

Free riding in voluntary environmental programs: The case of the U.S. EPA WasteWise program

MAGALI DELMAS & ARTURO KELLER

¹*Donald Bren School of Environmental Science & Management, University of California, Santa Barbara, CA 93101-5131; E-mail: delmas@bren.ucsb.edu; keller@bren.ucsb.edu*

Abstract. Voluntary Environmental Programs (VPs) involving industry and regulatory agencies have emerged as the promise of the future in environmental policy circles. Although the number of these agreements is increasing in OECD countries, there are still concerns about their effectiveness; in particular that “free-riding” behavior may be difficult to avoid within VPs. Free riding occurs when one firm benefits from the actions of another without sharing the costs. Free-riding behavior may undermine the credibility of VPs and therefore their viability. Our paper focuses on understanding the factors that favor or hamper free-riding behavior in VPs. Our analysis is based on the case of the WasteWise program that was established by the U.S. Environmental Protection Agency to reduce municipal solid waste.

Introduction

Voluntary Environmental Programs (VPs) are collaborative arrangements between firms and regulators (or other third parties) in which firms voluntarily commit to actions that improve the natural environment (Delmas and Terlaak, 2001). VPs are designed to associate private benefits with the voluntary provision of public goods. Participation in VPs, for example, can reduce the burden of regulation on firms. It can also facilitate the communication of environmental improvements and allow firms to get ahead of their competition for environmental products. These voluntary programs are increasingly popular as supplements and sometimes replacements for traditional command-and-control regulation. There are more than 300 VPs in place in the European Union (Börkey and Leveque, 1998), and Darnall and Carmin (this issue) identified more than 200 VPs operating in the United States.

However, some scholars are expressing reservations about the actual effectiveness of such programs (Harrison, 1999; King and Lenox, 2000; Rivera and deLeon, 2004). In particular, there are still concerns that some of the organizations that have voluntarily joined a voluntary program may decide to “free ride”: to benefit from the actions of others without sharing the cost of the cooperation. Since most voluntary programs lack explicit sanctions to punish free riders, can voluntary programs effectively encourage collaboration? In this paper we look at the incentives for organizations to fulfill the requirements of voluntary environmental programs when free riding is not sanctioned.

As Olson pointed out, some firms may willingly provide public goods when they receive sufficient benefit from doing so; therefore, they choose to participate regardless of how other firms respond to this action (Olson, 1965). In the case of environmental voluntary agreements, the specific nature of these benefits is open to empirical investigation. In this paper, we analyze how the initial motivations of organizations to enter

a voluntary program affect the probability of free-riding behavior. We differentiate between motivations related to the enhancement of the environmental reputation of the organization to various stakeholders, and motivations related to cost reduction and learning about environmental technologies.

In addition, the characteristics of organizations may affect their likelihood of adopting a participative behavior in voluntary agreements. We also analyze whether specific characteristics of organizations impact free-riding behavior, such as the resources that organizations devote to environmental management, and the level of support from upper management to the voluntary program. We use the case of the U.S. Environmental Protection Agency's (EPA's) WasteWise program to illustrate our framework. This program was established by the EPA to reduce municipal solid waste.

In both its analysis and empirical domain, this research extends the existing literature on voluntary agreements and on collective action. Most research on VPs has attempted to define and categorize VPs, and to understand organizations' incentives to enter such programs (Delmas and Terlaak, 2002, 2001; Orts and Deketelaere, 2001; Arora and Cason, 1996). However, little has been written about whether firms participating in these programs actually meet the requirements of the programs. Furthermore, this literature rarely investigates the link between the motivations to join a specific program and free-riding behavior. Research on collective action also lacks empirical evidence of the link between private incentives and the provision of public goods in this context.

We describe the WasteWise program in the section below. We then develop our framework concerning the incentives for compliance in a voluntary program and propose testable hypotheses. The third section explains the survey method and the results. A concluding discussion follows.

The EPA WasteWise program

The WasteWise program is a voluntary program created by the EPA in 1994 to promote waste reduction in businesses and other organizations. WasteWise encourages participants to design their own waste reduction and recycling programs, and to use emerging technologies in the manufacturing and design process of materials. In 2004, the WasteWise program included 1,429 organizations from the private and public sectors.

Technical assistance and public recognition

The WasteWise program offers free technical assistance to partners through an EPA contractor. The WasteWise internal website is also a place where partners can network and find out what other organizations similar to their own are doing with respect to solid waste management.¹ The EPA also provides partners with a variety of waste reduction publications describing tips for waste reduction. An annual progress report is distributed to inform partners of current events in WasteWise and to share any partner success stories about waste prevention.

Partners gain public recognition of their waste reduction efforts through EPA publications, case studies, and award ceremonies at national and regional events. The awards are given to partners based on their accomplishments in the tonnage of waste reduced, associated cost savings, and innovation. Innovative WasteWise partners are recognized through publicized case studies, which are included in WasteWise workshops and publications, and in trade journals. Partners can also meet with EPA officials to share their accomplishments by attending national and regional forums. In addition, there are regional forums and partner network meetings held in cities across the United States. The partners can also publicize their WasteWise membership, regardless of whether they report their achievements.

Reporting

There is no fee associated with joining the program but WasteWise partners have the responsibility to (i) register, (ii) set their waste reduction goals, and (iii) report their results. Partners have therefore to complete three forms: the registration form, the goal identification form and the annual reporting form. The registration form documents the partner's desire to participate in the WasteWise Program, identifies a point of contact and a description of the participating facilities. The goal identification form indicates the partner's specific goals in the areas of waste prevention, recycling, and purchasing or manufacturing of recycled content products. The annual reporting form describes the partner's progress in achieving its stated goals.

Reporting to WasteWise is expected but there is no sanction associated with non-reporting. Therefore, some organizations may elect not to report. For example, only approximately 150 WasteWise partners (~20%) reported their results to the EPA in 1999. In this paper we examine factors that may explain this low reporting rate.

Free riding in voluntary programs

According to the collective action literature, when a program is voluntary, it is unlikely that an organization will join it absent of potential private benefits associated with participation (Olson, 1965). Olson demonstrates that when large groups of workers organize, or when we see large professional or business organizations, we must look for the source of the membership in something other than the collective or public good that is at issue. The motivation for membership may be coercion or a positive selective incentive. But once an organization joins a VP, it can still free ride if there is no sanction associated with free riding. While Olson looked at the private incentives to form groups, we analyze the private incentives that motivate organizations to work toward the goal of a program once they have made the voluntary decision to participate in the program.

We argue that collaborative behavior in complying with the objectives of the VP is related to the specific private benefits that organizations hope to receive from their participation. We also point out that the fulfillment of the program's obligations will vary with an organization's resources, the commitment of its upper management and the characteristics of the program. Fulfillment of the requirements of the program in

this case means the disclosure of information about environmental performance (in other words, reporting).

Organizations' motivations to enter a voluntary program

The literature describes several motivations for firms to participate in voluntary programs. VPs can provide consumer recognition. They can help firms exploit a market for environmentally friendly products or generate firm-specific public goodwill (Arora and Gangopadhyay, 1995). Furthermore, the collaborative structure of VPs may be conducive to the development of new environmental competencies (Delmas and Terlaak, 2001). Alternatively, firms can enter voluntary programs to avoid more costly government policies that might be imposed. If the threatened government policy is a regulation with limited flexibility, firms can benefit from the increased flexibility that might accompany voluntary programs (Dawson and Segerson, 2003).

In the case of WasteWise, we argue that if reporting can directly benefit the organization, then the organization will be more likely to report. More specifically, if reporting allows the organization to fulfill the objective that motivated it to sign up for the program, then the organization will be more likely to report. For example, if the organization's objective in joining a VP is to enhance its relations with the regulatory agency, it will need to report its performance to the agency in order to show its good behavior. Indeed, because the regulatory agency is in direct contact with participating organizations, it will be able to monitor their reporting behavior and to spot free riders. Likewise, if the organization is trying to learn waste management techniques, the better the quality of the information exchanged with other firms and with regulatory agencies, the more likely it will learn about the waste techniques options available for its particular case.

On the other hand, if the organization had no specific individual motivation in entering the program but decided to participate because there was no cost associated with participation, it is unlikely that this organization will incur the additional cost of reporting their performance. We summarize the impact of the motivations for joining a voluntary program on the likelihood to comply with the program as follows:

H1: The more reporting helps the organization reach the objective(s) that motivated it to join the program, the more likely the organization will voluntarily disclose information on environmental performance.

Cost of compliance

There are at least two types of costs linked to reporting environmental performance. Information on low environmental performance disclosed through a VP may have a negative impact on financial performance (Arora, 2000). Indeed, there is a potentially negative impact of the information disclosed about low environmental performance on the reputation of the organization. In addition, it is costly to produce the information necessary for disclosure. Organizations have to put into place the administrative structure that will generate and process the information to be disclosed.

The potential cost to an organization's reputation will also vary according to the nature of the information (i.e., good news or bad news). For example, organizations that are performing below regulatory standards may well incur the costs of responding to enforcement measures.

The cost of producing the information to be disclosed will also depend on whether the information is readily available within the organization or whether the organization has to establish the administrative procedures to access the information. Firms that have already been part of waste reduction programs should have the information readily available and their cost should be lower than organizations that do not. Organizations that have already been involved in waste management reduction strategies should therefore be better off than organizations that are just starting to reduce their waste output. That is to say "greener" organizations will be more likely to disclose their positive results. We summarize our hypothesis on the cost of reporting as follows:

H2. The more experienced the organization with respect to pollution reduction programs, the more likely it will voluntarily disclose information about its environmental performance.

Upper management involvement

We argue that the support of the upper management to the WasteWise program impacts reporting behavior. More specifically, organizations where decisions about environmental issues are made at the level of the chief executive officer (CEO) or president should be more likely to report their progress than organizations where decisions are made at the operational level. The costs of reaching a decision on information disclosure will most likely be lower if there is direct access to the upper management level than if the decision is taken at the operational level and has to go to the top without prior commitment from the CEO or the president of the organization. Therefore the greater the support of upper management, the more likely the organization will voluntarily disclose information on waste reduction.

H3. The more the support of the upper management to the voluntary program the more likely the organization will voluntarily disclose information about its environmental performance.

Rules of the cooperative game

Collaborative behavior is a dynamic process that varies according to what organizations learn about the behavior of other organizations participating in the program. In the early days of a voluntary program, when there is uncertainty about the rules of the game (e.g., when organizations do not know whether the rules will be enforced), organizations may adopt a safe strategy by complying with the terms of the agreement (e.g., reporting) to avoid being excluded from the agreement.² This is especially true if the organization has previously been dealing with the regulatory agency as an enforcement agency, since the organization is likely to follow established behavior patterns,

and may assume that the agency will impose sanctions. However, if organizations realize over time that there is lax enforcement or no penalty for not complying with the VP (e.g., not reporting), they may be less willing to comply. An individual organization might also be looking at the contribution of other organizations to calculate the potential returns from its participation. New entrants might quickly learn the implicit “rules of the game,” and benefit from participation without reporting. The initial entrants can decide to stop reporting or to follow their established routine of complying with the agreement. As the number of free riders in the collaboration increases, the incentives to disclose information are diminished. In sum, organizations will adapt their behavior to the rules of the cooperative game over time. Once it becomes known that there is lax monitoring and enforcement, it is less likely that information will be disclosed. With the increase in the number of members, organizations may also believe that there will be less monitoring and therefore fewer sanctions associated with free riding (Olson, 1965). We summarize our hypothesis on the rules of the cooperative game as follows:

H4. Without sanctions for free-riding behavior, later entrants in the program are more likely to free ride than early entrants.

To summarize, our analytical framework considers that an organization is more likely to report its environmental performance within a program if reporting will further the organization’s objective in joining the program. An organization is also more likely to report if the organization has previous waste management experience, and if the decision to join the program was taken at the upper management level. However, the importance of these factors will vary with the time of entry of the organization into the program.

Research method

To test our hypotheses, we sent a questionnaire to the organizations participating in WasteWise, asking them about their motivations to join the program and the characteristics of their organization. From the questionnaire, we derived information about their information disclosure (reporting), their motivations to join the program, their experience with environmental management, and the involvement of the upper management in the decision to join WasteWise. A copy of the survey is available in Delmas et al. (2000).

Sample

On December 10, 1999, the EPA WasteWise program provided us with a list of all 947 companies and organizations participating in the program.³ The survey was sent on December 18, 1999. We received completed surveys from 106 members (11.2%). This relatively low response rate can be explained in part due to limited resources that did not allow us to send a second wave of questionnaires to potential respondents. We discuss below how the distribution of the respondents on various

important characteristics reflects the distribution of the population of WasteWise participants.⁴

The geographical distribution of respondents closely mirrored the distribution of all WasteWise members (based on 1997 EPA data) indicating a reasonably representative geographical sample.⁵ In terms of the number of employees, our sample was representative of the total population of WasteWise partners except for organizations over 5,000 employees. Although only 16% of all WasteWise members have over 5,000 employees, this group accounted for 32% of the responses. The comparison of response rates for members indicates that smaller organizations tended to respond less to our survey than larger organizations. The percentage of for-profit versus non-profit organizations in our sample was also similar to the total population.⁶ In our sample, we had 64 organizations that currently disclose information to the EPA on their waste management performance out of 106 respondents. There is therefore an overpopulation of reporting organizations in our sample. We interpret this as a reflection of the likelihood that organizations that report to WasteWise are more prone to respond to a survey on WasteWise. This is a common feature of survey questionnaires that ask respondents about performance issues.

In order to assess whether respondents were honest in their response about reporting we checked the original EPA database containing information about reporters and non-reporters. We found only one case where the firm said in our survey that it was reporting when it was not checked as such in the original EPA database. In our sample, we have a balanced distribution in our respondents between reporters and non-reporters to assess the difference between the two groups. We feel therefore confident that the data from our survey questionnaire is adequate to answer our research questions.

Variable definition and operationalization

Information disclosure

Our dependent variable is information disclosure. We asked participating organizations whether they were currently completing the annual reporting form for WasteWise. We created a dummy variable with 0 for organizations not completing the form and 1 for organizations completing the form.

Motivations to join the program

In the questionnaire, organizations were asked to indicate how important several issues were in making their decision to join WasteWise. The question was: "Indicate how important the following issues were in deciding to join WasteWise." The list of issues included: employee environmental interests, cost savings, learning waste reduction techniques, promoting relations with the EPA, promoting company waste reduction to the public, improving community relations, and free participation. Participants could respond on a four-point scale from not important to very important for all of these answers. Because of the significant correlations between some these variables, we conducted a principal component analysis on all these variables, which resulted in four factors explaining 77.7% of the variance. The first factor represents promotion of waste reduction to internal and community

stakeholders. It includes the variables representing “improve community relations,” “employee environmental interests,” and “promote company waste reduction goals.” The second factor includes the variable representing “cost savings.” The third one includes variables representing “learn waste reduction techniques” and “promote relations with EPA.” The fourth factor includes the variable representing the fact that the organization joined the program because there was no cost associated with participation.

Experience with environmental management

Firms that have been involved in waste-reduction programs or that have an Environmental Management System (EMS) in place are more likely to be “greener” and to benefit from reporting, as opposed to organizations that are just starting to pay attention to waste management issues. The first variable in this category represents whether, prior to their entry in the program, organizations had an EMS in place. This is a dichotomous variable. The second variable represents participation in a waste reduction program at the local, regional and state levels, prior to joining the WasteWise program.

Support of the upper management

If the upper management of the organization supports participation in the WasteWise program, the organization will be more likely to report, as participating in the program is dealt with at the strategic level of the company. We asked organizations to indicate the level of support from the CEO/president that the WasteWise program receives in their organization. The ranking was from unaware to supportive on a four-point scale.

Date of entry in the program

We hypothesize that there is a learning curve at the program level. Early entrants will be more likely to disclose information because there is some uncertainty concerning the rules of the game. These organizations assume that the rules will be enforced. The behavior of later entrants may differ as there is more certainty concerning the enforcement rules. If enforcement of reporting is lax, then later recruits may report less than early entrants. Evidence of lax enforcement in the WasteWise program is supported by the fact that no non-reporting member had been dropped from the program at the time of our study. We introduced dummy variables representing the year of entry of the organization in the program.

Geographical location

WasteWise is managed from the EPA’s headquarters in Washington, D.C. Organizations that are closer to this headquarters may have more contact with EPA officials and therefore managers may feel more pressure from the EPA to report their organization’s performance. We introduced dummy variables which represent the region where the organization is located (Northeast, Southeast, Midwest and West).

Controls

The type of sector in which the organization participates may also impact the willingness and ability of the organization to disclose information. We introduced a variable representing the sector to which the organization belongs. This variable includes three categories: manufacturing industries, service-oriented industries, and the non-profit sector. Also, larger organizations may have more resources to allocate to the reporting process. We therefore introduced the number of employees of the organization as a control variable.

Table 1 presents the summary statistics and correlations.

Results

The effect of the explanatory variables on information disclosure was tested by specifying a regression where the dependent variable is information disclosure (with Yes: 1 and No: 0). A Probit regression model was used since the dependent variable is dichotomous. The regression included all the observations in our sample and all our independent variables.

The results of our regressions are presented in Table 2. Model 1 is the full model that includes all the variables. In Models 2, 3, and 4, we remove the variables that are significantly correlated in order to check whether their inclusion changes the overall significance of the model. These variables are “joining date,” “EMS,” and “number of employees.” The exclusion of these variables did not change the significance of the variables included in the model. Overall, our model has a good explanatory power since the sum of predicted variables represents 81.25% of observed values in the full model.

Concerning the variables representing organizations’ motivations to enter WasteWise, two out of four are good predictors of organizations’ willingness to disclose information. The first significant variable concerns relations with the EPA, which indicates that organizations that said they joined the program to promote relations with the EPA and learn about waste techniques were more likely to report their progress to the WasteWise program (0.495; $p < 0.05$). Organizations know that the EPA is aware of those organizations that do report and those that do not, and therefore reporting can be seen as a means to increase the organization’s reputation with the EPA. The second significant variable is free participation, which exhibits a negative and significant coefficient, indicating that if organizations said they joined the program because “participation was free,” these organizations were less likely to report (-0.494 , $p < 0.05$).

In contrast, the aggregate variable representing waste promotion to internal and community stakeholders is not significant. This may be explained in part by the fact that although being part of WasteWise can be freely advertised to the local community, it is hard for community members to check whether the organization is reporting information or not. The WasteWise program may also not be known to the community.

The year of entry in the program also explains reporting behavior. We found important differences between organizations that entered the program early on, and

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	1	2	3	4	5	6	7	8	9	10	11
1. Environmental reporting	102	0.61	0.49	0.00	1.00	1.00										
2. Motivation: public relations	106	0.00	1.00	-2.33	2.11	-0.08	1.00									
3. Motivation: cost savings	106	0.00	1.00	-2.27	1.76	0.10	0.01	1.00								
4. Motivations: relations with EPA	106	0.00	1.00	-2.24	1.79	0.26	-0.04	0.02	1.00							
5. Motivation: participation is free	106	0.00	1.00	-1.99	2.24	-0.30	-0.03	-0.01	-0.01	1.00						
6. EMS	103	0.49	0.50	0.00	1.00	0.24	-0.03	0.14	0.13	-0.32	1.00					
7. Waste program	106	0.91	1.13	0.00	3.00	-0.15	0.17	0.15	0.13	-0.02	0.20	1.00				
8. Upper management support	106	3.12	1.12	1.00	4.00	0.24	0.17	0.15	0.04	0.00	0.15	0.03	1.00			
9. Wastewise joining date	104	1996.43	1.84	1994.00	1999.00	-0.35	0.12	-0.12	-0.12	0.44	-0.53	-0.12	-0.08	1.00		
10. Regions	106	2.60	1.16	1.00	4.00	-0.19	0.17	-0.12	-0.11	0.01	-0.26	-0.11	-0.08	0.23	1.00	
11. Number of employees	106	2.59	1.15	1.00	4.00	0.29	-0.13	0.22	0.17	-0.30	0.46	0.10	-0.10	-0.47	-0.29	1.00
12. Industry category	105	1.87	0.81	1.00	3.00	-0.06	0.15	-0.08	0.07	0.25	-0.38	0.01	-0.02	0.34	0.15	-0.17

Table 2. Regression results

	(1)	(2)	(3)	(4)
Motivation: public relations	0.062 (0.183)	0.054 (0.183)	0.060 (0.159)	0.042 (0.179)
Motivations: cost savings	0.030 (0.189)	0.024 (0.189)	0.083 (0.172)	0.096 (0.179)
Motivation: relations with EPA	0.495 (0.198)*	0.481 (0.195)*	0.387 (0.167)*	0.510 (0.193)**
Motivation: participation is free	-0.494 (0.217)*	-0.485 (0.216)*	-0.503 (0.186)**	-0.542 (0.217)*
EMS	-0.226 (0.478)		0.321 (0.394)	-0.057 (0.461)
Waste program	-0.381 (0.159)*	-0.390 (0.158)*	-0.367 (0.146)*	-0.384 (0.158)*
Upper management support	0.424 (0.164)**	0.407 (0.159)*	0.345 (0.140)*	0.381 (0.159)*
Joining date 1995	-0.335 (0.703)	-0.328 (0.695)		-0.523 (0.669)
Joining date 1996	0.988 (0.813)	0.949 (0.813)		0.837 (0.797)
Joining date 1997	0.042 (0.567)	0.107 (0.550)		-0.153 (0.543)
Joining date 1998	-0.308 (0.538)	-0.274 (0.531)		-0.496 (0.515)
Joining date 1999	-2.030 (0.883)*	-1.873 (0.815)*		-2.099 (0.880)*
Region South East	-1.113 (0.624) ⁺	-1.132 (0.612) ⁺	-1.072 (0.551) ⁺	-1.159 (0.619) ⁺
Region Midwest	-0.783 (0.564)	-0.785 (0.564)	-0.791 (0.504)	-0.751 (0.553)
Region West	-1.091 (0.566) ⁺	-1.080 (0.561) ⁺	-0.840 (0.494) ⁺	-1.165 (0.557)*
Number of employees	0.232 (0.189)	0.206 (0.180)	0.172 (0.162)	
SIC Services	-0.051 (0.449)	0.025 (0.421)	0.219 (0.389)	-0.033 (0.447)
SIC non profit	-0.009 (0.507)	0.064 (0.483)	0.275 (0.428)	0.172 (0.483)
Constant	-0.465 (0.993)	-0.510 (0.990)	-0.634 (0.757)	0.303 (0.773)
Observations	96	96	96	96
Pseudo R-squared	0.37	0.37	0.28	0.36

Standard errors in parentheses, ⁺ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.

organizations that joined the program at the end of the period studied. Later entrants report less than early entrants. The lack of negative consequences for non-reporting in the first years of the program may have impacted the behavior of later entrants. This may be reinforced by the EPA's difficulty in monitoring a growing number of free riders. The lack of reporting of later entrants may also be explained by the fact that their motivations to join the program differed from those of the early entrants. Indeed, we find a significant and positive correlation between later entrants and motivation to enter the program because it is free.

The dummy variables representing the regional location of the organization are negative and significant for the Southeast and Western regions. However, the significances are only at the $p < 0.10$ level and this result should be taken with caution. The reference dummy is Northeast. This indicates that organizations closer geographically to the EPA headquarters in Washington, DC may be more likely to report than organizations located farther away – possibly because the probability of an EPA visit is higher, and possibly because the difference in time zones (particularly in the case of Western region organizations) makes it more difficult for the EPA or its contractor to communicate with the organization.

With regard to an organization's experience with environmental management, we do not find evidence that organizations with an EMS in place are more likely to disclose information about their environmental performance. This invalidates hypothesis 2. Although this may be a surprising result, there is at least one plausible explanation. Companies that have an EMS in place may have already accomplished waste reduction. They may have already picked the low-hanging fruit. The next level of waste reduction may be more difficult to achieve, and these organizations may not want to communicate low reduction targets.

Unexpectedly, when an organization is already working with local or regional programs to reduce waste it is less likely to report, as indicated by a negative and significant value for the variable representing the participation in waste reduction programs (-0.381 , $p < 0.05$). A possible explanation is that firms that are already engaged in voluntary programs learn about the rules of the games of these programs and if enforcement is lax they may adapt their behavior accordingly.

As expected, the variable representing upper management (CEO/president) support for WasteWise is also significant and has a positive sign (0.424 , $p < 0.01$).

The overall size of the organization measured by the number of employees does not affect reporting behavior. The dummy variables representing industry types (manufacturing, service, or non-profit) are not significant either, indicating that the type of industry or organization is not an important factor in terms of reporting.

Discussion

In the case of the EPA WasteWise program, our results show that reporting behavior varies with the motivations to join the program, the support of upper management, and the date of entry into the program. First, organizations that said they joined the program to promote their relations with the EPA and learn about waste techniques were more likely to report their progress to the WasteWise program. On the other hand, organizations that said they joined the program because it was free were less likely to report. This is an important finding as it confirms that the association of private benefits within a program may increase the provision of public goods. In such a case, the strategies of organizations to gain private benefits such as reputation become key to explain reporting behavior.

Second, organizations where the CEO/president actively supported the decision to join the program were also more likely to report. It is interesting to note that two organizations that appear to have the same objectives may adopt a different collaborative attitude depending on whether the CEO or president was involved in the decision to join WasteWise. This highlights the importance of individual decisions within organizations. In particular, the credibility of CEOs and presidents is at stake if they commit to a program but adopt free-rider behavior. This may be less the case if the decision to join WasteWise is taken at the operational level. Our findings on the importance of upper management as a predictor of collaborative environmental behavior fill a gap in the literature on voluntary programs. This literature tends to analyze organizations as a whole without investigating individual incentives within the organizations.

Third, reporting behavior varied significantly according to the date of entry into the program. Free riding was more likely with later entrants. Over time, organizations may learn about the behavior of other organizations and the rules of the game. Lax rules encourage free-riding behavior. Free riding may also be related to the increase in the number of organizations participating in the program over the time period considered. Olson showed that larger group size tends to discourage individual participation in several ways (Olson, 1965). In this case, the large group size means that non-participation involves little social cost, whereas in a small group, one would be risking social censure, and possibly retaliation. Our finding is therefore consistent with Olson's argument about participation and group size. The early entrants may also be the ones that are the most enthusiastic about and committed to the program. This may be why they joined early.

These results should be taken as suggestive rather than definitive since our conclusions are based on only one case study and on a small sample size due to a low response rate. It would be interesting to test our hypotheses with other voluntary agreements.

From a policy perspective, what can be done to increase collaborative behavior in VPs? Our research indicates that VPs must provide private benefits to participating organizations to encourage collaboration. The objectives for joining the program seem to be an important factor in determining reporting behavior. In particular we showed that firms aiming to improve their relationships with the EPA were more likely to report. Organizations could not achieve this objective without reporting. This calls for linking the potential private benefits to the action of firms. In our case, of the six objectives identified for joining the WasteWise program, four could be achieved without reporting.

We conclude that voluntary programs should make sure to involve upper management. If not, these VPs run the risk of being managed at an operational level within participating organizations without upper management commitment or access to the necessary resources to disclose information and actually improve performance.

Would the provision of private incentives be sufficient to reduce free riding? Olson also alludes to coercion as a means of compelling individuals to engage in collective action (Olson, 1965). In the case we studied, coercion was not part of the program. Two types of coercion could be envisaged. First, it seems that the likelihood of free-riding behavior could be reduced if there were mechanisms to monitor and publicize the compliance of participants. If an organization does not comply with the rules of the program (e.g., reporting) and non-compliance is detected and publicized, the reputation of that organization may be damaged. The program needs to be more transparent so that organizations that actually do not provide information about their environmental performance are spotted by stakeholders. If there were more transparency within the program about who is doing what, organizations that did join the program to improve their public relations with the community would need to report to get the benefit they are looking for. Some VPs employ self-reporting, where organizations collect, evaluate, and report data themselves (Delmas and Terlaak, 2001). Other VPs assign the monitoring responsibility to a third party such as a research or certification institute. For example, in the *German Agreement on Global Warming Prevention*, an independent research institute monitors industry's efforts to reduce

CO₂ emissions on a yearly basis (Federation of German Industries, 2000). Second, sanctioning mechanisms that penalize non-compliant organizations could complement monitoring mechanisms. Combining monitoring and sanctioning mechanisms would deter free riding behavior more effectively.

To decrease free riding, program managers could also impose a fee for participation, which would screen some free riders. However, it is not obvious that this would differentiate between free riders and those who will comply with reporting requirements. If the benefits of free riding on the reputation of the program are sufficient, it may be worthwhile to pay the fee to join the program but still avoid further costs by free riding. In addition, this would limit the population of participants, as financially strapped companies would be reluctant to enter such a program, especially if the private benefits of participation are unclear. Alternatively, the program managers could perform a formal assessment of an organization's willingness to commit internal resources to the program and to report their progress with respect to the program.

Conclusion

We showed that for the WasteWise program, collaborative behavior varies according to the initial reasons that the organization joined the VP. Organizations will disclose information about their environmental performance when this disclosure provides them with the benefits they were looking for when they entered the program. Organizations that joined WasteWise to promote their relations with EPA and learn about waste techniques are more likely to report their progress to the WasteWise program. On the opposite side, firms that joined the program because it is free are more likely to free ride. Collaborative behavior also increased with the involvement of upper management and decreased for later entrants in the program.

It is important to analyze the incentives for information disclosure. If these issues are not resolved, free-rider behavior may destroy the viability of voluntary approaches. The problem of free riding certainly exists in other voluntary programs, but here we can actually measure its extent. We also determined the motivations that drive organizations to voluntarily provide information to the regulatory agency.

Our research advances theory in several ways. First we show that voluntary compliance in the case of a public good is increased when there are private benefits directly associated with compliance. We contribute to the literature on collective action by analyzing how an organization's motivations to join a voluntary program impact its subsequent behavior within the program. We test empirically which incentives are linked to collaborative behavior.

Our research also has important policy implications. Our results show that there are several avenues that policy-makers can use to reduce free-riding behaviors. We provide various policy options to improve the design of VPs. In particular we suggest that VPs tightly connect private benefits to the desired collaborative action and adopt informal or formal sanctioning mechanisms to deter free riding.

An important question is whether it is possible to encourage wide membership in a voluntary system and at the same time adopt a strict enforcement policy. It seems that stricter rules would deter the participation of potential free riders. But

voluntary approaches should not be seen in isolation. Indeed, these approaches aim at pushing firms to adopt beyond-compliance behavior. Perhaps these programs should be focused on a specific part of the population that will be clearly identified. But there is also an argument to be made for encouraging wider membership and accepting some free riding in order to encourage a broader range of firms to take part in the program. In that case it is possible to provide several levels of membership within the program where the best performers get more benefits than the lower performers.

Further research should analyze the effect of differing regulatory settings on reporting behavior. Delmas and Terlaak (2002) have shown that participation in voluntary programs differs across nations. In particular, the American institutional environment is marked by an adversarial relationship among stakeholders (Kagan, 2001). This makes the disclosure of information about environmental performance more difficult than in Europe, for example (Delmas, 2002). Furthermore, in national or industry contexts where there is more homogeneity among organizations, it may be easier to use informal sanctioning mechanisms.

Acknowledgments

We thank Peter Deleon, Murray Rutherford and two anonymous reviewers for their useful comments on an earlier version of this manuscript.

Notes

1. www.epa.gov/wastewise.
2. The economic literature on compliance decisions in the case of taxes shows that there is improved compliance when the uncertainty about enforcement policies increases (Alm, 1988; Beck and Jung, 1989; Scotchmer and Slemrod, 1989).
3. The list included 502 members with electronic mail addresses, while the remaining 445 members had only street addresses listed. Members with electronic mail addresses were sent email messages on December 18, 1999, with the survey included as an attachment. Of the surveys sent by email, 53 were returned as having invalid addresses. Members without email addresses were sent hard copy versions via standard mail on January 10, 2000. In addition, the 53 members with invalid email addresses were sent hardcopy versions of the survey. Of the surveys sent by standard mail, 15 were returned as having invalid mailing addresses.
4. See Delmas et al. (2000) pages 38–42 for more details.
5. The Western Region had a slightly higher percent of survey respondents (28%) relative to the region's population of WasteWise members (21%). This is primarily due to the higher response rate from California WasteWise members (16% of total responses). The high response rate from California may result from the willingness of state organizations to participate in a survey conducted at The University of California.
6. See Delmas et al. (2000) for more details.

References

- Alm, J. (1988). 'Uncertain tax policies, individual behavior and welfare,' *American Economic Review* (March) 78: 235–245.

- Arora, S. (2000). 'Green and competitive? Evidence from the stock market,' Stanford Business School Working Paper, # 1650.
- Arora, S. and S. Gangopadhyay (1995). 'Toward a theoretical model of voluntary overcompliance,' *Journal of Economic Behavior and Organization* 28(3): 289–309.
- Arora, S. and T. N. Cason (1996). 'Why do firms volunteer to exceed environmental regulations?' *Land Economics* 72: 413–432.
- Beck, P. and W.-O. Jung (1989). 'Taxpayers' reporting decisions and auditing under information asymmetry,' *Accounting Review* 64(3): 468–487.
- Börkey, P. and F. Leveque (1998). *Voluntary Approaches for Environmental Protection in the European Union*. Paris: Organisation for Economic Cooperation and Development.
- Dawson, N. L. and K. Segerson (2003). 'Voluntary agreements with industries: Participation incentives with industry-wide targets,' Working Papers 2004–2006, University of Connecticut, Department of Economics.
- Delmas, M. (2002). 'The diffusion of environmental management standards in Europe and in the United States: An institutional perspective,' *Policy Sciences* 35(1): 91–119.
- Delmas, M. and A. Terlaak (2001). 'A framework for analyzing environmental voluntary agreements,' *California Management Review* 43(3): 44–63.
- Delmas, M. and A. Terlaak (2002). 'Regulatory commitment to negotiated agreements: Evidence from the United States, Germany, the Netherlands and France,' *Journal of Comparative Policy Analysis* 4: 5–29.
- Delmas, M., A. Andrade, D. Cassano, A. Keller, C. Liu, A. Teo, and J. Yahner (2000). *An Evaluation of the EPA WasteWiSe Program*. University of California, Santa Barbara.
- Federation of German Industries. (2000). Agreement on Climate Protection between the Government of the Federal Republic of Germany and German Business. (<http://www.bmu.bund.de/en/1024/js/topics/climateprotection/agreement/main.htm>).
- Harrison, K. (1999). 'Talking with the donkey: Cooperative approaches to environmental protection,' *Journal of Industrial Ecology* 2(3): 51–72.
- Kagan, R. (2001). *Adversarial Legalism: The American Way of Law*. Cambridge, MA: Harvard University Press.
- King, A. and M. Lenox (2000). 'Industry self-regulation without sanctions: The chemical industry's responsible care program,' *Academy of Management Journal* 43(4): 698–716.
- Olson, M. (1965). *The Logic of Collective Action*. Cambridge, MA: Harvard University Press.
- Orts, E. W. and K. Deketelaere (eds.). (2001). *Environmental Contracts: Comparative Approaches to Regulatory Innovation in the United States and Europe*. Boston: Kluwer Law International.
- Rivera, J. and P. deLeon (2004). 'Is greener whiter? The Sustainable Slopes Program and the voluntary environmental performance of western ski areas,' *Policy Studies Journal* 32(3): 417–437.
- Scotchmer, S. and J. Slemrod (1989). 'Randomness in tax enforcement,' *Journal of Public Economics* 38: 17–32.