigating risks posed to society overall, or even for environmental justice target communities. However, while we do not contend that *more* enforcement activity necessarily means *more effective* enforcement, regulatory enforcement activity in general has been found to be an important determinant of pollution prevention and firm compliance (Gray and Shimshack 2011).

In reflecting on these results, one area that we would like to highlight is the findings regarding state enforcement. As noted previously, on balance, our analysis of CAA enforcement suggests that the federal reforms did not do much to push states toward more aggressive enforcement of major air polluters in target communities, with the exception of facilities in areas with large Hispanic populations. It is necessary to emphasize that the effect that we identified is the average effect across the fifty states, and there is undoubtedly large variance across the states, with some states acting as leaders and others as laggards. Identifying which states fall in which category is important for determining whether the outcomes were equally distributed across the country.

More generally, it is important to note that in its most recent environmental justice initiative, *Plan Environmental Justice 2014 (Plan EJ 2014)*, the EPA has not placed much emphasis in its most recent environmental justice initiative—*Plan EJ 2014*—on the hugely important role of state agencies in environmental enforcement. In fact, states are barely mentioned in the EPA's implementation plan for addressing equity issues through compliance and enforcement (EPA 2011). In our view, this is a glaring weakness in the new initiative, and the EPA should think carefully about how to use its financial influence and oversight powers to affect state enforcement behavior, as well as to further direct its attention to environmental justice priorities in performance partnership agreements and other federal-state cooperative arrangements.

Given the existence of varying perspectives of success and informational levels on EPA and state program activity, the implementation of any policy reform represents only one piece of an effective response to overburdened communities. The EPA's *Plan EJ 2014* highlights the essential

role of communicating with communities, and we strongly echo this focus. It is important that EPA and state administrative agencies communicate their enforcement accomplishments with the affected communities. A successful change in enforcement activity may very well go unnoticed in a community that may traditionally be less engaged in politics or policy in a meaningful way. In the absence of effective communication, citizens' perceptions of an agency's continuing neglect is likely to become their reality. In this way, perceptions of environmental injustice may persist, despite the actions of government intended to genuinely address—though not necessarily resolve—disparities in regulatory enforcement.

Regulatory enforcement is a critical component of an effective environmental protection system. Laws matter only to the extent to which they are adhered, and our past work has shown some tendency for compliance rates, at least under the CAA, to be lower in some poor and minority communities (Konisky and Reenock 2013a, b). Moreover, enforcement represents a set of tools that government agencies can potentially use to remedy (or at least reduce) observed environmental risk disparities. Although the EPA and state governments cannot force power plants, factories, and other polluting facilities to reduce their emissions in low-income and minority communities (to the extent to which they are legally permissible under the law), they can ratchet up their enforcement efforts against firms that exceed emission limits. Thorough enforcement, performed fairly across all communities, is a goal that we believe EPA and state governments should work diligently to achieve.

Appendix

Table A7.1
Descriptive Statistics

Variable	Data Source	Mean	Std. Dev.	Min	Max
Enforcement Measure					
EPA inspection	EPA's Integrated Data for Enforcement Analysis database	0.088	0.284	0.000	1.000
State inspection	EPA's Integrated Data for Enforcement Analysis database	0.537	0.499	0.000	1.000
EPA enforcement action	EPA's Integrated Data for Enforcement Analysis database	0.009	0.096	0.000	1.000
State enforcement action	EPA's Integrated Data for Enforcement Analysis database	0.090	0.286	0.000	1.000
EJ Indicators					
African-American target community	EPA's Integrated Data for Enforcement Analysis database	0.099	0.299	0.000	1.000
Hispanic target community	EPA's Integrated Data for Enforcement Analysis database	0.099	0.299	0.000	1.000
Poor target community	EPA's Integrated Data for Enforcement Analysis database	0.099	0.299	0.000	1.000
Demographic Indicators					
% African-American	U.S. Census Bureau	11.862	18.258	0.000	100.000
% Hispanic	U.S. Census Bureau	10.110	16.268	0.000	97.952
% Poverty	U.S. Census Bureau	14.507	8.926	0.000	92.177
% Household education	U.S. Census Bureau	55.569	15.865	0.000	100.000
Median household income (thousands)	U.S. Census Bureau	38.616	14.931	0.000	215.727

Table A7.1 (continued)

Policy Task Factor Indicators					
Nonattainment	EPA's Green Book	0.387	0.487	0.000	1.000
Unemployment	Bureau of Labor Statistics	6.067	2.649	0.400	40.800
Political Context Indicators					
Democratic governor	Calculated from original data	0.448	0.494	0.000	1.000
% Democrats in state Legislature	Calculated from original data	53.268	12.119	11.428	90.789
State government Ideology (ADA/COPE)	Berry et al. (1998)	48.109	24.760	0.000	97.917
Firm-Level Indicators					
EPA inspection (1 year lag)	EPA's Integrated Data for Enforcement Analysis database	0.088	0.284	0.000	1.000
State inspection (1 year lag)	EPA's Integrated Data for Enforcement Analysis database	0.537	0.499	0.000	1.000
EPA enforcement action (1 year lag)	EPA's Integrated Data for Enforcement Analysis database	0.009	0.096	0.000	1.000
State enforcement action (1 year lag)	EPA's Integrated Data for Enforcement Analysis database	0.090	0.286	0.000	1.000
Manufacturing firm	EPA's Integrated Data for Enforcement Analysis database	0.527	0.499	0.000	1.000
Utility firm	EPA's Integrated Data for Enforcement Analysis database	0.300	0.458	0.000	1.000
Oil and gas firm	EPA's Integrated Data for Enforcement Analysis database	0.052	0.223	0.000	1.000
Mining firm	EPA's Integrated Data for Enforcement Analysis database	0.011	0.104	0.000	1.000

Note: All "Disparities" refer to estimated differences in a given environmental justice (EJ) community for a given expected agency action relative to non-EJ communities. A Positive Disparity exists when a given agency action is more likely for an EJ community relative to non-EJ communities. A Negative Disparity exists when a given agency action is less likely for an EJ community relative to non-EJ communities. No Disparity exists when a given agency action is equally likely in EJ and non-EJ communities.

Table A7.2
The Impact of EJ Policy Reform on EPA and State Enforcement Actions

	Model 1				Model 2			
	Logit, with Cubic Splines				Logit, with Cubic Splines			
	EPA	EPA	EPA	States	EPA	EPA	States	States
Pr(Inspection)	Pr(Punitive Action)	Pr(Inspection)	Pr(Punitive Action)	Pr(Inspection)	Pr(Punitive Action)	Pr(Inspection)	Pr(Punitive Action)	
b	s.e. b	b	s.e. b	b	s.e. b	b	s.e. b	
EJ Policy Indicators								
African-American target community (AATC)	0.8579 **	0.1693	0.0552	0.2142	0.0945	0.0586	0.1797 *	0.0868
Hispanic target community (HTC)	0.2976	0.2512	-0.2867	0.3257	-0.1810 **	0.0663	-0.9994 **	0.1368
Poor target community (PTC)	-0.0602	0.1917	0.1708	0.1904	-0.0077	0.0533	0.0155	0.0893
EJ Policy 1995	1.4090 **	0.0877	0.5637 **	0.0998	0.5698 **	0.0216	0.3763 **	0.0387
AATC X Policy	-0.6949 **	0.1641	-0.0595	0.1884	-0.1642 **	0.0520	-0.1797 *	0.0789
HTC X Policy	-0.4368	0.2421	0.5341	0.3098	0.3855 **	0.0602	0.9873 **	0.1278
PTC X Policy	0.0539	0.1876	-0.1406	0.1941	-0.1505 **	0.0533	0.0307	0.0858
Demographic Controls								
Median household income	-0.0002	0.0009	-0.0044	0.0026	0.0033 **	0.0008	-0.0004	0.0009
% African-American	-0.0041 **	0.0011	-0.0023	0.0026	0.0010	0.0008	-0.0002	0.0010
% Hispanic	-0.0009	0.0013	-0.0098 **	0.0034	-0.0049 **	0.0009	-0.0009	0.0011
% Household education	-0.0275 **	0.0010	-0.0071 **	0.0025	0.0053 **	0.0006	-0.0083 **	0.0007
% Poverty	-0.0066 **	0.0022	0.0060	0.0052	0.0115 **	0.0017	-0.0024	0.0021

Table A7.2 (continued)

Policy Task Controls												
% Unemployment	0.0449	**	0.0052	0.0202	0.0118	0.0108	**	0.0032	0.0233	**	0.0045	
Nonattainment	0.0174		0.0217	0.3038	**	0.0556	0.0310	0.0178	0.2395	**	0.0219	
Political Controls												
Democratic governor	1.0406	**	0.0342	-0.2700	**	0.0831	-0.0731	**	0.0228	-0.1586	**	0.0322
% Democrats in state legislature	0.0109	**	0.0013	0.0056	0.0031	0.0003	0.0009	-0.0103	**	0.0011		
State government ideology	-0.0150	**	0.0008	0.0035	0.0019	0.0007	0.0005	0.0076	**	0.0007		
Bush 1 administration dummy	-2.7147	**	0.1022	-1.3115	**	0.1180	-1.7990	**	0.0245	-1.2027	**	0.0461
Clinton administration dummy	-1.1504	**	0.0445	-0.0164	0.0774	-0.7431	**	0.0173	-0.2503	**	0.0238	
Firm-Level Controls												
Utility firm	0.1792	**	0.0321	-0.0696	0.0985	0.0036	0.0242	-0.1511	**	0.0337		
Manufacturing firm	0.1144	**	0.0311	0.4149	**	0.0886	0.1364	**	0.0231	0.3684	**	0.0285
Mining firm	-0.1456		0.0897	-0.0056	0.2382	0.3214	**	0.0768	0.3631	**	0.0916	
Oil and gas firm	-0.2019	**	0.0620	-0.1266	0.2007	-0.1265	**	0.0395	0.1627	**	0.0520	
State enforcement action (1 year lag)	0.2664	**	0.0253	1.0812	**	0.0619	0.4862	**	0.0252	0.7538	**	0.0218
Federal enforcement action (1 year lag)	0.4663	**	0.0679	0.7375	**	0.0687	0.5631	**	0.0683	-0.1499	**	0.0253
Intercept	0.5563	**	0.1446	-4.0295	**	0.3165	1.6624	**	0.0845	0.1587	0.5526	
Log-likelihood	-48,435.13			-12,011.807			-10,6091.38			-64,353.61		
Cases	241,016			241,016			241,016			241,016		

Note: Cubic splines and EPA dummy variables not shown. *p < 0.05, **p < 0.01, two-tailed tests.

Notes

1. Until the CPI/NPR study, the contents of the watch list had not been made public. In response to this report, the EPA has since published a monthly update of the watch list on its website, although the specific criteria that lead to the inclusion or exclusion on the list are not made public (available at: http://www.epa-echo.gov/echo/echo_watch_list.html).

2. These differences are based on 2010 census data, measured at the ZIP code level.

3. The model also includes a spell-identification counter and three cubic spline variables (included to account for duration dependence) and an error term that allows for correlation of errors at the facility level.

4. More formally, we estimate the following model: $Eit = \beta_0 + \beta_1 EJit + \beta_2 Policyt + \beta_3 EJit * Policyt + \beta_4 Controlsit + \beta_5 Splinesit + \epsilon_{it}$, where i indexes facilities and t indexes years; E is a measure of EPA or state regulatory enforcement of the CAA; EJ is a vector of demographic characteristics that identifies environmental justice communities; $Policy$ is an indicator variable capturing the period before and after the environmental justice policies were put in place; $Controls$ is a vector of k control variables to capture other correlates of regulatory enforcement outcomes; $Splines$ is a vector that includes a spell-identification counter, as well as three cubic spline variables (included to account for duration dependence); and ϵ is an error term that allows for correlation of errors at the facility level. The effect of the policy intervention is given by the following partial derivative: $\partial Eit / \partial Policyt = \beta_1 + \beta_3 EJit$.

5. We elected to focus on currently active major air sources because of the availability of geospatial information that enables us to precisely locate them in geographical space. Geospatial data, however, are consistently available only for major air sources that are currently active, so we restricted the data to these facilities. We also make the assumption that these facilities were active for the entire period of study, which is a necessary assumption because the EPA does not track the historical operation status (active or inactive) of regulated entities.

6. Because of missing data in some decennial Census years, the number of facilities included in the analysis varies by a small number in the 1990, 2000, and 2010 information.

7. Most studies in the environmental justice literature use Census units such as counties, ZIP codes, or tracts to develop demographic measures of the relevant community, but there are two well-known problems with this approach. First, demographic characteristics may not be uniformly distributed among the population of the Census unit, a particular problem for geographically larger units. This assumption is maintained with the areal apportionment method, but it is less problematic because Census tracts are relatively small geographical units. Second, the relevant population may extend to adjacent Census units, especially when a facility is located on the border of another unit.

8. Specifically, we separately intersect a geospatial map of the major air sources with a geospatial map of U.S. Census tracts. Using a predefined distance of 1 mile to indicate the potentially affected population, we create a 1-mile radius around each facility as a buffer and intersect the maps to merge spatial data from the circular buffer with that from the Census maps. The intersections are then used

as weights for each demographic attribute, where the weight is the proportion of each Census unit contained within the circular buffers. We then create a weighted average of the relevant demographic data to create a measure for each variable of interest within 1-mile of the facility (i.e., percent African Americans, percent Hispanic, percent poor, percent with at least a high school education, and median household income). In a small number of cases, the demographic data from the Census was missing for some Census tracts; in these cases, we imputed a value based on the average of the other intersected units.

9. We also repeated all of our analysis using different distances (specifically, half-mile and 2-mile radii) to define the neighborhood around facilities. The half-mile analysis yielded substantively nearly identical results (the interaction with African-American communities is null for the state punitive action model). The 2-mile analysis generated two additional differences. With the expanded 2-mile radii, we also find that the estimated effect for the policy in poor communities with respect to state inspections is now null, and that the previously estimated null effect for the policy in African-American communities is now statistically significant for state punitive actions.

10. Other researchers have used a less-restrictive threshold based on the top quartile of an area (e.g., Lavelle and Coyle 1992; Ringquist 1998). In work not reported here, we conducted an analysis using this alternative threshold, with substantively similar results.

11. The thresholds for our other areal boundaries (half-mile and 2-mile) were 40 percent, 32 percent, and 28 percent, and 37 percent, 30 percent, and 25 percent for African-American, Hispanic, and poor communities, respectively. For the half-mile boundary, within these communities, the population demographic statistics for each targeted group were mean = 60 percent and standard deviation (s.d.) = 16 percent; mean = 54 and s.d. = 17 percent; and mean = 36 percent and s.d. = 8 percent, respectively. For the 2-mile boundary, within these communities, the population demographic statistics for each targeted group were mean = 54 percent and s.d. = 14 percent; mean = 50 percent and s.d. = 16 percent; mean = 31 percent and s.d. = 5.5 percent, respectively.

12. We also coded the intervention variable split on 1994, which produced similar findings. In addition, we considered a balanced policy window where we limited our analysis to the pre-reform era (1990–1994) and the post-reform era (1995–1999). This truncated data set (1990–1999) yielded similar findings to those reported in this chapter.

13. For each of the models, log-likelihood tests support the necessity of including cubic splines for each of the dependent variables to account for time dependence between observations for a given individual firm. These tests suggest negative duration dependence for each dependent variable, with the hazard rate of either an inspection or a punitive action declining in its duration.

14. A few of our estimated effects for our control variables are not in line with expectations from the literature. Democratic control of either the governor's office or the state legislature and the ideological liberalism of state government is generally thought to increase the probability of firm inspection and punishment—but in a few instances, we have found the opposite. The effect of a Democratic governor is the most consistent of these unexpected findings.

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