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# VOLUNTARY AGREEMENTS TO IMPROVE ENVIRONMENTAL QUALITY:

# ARE LATE JOINERS THE FREE RIDERS?

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**VOLUNTARY AGREEMENTS TO IMPROVE ENVIRONMENTAL QUALITY:**

**ARE LATE JOINERS THE FREE RIDERS?**


## Abstract

Within the context of environmental voluntary agreements (VAs), this paper analyzes how free riding affects the effectiveness of collective corporate political strategies that aim at shaping government policy. 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 Good, Non-Market Strategy

## INTRODUCTION

The literature on corporate political strategy focuses on the strategies used by firms 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 the rationales behind firms' political strategies, such as hiring lobbyists and forming political action committees (Baron, 2005; Hillman & Hitt, 1999). An important task for scholars and practitioners is to assess the degree of effectiveness of corporate political strategies. Corporate political activity represents a classic problem of collective action because legislative and regulatory decisions are not selective and affect all firms, even if they do so unevenly (Olson, 1965). Therefore, the benefits that firms seek from their corporate political activity will accrue, to some degree, 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, their effectiveness may be undermined. It is important for both firms and policy makers and to assess the risks and to understand under what conditions collective strategies could be attractive options.

However, this task has proven difficult both theoretically and empirically (Schuler, 2002). One of the research challenges is to assess effectiveness when firms' political strategies are carried out collectively via coalitions, partnerships and through trade associations. Collective political action complicates the analysis of a single firm's political action because it is difficult to identify each firm's contribution (King & Lenox, 2000; Schuler, 2002). Another complicating factor is that individual contributions may vary over time (Lenway & Rehbein, 1991).

In this paper we address these challenges with the analysis of the effectiveness of collective political strategies in the context of the natural environment. We examine firms' participation in the Climate

Challenge Program, a Voluntary Agreement (VA) established in 1995 by the U.S. Department of Energy (DOE) and representatives of the national electric utilities, to reduce greenhouse gas emissions and potentially mitigate the need for regulation in this arena. Our objective is to understand whether participants in the program reduced their emissions significantly more than non-participants and to understand differences in levels of cooperation within participants of the program. We hypothesize that firms' level of participation in the program vary with the timing of entry into the program and that early joiners are more likely to contribute substantially to the program than late joiners. We argue that these different types of cooperation are explained by the different institutional pressures and incentives that early and late entrants experience. Through an analysis of levels of cooperation within the Climate Change Program, this study contributes to the corporate political strategy literature by expanding the understanding of free riding and potentially the effectiveness of collective corporate political strategies. Further, by focusing on how institutional mechanisms, and political pressures frame selective incentives, our study combines previously separate theoretical perspectives to provide an explanation of various strategic behaviors within collective corporate actions, as well as how these vary over time.

## EARLY AND LATE JOINERS OF COLLECTIVE POLITICAL STRATEGIES

Building on collective action theory, the corporate political strategy literature argues that firms participate in collective corporate strategies primarily for material rewards rather than for the collective or public good that is at issue (Lenway & Rehbein, 1991; Yoffie, 1987). For example, Lenway and Rehbein use a cost benefit framework to predict a firm's involvement (Lenway & Rehbein, 1991). Thus the primary mechanism for participation has been shown to be economic. Other scholars have identified additional types of rewards for acting collectively which can include social rewards (such as enhanced reputation) and purposive rewards (doing the right thing) (Wilson, 1973). For instance, firms acting collectively in the context of the natural environment want to convince regulators that their voluntary practices can be

legitimately considered within a "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, a context that 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 differences in national institutional environments across countries drive differences in firms' political action, this stream of research still pays little attention to the social context in which firms operate and to the importance of changes over time (Bonardi & Keim, 2005; Hillman, 2003). Furthermore, collaborative behavior is often treated as a dichotomous variable with "participation" in collective action, becoming, with "non participation," the only alternatives when, in reality, collective behavior is much more nuanced. This is because firms' can adopt various levels of participation within collective action and also because behavior may change over time. Several scholars within the tradition of corporate political strategy research have begun to identify the selective incentives and mechanisms that trigger different levels of cooperation and how these vary temporally (Lenway & Rehbein, 1991; Yoffie, 1987).

The institutional literature provides an interesting, complementary approach to understand how social context shapes organizations' behavior. Institutionalists have argued that early adopters and late adopters of management practices and technologies face different pressures from their institutional environment and therefore may implement the same practice differently (Tolbert & Zucker, 1983; Westphal, Gulati, & Shortell, 1997). 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." They also find, in contrast, that 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 aim at increasing their legitimacy (Westphal et al., 1997). In addition, institutionalists contend that symbolic adoption, or decoupling of formal organizational structures from actual practices in the organization, is more likely when institutional forces are present and when a practice is adopted for legitimacy (Meyer & Rowan, 1977) rather than efficiency reasons. The institutional literature shows that managers can increase the legitimacy of their organization by adopting governance structures without changing actual practices, and that late joiners are more likely to act in this way (Westphal & Zajac, 1994; Zajac & Westphal, 1995).

In this paper, we combine corporate political strategy theory with 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. In this endeavor, we follow the path of Oliver, who argued for the integration of institutional theory with research on strategic motives (Oliver, 1991). Our model differs significantly from previous analyses and yields new findings on the effects of institutional and political pressures on corporate political strategies. 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 build on the work of Bansal who challenged the institutional assumption that institutional pressures are only present in the later stages of the adoption of a management practice (Bansal, 2005). 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.

## CORPORATE POLITICAL ACTIVITY THROUGH ENVIRONMENTAL VOLUNTARY AGREEMENTS (VAS)

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. DOE and national electric utilities to reduce greenhouse gas emissions. VAs are "collaborative arrangements between firms and regulators in which firms voluntarily commit to actions that improve the natural environment" (Delmas & Terlaak, 2001: 44). VAs vary in objectives and designs, and, as a result, offer different kinds of strategic opportunities for participating firms to influence political outcomes (Lyon & Maxwell, 2004). VAs can be designed to preempt regulation as a response to a regulatory threat, to provide flexibility with the implementation of existing regulation, and/or to influence the form of future regulation (Decker, 1998; Delmas & Terlaak, 2001; Maxwell & Decker, 1998; Segerson & Miceli, 1998). The Climate Challenge Program, created by the electric utility industry to pre-empt legislation relating to climate change, is a form of VA also known as a "negotiated agreement," one typically negotiated by an industry trade association (Delmas & Terlaak, 2001; Maxwell, Lyon, & Hackett, 2000), and therefore a type of collective corporate political strategy.

VAs differ from other political strategies identified in the literature such as information-based strategies, financial-incentives strategies, and constituency-building strategies (Hillman & Hitt, 1999). For example, although VAs might include an exchange of information between firms and regulators, this is not their main objective. VAs represent a quid pro quo where firms commit to provide a public good voluntarily in return for a potential private benefit. VAs also differ from self-regulation strategies that represent collective political strategies undertaken without government involvement (Bonardi & Keim, 2005; King & Lenox, 2000). There are two different forms of cooperation at work within VAs. The first one is among

firms within the industry who jointly decide to reduce their environmental impact voluntarily. This type of cooperation is usually orchestrated by the trade association. The second form of cooperation occurs between firms and government where they agree on a mutually acceptable arrangement.

The last decade, has seen an increase in the use of such agreements with more than 300 VAs in place in the European Union (Borkey & Leveque, 1998), and around 200 VAs launched in the U.S. (Darnall & Carmin, 2005). However, because most of these agreements lack explicit measures to sanction free riders, there are concerns that firms may enter a VA and cooperate only in a token fashion rather than undertake effective 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 participating firms actually meet the requirements of the programs (Arora & Cason, 1996; 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 that may explain why or why not requirements are met.

Firms face three choices of participation in a VA: first, participation and -cooperation where they improve their environmental performance. In undertaking actions to improve their environmental performance, these participating firms must accomplish organizational or technological changes that could lead to such improvement. 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, firms can refuse to participate in the collective activity and free ride on the behavior of other members of the industry who participate fully in the VA. Although the literature has focused mostly on these two options,

we take up the argument that there is a third: participation in the VA without substantive implementation of the VA's requirements. That is to say, firms might participate without actually improving their environmental performance. In this sense, participation in VAs may be only symbolic as firms decouple their practical actions from formal organizational structures (Meyer & Rowan, 1977). Consequently, we refer to participation in a 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 was a VA between the U.S. DOE and electric utility industry representatives to reduce, avoid or sequester 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 exceeded 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 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 U.S., 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

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

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, aiming to demonstrate that emissions reductions could be achieved voluntarily rather than through mandated regulation. Tom Kuhn, president of the Edison Electric Institute, made this 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" and 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 the DOE on Earth Day 1994 and (ii) individual agreements signed by the utilities from 1995 to 1999. 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 periodically with the DOE over 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 the use of carbon fuels such as natural gas, and increased generation using non-carbon sources such as renewable

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[2] About 40.5 percent of the U.S. $CO_2$ 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.

energy and nuclear power. In 2000, at the end of the Program, 124 participation agreements had been signed. The signatories 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. Even though each participating utility was subject to requirements to provide information about its greenhouse gas emissions, no limits were set on such emissions. Although the DOE reviewed the participants' annual, self-reported information during the course of the Program, no penalties 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 the differences over time in cooperative strategies among participants and between participants and non-participants. The Program permitted firms to enter the VA at various dates during its operation. This allows us to compare the cooperative behavior of early and late joiners. Furthermore, approximately half of the investor-owned electric utilities joined the Program. This enables a comparison of cooperative behavior between participants and non-participants.

Welch, Mazur and Breschneider evaluated the effectiveness of the Climate Challenge Program during its early years (Welch et al., 2000). According to their results, participating firms did not reduce their emissions significantly more than non-participants during the 1995-1997 period. The authors warned that these results have to be viewed with caution based as they are 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,

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

through 2000, allowing us not only to assess differences between late and early joiners, but also to consider a longer time period when evaluating the results of firms' $CO_2$ reduction efforts. In addition, we include a larger and more representative sample of firms (133 utilities), incorporating more variability in firm characteristics. The firms in our sample produced 61% of the U.S. electricity generated from 1995 to 2000 and 75% of the $CO_2$ emissions emitted by the electricity sector during that period. Moreover, we sought 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.

## HYPOTHESES

We develop below a model based on the concepts from institutional theory and the corporate political strategy literature to explain substantive and symbolic collective corporate strategy. We argue 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 drove a firm's decision to participate early in the Climate Change Program, to participate late, or to remain a non-participant. We focus on the two major constituents of the institutional environment of utilities: namely the Government and the industry association and on how utilities' relationship with these prior to the Program can explain collective cooperative behavior.

### Political Pressure

Even though the creation of a VA might help an entire industry avoid potential future regulations, not all firms will experience the same level of threat from these potential regulations and therefore neither the same benefits from pre-empting regulation. The corporate political activity literature shows that firms'

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

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 smaller areas with governmental authority issue different rules and regulations. We argue that differences in sub-national politics will impact the likelihood that firms will 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 incentive to participate in corporate political strategies. Regardless of federal standards, companies also face a complex set of environmental standards which again vary by state. A program that demonstrates the effectiveness of voluntary practices at the national level could also help influence future regulation at the state level.

Furthermore, in a federal context, firms may try to influence state congressional representatives by participating in VAs. These representatives may pay more attention to strategies undertaken by companies in their district. When congressional representatives are more prone to vote positively on more stringent environmental regulation, firms have more incentive to show them that improved environmental performance can be achieved voluntarily.

Additionally, there may be firm-specific characteristics that tend to make a firm subject to greater levels of political pressure (Bansal, 2005). For example, some firms may be temporarily or permanently more dependent than others on governments to obtain licenses to operate. In the electric utility sector, this may happen when firms are undergoing rate changes or when they want to bring new plants online (Bonardi, Holburn, & Vanden Bergh, 2006).

We argue that firms subjected to greater political pressure were more likely to have participated in the early stages of the Climate Challenge Program because the potential individual benefits they would derive from the VA would outweigh the costs of organizing a collective effort. These firms might have helped to

create the VA regardless of the action of other firms. In that sense, their decisions to participate in the VA resemble individual decisions 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 subjected to greater levels of political pressure within the state in which they operated were more likely to be early joiners of the Climate Challenge Program than firms that did not face such levels of pressure. It follows that firms operating in states with lower levels of political pressure would not have experienced the same desire to participate in a program at its initiation, and would have been more likely to wait and see what others do.

We therefore hypothesize as follows:

*Hypothesis 1a. Early participants in the Climate Challenge Program were subjected to greater political pressure than late joiners and non-participants.*

*Hypothesis 1b Early participants in the Climate Challenge Program were more dependent on local and federal regulatory agencies than late joiners and non-participants.*

**Links with the Industry Association**

Scholars have shown that the structure of communication networks influences the order in which potential adopters receive information about innovations and therefore the order in which they adopt them (Abrahamson & Rosenkopf, 1997; Westphal et al., 1997). For example, Westphal, Gulati, and Shortell (1997) showed that in earlier stages of the diffusion process, communication ties may help match innovations to organizations' unique efficiency needs. In the context of corporate political strategies, trade associations have been shown to play a central role in facilitating the emergence of such strategies (King & Lenox, 2000). Trade associations constitute industry networks that provide a central forum for

communication about political issues at stake (Rees, 1997). Firms participating in a trade association are therefore more informed about the impact of potential regulations on their activities than firms that do not participate in the association. They are also more likely to be informed about the negotiations that lead to the creation of a VA.

Firms participating in a 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 a context of continuous relations. Furthermore, because firms pay significant fees to join an association, firms that choose to join may do so because they agree with the policy of the association. Firms that are part of a trade association are therefore more likely to be the first participants in an action initiated by the association. We therefore propose the following:

> *Hypothesis 2. Early participants in the Climate Challenge Program were more likely to be members of the industry trade association than late joiners and non-participants.*

**Firms' Previous Environmental Investment**

Firms' resources and the ability of a firm to sustain the cost of collective action have been shown to be important explanatory factors in firms' involvement in such action (Lenway & Rehbein, 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 such as VAs: first, that firms with a high level of resources or slack resources will be able to afford political action; second, that firms with fewer resources will seek a political solution to their limited resources.

In our case, the levels of investment in environmental performance improvements prior to the initiation of the VA may have had an impact on the potential benefits of participating in a voluntary program. "Greener" firms, ones that have already invested in reducing their environmental impact before the initiation of a related VA, could be more likely to join one provided that it gives credit for their earlier

efforts. On the other hand, "browner" firms, those that have not invested in reducing their environmental impact prior to a VA, may use the agreement to improve their reputation as they need such improvement more than the others. Because there are rationales for both greener and browner firms to join a VA, the empirical evidence is mixed. One set of empirical studies shows that firms with larger percentages of emission reductions prior to making their participation decisions were more likely to participate in voluntary activities mainly to publicize their efforts (Arora & Cason, 1996; Khanna & Damon, 1999). In contrast, other studies show that firms with a lower environmental performance are more likely to undertake voluntary activities largely because they were under more pressure to do so (Bansal and Hunter, 2003; Konar & Cohen, 1997; Videras & Alberini, 2000). We argue below that both greener and browner firms had incentives to participate in the Climate Change Program but as affected by circumstances that varied over time.

Companies that have taken early steps on voluntary reductions of their emissions may find it advantageous to compel other, less committed competitors to follow suit (Hoffman, 2005). Scholars have suggested that chemical companies that had undertaken investments in safety and environmental improvements were behind 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 suggested that participating firms could potentially get future "credits" for their emissions reductions in the event that a tradable permit system were put into place. This provided an incentive for greener firms to participate, and to put their efforts on the record as soon as possible. Assuming that a future regulatory target would require a firm to reduce its emissions by a percentage from some base year, firms that act early to reduce $CO_2$ yet fail to register those

reductions early under a voluntary scheme are in danger of being penalized.[6] In summary, firms that have already started efforts to reduce their emissions are more likely to benefit from a program that gives them credit for their past experience, regardless of what other firms contribute.

In such a context, it seems logical that firms that have not yet undertaken efforts to reduce their emissions would resist the costs associated with initiating such a program. However, such firms could still benefit from participating in a program if it allowed them to be associated with greener firms. 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 good reputations can pressure other organizations to adopt a practice (Rosenkopf & Abrahamson, 1999). Principally, followers might want to be associated with "high-quality" first adopters to increase their external legitimacy. While late joiners may not have been subjected to the same political pressure to participate in a VA as early joiners, as time passes non-participants could become singled out as the black sheep of the industry, especially if their environmental performance is poorer. This situation arose with the Climate Challenge Program when non-participant firms where identified by some NGOs as bad performers. For example, nine months after the creation of the Program and 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."[7]

Therefore, we hypothesize that the level of environmental effort undertaken by a firm prior to the start of the Climate Challenge Program impacted not only the firm's participation decision but also the timing of

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[6] "Baseline protection" is the term of art used by firms and regulators to describe this phenomenon.

its participation. While firms that undertook environmental efforts prior to the creation of the Program had incentives to participate early to influence competition, the incentives for firms that had not yet undertaken such efforts became stronger for late joiners after a "critical mass" of participants had joined. This leads us to propose:

*Hypothesis 3. Late joiners of the Climate Challenge Program were less likely than early joiners and non-participants to have undertaken efforts to reduce their emissions prior to the start of the Program.*

**Substantive Versus Symbolic Cooperation**

Because firms' incentives are shaped by different institutional pressures that can 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 a program. Greater political pressure and strong trade association connections put early joiners under more scrutiny than late joiners. Additionally, if early joiners wish to impose a cost on competition, they need to provide evidence to their competitors that they are undertaking substantive action in order for their claim of reducing their emissions to be credible.

Institutional studies have found that firms might engage in symbolic management as a means of responding to institutional pressure (e.g., Edelman, 1992; e.g., Westphal & Zajac, 1998). As Oliver (1991: 155) notes, "from an institutional perspective…the appearance rather than the fact of conformity is often presumed to be sufficient for the attainment of legitimacy." In this way, 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

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[7] Southeast Power Report (1995): "Southern Company, Dominion Resources Dismiss 'Worst Polluter Allegations" Dec. McGraw-Hill, Inc: 13.

participation based on legitimacy does not explain specifically why the firms with worse performance are the ones seeking symbolic participation.

Indeed, symbolic participation could also been seen as manipulation by corporations that do not want to conform but use the institution to a different strategic end than conformity with the aims of the program, that of deflecting institutional pressures. Thus, firms could decide to participate in the Climate Challenge Program to avoid criticism for not joining, but without adopting any of the substantive changes associated with participation. Firms not entering into a VA may not only be considered to lack legitimacy, they might also send a negative signal, and encourage critics to review their performance Firms, then, may join a VA as a way to hide their poor performance.

Late joiners may perceive that the risks associated with symbolic participation are small. If a program clearly states that no penalties will be associated with free riders, firms face no threat of punishment for symbolic cooperation. Joining after the announced success of a program, a firm may not fear damaging the reputation of the program or being singled out. For example, in the case of the Climate Challenge Program, the DOE 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) by the year 2000. This represented approximately half (45%) of the total cuts that the U.S. pledged at the world environmental summit under FCCC in 1992 (DOE/FE0355, 1996). It is therefore possible that companies joining a program after such a point might have believed the program was already successful and that their lack of contribution would not endanger the program's perceived effectiveness. In addition, media attention to a VA may decline over time to focus on other issues (Hoffman, 1999). Later joiners may therefore be under less scrutiny than early joiners.

In summary, because early and late joiners face different incentives and pressures, we expect that they will adopt different cooperative behaviors within VAs. Specifically in relation to the Climate Change Program, we hypothesize as follows:

> *Hypothesis 4. Late joiners were more likely to cooperate symbolically while early joiners were more likely to cooperate substantively within the Climate Change Program.*

## EMPIRICAL ANALYSIS

To test our hypotheses, we collected data from different sources. From the DOE, we used the Climate Challenge "participation accords" and "letters of commitment" to identify participating firms.[8] We also used data on utilities' characteristics and environmental performance from the U.S. Federal Energy Regulatory Commission (FERC) Form Number 1 (U.S. DOE, FERC Form 1, from the U.S. Energy Information Administration (Forms EIA-860, EIA-861 and EIA-906), and from the U.S. Environmental Protection Agency Clean Air Market Program's website. After merging these databases, we retained 133 investor-owned electric utilities representing 61% of the total U.S. electricity production by utilities from 1995-2000 and 75% of the $CO_2$ emissions emitted by the electric sector during that period. Out of these 133 firms, 82 participated in the Climate Challenge Program. Our sample includes 46% of the total 124 signed agreements with the DOE.[9]

### Estimated Model and Dependent Variables

Our goal was 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 were likely to be influenced by the same factors (Anton, Deltas, & Khanna, 2004;

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[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

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 needed to correct for a potential endogeneity problem (Hartman, 1988; Heckman, 1978; 1979; Maddala, 1983). We therefore used a two-stage estimation model that determines simultaneously the outcome of program participation (here $CO_2$ 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 faced and that differed from previous studies was that, in the first-stage equation, we wanted to predict not only the probability of participation in the VA, but also to differentiate between early and late joiners. Because we wanted to understand differences among various types of participants, we modified the traditional first-stage equation to predict the likelihood that a firm would be a non-participant, a late joiner, or an early joiner. In the second stage, we used the predicted values of these various types of participants to test how voluntary cooperative strategies contributed to pollution reduction.

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 joiner and (3) early joiner. Both models are estimated by maximum likelihood (Greene, 2003).

**Participation.** This binary variable represents the decision of a 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 were used to identify participants and non-

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[9] An agreement can represent several firms. Non-investor owned utilities are not included in our analysis as they are not part of

participants and the year of enrollment in the Program. These were accessed through the DOE's website. We use this measure as a dependent variable in the binary logit model for the first stage regression (Model 1a). The binary logit model provides an estimation of the likelihood that a given electric utility would 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):

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

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 ($F(x) = e^x/(1+e^x) = 1/(1+e^{-x})$).

**Type of Participant.** This categorical variable represents the type of participant within the Climate Challenge Program. Early participants were those that enrolled in the Program during the official ceremony organized in March 1995 by the DOE, and late participants were those that enrolled in the Program at a later date (end of 1995 to end of 1998). The official ceremony of March 1995 was a high visibility event involving high level officials such as Al Gore. It marked the conclusion of more than a year of active negotiations between the industry and the DOE concerning the general "rules" of the Climate Challenge Memorandum of Understanding as well as the specific items included in each signed agreement. Utilities that signed the agreement after the official ceremony did not participate in the initial setting and configuration of the program. They did not show interest only after the Program was up running. There is therefore a significant difference between early joiners who participated in initial negotiations and late joiners who joined after the program was established and publicized outside of the

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the Federal Energy Regulatory Commission (FERC) Form 1 database.

industry. We created a categorical variable and coded non-participants as 1, late joiners as 2, and early joiners as 3. [10] This measure is used as a dependent variable in the multinomial logit model for the first stage regression (Model 2a). Our sample includes 82 participating firms with 61 early joiners and 21 late joiners. The number of non-participating firms included in the sample is 51. The multinomial logit model provides an estimation of the likelihood that a given electric utility would 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):

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

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, … , 3), depending the firms' group and $Z_{i,t-1}$ is the set of exogenous independent variables used as instruments.

In the ***second stage regression***, 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 $CO_2$ emissions ($CO_2$/Generation) from one year to another to assess the changes in the level of emissions.

**Changes in $CO_2$ rates**. We assess the outcome of the Climate Challenge Program in terms of changes over time from 1996 through 2000. The variable changes in $CO_2$ emissions rates reflects the changes in the rates between two consecutives years. We computed the differences in $CO_2$ emissions' rate between

[10] Of the 124 agreements signed with the DOE, 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.

two consecutive years across the whole period of the program. The U.S. Environmental Protection Agency reports under the Clean Air Market Program the amount of $CO_2$ emissions emitted by each utility. We divide this by the amount of net generation reported on Form EIA-906.

$$\text{Second Stage Dependent variable: Change in CO2 rate}_i = \left(\frac{\text{CO2 emissions}_{i,t}}{\text{Generation}_{i,t}}\right) - \left(\frac{\text{CO2 emissions}_{i,t-1}}{\text{Generation}_{i,t-1}}\right)$$

This variable is normally distributed; we therefore use pooled regression (Model 1c) and random-effect general least squares (GLS) panel regression (Model 2c).

The formulations using this variable are the following (second stage):

$$\text{Changes in CO2}_i = \delta\ \text{Participation}_i + X_i'\gamma + \varepsilon_i \qquad \text{(Model 1c)}$$

$$\text{Changes in CO2}_i = \alpha\ \text{Late joiners} + \eta\ \text{Early joiners} + X_i'\gamma + \varepsilon_i \qquad \text{(Model 2c)}$$

where the variable changes in $CO_2$ 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 variables that could also explain reduction in the change of $CO_2$ 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 be undertaken, before they affects the emissions of the firm.

**Independent and Control Variables in the First stage**

The Climate Challenge Program started in 1995 and ended in 2000 but firms could only enroll until 1999. In the 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 several measures as proxy for political pressure. The first one represents the regulatory expenses of the utility. The second one is a measure emanating from political/legislative actors by the voting record of each state's congressional delegation. The third one represents a proxy of the resources of the states allocated to the environment as measured by the environmental agency employment to the total number of the state's employees.

**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 came from the FERC Form Number 1, and report particulars of regulatory commission expenses incurred relating to prepare cases that are submitted to a regulatory body, or cases to which such a body was party. It includes, for example, fees paid to the Federal Energy Regulatory Commission or the costs of dockets.

**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, 2006; Lubell, Schneider, Scholz, & Mete, 2002; Ringquist & Emmert, 1999; Viscusi & Hamilton, 1999). Each year, the LCV selects environmental issues to constitute an "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 on the environmental agenda (e.g., on the global warning gag rule, tropical forest conservation, global climate change). The index ranges from 0 to 100, with 100 representing a record of voting for the environmental agenda in all cases. The variable is the average of the environmental scores of the U.S. House of Representatives and U.S. senators of the states

where each utility operated (Kahn, 2002), weighted by the percentage of generation of each firm in each state for multi-state utilities.

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

**Trade association membership.** We measure the links between the trade association and the utilities using membership of the Edison Electric Institute (EEI). Created in 1933, EEI is the association of US shareholder-owned electric companies. Its members serve 71 percent of end use customers in the U.S., and generate almost 60 percent of the electricity produced by U.S. electric generators. The Edison Electric Institute works closely with all its members, representing their interests and advocating equitable policies in legislative and regulatory arenas. We created an indicator that reflects whether a utility was a member of the trade association taking the value 1, and 0 otherwise.

**Environmental effort.** Following Welch et al. (2000), we include a measure of a firm's environmental expenses as the ratio of the environmental expenses divided by total operations expenses. Data were obtained from the FERC Form Number 1. Under the category of environmental expenses, utilities report the expenses and costs incurred due to the operation of environmental protection facilities. This contains, for example, the costs of air and water pollution control facilities, noise abatement equipment, the preparation of environmental reports, etc.

In the first stage, we also control for additional variables that may affect the probability of a firm being an early or late joiner. These include the level of pollution in the state, a proxy for the environmental preference in the state, the productive efficiency of the firm, whether the firm is a big player in its states of operations, and the size of the firm as measured by its number of subsidiaries.

**State pollution:** Firms located in states with higher levels of pollution might be subjected to greater scrutiny by and pressure from environmental NGOs to undertake some action to reduce $CO_2$ emissions and to participate in the Program. Following King and Lenox (2000) and Kassinis & Vafeas (2002), we base the measure of pollution using the state's toxic emissions (the total amount of on- and off-site toxic release) for all sectors. We collected this information from the EPA's Toxics Release Inventory (TRI) database. The amount of total emissions is divided 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.

**Sierra Club.** As have previous studies (e.g. Helland, 1998; Kassinis & Vafeas, 2002; Riddel, 2003) (Maxwell, Lyon, Hacket, 2000), we measure the environmental preferences of the population of the state in which a firm operates based on membership figures for one of the major environmental non-governmental organizations, the Sierra Club. The measure itself is the number of dues-paying Sierra Club members per 1,000 state residents.

**Productive efficiency.** The ability to produce electricity efficiently has an important impact on a utility's profitability and on the availability of slack resources as 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). Data came from the FERC Form Number 1 (U.S. DOE, 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 (Coelli, 1996). 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 megawatt hours (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 MWh (Roberts, 1986; Thompson, 1997).

**Big player.** Visibility affects the level of social pressure that a firm is subjected to (Pfeffer & Salancik, 1978). 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 provide a proxy for visibility we follow Delmas and Tokat (2005), and note whether a firm was 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 among the four big players in their states using the retail sales reported on Form EIA-861 for the period 1994-1998, assigning the value 1 when the firm was a big player and 0 otherwise.

**Number of subsidiaries**. The size of a 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 a firm but also of the ability of a firm to impact the results of collective action. As a proxy for the size of a utility, we include the number of subsidiaries that belong to a firm as taken from the FERC 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.

**Independent and Control Variables in the 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 $CO_2$ emissions rate during the 1996-2000 timeframe. This includes the variable of environmental effort from the first stage.

**Change in the percentage of fossil fuel used**. The type of technology a firm uses for generating electricity might explain its emissions rate. Firms that generate electricity from fossil fuels, especially coal, emit more $CO_2$ 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 change their size by 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 generating units could have an impact on $CO_2$ emissions rate as it is associated with technology and the capacity to be clean. We compute the average of the years of the installation of all the generating units that belong to a 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 (U.S. DOE, 2000). We measure whether an electric utility was merging with other electric power producers or with gas producers. During the merger process, there can be changes in the structure of a 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 pollute more. If the utility or its holding company went 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 generated in a state that required 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).[11] 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.

**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 had an RPS in place and 0 if not, 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.

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[11] Interstate Renewable Energy Council (IREC). http://www.dsireusa.org/.

## RESULTS

Table 1 displays the descriptive statistics for the first 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 discussed earlier, this methodology allows 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 of participation 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).[12]

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 paid a higher amount of regulatory expenses were more likely to enroll in the Program. Firms that had a higher level of pressure from elected legislatures were also 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 differed 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 with late joiners. However, these two variables do not significantly differentiate late joiners from non-participants. We therefore find evidence that firms that incurred high regulatory expenses and a greater pressure from elected legislatures were more likely to be early joiners in the Program. This confirms hypothesis 1 concerning the role of political pressure in predicting early participation in the VA. The variable representing the number of state environmental employees divided by the total number of employees- did not significantly impact the probability of a 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 impact an electric utility, and may relate more, for example, to the maintenance of parks and connected activities.

The variable representing trade association 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 late joiners. We therefore find evidence that firms that belonged to the trade association were more likely to enroll in the Program and to join it early. This confirms hypothesis 2 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 effort 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

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[12] Results available upon request from the authors.

environmental efforts than non-participants. This confirms hypothesis 3 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 using the number of subsidiaries owned by a firm, were 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 player firms were 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 was to join the Program. However, we note that early joiners and late joiners did not exhibit significant differences in 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 affected the behavior of utilities in regard to the Program. 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 which may in general have looked at this particular environmental practice with suspicion. In addition, the level of pollution in the state in which the electric utility produced did 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 in $CO_2$ 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 into 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. The Hausman test (Hausman, 1978) showed that a random-effects model is more appropriate than a fixed-effects model.[13]

In the first models (1b and 1c), the probability of participation is not significant. This means that participants in the Climate Challenge Program were not more likely than non-participants to reduce their $CO_2$ 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, among participants, only early entrants reduced their emissions significantly more than non-participating firms. If a utility with an average $CO_2$ emissions rate equal to 0.67 tons per MWh in 1995 (the U.S. average of $CO_2$ emissions rate in the electric industry in that year) decided to participate early in the Climate Challenge Program, it would exhibit a $CO_2$ emissions' rate of 0.418 tons per MWh 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 4, which states that early joiners were 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 10 percent level, indicating that older

[13] Results available from the authors upon request.

plants were more likely to increase their emissions rate over time. The variables representing mergers with electric and gas utilities are not significant. Firms undertaking mergers did not seem to be paying less attention to environmental performance than other firms. Likewise, the variables representing disclosure and renewable standard portfolio policies in the states where a firm operated are not significant. This could be explained because these programs were started toward the end of our study period and more time may be needed to show some effect on performance. 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 $CO_2$ rate in the years 1998, 1999 and 2000 compared with the reference year 1996.

**DISCUSSION AND CONCLUSION**

We have identified key factors that explain firms' cooperative behavior within VAs. We analyzed three types of cooperative behavior: non-cooperation, symbolic cooperation, and substantive cooperation. Non-cooperation represented the behavior of firms that did not participate in the VA. Substantive cooperation included participation in the VA associated with improvements in environmental performance. Symbolic cooperation signified firms that participated in the VA but did not improve their environmental performance significantly more than non-participants. Our results show that early joiners and late joiners to the Climate Challenge program adopted different types of cooperative behavior. Symbolic cooperation was more likely with later entrants while substantive cooperation resulting in changes in emissions was more likely with early entrants.

We found that these differences in cooperative behavior were explained by the different institutional pressures experienced by early and late entrants and by their previous levels of investments in environmental improvements. Early entrants were subjected to a higher level of political pressure at the state level, and more dependent on local and federal regulatory agencies. They were also better connected to the trade association. When considering investments in environmental improvements, late joiners were

also significantly different from early joiners and non-participants. In particular, they had undertaken less environmental effort than early joiners and non-participants prior to the creation of the Program.

We also assessed the overall effectiveness of the Program and found no significant difference between participants and non-participants in the reduction of their emissions. Even if early entrants reduced their emissions significantly more than non-participants, when late joiners are included in the analysis, the Program overall does not seem to have been effective. 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 free riding is compensated for by the good behavior of other participants. However, because free riding behavior can detract from the overall effectiveness of a program, it is important to assess and adjust for the possible impact of free riders on the overall effectiveness of a program. The problem of free riding certainly exists within other collective cooperative political strategies, but here we actually measured its extent. An important question remains: why would early joiners tolerate free riding? As Lenox suggests, it is possible that some members are willing to tolerate free riding rather than quit because their continued participation is necessary to maintain the institution (2006). As we show, early joiners have more at stake than late joiners. They are under more political pressure and are also more visible. Defection of substantive contributors to the program, would attract attention and conceivably even lead to the collapse of the agreement.

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 static and dichotomous. Helping to respond to the call by several scholars to study the issue of timing in corporate political strategies in more detail (Bonardi, Hillman, & Keim, 2005), we were able to tease out the institutional pressures that explain different types of cooperation over time. Our findings show that it is very important to analyze various modes of cooperation, and to understand their temporal variation. In particular, we highlighted some of the dynamics at stake within VAs that may encourage free riding and endanger the fate of such programs. We were also able to demonstrate how the social context in

which a firm operates impacts its level of engagement in collective corporate strategy. Early joiners and late joiners of the Climate Change Program operated in very different institutional fields. Early joiners were more connected than late joiners to the industry and more dependent on regulators. The analysis of VAs proved to be particularly interesting as a Corporate Political Strategy because these arrangements include both cooperation between firms and the government and also cooperation among firms. We show the importance of analyzing pre-existing relationships among these actors to predict the level of cooperation within VAs.

Our study also makes contributions to the institutional theory literature. This literature argues that early joiners are mostly interested in the technical efficiency of a practice while followers are subjected to more institutional pressures. In this stream of research, early joiners seem to function out of their institutional context. As Westphal, Gulati and Shortell noted, earlier adopters are "motivated by the opportunity for efficiency gains and free from the 'iron cage' of isomorphic pressures" (1997:374). In our study, we challenge these assumptions. We find that early joiners respond to institutional pressures and to political pressures at the state level, as well as to peer pressure exerted by their trade association. This is consistent with the findings of Bansal, who identified the presence of institutional pressures to explain the early adoption of environmental management practices (Bansal, 2005). Regarding late joiners, the institutional literature has shown that these respond primarily to normative pressures. In our study, however, we find that late joiners could adopt a strategic approach to their participation in the Program. In brief, they were seeking the benefits of participation achieved by the early joiners (such as benefits to their reputation and potentially forestalled regulation) without incurring the costs associated with substantive participation. The notion of free riding has not been explicitly included in previous institutional analyses, beyond the possible understanding of late joiners as free riders on the legitimacy established by early joiners.

We advance the institutional literature also by describing key pressures and incentives that early joiners face, and by linking them to performance. The institutional literature has sought mostly to explain convergence toward similar behavior or isomorphism. In our study, we link institutional pressures and incentives to divergence of behavior over time. Furthermore, while previous studies have shown a positive relationship between the number and the quality of initial adopters and subsequent adoptions, we show that this might not always occur. For example, Rosenkopf and Abrahamson suggest that initial adopters with strong reputations could intensify pressure on other organizations to imitate adoption (Rosenkopf & Abrahamson, 1999). Our results show that even if non-adopters decide to join the program to be associated with "high quality" early joiners --here firms that have undertaken efforts to reduce their emissions-- this 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 types of cooperative behavior. We find that institutional pressures and previous investments are the most important predictors of the type of cooperative behavior.

The electric utility sector constituted an opportune field to analyze the issue of the effectiveness of collective political strategies within the context of the natural environment for several reasons. Because the electric utility sector is highly regulated and also because electric utilities are among the leading polluters in the U.S., this is a sector where non-market strategies may be more prominent than in other sectors. However, collective political strategies in the context of the environment are starting to be at the forefront for many other industries facing increasing environmental regulatory oversight. This study can therefore illuminate collective corporate strategies such as VAs that are emerging in other sectors. Our model identifies conditions that trigger different types of behavior within VAs. We chose to study the Climate Challenge Program because it is representative of most of the VAs currently implemented, the majority without sanctioning mechanisms. Our findings also point to the limits of VAs lacking sanctions to

promote cooperative behavior, and are particularly relevant for policymakers. 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 an example. Our findings suggest that this strategy might not always be effective because followers may only collaborate symbolically and jeopardize the overall effectiveness of the program. We suggest that policymakers who wish to design effective environmental agreements need to adjust the design of VAs for factors that trigger substantive or symbolic cooperation.

Our study has several limitations. First, we studied the factors that could reduce the effectiveness of a VA in terms of its ability to get its members to cooperate substantively. However, we did not assess whether the Climate Challenge Program specifically was successful at changing political outcomes. This is beyond our study and would necessitate identifying, whether changes in the political landscape, independent of the Climate Change Program, reduced the level of threat that more stringent regulation would be put into place. Second, our study did not take into consideration the other strategic choices that firms could or did pursue outside their participation in the VA. Such choices could include lobbying, for example (de Figueiredo & Tiller, 2001). Further research is needed to look at the interaction of various strategies and how they impact the likelihood that a firm will undertake substantive or symbolic cooperation within a VA. Third, we focused on cooperative strategies in the U.S., showing that variations in political pressure exerted by regulators at the state level are important predictors of cooperative strategies. In other contexts, scholars have shown that national regulatory environments impact 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 is

particularly important in the case of climate change as the major transboundary issue of our time where the potential of VAs could be significant – either negatively or positively.

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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 pollution | 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 / *Big player* | 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<br>(0.033)* | -0.020<br>(0.050) | 0.085<br>(0.036)* | 0.105<br>(0.049)* |
| League of Conservation Voters | 0.017<br>(0.005)** | 0.002<br>(0.006) | 0.023<br>(0.006)** | 0.020<br>(0.006)** |
| State's environmental employees | 0.029<br>(0.081) | 0.025<br>(0.102) | -0.024<br>(0.095) | -0.049<br>(0.110) |
| Sierra Club | 0.008<br>(0.026) | 0.022<br>(0.030) | -0.004<br>(0.034) | -0.026<br>(0.035) |
| State's pollution | 0.140<br>(0.326) | -0.574<br>(0.450) | 0.092<br>(0.366) | 0.666<br>(0.457) |
| Trade association's membership | 0.521<br>(0.250)* | 0.023<br>(0.310) | 0.952<br>(0.303)** | 0.929<br>(0.354)** |
| Productive efficiency | 2.513<br>(0.725)** | 1.881<br>(0.940)* | 3.492<br>(0.856)** | 1.611<br>(1.028) |
| Environmental effort | 0.091<br>(0.028)** | -0.174<br>(0.054)** | 0.148<br>(0.033)** | 0.323<br>(0.055)** |
| Visibility / *Big player* | 0.499<br>(0.308) | -0.088<br>(0.392) | 1.216<br>(0.377)** | 1.304<br>(0.442)** |
| Number of subsidiaries | 0.645<br>(0.078)** | 0.446<br>(0.106)** | 0.864<br>(0.098)** | 0.418<br>(0.075)** |
| Year 1996 | 0.217<br>(0.297) | 0.050<br>(0.395) | 0.256<br>(0.340) | 0.206<br>(0.409) |
| Year 1997 | 0.633<br>(0.298)* | 0.048<br>(0.390) | 0.195<br>(0.339) | 0.147<br>(0.406) |
| Year 1998 | 0.508<br>(0.298)+ | -0.135<br>(0.395) | 0.018<br>(0.339) | 0.153<br>(0.412) |
| Year 1999 | 0.569<br>(0.317)+ | -0.004<br>(0.408) | 0.051<br>(0.364) | 0.055<br>(0.429) |
| Constant | -5.246<br>(0.849)** | -2.143<br>(1.072)* | -7.518<br>(1.044)** | -5.375<br>(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 $CO_2$ 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 | -0.086 | | |
| | (0.079) | (0.085) | | |
| Probability of Participation (late joiners) | | | 0.043 | 0.056 |
| | | | (0.105) | (0.111) |
| Probability of Participation (early joiners) | | | -0.255 | -0.252 |
| | | | (0.114)* | (0.121)* |
| Change in percentage of generation from fossil fuel | 0.005 | 0.005 | 0.005 | 0.005 |
| | (0.002)** | (0.002)** | (0.002)** | (0.002)** |
| Change in the number of operating plants | 0.033 | 0.033 | 0.033 | 0.033 |
| | (0.006)** | (0.006)** | (0.006)** | (0.006)** |
| Environmental Effort | 0.005 | 0.010 | -0.013 | -0.008 |
| | (0.062) | (0.065) | (0.062) | (0.065) |
| Year of installations (average) | -0.003 | -0.004 | -0.004 | -0.004 |
| | (0.002)+ | (0.002)+ | (0.002)* | (0.002)+ |
| Merger process with electric utility | -0.053 | -0.063 | -0.055 | -0.064 |
| | (0.055) | (0.055) | (0.054) | (0.055) |
| Merger process with gas utility | 0.030 | 0.026 | 0.044 | 0.039 |
| | (0.097) | (0.099) | (0.097) | (0.099) |
| Information disclosure | 0.036 | 0.025 | 0.006 | -0.002 |
| | (0.082) | (0.084) | (0.083) | (0.085) |
| Renewable standard portfolio | -0.066 | -0.059 | -0.074 | -0.067 |
| | (0.086) | (0.087) | (0.086) | (0.087) |
| Year1997 | 0.062 | 0.061 | 0.062 | 0.061 |
| | (0.060) | (0.059) | (0.060) | (0.059) |
| Year 1998 | 0.107 | 0.108 | 0.102 | 0.104 |
| | (0.063)+ | (0.062)+ | (0.062)+ | (0.061)+ |
| Year 1999 | 0.136 | 0.139 | 0.130 | 0.133 |
| | (0.063)* | (0.062)* | (0.063)* | (0.062)* |
| Year 2000 | 0.164 | 0.171 | 0.160 | 0.167 |
| | (0.069)* | (0.068)* | (0.068)* | (0.067)* |
| Constant | 6.872 | 7.081 | 7.068 | 7.243 |
| | (3.512)+ | (3.734)+ | (3.504)* | (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%.