

VOLUNTARY AGREEMENTS TO IMPROVE ENVIRONMENTAL QUALITY:

ARE LATE JOINERS THE FREE RIDERS?

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Abstract

This paper analyzes how free riding affects the effectiveness of corporations' collective political strategies aimed at shaping government policy. We do so within the context of environmental voluntary agreements (VAs). We demonstrate that substantive cooperative strategies are more likely to be pursued by firms that enter a VA at its initiation while free riding or symbolic cooperation is more likely to be adopted by late joiners. We demonstrate that late joiners and early joiners within VAs adopt different cooperative strategies because they face different institutional pressures. We also find that late joiners that cooperate only symbolically may endanger the overall effectiveness of a VA. Our analysis is based on the strategies of firms participating in the Climate Challenge program established in 1995 by the U.S. Department of Energy (DOE) and the representatives of the national electric utilities to reduce greenhouse gas emissions.

Keywords: Free riding, Collective Action, Institutional Theory, Symbolic Action, Environmental Voluntary Agreements, Public Goods, Non-Market Strategy

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INTRODUCTION

The corporate political strategy literature focuses on the strategies firms use to shape government policy (Baron, 1995; Baysinger, 1984; Hillman, Keim, & Schuler, 2004; Keim & Baysinger, 1988; Keim & Zeithaml, 1986). This line of research makes important strides to explain firms' rationales to develop political strategies, such as hiring lobbyists and forming political action committees (Baron, 2005; Hillman & Hitt, 1999). An important question for scholars and practitioners is to determine how effective corporate political strategies are. However, this question has proven to be a difficult problem both theoretically and empirically (Schuler, 2002). One of the research challenges is to assess the effectiveness of firms' political strategies when the strategies are carried out collectively via coalitions, partnerships and through trade associations. Collective political action complicates the analysis of a firm's political action because it is difficult to identify each firm's contribution (King & Lenox, 2000; Schuler, 2002). In this paper we address this challenge with the analysis of the effectiveness of collective political strategies in the context of the natural environment.

Corporate political activity represents a classic problem of collective action (Olson, 1965) because legislative and regulatory decisions are not exclusive and affect all firms. Therefore, the benefits that firms seek from their corporate political activity will be available to other firms regardless of each firm's contribution. Because of this, firms may be tempted to behave opportunistically and free ride on the corporate political activity of others (Yoffie, 1987). This is particularly true for collective strategies that engage several firms (Hillman & Hitt, 1999). Due to this potential for opportunistic behavior, collective political strategies are risky. If too many firms free ride, it may undermine the effectiveness of collective strategies. It is important for firms to assess the risks associated with such collective strategies and to understand under what conditions they would seem attractive options.

Building on the collective action theory, the corporate political strategy literature has argued that firms would participate in collective corporate strategies action only because of the potential for private benefits. However this approach treats collaborative behavior as a dichotomous variable with “participation” in collective action and “non participation” being the only alternatives when, in reality, collective behavior is much more nuanced. For example, firms could decide to participate in a collective strategy and undertake the full cost of participation, or they may agree to participate but do so only symbolically, thereby incurring only part of the costs associated with cooperation. Firms could also vary their strategies over time. They could refuse to participate in one period and become an active or symbolic participant in a subsequent period. The corporate political strategy literature is therefore limited to identifying the selective incentives and mechanisms that trigger different levels of collective corporate political strategy and how these vary over time. Several scholars within this tradition have identified this research opportunity and have started to identify the factors that explain firms’ levels of involvement in collective action activities (Lenway & Rehbein, 1991; Yoffie, 1987) and the importance of timing in explaining corporate political strategy (Bonardi & Keim, 2005).

The institutional literature provides an interesting, complementary approach to the corporate political strategy literature to understand the conditions that explain symbolic cooperation or the decoupling of formal organizational structures from actual practices in the organization. Institutionalists contend that decoupling is more likely when institutional forces are present and when a practice is adopted for legitimation reasons (Meyer & Rowan, 1977) rather than efficiency reasons. Institutionalists have argued that early adopters of management practices and technologies face different institutional pressures and therefore may implement the same practice differently (Tolbert & Zucker, 1983; Westphal, Gulati, & Shortell, 1997).

In this paper, we combine the Corporate Political Strategy literature to institutional theory to propose a model of collective corporate political activity where private incentives are institutionally shaped. We show that private incentives vary with the timing of joining collective corporate activity and that symbolic cooperation is more likely with late joiners than with early joiners of collective corporate political activity. Our model differs substantially from previous institutional analyses. While in previous studies institutional pressures lead to isomorphism or conformity, in our model, institutional pressures could lead to strategic behavior and manipulation. In addition, we propose that early joiners may not just seek technical efficiency but may respond to institutional pressure while late joiners may not seek only legitimacy but may want to take advantage of the technical benefits of participation.

In this study, we focus on collective corporate political strategies through environmental voluntary agreements (VAs) between firms and regulatory agencies. We examine the cooperative strategies of firms within the Climate Challenge program, a VA established in 1995 by the U.S. Department of Energy (DOE) and representatives of the national electric utilities to reduce voluntary greenhouse gas emissions. VAs are "collaborative arrangements between firms and regulators in which firms voluntarily commit to actions that improve the natural environment." (Delmas and Terlaak, 2001). VAs aim at influencing political outcome. By committing to voluntarily improve their environmental performance, firms seek to pre-empt some (presumably more costly) regulations that might be imposed or to seek flexibility from existing regulations (Lyon & Maxwell, 2004). In the last decade, we have seen an increase in the use of these agreements. There are more than 300 VAs in place in the European Union (Borkey & Leveque, 1998), and around 200 VAs have been launched in the United States (Darnall & Carmin, 2005). However, because most of these agreements lack explicit measures to sanction free-riders, there are concerns that firms may enter these agreements and cooperate only symbolically rather than undertake substantive actions to reduce their impact on the environment (King & Lenox, 2000; Rivera & DeLeon, 2004).

Because VAs are a relatively recent phenomenon: “there are relatively few empirical studies assessing the specific impacts of VAs on emissions reductions, compared to business-as-usual emissions abatement” (Baranzini & Thalmann, 2004):28). Indeed, rare are the analyses investigating whether firms participating in these programs actually meet the requirements of the programs (Arora & Cason, 1996; Bjorner & Jensen, 2002; Khanna & Damon, 1999; King & Lenox, 2000; Rivera, 2002; Videras & Alberini, 2000; Welch, Mazur, & Bretschneider, 2000). Most importantly, these studies seldom investigate differences in cooperative behavior within VAs.

The corporate political strategy literature provides many insights into the drivers of corporations’ proactive political strategies such as the provision of financial support to political decision makers or political parties, information strategies toward government officials, and constituency-building strategies (Baron, 2005; Hillman & Hitt, 1999), but the literature has barely begun to investigate collective strategies such as cooperative arrangements that engage firms and regulatory agencies and the pros and cons of such arrangements (Hillman et al., 2004). This study contributes to the corporate political strategy literature by expanding our understanding of the factors that impact free riding and potentially the effectiveness of such collective corporate political strategies. Further, by emphasizing how institutional mechanisms frame selective incentives of collective action strategies our study combines previously separate theoretical perspectives to give an explanation of various strategic behaviors within collective corporate strategies.

In the sections below, we begin with a review of environmental voluntary agreements and of the Climate Challenge program. We then develop our hypotheses concerning the factors that trigger differences in cooperative behaviors between early and late joiners. The third section explains the methodology and the results. A concluding discussion follows.

Corporate political Activity through Environmental Voluntary Agreements (VAs)

VAs vary in objectives and designs, and, as a result, offer different kinds of strategic opportunities for participating firms. Participation in VAs can be designed to preempt regulation as a response to a regulatory threat, provide flexibility with the implementation of existing regulation, and influence the form of future regulation (Decker, 1998; Delmas & Terlaak, 2001; Maxwell & Decker, 1998; Segerson & Miceli, 1998). In this paper, we focus on the Climate Challenge Program, a VA created by the electric utility industry to pre-empt legislation on Climate change. This form of VA has also been called negotiated agreements and is typically negotiated by an industry trade association (Delmas & Terlaak, 2001; Maxwell, Lyon, & Hackett, 2000). These VAs can therefore be referred to as a collective corporate political strategy.

VAs differ from other political strategies identified by the literature such as information-based strategies, financial-incentives strategies and constituency-building strategies (Hillman & Hitt, 1999). For example, although VAs might include the exchange of information between firms and regulators, this is not their main objective. VAs represent a quid pro quo where firms commit to voluntarily provide a public good in exchange for a potential private benefit. VAs also differ from self-regulation strategies that represent collective political strategies undertaken without government initiative (Bonardi & Keim, 2005; King & Lenox, 2000). There are different forms of cooperation at work within VAs. The first one is among firms within the industry who jointly decide to voluntarily reduce their environmental impact. This cooperation is usually orchestrated by the trade association. The second form of cooperation is between firms and the government who agree on a mutually acceptable arrangement.

Firms face three choices of participation in a VA. First, they can participate in the VA and cooperate substantially. In that case they reduce their emissions to potentially pre-empt more stringent regulations. Participating firms that undertake substantive actions to reduce their emissions must have accomplished

organizational or technological changes that allow such reductions. Thus, for these firms, participation in a VA is coupled with practical changes at the operational level. We refer to this type of participation as substantive cooperation. Second, they can refuse to participate in the collective activity and free ride on the behavior of other members of the industry who participate in the VA and reduce their emissions. Although the literature has focused mostly on these two options, we argue that there is a third option available to firms: participation in the VA without substantive implementation of the VA's requirements. That is to say, firms might participate in a VA without actually improving their environmental performance. In that sense participation in VAs may only be symbolic where firms decouple their practical actions from formal organizational structures (Meyer & Rowan, 1977). Consequently, we refer to participation in the VA without performance improvement as symbolic cooperation. In addition to non-participants, firms that undertake symbolic cooperation are also free riding on the effort of firms that undertake substantive cooperation.

The Climate Challenge Program

The Climate Challenge Program is a VA between the U.S. Department of Energy (DOE) and the electric utility industry to reduce, avoid or sequester the greenhouse gas emissions through voluntary commitment.¹ The program was initiated just after President Clinton launched, in 1993, the Climate Change Action Plan (CCAP), where he announced the nation's commitment to reducing U.S. emissions of greenhouse gases to their 1990 levels by the year 2000. At the time, the Clinton Administration was investigating the possibility of implementing a tradable credit system, where firms that exceed the limits, or "caps", on emissions could buy emissions credits from entities that were able to stay below their designated limits. The issue of greenhouse gases emissions had become a widely salient issue--a public

¹ These representatives were Edison Electric Institute, American Public Power Association, National Rural Electric Cooperative Association, Large Public Power Council and Tennessee Valley Authority.

policy likely to be of interest to a large segment of likely voters and to receive considerable attention (Bonardi & Keim, 2005). As they were among the leading generators of greenhouse gases in the United States, electric utilities were particularly worried about the possibility of new regulations being implemented.² The Climate Challenge program was clearly an attempt by the industry to promote voluntary approaches and negate the need for future greenhouse gas regulations. The Edison Electric Institute, the trade association for U.S. shareholder-owned electric companies, was instrumental in the creation of the program to demonstrate that emissions' reductions could be achieved voluntary rather than through mandated regulations. Tom Kuhn, the president of the Edison Electric Institute made it clear in a statement to the press one year after the start of the program: "Our industry has demonstrated that a vigorous, voluntary approach toward curbing greenhouse gas emissions is the way to go. We will continue to put these programs in place while opposing government and international mandates that would cost the U.S. economy thousands of jobs. Utilities have met the challenge and are continuing their leadership role in working with the government to find creative and effective ways to improve the environment." ³

The U.S. DOE also explicitly stated on the Climate Challenge website that: "an effective voluntary effort may negate the need for legislation or regulation" or that "emission reductions could possibly be used for 'credit' against future mandatory requirements." ⁴

The Climate Challenge program consisted of (i) a general Memorandum of Understanding signed by the national electric trade organizations and DOE on Earth Day 1994 and (ii) individual agreements signed by the utilities from 1995 to 2000. In these agreements, each participating firm committed to (1) reduce, avoid or sequester greenhouse gas emissions, (2) report annually its achievement and activities and (3) confer

² About 40.5 percent of the U.S. CO₂ emissions were attributed to the combustion of fossil fuels for the generation of electricity in 1998 (DOE/EIA-0573(98), 1999).

³ Newswire Association 1996 "U.S. Electric Utility companies are not waiting to reduce greenhouse gas emissions" April 12, 1996, Financial News.

periodically with the Department of Energy's evaluations of its progress and discussions of the adjustment. Each participating firm had to establish the level and detail of its commitment to be reached by the year 2000. Such commitments included efficiency improvement in generation, fuel switching to lower carbon fuels such as natural gas, and increased generation using non-carbon sources such as renewable energy and nuclear power. In 2000, at the end of the program, 124 participation agreements had been signed. The utilities that signed these agreements represented approximately 60% of the 1990 U.S. electric utility generation and utility carbon emissions (DOE/FE0355, 1996).

There were no direct sanctions for firms that did not participate in the program or that participated only symbolically. First, even though the electric utility was subjected to requirements to provide information about its greenhouse gas emissions through various programs, greenhouse gases were not regulated; that is to say, there were no limits to such emissions. Second, although the agency reviewed the participants' annual self-reported information during the course of the program, no sanctions were imposed on firms that did not meet their commitments. Furthermore, the initial Memorandum of Understanding stipulated that utilities would be allowed to quit the program whenever they chose "without penalty and without being subject to remedies at law or equity."⁵

The Climate Challenge program exhibits features that make it particularly appealing to study over time differences in cooperative strategies among participants and between participants and non-participants. First, the program was in operation from 1995 to 2000 and permitted firms to enter the program at various dates during that period. This allows us to compare the cooperative behavior of early and late joiners. Second, approximately half of the investor-owned electric utilities joined the program. This enables the comparison of cooperative behavior between participants and non-participants.

⁴ See http://www.climatevision.gov/climate_challenge/factsheet.htm last accessed on March 2006.

⁵ See http://www.climatevision.gov/climate_challenge/cc_accordxNSTATESP.htm

Welch, Mazur and Breschneider evaluated the effectiveness of the Climate Challenge program during the early years of the program (Welch et al., 2000). According to their results, firms participating in the Climate Challenge program did not reduce their emissions significantly more than firms that did not participate in the program during the 1995-1997 period. The authors warned that these results have to be taken with caution because they are based on a study of only the first two years of the program and only the top 50 utilities. In contrast, our study focuses on the entire life of the program, through 2000, allowing us to assess differences between late and early joiners and to consider a greater time period when evaluating the results of firms' CO₂ reduction efforts. In addition, we include a larger and more representative sample of firms (133 utilities), allowing more variability in firm characteristics. Our sample includes 61% of the U.S. electricity generated from 1995 to 2000 and 75% of the CO₂ emissions emitted by the electric sector during that period. Furthermore, we seek not only to analyze the overall effectiveness of the Climate Challenge program but also to understand which firms within the program were free riding and which ones undertook substantive cooperation.

EARLY AND LATE JOINERS & COLLECTIVE POLITICAL STRATEGY

The literature on collective action predicts that it is unlikely that an organization will participate in a collective political strategy absent potential private benefits associated with participation (Olson, 1965). Olson's seminal work 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 participation in something other than the collective or public good that is at issue. Building on this approach, the corporate political strategy literature has argued that firms may participate in collective political strategies mostly for material rewards (Lenway & Rehbein, 1991; Yoffie, 1987). Thus the primary mechanism remains economic. Other scholars have identified additional types of rewards for acting collectively which can include social rewards (such as increase reputation) and purposive rewards (doing the right thing) (Wilson, 1973). In the

case of a VA, firms want to convince regulators that their voluntary practices are legitimate defined as the “generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs and definition (Suchman, 1995): 574). Therefore the rewards that firms are seeking may be influenced by the social context in which the collective action initiative is implemented. Firms social context may vary geographically but also over time. For example regulators and other organizations may find voluntary activities more legitimate once they have diffused among a larger set of firms. While the corporate political strategy literature has identified how institutional differences across countries drive differences in political action, or how differences in institutions predict corporate political activity, this stream of research does still pay little attention to the social context in which firms operate and to the social mechanisms that link firm strategies (Hillman, 2003).

The institutional literature provides an interesting, complementary approach to the corporate political strategy literature to understand how the social context shapes organizations’ behavior. It argues, in the case of the adoption of technological and management practices, that first movers and followers face different levels of institutional pressure (DiMaggio & Powell, 1983; Tolbert & Zucker, 1983). Using the case of the diffusion of civil service reform, Tolbert and Zucker demonstrate that first movers are mainly interested in the technical efficiency of a practice while followers are more subject to institutional pressure. They argue that first movers adopt management practices because “of real needs”. On the contrary, followers do not implement a practice because of its merits but because other organizations do. Westphal, Gulati and Shortell also show that early adopters of total quality management practices in hospitals seek efficiency gains while later adopters aimed at increasing their legitimacy (Westphal et al., 1997). In addition, the institutional literature shows that managers can increase their legitimacy by adopting governance structures only symbolically and that late joiners are more likely to do so (Westphal & Zajac, 1994; Zajac & Westphal, 1995).

We develop below a model based on the thoughts of institutional theory and the corporate political strategy literature to explain substantive and symbolic collective corporate strategy. In this endeavor we follow the path of Oliver (1991:146) who argued that institutional theory provides an overly passive and conforming depiction of organizations' and could benefit from integrating strategic motives.

We argue below that first movers and late joiners face different institutional pressures that impact the type of cooperative behavior they will pursue within VAs. We first develop hypotheses on the institutional pressures that drive firms' decision to participate early in the Climate Change Program, to participate late or to remain a non-participant. We subsequently link the timing of participation to symbolic and substantive cooperation.

Political pressure

Even though the creation of a VA might help the entire industry avoid potential future regulations, not all firms will experience the same level of threat from these potential regulations and therefore the same benefits from pre-empting the regulation. The corporate political activity literature shows that firms incentives to undertake corporate political activity vary according to the national regulatory environment in which they operate (Hillman, 2003; Hillman & Wan, 2005; Murtha & Lenway, 1994). Within a single country, states and counties issue different rules and regulations. We argue that these differences in local politics will impact the likelihood of firms to undertake corporate political activity at the national level. In the U.S. context, for example, Environmental legislation at the Federal level is usually implemented by states. So firms located in states with more stringent regulations will be under more pressure to undertake reductions in emissions and will have more incentives to participate in corporate political strategies. Regardless of federal level standards, companies are facing a complex set of environmental standards that vary by state. A program that demonstrates the effectiveness of voluntary practices at the national level can also help influence future regulations at the state level.

Furthermore, in a federal context firms may try to influence congress representatives that are elected by States by participating in VAs. These Congress representatives may pay more attention to strategies undertaken by companies in their district. When Congress representatives are more prone to vote positively on more stringent environmental regulation, firms have more incentives to show them that reductions in environmental emissions can be achieved voluntarily.

Additionally, there may be firm specific characteristics that may make the firm subjected to higher levels of political pressure. For example some firms may be temporarily or permanently more dependent on governments to obtain licenses to operate than others. In the electric utility sector this may happen when firms are undergoing rate changes or when they want to put new plants online (Bonardi, Holburn and Vanden Bergh, 2006).

We argue that firms subjected to higher levels of political pressure will be more likely to participate in the creation of a VA because the potential individual benefits they may derive from the VA would outweigh the costs of organizing a collective effort. In other words, these firms might participate in the creation of the VA regardless of what other firms do. In that sense, their decisions to participate in the VA resemble an individual decision rather than a collective decision (Hillman & Hitt, 1999). Timing is important for firms subjected to a great deal of political pressure. They need to move as early as possible to pre-empt the evolution of the political issue at stake into a potentially more costly regulation (Baron, 2003; Bonardi & Keim, 2005). This is because it is usually more difficult for firms to advance their agendas once issues have become widely salient (Bonardi & Keim, 2005). In summary, firms that are subjected to higher levels of political pressure within the state in which they operate might be more likely to be early joiners of a VA than firms that do not face such level of pressure. Firms operating in states with lower levels of political pressure would not get the same urge to participate in a program at its initiation and will be more likely to wait and see what others do. We therefore hypothesize that:

Hypothesis 1. Early participants in the Climate Challenge Program are subjected to higher political pressure than late joiners and non-participants.

Hypothesis 2 Early participants in the Climate Challenge Program are more dependent on local and federal regulatory agencies than late joiners and non-participants.

Links with the industry association

Trade associations have been shown to play a central role in facilitating the emergence of corporate political strategies (King and Lenox, 2000). They provide a central forum for communication about the political issues at stake (Rees, 1997). Firms participating in the trade association are therefore more informed about the impact of potential regulations on their activities than firms that do not participate in the association. Firms participating in the trade association are also more likely to be exposed to normative pressure exerted by their peers as divergence of opinion may be more difficult in context of continuous relations. Furthermore because firms pay significant fees to participate in the association, firms that choose to participate in the association may do so because they agree with the policy of the association.⁶ Firms that are part of the trade association are therefore more likely to be the first participants in an action initiated by their association. We therefore hypothesize that:

Hypothesis 3. Early participants in the Climate Challenge Program are more likely to be member of the industry trade association than late joiners and non-participants.

Firms' previous environmental investments

Firms' resources and the ability of a firm to sustain the cost of collective action has been shown to be an important explanatory factor of firms' involvement in collective action activities (Lenway & Rehbein,

⁶ Fees for trade association in the electric utility sector can amount to \$1M per year.

1991; Meznar & Nigh, 1995; Schuler & Rehbein, 1997). There are two competing arguments about the relationship between resources and firms' involvement in collective corporate political actions. The first one is that firms with higher resources or slack resources will be able to afford the political action. The second one is that firms with low levels of resources will seek a political solution to their limited resources. In our case, the levels of investments in environmental performance improvements prior to the initiation of the VA may have an impact on the potential benefits of participating in a voluntary program. On the one hand, firms that have already invested in reducing their environmental impact before the initiation of a VA could be more likely to join the VA provided that the program gives credit to their earlier efforts. On the other hand, firms that have not invested in reducing their environmental impact before the initiation of a VA may use the program to increase their reputation as they need it more than the others. Because there are rationales for both greener and browner firms to join a VA, the empirical evidence is mixed. A set of empirical studies show that firms with larger percentages of emission reductions, prior to making their participation decisions, were more likely to participate in voluntary activities mostly to publicize their efforts (Arora & Cason, 1996; Khanna & Damon, 1999). On the opposite, other studies show that firms with lower environmental performance were more likely to undertake voluntary activities mostly because they were under more pressure to do so (Bansal, 2005; Konar & Cohen, 1997; Videras & Alberini, 2000). We argue below that both greener and browner firms have incentives to participate in the Climate Change Program but under circumstances that may vary over time.

First, companies that have taken early steps on voluntary reductions of their emissions may find it advantageous to compel others, less committed competitors to follow suit (Hoffman, 2005). Scholars have suggested that chemical companies that had undertaken investments in safety and environmental improvements were at the origin of the industry program Responsible Care, and that these companies, among other things, were looking to impose a cost on their competitors (King & Lenox, 2000; Reinhardt,

2000). In addition, in the case of the Climate Challenge program, the DOE said that participating firms could potentially get future “credits” for their emissions’ reductions in the event that a tradable permit system were put into place. That is to say, firms that had already undertaken some environmental improvements could get credit for these improvements, therefore providing incentives for greener firms to participate and to put their efforts on the record as soon as possible. Assuming that the future regulatory target would require them to reduce a percentage of their emissions from some base year, firms that act early to reduce CO₂ yet fail to register those reductions early under a voluntary scheme are in danger of being penalized.⁷ In summary, firms that have already started their efforts to reduce their emissions are more likely to benefit from a program that gives them credit for their past experience. They would be able to get this credit regardless of what other firms contribute.

In such context, it seems logical that firms that have not yet undertaken efforts to reduce their emissions, and could be considered ‘brownier firms’ would resist the costs associated with initiating such a program. However such firms could still benefit from participating in the program if it allows them to be associated with “greener” firms and therefore improve their reputation. For such firms it might therefore be prudent to wait and see who the early joiners are before deciding to participate in the VA. Researchers have highlighted how the nature of early adopters of a technology or a management practice can impact future adoption (DiMaggio & Powell, 1983; Rosenkopf & Abrahamson, 1999). In particular, Rosenkopf and Abrahamson show that initial adopters with high reputations can pressure other organizations to adopt the practice (Rosenkopf & Abrahamson, 1999). The main idea is that followers might want to be associated with these “high-quality” first adopters so as to increase their external legitimacy. While late joiners may not have been subjected to the same political pressure to participate in the VA as early joiners, as time passes non-participants could be singled out as the black sheep of the industry, especially if they are

browner. This situation arose with the Climate Challenge Program when non-participant firms were identified by some NGOs as bad performers. For example, 9 months after the creation of the Climate Challenge Program and after the main meeting where the majority of participants agreed to participate, a report by the Council on Economic Priorities (CEP), a non-profit organization, put the utility Virginia Power on a list of the nation's worst polluters for “failing to participate in the U.S. Dept. of Energy's Climate Challenge program for reducing greenhouse gases, and for Virginia Power's lack of a formal environmental policy.”

Therefore, we hypothesize that the level of environmental effort undertaken by the firm prior to the start of the Climate Challenge Program will impact not only firm's participation decision but also the timing the participation. While firms that have undertaken environmental efforts prior to the creation of the program will be have incentives to participate early to influence competition, the incentives for firms that have not yet undertaken such efforts become stronger for late joiners after a “critical mass” of participants has joined.

Hypothesis 4. Late joiners of the Climate Challenge Program are less likely than late joiners and non-participants to have undertaken efforts to reduce their emission prior to the start of the program.

In conclusion, we expect that early and late joiners will face different institutional pressures. We hypothesize that early joiners are more likely to be subjected to political pressures and to be influenced by the trade association. We also argue that institutional pressures vary over time and according to firms' resources. Firms that did not participate in the program early and that have undertaken lower environmental efforts are more likely to be subjected to institutional pressures after the majority of members of the industry have joined the VA.

⁷ “Baseline protection” is the term of art used by firms and regulators to describe this phenomenon.

Substantive versus symbolic cooperation

Because firms' incentives are shaped by different institutional pressures that may vary over time, we argue that early joiners are more likely to undertake substantive actions to reduce their environmental impact and that late joiners are more likely to participate only symbolically in the program. First, because they are subjected to political pressure and they are better connected to the trade association they will be under more scrutiny than late joiners. Second, if they wish to impose a cost on competition they need to provide evidence to their competitors that they are undertaking substantive action. In other words, they need to be credible in their claim of reducing their emissions.

Institutional studies have found that firms might engage in symbolic management as a means of responding to institutional pressure (e.g., Edelman, 1992; Westphal & Zajac, 1998). As Oliver (1991: 155) noted, "from an institutional perspective...the appearance rather than the fact of conformity is often presumed to be sufficient for the attainment of legitimacy." In that context firms adopting symbolic practices are 'conforming' but to a lesser extent. However while institutional pressures lead to isomorphism, symbolic participation could be seen as a departure from isomorphism. Thus an explanation of symbolic participation based on legitimacy does not explain why specifically the firms with worse performance are the ones seeking symbolic participation.

Indeed, symbolic participation could also be seen as a manipulation by corporations that do not want to conform but use the institution to their strategic means i.e. to deflect institutional pressures. Thus, firms could decide to participate in the Climate Challenge Program to deflect some of the critics without adopting any of the substantive changes associated with participation. Because not entering into the VA would send a negative signal, firms use the VA to hide their poor performance.

Late joiners may also perceive that the risks associated with symbolic participation may be small. First if the program clearly state that no penalties will be associated with free riders, firms will fear no threat of

punishment if they cooperate only symbolically. Second, the success of the program being already announced, they may not fear damaging the reputation of the program and to be singled out. For example, in the case of the Climate Challenge program, the Department of Energy announced in October 1996 that the electric utilities participating in the program had committed to reduce, avoid or sequester more than 44 million metric tons of carbon equivalent (MMTCE) in the year 2000. This represented approximately half (45%) of the total cuts that the United States pledged at the world environmental summit under FCCC in 1992 (DOE/FE0355, 1996). It is therefore possible that companies joining the program after that date might have believed the program was already successful and that their lack of contribution would not endanger the program's effectiveness.

In summary, because early and late joiners face different incentives and pressures, we expect that they will adopt different cooperative behaviors within VAs:

Hypothesis 5. Late joiners are more likely to cooperate symbolically while early joiners are more likely to cooperate substantively within the Climate Change Program.

EMPIRICAL ANALYSIS

Data sources

To test our hypotheses, we collect data from different sources. From the U.S. Department of Energy, we use the Climate Challenge “participation accords” and “letters of commitment” to identify participating firms.⁸ We also use data on utilities' characteristics and environmental performance from the U.S. Federal Energy Regulatory Commission Form Number 1 (United States Department of Energy, FERC Form 1, from the U.S. Energy Information Administration (Forms EIA-860, EIA-861 and EIA-906), and from the

⁸ Utilities with more than 50,000 customers develop individual participation accords while those with fewer than 50,000 customers submit letters of commitment. http://www.climatevision.gov/climate_challenge/cc_accords.htm

U.S. Environmental Protection Agency Clean Air Market program's website. After merging these databases, we retain 133 investor-owned electric utilities representing 61% of the total U.S. electricity production by utilities from 1995-2000 and 75% of the CO₂ emissions emitted by the electric sector during that period. Out of these 133 firms, 82 participate in the Climate Challenge program. Our sample includes 46% of the total 124 signed agreements with the Department of Energy.⁹

Estimated Model and dependent variables

Our goal is to examine the motivations that explain utilities' participation in the program and to assess their performance outcomes. The decision to participate in the Climate Challenge Program and the performance results are likely to be influenced by the same observable and unobservable factors (Anton, Deltas, & Khanna, 2004; Khanna & Damon, 1999). To compare emissions' outcomes between participants and non-participants of the Climate Challenge program, thus, to isolate the impact of participation in a VA on environmental performance, we need to correct for a potential endogeneity problem (Hartman, 1988; Heckman, 1978; 1979; Maddala, 1983). We therefore use a two-stage estimation model that determines simultaneously the outcome of program participation (here CO₂ emission rate) and the determinants of a firm's participation decision to address this issue (Khanna & Damon, 1999; King & Lenox, 2000; Rivera, 2002; Welch et al., 2000).

The other empirical challenge that we face and that differed from previous studies is that, in the first-stage equation, we want to predict not only the probability of participation in the VA, but also to differentiate between early and late joiners. Because we want to understand differences among various types of participants, we modify the traditional first-stage equation to predict the likelihood of a firm to be a non-

⁹ An agreement can represent several firms. Non-investor owned utilities are not included in our analysis as they are not part of the Federal Energy Regulatory Commission (FERC) Form 1 database.

participant, a late joiner or an early joiner. In the second stage, we use the predicted values of these various types of participants to test how voluntary cooperative strategies contribute to pollution reduction.

First-stage regression

In the first stage regression, we predict participation in the VA using two models. First a binary logit model predicts participation in the Climate Challenge Program and second a multinomial logit model predicts the types of participant representing three groups: (1) non participant, (2) late joiners and (3) early joiner. Both models are estimated by maximum likelihood estimation (Greene, 2003).

Participation. This variable represents the decision of the firm to participate in the Climate Challenge program. It takes a value equal to 1 the year of enrollment and the following years, and 0 otherwise. The Climate Challenge participation agreements are used to identify participants and non-participants and the year of enrollment in the program. These were accessed through the US Department of Energy's website.¹⁰ We use this measure as dependent variable in the binary logit model for the first stage regression. The binary logit model provides an estimation of the likelihood that a given electric utility will participate in the Climate Challenge program. This model allows us to analyze the aggregate effectiveness of the program in the second stage regression.

The participation model in the binary logit model is specified as follows (first stage):

$$\text{Pr ob (Participation}_{i,t} = 1) = F(Z_{i,t-1}'\beta) \quad (\text{Model 1a})$$

where *Participation* is the binary dependent variable of this first stage, $Z_{i,t-1}$ is the set of exogenous independent variables used as instruments, and F is the cumulative logistic distribution

¹⁰ www.eere.energy.gov/climatechallenge/cc_accords.htm. (March 2004)

($F(x) = e^x / (1 + e^x) = 1 / (1 + e^{-x})$). The independent variables are used with 1 lagged year to avoid reverse causality.

Type of Participant. This variable represents the type of participant within the Climate Challenge program. Most participants signed the agreement by March 1995, but some firms entered the program at a later date (end of 1995 to end of 1998). Early participants are those that enrolled in the program during the ceremony organized in March 1995 by the DOE, and late participants are those that enrolled in the program at a later date.¹¹ We create a categorical variable and coded non-participants as 1, late joiners as 2, and early joiners as 3.¹² This measure is used as dependent variable in the multinomial logit model for the first stage regression. The multinomial logit model provides an estimation of the likelihood that a given electric utility will participate in the Climate Challenge program as a late joiner or will participate as an early joiner. This model allows us to compare the effectiveness of different types of participants. Multinomial logit handles non-independence of these groups by estimating the models for all outcomes simultaneously, using one group as a baseline.

The participation model in the multinomial logit model is specified as follows (first stage):

$$\text{Pr ob (Types of Participant}_{i,t} = j) = \frac{e^{Z_{i,t-1}'\beta^{(j)}}}{\sum_{j=1}^J e^{Z_{i,t-1}'\beta^{(j)}}} \quad (\text{Model 2a})$$

where *Types of Participant* is the categorical dependent variable of this first stage and takes a value of 1 to 3 (i.e. $j = 1, \dots, 3$), depending the firms' group and $Z_{i,t-1}$ is the set of exogenous independent variables used as instruments.

¹¹ The numerical values are arbitrary and do not imply any ordination in the multinomial logit model. This unordered property distinguishes multinomial logit from other techniques, such as ordered logit and regression.

Second stage regression

In the second stage, we use the predicted values of participation and the types of participant to test whether they explained reductions in emissions. We used the changes in rates of CO₂ emissions (CO₂/Generation) from one year to another to assess the changes in the level of emissions.

Changes in CO₂ rates. We assess the outcome of the Climate Challenge program in terms of changes over time from 1996 through 2000. The variable changes in CO₂ emissions' rates reflects the changes in the rates between two consecutive years. We compute the differences in CO₂ emissions' rate between two consecutive years. The U.S. Environmental Protection Agency reports under the "Clean Air Market" section the amount of CO₂ emissions emitted by each utility. We divide it by the amount of net generation reported on the Form EIA-906.

$$\text{Change in CO}_2 \text{ rate}_i = \left(\frac{\text{CO}_2 \text{ emissions}_{i,t}}{\text{Generation}_{i,t}} \right) - \left(\frac{\text{CO}_2 \text{ emissions}_{i,t-1}}{\text{Generation}_{i,t-1}} \right)$$

This variable is normally distributed; we therefore use pooled regression and random-effect general least squares (GLS) panel regression. The formulation using this variable is the following (second stage):

$$\text{Changes in CO}_2_i = \delta \text{ Participation}_i + X_i' \gamma + \varepsilon_i \quad (\text{Model 1c})$$

$$\text{Changes in CO}_2_i = \alpha \text{ Late joiners} + \eta \text{ Early joiners} + X_i' \gamma + \varepsilon_i \quad (\text{Model 2c})$$

where the variable changes in CO₂ emissions' rate is the dependent variable that we use to measure the outcome of the Climate Challenge program. *Participation_i* is the predicted probability of participation in the Climate Challenge program obtained in the first stage using binary logit, and *X_i* is a set of control

¹² Of the 124 agreements signed with the Department of Energy, seven agreements were signed at the end of 1995, one agreement in 1996, eight in 1997 and two agreements in 1998. An agreement can represent several firms because they can be signed at the holding level.

variables that could also explain reduction in the change of CO₂ emissions' rate. The predicted probabilities for each group defined in the type of participant from multinomial logit are *late joiners* and *early joiners*. The category of *non-participant* is the baseline. The probability of participation is lagged 1 year. Because participation in the program is associated with activities that need time to undertake, it might be logical to argue that its impact requires a certain time lag (here we assume 1 year) before it affects the emissions of the firm.

Independent and control variables

First stage

The Climate Challenge program started in 1995 and ended in 2000 but firms could only enroll until 1999. In this first stage, we examine the motivations that explain the utilities' participation in the Climate Challenge program using the independent variables with 1 year lagged to avoid reverse causality. Therefore, the independent variables used in the first stage are data from 1994 until 1998.

As detailed in the previous section, we use two measures to proxy political pressure. The first one represents the regulatory expenses of the utility, and the second one is a measure of the environmental preferences at federal level, League of Conservation Voters, and at state and local level, State's environmental employees and Sierra Club.

Regulatory expenses. Following Welch et al. (2000), we include the annual amount of regulatory expenses paid by the firm as a proxy of regulatory agency pressure. The data comes from the Federal Energy Regulatory Commission Form Number 1. It reports particulars details of regulatory commission expenses incurred relating to format cases that are submitted to regulatory body, or cases in which such a body was a part. It includes, for example, the fees the Federal Energy Regulatory Commission, the costs of the dockets, etc.

League of Conservation Voters (LCV). We measure the pressure emanating from political/legislative actors by the voting record of each state's Congressional delegation (members of the US Senate and US House of representatives) in which the firm operates. Several researchers have used the scores of the League of Conservation Voters (LCV) as a measure of the elected representatives' preferences of a state (Hamilton, 1997; Hedge & Scicchitano, 1994; Kassinis & Vafeas, 2002; Lubell, Schneider, Scholz, & Mete, 2002; Ringquist & Emmert, 1999; Viscusi & Hamilton, 1999). Each year, the LCV selects environmental issues that constitute the environmental agenda with a panel comprising the main U.S. environmental groups. The organization then creates an index by counting the number of times each representative or senator in Congress votes favorably for the "environmental agenda" (e.g., global warming gag rule, tropical forest conservations, global climate change). The index ranges from 0 to 100, with 100 representing a record of voting with the environmental agenda in all cases. The variable is the average of the environmental scores of U.S. House of Representatives and U.S. Senators (Kahn, 2002; Levinson, 1999), weighted by the percentage of generation of each firm in each state for multi-states utilities.

State's environmental employees. Following Kassinis and Vafeas (2006), we measure the state's long-term commitment with the environment through the investment in people as a ratio of the state environmental agency employment to the total number of states employees. It captures the state's commitment to environmental protection and the institutional capacity to support that. We collect the data of state's environmental agency employees from Environmental Council of the States (ECOS), a national, nonprofit, nonpartisan association of states and territorial environmental commissioners and the total number of states employees from US Census Bureau.

Trade association's membership. We measure the links between the trade association and the utilities using the Edison Electric Institute membership. The Edison Electric Institute, created in 1933, is the association of US shareholder-owned electric companies. Its members serve 71 percent of the ultimate

customers in the U.S. and they generate almost 60 percent of the electricity produced by US electric generators. The Edison Electric Institute works closely with all of its members, representing their interests and advocating equitable policies in legislative and regulatory arenas. We create an indicator that reflects whether the utility is a member of the trade association taking the value 1, and 0 otherwise.

Sierra Club. As have previous studies (e.g. (Helland, 1998; Kassinis & Vafeas, 2002; Riddell, 2003) (Maxwell, Lyon, Hacket, 2000), we measure the environmental preferences of the population of the state in which the firm operates using the membership of one of the major environmental non-governmental organizations: the Sierra Club. Our measure of environmental preferences of the populace is the number of dues-paying members of Sierra Club per 1,000 state residents.

Environmental effort. Following Welch et al (2000), we include a measure of the firms' expenses for environmental purposes. It is the ratio of the environmental expenses divided by total operations expenses. Data were obtained from the Federal Energy Regulatory Commission Form Number 1. Under the category environmental expenses, utilities report the expenses and costs incurred due to operation of environmental protection facility. For example, it contains the costs of air and water pollution control facilities, the noise abatement equipments, the preparation of environmental reports, etc.

In the first stage, we also control for additional variables that may affect the probability to be an early or late joiner. These include the level of dirtiness of the state, the trade association's membership, the productive efficiency of the firm, whether the firm is a big player in its states of operations, and the size of the firm measured by its number of subsidiaries.

State dirtiness. The level of dirtiness of the state where the firm produces electricity might be a determinant factor in the decision of a firm to participate in the program. Dirtier states might be subjected to greater scrutiny by and pressure from environmental NGOs at the national level to undertake some action to reduce CO₂ emissions. Following King and Lenox (2000) and Kassinis & Vafeas (2002) we base

this measure using the state's toxic emissions (the total amount of on- and off-site toxic release) for all sectors. We collect this information from EPA's Toxics Release Inventory (TRI) database. The amount of total emissions is deflated by the state's land area. We construct a firm-level measure weighting this ratio by the percent of electricity generated by the utility in each state and year.

Productive efficiency. The ability to produce electricity efficiently has an important impact on a firm's profitability and on the availability of slack resources because electric utilities are highly capital intensive (Delmas & Tokat, 2005). Therefore, productive efficiency can be an alternative way to control for the availability of slack resources. We estimate productive efficiency using Data Envelopment Analysis (DEA) (Banker, Charnes, & Cooper, 1984; Charnes, Cooper, & Rhodes, 1978). The DEA technique uses linear programming to convert multiple input and output measures into a single measure of relative efficiency for each observation. Our construction of the measure of productive efficiency is derived from the work of Delmas and Tokat (2005), who analyzed the productivity consequences of deregulation in the electric utility sector. Data comes from the Federal Energy Regulatory Commission Form Number 1 (United States Department of Energy, FERC Form 1, 1994-1998). The productive efficiency of a firm in a specific year is computed by comparing it with all other firms in the same year, using a program written by Coelli (1996). We use an input-oriented productive efficiency measure, which seeks to reduce the input quantities without changing the output quantities. Following Majumdar and Marcus, we use the following items as *inputs*: labor cost; plant value; production expenses; transmission expenses; distribution expenses; sales, administrative and general expenses; and electricity purchased from other sources in Mwh (Majumdar & Marcus, 2001). We consider the following *outputs*: quantities of low-voltage sales (residential and commercial), high-voltage sales (industrial, interchanges out, and wheeling delivered), and electricity for resale to other utilities in megawatt hours. A firm's cost of supplying power to final consumers is affected by the type of customer it serves. High-voltage sales incur less transmission costs than low-voltage sales due to reduced operating and maintenance costs. Furthermore, wholesale sales are

less costly than both low- and high-voltage sales because they typically occur during less-costly, off-peak hours and entail larger quantities per transaction. We consider these three types of outputs separately because of their differing costs (Roberts, 1986; Thompson, 1997).

Big player. Visibility affects the level of social pressure that a firm is subjected to (Pfeffer & Salancik, 1978). Constituents of an institutional environment are more likely to take interest in an organization of which they are aware. For example, a dominant firm with a large market share will most likely be under the spotlight of environmental activists and the community concerning its environmental efforts. Research has noted that bigger and more visible firms are more likely to be the target of activism (Meznar & Nigh, 1995) and to participate in collective action (King and Lenox, 2000). To proxy visibility we follow Delmas and Tokat (2005), and compute the number of times that a firm is among the top four sellers in a state in any of the residential, commercial or industrial markets. For each year and state, we identify which firms were the among the four big players in their states using the retail sales from Form EIA-861 for the period 1994-1998, assigning the value 1 when the firm is a big player and 0 otherwise.

Number of subsidiaries. The size of the company has been used as one of the main predictors of participation in political activity (Hillman et al., 2004). Size is often a proxy for the availability of resources within the firm but also of the ability of the firm to impact the results of the collective action. It is often asserted that the fixed costs associated with environmental compliance are large enough to generate economies of scale that make it relatively cheaper for large firms to comply with regulations. It is reasonable to assume that the same is true for over-compliance. In addition, larger firms may have better access to capital markets and/or may engage in more R&D (Lyon & Maxwell, 2004). As a proxy of the size of the utility, we include the number of subsidiaries that belong to the firm, taken from the Federal Energy Regulatory Commission Form Number 1.

Year effects. We include dummy variables for the years 1996 to 1999 in the first-stage model. We omitted the 1995 dummy to avoid overdetermination.

Second stage

In the second stage, in addition to the predicted probability of participation in the Climate Challenge program, we include variables that could also explain changes in the CO₂ emissions' rate during the 1996-2000 timeframe.

Change in the percentage of fossil fuel used. The type of technology the firm uses for generating electricity might explain the emissions' rate. Firms that generate electricity from fossil fuels, especially coal, emit more CO₂ emissions than those that use renewable resources. To account for these differences, and following Welch et al (2000), we utilize the change in the percentage of generation from fossil fuel using data from Form EIA-906.

Change in the number of plants. Changes in the emissions' rate might be explained because firms are increasing their size, such as changing the number of plants that are under their operation. We compute the change in the number of plants under the ownership of a firm at t minus the number of plants owned by the firm at $t-1$ using data from Form EIA -906.

Year of installation of the generating units. The age of the installations of the generating units might have an impact on the CO₂ emissions' rate. It is associated with technology and capacity to be clean. We compute the average of the years of the installation of all the generating units that belong to the utility. Form EIA-860 reports the year of installation at the facility level. We aggregate this information at the firm level based on the percentage of ownership reported in the same database.

Merger Process with Gas or Electricity Utilities. We also control for the effects of merger activity that occurred during the course of the Climate Challenge program. From 1995 to 2000, 36 mergers or

acquisitions were completed between investor-owned electric utilities or between investor-owned electric utilities and independent power producers (United States Department of Energy, 2000). We measure whether an electric utility is merging with other electric power producers or with gas producers. A merger with an electric company is considered a related merger whereas a merger with a gas company corresponds to a diversification strategy. When a firm goes through a merger, there is uncertainty about whether the merger will be accepted and how to merge the assets of the companies. In addition, during the merger process, there can be changes in the structure of the firm. For example, firms could decide to downsize the labor force, adopt similar technologies in the merged facilities or retire some of their facilities. During this adjustment period, it is possible a firm will pay less attention to environmental performance and will pollute more. If the utility or its holding company goes through a merger process, then the indicator is 1 the year before until the year after the merger is completed (i.e. if the merger took place in year 1998, the indicator would be 1 for the years 1997 through 2000).

Information disclosure. The level of environmental information that firms are required to disclose in each state might affect their corresponding emissions. Some states require electricity suppliers to provide information regarding fuel sources and emissions associated with electricity generation. In our study, if the firm generates in a state that requires a full or partial environmental disclosure, the information disclosure variable takes the value 1 and 0 otherwise. We use information from the Database of States Incentives for Renewable Energy (DSIRE).¹³ For multi-state utilities, this variable is weighted based on the percentage of production within each state by the utility. Information disclosure was not required in the period previous to the creation of the Climate Challenge program.

¹³ The Database of States Incentives for Renewable Energy is an ongoing project of the Interstate Renewable Energy Council (IREC). <http://www.dsireusa.org/>.

Renewable Portfolio Standard. This variable captures the effect of operating in a state with an established renewable portfolio standard (RPS). These standards mandate that utilities generate a specified proportion of their energy from renewable sources. We first create a variable that takes the value 1 if the state has an RPS in place and 0 otherwise using the Database of State Incentives for Renewable Energy (DSIRE). For multi-state utilities, this variable is weighted based on the percentage of electricity produced within each state by the utility. Renewable portfolio standards did not exist in the period previous to the creation of the Climate Challenge program.

Year effects. We incorporate dummy variables for the years 1997 to 2000 in the second stage model. We omit the variable year 1996 that represents the changes between 1996 and 1995 to avoid overdetermination.

RESULTS

Table 1 displays the descriptive statistics for the first-stage regression and the second stage regression.

First stage: Participation model

Table 2 presents the results for the participation decision model using the binary logit and multinomial logit specification. As we discussed earlier, this methodology allowed us to compare the effectiveness of the participation and the different types of participants. The first column (model 1a) contains the results using the binary logit analysis predicting the probability to participate in the VA. The second column (model 2a1) shows the results of the multinomial logit predicting the probability of being a late joiner (as compared with being a non-participant). The third column (model 2a2) displays the results of the multinomial logit predicting the probability of being an early joiner as compared with being a non-participant. The fourth column (model 2a3) includes the results of the multinomial logit predicting the probability of being an early joiner as compared with being a late-joiner. Models 1 and 2 correctly classify 75.06% and 78.80% of the observations, respectively.

The multinomial logit model makes the assumption that categories are independent. This is called the independence of irrelevant alternatives assumption (IIA). We use a formal Hausman McFadden and Small Hsiao test, which confirmed the independence of our categories (Small & Hsiao, 1985).¹⁴

In the first model (model 1a), the variables regulatory expenses and League of Conservation Voters are positive and significant at the 5 and 1 percent level, respectively. Firms that pay a higher amount of regulatory expenses are more likely to enroll in the program. Firms that have a higher level of pressure from elected legislatures are more likely to enroll in the program. Looking at the same variables in the multinomial logit models (models 2a1, 2a2 and 2a3), we find that early joiners differ from late joiners and non-participants. The variables regulatory expenses and League of Conservation Voters are both significant for early joiners as compared with non-participants and compared with late joiners. However, these two variables do not differentiate significantly late joiners from non-participants. We therefore find evidence that firms that incur high regulatory expenses and a higher pressure from elected legislatures are more likely to be early joiners in the program. This confirms hypothesis 1 concerning the role of political pressure to predict early participation in the VA. The variable representing the number of state's environmental employees over the total number of employees- does not impact significantly the probability of the utility's participation in the Climate Challenge program. This could be explained by the fact that this variable may not represent the type of regulations or programs that impacts the electric utility and may more represent employees related to parks and such activities.

The variable representing trade association's membership is a significant predictor of participation at the 5 percent level. It is important to note that this variable is significant for early joiners as compared with non-participants and compared with late joiners. We therefore find evidence that firms that belong to the trade

¹⁴ Results available upon request from the authors.

association are more likely to enroll in the program and join it early. This confirms hypothesis 3 concerning participation in the trade association to predict early participation in the VA

With respect to the effect of existing resources, the variable environmental effort is positive and significant at the 1 percent level to predict participation and to differentiate early joiners from late joiners and early joiners from non-participants. This indicates that early joiners undertook more environmental efforts than late joiners and non-participants. This variable also differentiates late joiners from non-participants with a negative and significant sign at the 1 percent level. This means that late joiners have undertaken even less environmental efforts than non-participants. This confirms hypothesis 4 on the role of environmental efforts in distinguishing between early participant and late participants in the program.

Turning to the control variables, we find that size matters in explaining participation and differentiating among early and late joiners. The variable number of subsidiaries exhibits a positive and significant sign at the 1 percent level in all models. The bigger firms, measured as the number of subsidiaries owned by the firm, are more likely to join the program. The variable big player shows a positive and significant sign at the 1 percent level in models 2a2 and 2a3. Big players firms are more likely to enroll in the program earlier. The variable representing the productive efficiency of the firm is also significant and positive. This shows that the more efficient the firm, the more likely it will join the program. However, we note that early joiners and late joiners do not exhibit significant differences in the levels of efficiency.

In both analyses, our findings do not support the claim that the environmental preferences of the population measured by the number of Sierra's membership per 1,000 residents. This result differs from previous studies showing the effect of such a variable on environmental voluntary activities (Maxwell, Lyon, Hacket, 2000). This could be explained by the fact that the Climate Challenge Program is mostly an effort to pre-empt regulation and less to appease environmental NGOs who may have looked at this

particular environmental practice with suspicion.¹⁵ In addition, the level of dirtiness in the state in which the electric utility produces does not have a significant effect on the decision to enroll in the program.

Second stage: Outcome of Climate Challenge program model

Table 3 presents the regression results for the outcome of the Climate Challenge program with changes CO₂ emissions rates as the dependent variable (second stage). Models 1b and 1c display the regression results when the probability of participation from the first stage is introduced in the equation. Model 1b is the pooled regression while model 1c presents the random-effects general least square (GLS) panel model. Models 2b and 2c contain the results for the multinomial probabilities predicting late and early joiners. Model 2b is the pooled regression while model 2c includes the random-effects GLS regression. The Lagrangian Multiplier (Breusch & Pagan, 1980) suggested the use of panel rather than pooled estimation.¹⁶ The Hausman test (Hausman, 1978) showed that a random-effects model is more appropriate than a fixed-effects model.¹⁷

In the first models (1b and 1c), the probability of participation is not significant. This means that participants in the Climate Challenge program are not more likely than non-participants to reduce their CO₂ emissions. In the second models (2b and 2c), the probability of participation for early joiners is negative and significant at the 5 percent level. This shows that, within participants, only early entrants

¹⁵ This is the case of the Sierra Club who was particularly opposed to the Climate Challenge Program.

¹⁶ In the Lagrangian Multiplier Breusch, T. & Pagan, A. 1980. The Lagrange-multiplier test and its applications to model specification in econometrics. *Review of Economic Studies*, 47: 239-253. of random effects model, the test statistics of 3.13 for participation and 4.04 for types of participation allow us to reject the null hypothesis of zero variance at 10 and 5 percent level, respectively. This supports the use of panel rather than pooled estimation.

¹⁷ The Hausman specification test Hausman, J. A. 1978. Specification tests in econometrics. *Econometrica*, 46: 1251-1271. compares the fixed effects with the random effects model. It tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are (insignificant P-value, Prob>chi2 larger than .05) then it is appropriate to use random effects. In our case, the calculated tests statistics of 6.65 for participation (P=0.9191) and 8.84 for types of participants (P=0.8414) justify the use of random rather than fixed effects model.

reduced their emissions significantly more than non-participating firms. If a utility with an average of CO₂ emissions rate equals to 0.67 tons per Megawatthour in 1995 (the U.S. average of CO₂ emission's rate in the electric industry in that year) decides to participate early in the Climate Challenge program, would exhibit a CO₂ emissions' rate of 0.418 tons per Megawatthour in 2000 (the other variables being held constant). This means a relative decrease of 7.5 percent per year for early joiners as compared to a relative reduction of 2.5 percent per year for all participants (early and late joiners together). This confirms hypothesis 5 which states that early joiners are more likely to undertake substantive cooperation than late joiners.

Turning to the control variables, the variable representing change in percentage of generation from fossil fuel and change in the number of plants owned by the firm are positive and significant at the 1 percent level in all models. Firms that increased the percentage of their generation from fossil fuel increased their emissions rate. Firms that increased the number of plants they owned also increased their emissions rate. The variable year of installation is negative and significant at the 0.10 level, indicating that older plants are more likely to increase their emissions rate over time. The variables representing the merger process undertaken by the utility and the disclosure and renewable standard portfolio policies in the states where firm operates are not significant. This means that firms located in states where these policies are enacted do not reduce their emissions rate significantly more than others located in states without these policies. The dummies for years are statistically significant at the 10 percent level, except for the dummy associated with the year 1997, implying an incremental change in CO₂ rate in the years 1998, 1999 and 2000 compared with the reference year 1996.

DISCUSSION AND CONCLUSION

We have identified the factors that explain different types of cooperative behavior within VAs. We analyzed three types of cooperative behavior: non-cooperation, symbolic cooperation and substantive

cooperation. Our results show that early joiners and late joiners to the Climate Challenge program adopt different types of cooperative behavior. Symbolic cooperation is more likely with later entrants while substantive cooperation resulting in changes in emissions is more likely with early entrants.

We find that these differences in cooperative behavior are explained by the different institutional pressures and incentives that early and late entrants experience. Early entrants are subjected to a higher level of political pressure and had already undertaken efforts to reduce their emissions prior to joining the VA. They were also most likely to be a member of the trade association. When considering these characteristics, late joiners are also significantly different from non-participants. In particular, they had undertaken less environmental efforts than non-participants prior to the creation of the program.

Participants that engaged only in symbolic cooperation could potentially endanger the overall effectiveness of the VA. That is to say, even if early entrants reduce their emissions significantly more than non-participants, when we include late joiners in the analysis, the program overall does not seem effective. Overall the behavior of participants and non participants is not significantly different. Free-riding behavior might not be problematic for the viability of a voluntary program if it is limited to a small number of participants and if the result of their free-riding action is compensated by the good behavior of other participants. In that case the program might still have an overall positive benefit. In other words, participants have reduced their emissions significantly more than non-participants. However, free-riding behavior can detract from the overall effectiveness of the program. It is therefore important to test the impact of free-riders on the overall effectiveness of the program. The problem of free-riding certainly exists within other collective cooperative political strategies, but here we actually measure its extent.

Our research advances theory in several ways. We started by pointing out that the corporate political strategy literature was limited in its ability to explain differing collective action behavior because it treated cooperation as a dichotomous variable. Our findings show that it is very important to analyze various

discrete modes of cooperation. In our case, late joiners to the VA did face different pressures and incentives than non-participants that led them to free ride. By analyzing different behaviors within a VA, we were able to tease out the institutional pressures that explain symbolic cooperation.

More importantly, our findings differ from previous analyses. While previous studies had shown a positive relationship between the number and the quality of initial adopters and subsequent adoptions, we show that this might not be always the case. For example, Rosenkopf and Abrahamson suggest that initial adopters with strong reputations could intensify pressure on other organizations to imitate adoption (Rosenkopf & Abrahamson, 1999). The idea is that adoption by highly regarded firms supports imitation behavior because initial non-adopters may wish to associate themselves with these first adopters. Our results show that even if non-adopters decide to join the program to be associated with “high quality” early joiners, it does not mean they will commit to the same type of actions within a program. Therefore, the quality of early adopters does not guaranty the quality of the participation of later adopters. We have to look at other factors to explain the type of cooperative behavior. We find that coercive pressures and the availability of resources are the most important predictors of the type of cooperative behavior.

We also advance the corporate political strategy literature by identifying the features that could endanger the effectiveness of collective political strategies. We suggest that firms might use collective corporate political strategies to obtain relief from the coercive pressure of policy-makers but that these strategies may lose their effectiveness if there are too many free riders. Our results also show the importance of studying such strategies in a dynamic manner since firms’ cooperative strategies will vary with the timing of their entries in the VA. This is consistent with the call of several scholars to study in more detail the issue of timing in corporate political strategies (Bonardi, Hillman, & Keim, 2005).

Our study has several limitations. First, we study the factors that could reduce the effectiveness of VAs, but we do not assess whether this specific VA was successful at changing the political outcome. This

would necessitate identifying changes in the political landscape, independent from the Climate Change program, which reduced the level of threat that more stringent regulations would be put into place. Second, in our study we do not take into consideration the other strategic choices that firms could pursue outside their participation in a VA. Firms could pursue other individual strategies such as lobbying, for example (de Figueiredo & Tiller, 2000). Further research should look at the interaction of these various strategies and how they impact the likelihood of a firm to undertake substantive or symbolic cooperation within a VA. Third, we focused on cooperative strategies in the United States, and we showed that variations in political pressures exerted by regulators at the state level are an important predictor of cooperative strategies. In other contexts, scholars have shown that national regulatory environments impacted corporate political activity (Hillman & Wan, 2005; Murtha & Lenway, 1994). For example, Delmas and Terlaak have shown that participation in voluntary programs differs across nations (Delmas & Terlaak, 2002). It would be interesting to analyze the effect of differing national regulatory settings on the willingness of firms to cooperate within VAs. This issue is particularly important in the case of climate change that transbounds national frontiers.

Our findings are particularly relevant for policymakers. They suggest that policymakers who wish to design effective Environmental Agreements need to identify the factors that trigger substantive or symbolic cooperation within a VA. The U.S. Environmental Protection Agency has typically encouraged a group of very well known and successful organizations to take the lead in participating in voluntary programs, hoping that these firms would set the example. Our findings suggest that this strategy might not always be effective because followers might only collaborate symbolically and jeopardize the overall effectiveness of the program.

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TABLE 1
DESCRIPTIVE STATISTICS OF VARIABLES USED IN FIRST & SECOND STAGE REGRESSION ^a

First stage Model	Mean	Sd.	1	2	3	4	5	6	7	8	9	10	11
1. Participation ^b	0.60	0.49	1.00										
2. Regulatory expenses	2.65	3.21	0.10*	1.00									
3. League of Conservation Voters	46.09	22.31	0.08*	0.03	1.00								
4. State's environmental employees	3.88	1.44	-0.01	-0.13*	-0.27*	1.00							
5. Sierra Club	1.89	3.29	-0.03	0.08*	0.21*	0.02	1.00						
6. State's dirtiness	0.48	0.37	0.09*	-0.09*	-0.14*	0.21*	-0.11*	1.00					
7. Trade association's membership	0.80	0.40	0.15*	0.12*	-0.04	-0.01	-0.04	0.02	1.00				
8. Productive efficiency	0.88	0.15	0.16*	0.01	-0.24*	0.11*	-0.12*	0.13*	0.12*	1.00			
9. Environmental effort	3.83	3.53	0.07	-0.05	-0.10*	0.04	-0.07	0.16*	-0.01	0.02	1.00		
10. Visibility / <i>Big player</i>	0.83	0.38	0.08*	0.25*	-0.05	0.26*	0.12*	0.12*	0.15*	0.07	-0.03	1.00	
11. Number of subsidiaries	1.66	2.37	0.38*	0.12*	0.10*	0.16*	0.07	0.10*	0.21*	0.13*	-0.07	0.08*	1.00

Second Stage Model	Mean	Sd.	1	2	3	4	5	6	7	8	9
1. Change in CO ₂ emissions rate	0.07	0.31	1.00								
2. Change in % of generation from fossil fuel	-0.61	11.66	0.22*	1.00							
3. Change in the number of plants	0.50	3.75	0.29*	0.28*	1.00						
4. Environmental effort	3.68	3.15	-0.06	0.01	-0.04	1.00					
5. Year of installations (average)	1957.76	11.38	-0.10*	0.05	-0.13*	-0.03	1.00				
6. Merger process with electric util.	0.16	0.37	0.01	-0.08*	0.04	0.02	-0.01	1.00			
7. Merger process with gas utility	0.04	0.21	0.06	-0.09*	0.04	-0.06	-0.07	0.01	1.00		
8. Information disclosure	0.08	0.26	0.11*	-0.17*	0.22*	-0.04	-0.13*	0.07	0.01	1.00	
9. Renewables Portfolio Standard	0.07	0.25	0.05	-0.15*	0.09*	-0.10*	-0.14*	0.14*	0.03	0.25*	1.00

^A N=633. CORRELATIONS WITH AN ABSOLUTE VALUE GREATER THAN 0.08 ARE SIGNIFICANT AT 5% LEVEL.

^b 82 participating firms are included with 61 early joiners and 21 late joiners. The number of non-participating firms included in the sample is 51.

TABLE 2
LOGIT ESTIMATES OF PARTICIPATION IN CLIMATE CHALLENGE PROGRAM ^A

Model	Binary Logit	Multinomial Logit		
Dependent variable	Participants (Model 1a)	Late joiners (Model 2a1)	Early Joiners (Model 2a2)	Early Joiners (Model 2a3)
Reference group	Non- participants	Non- participants	Non- participants	Late Joiners
Regulatory expenses	0.078 (0.033)*	-0.020 (0.050)	0.085 (0.036)*	0.105 (0.049)*
League of Conservation Voters	0.017 (0.005)**	0.002 (0.006)	0.023 (0.006)**	0.020 (0.006)**
State's environmental employees	0.029 (0.081)	0.025 (0.102)	-0.024 (0.095)	-0.049 (0.110)
Sierra Club	0.008 (0.026)	0.022 (0.030)	-0.004 (0.034)	-0.026 (0.035)
State's dirtiness	0.140 (0.326)	-0.574 (0.450)	0.092 (0.366)	0.666 (0.457)
Trade association's membership	0.521 (0.250)*	0.023 (0.310)	0.952 (0.303)**	0.929 (0.354)**
Productive efficiency	2.513 (0.725)**	1.881 (0.940)*	3.492 (0.856)**	1.611 (1.028)
Environmental effort	0.091 (0.028)**	-0.174 (0.054)**	0.148 (0.033)**	0.323 (0.055)**
Visibility / <i>Big player</i>	0.499 (0.308)	-0.088 (0.392)	1.216 (0.377)**	1.304 (0.442)**
Number of subsidiaries	0.645 (0.078)**	0.446 (0.106)**	0.864 (0.098)**	0.418 (0.075)**
Year 1996	0.217 (0.297)	0.050 (0.395)	0.256 (0.340)	0.206 (0.409)
Year 1997	0.633 (0.298)*	0.048 (0.390)	0.195 (0.339)	0.147 (0.406)
Year 1998	0.508 (0.298)+	-0.135 (0.395)	0.018 (0.339)	0.153 (0.412)
Year 1999	0.569 (0.317)+	-0.004 (0.408)	0.051 (0.364)	0.055 (0.429)
Constant	-5.246 (0.849)**	-2.143 (1.072)*	-7.518 (1.044)**	-5.375 (1.232)**
Observations	633	633	633	633
% correctly classified	75.06%	78.80%		

^a Number of participating firms: 82 including 61 early joiners and 21 late joiners. Number of non-participating firms: 51.

Standard errors are in parentheses.

+ Significant at 10%; * significant at 5%; ** significant at 1%.

TABLE 3
REGRESSION ESTIMATES OF CHANGES IN CO₂ EMISSIONS' RATE 1996-2000^A

Dependent variable: Changes in CO ₂ rates (CO ₂ rate _t - CO ₂ rate _{t-1})				
	Pooled (Model 1b)	Random GSL (Model 1c)	Pooled (Model 2b)	Random GSL (Model 2c)
Probability of Participation	-0.091 (0.079)	-0.086 (0.085)		
Probability of Participation (late joiners)			0.043 (0.105)	0.056 (0.111)
Probability of Participation (early joiners)			-0.255 (0.114)*	-0.252 (0.121)*
Change in percentage of generation from fossil fuel	0.005 (0.002)**	0.005 (0.002)**	0.005 (0.002)**	0.005 (0.002)**
Change in the number of operating plants	0.033 (0.006)**	0.033 (0.006)**	0.033 (0.006)**	0.033 (0.006)**
Environmental Capital	0.005 (0.062)	0.010 (0.065)	-0.013 (0.062)	-0.008 (0.065)
Year of installations (average)	-0.003 (0.002)+	-0.004 (0.002)+	-0.004 (0.002)*	-0.004 (0.002)+
Merger process with electric utility	-0.053 (0.055)	-0.063 (0.055)	-0.055 (0.054)	-0.064 (0.055)
Merger process with gas utility	0.030 (0.097)	0.026 (0.099)	0.044 (0.097)	0.039 (0.099)
Information disclosure	0.036 (0.082)	0.025 (0.084)	0.006 (0.083)	-0.002 (0.085)
Renewable standard portfolio	-0.066 (0.086)	-0.059 (0.087)	-0.074 (0.086)	-0.067 (0.087)
Year1997	0.062 (0.060)	0.061 (0.059)	0.062 (0.060)	0.061 (0.059)
Year 1998	0.107 (0.063)+	0.108 (0.062)+	0.102 (0.062)+	0.104 (0.061)+
Year 1999	0.136 (0.063)*	0.139 (0.062)*	0.130 (0.063)*	0.133 (0.062)*
Year 2000	0.164 (0.069)*	0.171 (0.068)*	0.160 (0.068)*	0.167 (0.067)*
Constant	6.872 (3.512)+	7.081 (3.734)+	7.068 (3.504)*	7.243 (3.724)+
Observations	633	633	633	633
R-squared (adjusted model b / overall model c)	0.13	0.14	0.15	0.21
$\chi^2_{(Breusch-Pagan)}$		3.13+ [0.0767]		4.04* [0.0445]
$\chi^2_{(Hausman)}$		6.65 [0.9191]		8.84 [0.8414]

^a The estimates values are unstandardized coefficients. Standard errors are in parentheses. The corresponding p-values for Breusch and Pagan and Hausman tests are in bracket. + Significant at 10%; * significant at 5%; ** significant at 1%.