



Analysis

Reducing Toxic Chemical Pollution in Response to Multiple Information Signals: The 33/50 Voluntary Program and Toxicity Disclosures



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ABSTRACT

We study firms' responses to two US Environmental Protection Agency (EPA) information-based interventions. First, the EPA disclosed toxicity information on the chemicals listed in the Toxics Release Inventory (TRI). Second, it grouped 17 of the TRI chemicals in the 33/50 voluntary program and challenged firms participating in this program to aggressively reduce their aggregate emissions. Firms therefore faced “twin” signals: focus on the most toxic chemicals, and focus on 33/50 targeted chemicals.

We use a novel set of instruments to estimate the causal effects of these twin signals on chemical releases of U.S. manufacturing firms during the life of the 33/50 program (1991–1995), and after the program ended (1996–2013). We examine both “raw” emissions (in pounds) and “weighted” emissions (weighted by toxicity scores) of both 33/50-targeted and non-targeted chemicals. We find that 33/50 program participants reduced weighted emissions of 33/50-targeted chemicals only, with no effects on “raw” emissions or non-targeted chemicals. We also find that these reductions persisted after the program ended in 1995. These results suggest that firms are not unconditional greenwashers or environmental stewards. Rather, firms strategically invest resources to pursue environmental stewardship while taking into account multiple signals from their key stakeholders such as the EPA.

1. Introduction

Governments deploy many different policy instruments to address pollution problems. They enact mandatory laws requiring firms not to exceed pollution thresholds and/or adopt specific pollution abatement technologies. Among the non-mandatory measures, governments establish mechanisms so that stakeholders and firms can access information on say toxicity levels of regulated chemicals. Sometimes regulators group a subset of regulated chemicals in a voluntary environmental program (VEP) in order to focus firm and stakeholder attention on them. In this paper we explore how firms respond to the twin information signals from regulators: providing toxicity information on *all* regulated chemicals and the grouping a *subset* these pollutants in a voluntary challenge program.

The US Environmental Protection Agency (EPA) established the Toxics Release Inventory program (TRI) in 1987 under the Emergency Planning and Community Right-to-Know Act. Under TRI, manufacturing companies (SIC codes 20–39; please see [Table A.1](#) in Appendix A) are required to annually report facility-wise environmental

releases and transfers of specified chemicals that are associated with health and environmental damage. These reports are available to public in an online, easy to access database. Because TRI chemicals vary in their toxicity levels, the EPA also provides toxicity information on all TRI chemicals. Consequently, firms and their stakeholders can assess the public health and environmental implications of TRI releases after taking into account the varying toxicities of TRI chemicals.

The EPA employed another information-based tool to focus firm and stakeholder attention on a subset of highly-toxic chemicals. Within TRI, it grouped 17 chemicals in a voluntary program called 33/50 (please see [Table A.2](#) in Appendix A). Launched in 1991 and discontinued in 1995, firms participating in 33/50 pledged to reduce the discharges of 17 highly-toxic chemicals (also listed under the TRI), aiming for a 33% reduction by the end of 1992 and a 50% reduction by the end of 1995 (USEPA, 1992, 1997).¹ Interestingly, the targets established by the 33/50 program pertained to the raw emissions only, thereby treating all the 17 chemicals alike and perfectly substitutable for fulfilling pollution reduction targets. Because 33/50 participants were privy to another piece of information: toxicity information, we speculate that these firms

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¹ In some cases, only a subset of facilities within a firm participated in TRI.

recognized that the 17 targeted chemicals varied in their toxicity levels. If so, this information should have encouraged firms to focus on the more toxic among the 17 targeted chemicals fulfilling their pollution reduction commitments.

To explore how the twin signals of toxicity information and 33/50 grouping influence participants' environmental performance, we pose three questions. First, compared to non-participants, did 33/50 participants reduce the emissions/discharges of the 17 targeted chemicals during the life of the program (1991–1995)? Second, did these emission reductions continue once the program ended (1996–2013)? Third, within the 17 targeted chemicals, did 33/50 participants focus their pollution reduction efforts towards the more toxic ones?

Empirically, we examine a panel of approximately 17,000 manufacturing firms² listed under SIC codes 20–39. We use a novel set of instruments to estimate the causal effects of these twin signals on chemical releases during the life of the 33/50 program (1991–1995), and after the program ended (1996–2013). We examine both “raw” emissions (in pounds) and “weighted” emissions (weighted by RSEI toxicity weights) of both 33/50 targeted-chemicals and non-targeted chemicals. We find that firms responded to the overlap between these “twin” signals: 33/50 program participants reduced weighted emissions of 33/50-targeted chemicals only, with no effects on “raw” emissions or non-33/50 chemicals. We also find that these reductions persisted after the program ended in 1995. These results suggest that, instead of unconditional greenwashers or environmental stewards, firms should be viewed as strategically investing resources to pursue environmental stewardship while taking into account multiple signals from their key stakeholders such as the EPA.

The paper is organized in six sections. In section two, we review the literature on information-based regulation, commensuration and voluntary regulation. In the third section, we describe the 33/50 program, discuss why firms join 33/50 and how 33/50 participation correlates with environmental performance. The fourth section outlines the model, variables, and empirical methods. We present our results in section five and discuss in section six. We conclude in section seven.

2. The Regulatory Tool Kit for Pollution Reduction

Information-based approaches are predicated on the idea that stakeholders are not able to reward or punish firms for their environmental performance because they lack reliable information about how and what types of pollutants firms discharge (Kraft et al., 2011). If information-based regulations can encourage or compel the firm to provide this information, stakeholders will be able to perform their naming and shaming functions more effectively. At the same time, such information can make managers and internal stakeholders more aware of the impact of their activities on the environment and human health. This can create internal pressures within firms to reduce pollution (Howard-Grenville, 2006).

The EPA has leveraged information-based approaches in several ways. Given that regulated chemicals vary in their toxicities, it developed the Integrated Risk Information System (IRIS), and made it publicly available in 1988 (USEPA 2016). The policy impact of such toxicity information is amplified by the TRI program started in 1987 that compelled manufacturing companies (SIC codes 20–39) to annually report facility-wise environmental releases and transfers of specified chemicals. Environmental groups employed toxicity data to rank TRI chemicals by their levels of toxicities and began naming and shaming facilities at the county and state level based on the “dirtiness” of their operations (Bryner, 2001).

The EPA has also pioneered the use of another information-based

intervention: voluntary environmental programs (VEPs).³ The core idea is to motivate firms to voluntarily reduce pollution beyond the mandatory legal requirements (Zatz and Harbour, 1999). In return, firms get reputational benefits of associating with the voluntary program, a point noted in the cross-disciplinary literature on this subject. Outside stakeholders can use the membership in a VEP to differentiate environmental stewards from non-stewards (King et al., 2005; Singh et al., 2015). This VEP branding can allow firms to corner reputational as well as more tangible benefits as a reward for incurring the extra costs of environmental stewardship (Prakash and Potoski, 2006). Arora and Gangopadhyay (1995) find that firms participate in VEPs to secure consumer goodwill predicated on the belief that consumers will favor companies that are more “green,” or at least mitigate the risk of consumer boycott (Innes, 2006). It can protect a firm from pro-environmental activists that would otherwise tarnish the firm's brand and reputation (McDonnell, 2015). VEP participation can also preempt more stringent laws by reducing the “demand” for government's regulatory intervention (Maxwell et al., 2000).

Are VEPs effective? For a review of this voluminous literature, see Koehler (2007), Morgenstern and Pizer (2007), Borck and Coglianese (2009), and Prakash and Potoski (2012). Empirical research to date has shown the efficacy of voluntary programs to be uneven (Darnall and Kim, 2012; De Leon and Rivera, 2009; Morgenstern and Pizer, 2007). Firms participating in the chemical industry's Responsible Care program (King and Lenox, 2000) and the U.S. Department of Energy's Climate Wise program (Welch et al., 2000) appear to have done little to protect the environment beyond what they would have done had they not joined those programs. Conversely, firms that joined the Environmental Protection Agency's (EPA) 35/50 voluntary program reduced their emissions of toxic pollutants more than those that did not (Khanna & Damon, 1999). While Potoski and Prakash (2005) and Russo (2009) finds that joining ISO 14001 reduced firms' pollution emissions, Andrews et al. (2003) provides some evidence that ISO 14001 did not affect firms' environmental performance.

Given this mixed track record, how might we explain the varying efficacy of voluntary programs? One argument is that programs that specify outcomes allow stakeholders to monitor and assess participants' environmental records. In contrast, programs that outline internal policies and systems that firms need to adopt make it difficult for outside participants to assess performance because they have no yardstick with which to assess the participants' performance. But even within programs that specify internal systems, there are two variants. Some programs explicitly incorporate mechanisms to detect and punish non-compliance (Ostrom, 1990). Indeed, there is some work on this debate in the context of voluntary environmental programs. King and Lenox (2000) and more recently, Gamper-Rabindran and Finger (2013), attribute the inefficacy of the Chemical Industry's Responsible Care CSR program to its design, which did not provide adequate monitoring and sanctioning. In 2005, Responsible Care modified its institutional design and introduced third-party monitoring to curb shirking. In a recent paper, Vidovic et al. (2013) report that once the monitoring mechanisms were introduced, participants' behaviors changed significantly: Participants began to pollute less than nonparticipants.

The importance of third-party monitoring in curbing shirking is also highlighted by Potoski and Prakash (2005) who report that ISO 14001, a voluntary program that imposes obligations that are similar to the ones imposed by Responsible Care but provides for enforcement via third-party audits, leads to improvements in participating firms' environmental performance. 33/50 is an interesting case in this regard because it outlines specific outcomes that participating firms agree to

³ Coglianese and Nash (2014) study of the Performance Track is instructive on this count. They find that unlike the assertions made by the EPA, facilities participating in Performance Track were not the top environmental performers. These facilities, however, excelled in outreach with government and community groups. For them, Performance Track attracted extroverts, not environmental leaders.

² While the TRI data are available at the facility level, we aggregate it to the firm-level for the purpose of our analysis.

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