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Green Clubs and Voluntary Governance: ISO 14001 and Firms' Regulatory Compliance

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Abstract

Voluntary programs have become widespread tools for governments and non-governmental actors looking to shape industry behavior. Voluntary programs can be conceptualized as club goods that provide non-rival but potentially excludable benefits to members. For firms, the value of joining an effective green club over taking the same actions unilaterally is to appropriate the club's positive reputation with stakeholders. Our analysis of about 3,800 US facilities indicates that joining ISO 14001, an important non-governmental voluntary program, improves facilities' compliance with government regulations. We conjecture that ISO 14001's efficacy stems from its relatively open membership standards and its focus on management systems that provide participants with private benefits while addressing the root causes of regulatory non-compliance. Many government sponsored voluntary programs may be designed to fail because their rigid standards exclude all but highly compliant firms and their focus on performance standards ignores key causes of regulatory non-compliance.

Introduction

Although voluntary programs have served as governance tools for thousands of years (Webb, 2003), in recent years voluntary programs have reemerged as important governance mechanisms across issue areas (Haufler, 2001). The US Environmental Protection Agency (EPA) has launched over forty voluntary programs, including the 33/50, Green Lights, Common Sense, and Energy Star programs involving more than 11,000 organizations (EPA, 2003). Along with the federal and state governments, several industry associations (American Chemistry Council, American Forest and Paper Association) and NGOs (Greenpeace, Friends of Earth) have launched their own voluntary programs. Three hundred voluntary agreements are in place in the European Union and there are around 30,000 local government programs in Japan (Borky et al., 1998). This paper focuses on voluntary environmental programs that seek to improve firms' compliance with public law and even take firms 'beyond compliance'. Given the policy salience of the voluntary approach, our paper investigates two questions: what types of firms adopt voluntary programs and how their institutional designs influence firms' compliance with public law.

We conceptualize voluntary programs as club goods that create non-rival but potentially excludable reputational benefits for subscribing members. Firms' actions as club members have advantages over the same actions taken unilaterally. This is because clubs typically are more visible (a pre condition for generating reputation), and therefore reap economies of scale in producing reputational benefits. While the collective pursuit of reputational benefits may provide efficiency gains, there are risks. Some firms may join the club but not comply with club standards. Such free riding could undermine the club's overall efficacy and legitimacy, and therefore make the club less attractive to current and future members. The issue then is how to

screen out potential non-compliers while helping those that join adopt club standards and improve their performance.

Designing voluntary programs requires balancing competing imperatives. Many environmental groups, suspicious that voluntary programs are greenwashes to cover firms' poor compliance records (Steinzor, 1998), demand that club sponsors stipulate stringent standards that limit membership to highly compliant firms. On the other hand, stringent standards may deter many potential participants, particularly those whose performance may improve the most by joining the program. Excluding firms with less than perfect compliance records may make the program appear ineffective because compliance leaders may not have room for improved compliance after joining the voluntary program. Indeed many government sponsored voluntary programs, saddled with stringent membership requirements, have had trouble attracting many members (Coglianese and Nash, 2001).

In this paper, we show how ISO 14001, a voluntary club sponsored by the International Organization for Standardization, has successfully negotiated this balance. ISO 14001 is perhaps the most important and visible voluntary environmental program, with over 36,000 registered facilities worldwide as of 2001, including 1,645 in the US, and a 50% per year growth rate since 1996 (ISO 2001). Drawing on data on nearly 3,800 facilities regulated under US Clean Air laws, our analyses show that firms with moderately strong compliance records and those which are frequently inspected by regulators are most likely to join ISO 14001. More importantly, our analyses indicate that joining ISO 14001 significantly improves these facilities' compliance with the law. This result persists even while controlling for facilities' previous compliance histories as well as addressing potential endogeneity issues between facilities' regulatory performance and their decision to join ISO 14001.

The strong regulatory performance of ISO 14001 certified facilities is important in light of criticism that ISO 14001 is less stringent relative to government and industry sponsored clubs. ISO 14001's standards prescribe members' internal environmental management systems (EMSs) rather than their performance objectives.[1] Furthermore, ISO 14001 was established and managed by a non-governmental organization and consequently lacks the strong coercive "stick" that lies behind government regulation. Nor does ISO 14001 have strong backing from an industry association that is looking to improve its members' collective reputations.[2] Hence, ISO 14001 could be termed a weak club.

The efficacy of ISO 14001 suggests important lessons for the institutional design of effective voluntary clubs. We conjecture that ISO 14001 improves compliance because its eligibility criteria are sufficiently broad to attract large numbers of participants, including those with less than perfect compliance histories, and because it prescribes participants' EMSs. The EMS focus helps overcome free riding (Olson, 1965) because firms have strong private reasons for adopting effective environmental management practices, such as saving costs through waste reduction (Montabon et al., 2000). Moreover, ISO 14001's EMS standards direct members' attention to root causes of regulatory non-compliance, such as ignorance of environmental regulations (Brehm and Hamilton, 1995). In the remainder of this paper, we first introduce voluntary environmental programs and place them in the context of governmental regulations and club theory. We then summarize ISO 14001 and its key institutional features. Next, we present our data and analytic methods for evaluating why firms join ISO 14001 and how joining

[1] Examining the efficacy of ISO 14001 in the U.S. context is interesting for another reason: U.S. adoption rates compare poorly with other OECD countries. As of 2001, 5556 facilities have been certified in Japan, 2534 in the United Kingdom, 1260 in Germany, and only 1042 in the U.S. (ISO 2001). These differences become more pronounced after factoring in the relative sizes of the national economies. Thus, the U.S. itself is a hard case for demonstrating the efficacy of ISO 14001.

[2] The chemical industry's Responsible Care Program and the Forestry Industry's Sustainable Forestry Initiative can be viewed as industry-level responses to 'collective reputation' problems. In both instances, the industry associations have mandated that their members join the respective voluntary programs.

influences regulatory performance. Finally, we discuss the results of our analysis and conclude by discussing the implications of our study for theories of governance and institutional design.

Mandatory Regulations and Voluntary Programs

Regulation involves the use of governmental authority to permit, prescribe, or prohibit private actors' behavior (Ostrom, 1990). The command and control approach represents the traditional style of government regulation; regulators prescribe legally binding performance standards such as emissions limits or the use of specific (or best available) production technologies. Regulators are expected to monitor firms' compliance with these standards and sanction those found out of compliance. In the U.S., federal command and control expanded in the early 1970s with the passage of major environmental legislation such as the Clean Air Act and the Clean Water Act. By the 1980s, it became clear that while initially successful, diminishing returns to command and control regulation were setting in (Ayres and Braithwaite, 1992; Fiorino, 1999). Businesses complained that technology-forcing regulation coupled with rigid enforcement created high compliance costs that hurt productivity and profits (Jaffe et al., 1995; Walley and Whitehead, 1994). For regulators, command and control regulation has been resource and enforcement intensive. Declining agency budgets (especially in the U.S.) relative to regulatory mandates may undermine enforcement frequency and efficacy (GAO, 1983; Bagby, Murray and Andrews, 1995). To illustrate, between 1996 and 1998, less than one percent of the 122,226 large regulated facilities nationwide were inspected for all three pollution media (Hale, 1998). While command and control regulation may be more effective than no regulation, its high costs both for regulators and regulatees suggest there may be more effective and efficient regulatory approaches. Voluntary programs offer one such approach.

Voluntary programs require participants to incur specific private costs for producing a more general good for society's benefit. Excludable reputational benefits are expected to align firms' benefits and costs, thereby creating incentives for them to join the program and provide the public goods it offers. For firms who become members, such voluntary programs are impure public goods, or more specifically club goods (Tiebout, 1956; Buchanan, 1965; Cornes and Sandler, 1996)[3] whose discrete consumption units cannot be priced. Membership fees (reflecting average costs instead of marginal costs) are used to finance club good provision.

Club (or program) sponsors develop, monitor, and enforce their club's standards for members. For sponsors, clubs promise to improve members' performance while reducing enforcement burdens through members' self policing systems (Innes, 2001). For members, the club's reputational benefits are excludable but non-rival (Cornes and Sandler, 1996). The benefits of club membership are made excludable by an enforceable branding certification that allows members to publicize their membership in the club and thus claim credit for their pro-environmental activities. Such branding reduces transaction costs for various stakeholders to distinguish members from non-members, and if the club is credible, provides information about how members are complying with regulations and thereby protecting the environment. The value of joining a green club over taking the same actions unilaterally is to appropriate the club's positive reputation with stakeholders. Consumers and shareholders who demand superior performance may pay a premium for club members' products (Charter and Polonsky, 1999). Suppliers such as banks and insurance companies may reward firms that join voluntary environmental programs (Schmidheny and Zoraquinn, 1996). Regulators may reward members by granting regulatory flexibility or other compliance incentives. From a strategic perspective,

[3] **Toll goods such as movie theaters are another type of impure public goods. Toll goods can be unitized whereby consumers reveal their preferences by paying for every additional unit so that tolls for each use produce relatively efficient transactions for each use of the good (Prakash, 2000).**

strong green clubs may help preempt more stringent regulations and favorably influence future rulemaking (Salop and Scheffman, 1983), thereby creating first-mover advantages (Nehrt, 1998).

Clubs may also carry benefits that accrue to members privately through their internal operations rather than externally through stakeholder goodwill. For example, a focus on pollution reduction can help to uncover waste and save costs (Hart, 1995; Porter and Van der Linde, 1995) and improve production processes and technologies (Montabon et al., 2000). As we pointed out earlier, if non-compliance is rooted in ignorance of the law or inadequate internal systems to oversee compliance, EMS systems can help firms reap private benefits in this regard.

There are two categories of costs to club membership: an initiation fee and ongoing membership dues. Such costs are tangible as well as intangible. For green clubs, initiation fees are reflected in the costs of the steps applicants take to receive initial certification as bona fide members. Membership dues are the ongoing costs of adhering to those membership standards over time. For green clubs, costs are generally not direct payments to club sponsors. Rather, they are the monetary and non-monetary costs of adopting and adhering to the club's program requirements. The distinction between initiation fees and dues is important because club sponsors have an easier time monitoring the payment of initiation fees than ongoing dues.

For green clubs to produce the broader collective benefits of superior compliance with public law, they must first overcome their internal collective action problems. Members face incentives to shirk because the benefits of the club's reputation accrue to all members, even laggards with substandard regulatory performance. Members could pay the initiation fee and formally adopt the club's codes of behavior but not implement the club's requirements. If enough members follow through on such incentives, the club is not likely to be credible or endure for long. Of course, such shirking can be reduced if the sponsors effectively monitor and

sanction members' non-compliance, or if members receive sufficient private (and thus excludable) benefits from joining, such as improved profits from streamlined production processes. Green clubs vary in their capacities to monitor and sanction, with stronger clubs having stronger enforcement regimes and weaker clubs, including ISO 14001, having less elaborate enforcement mechanisms. Green clubs also vary in the extent to which they provide participants with private benefits that do not depend on the club's positive reputation with external stakeholders.

An important question surrounding green clubs is whether members' behavior is different from what they would have done had they not joined. Recent literature has examined this question in terms of firms' environmental and regulatory performance.[4] The evidence on environmental performance is mixed. Khanna and Damon (1999) find that the releases of the chemicals targeted by the US EPA's 33/50 program declined significantly post adoption; hence this voluntary program was efficacious. However, King and Lenox (2000) report that releases of toxic chemicals did not decline faster for firms that participated in the chemical industry's Responsible Care program compared to those that did not. Welch et al. (2000) also find that participating electric utilities in the US EPA's Climate Change program did not reduce their CO_2 emissions more than non participants. Regarding regulatory performance, Dasgupta et al. (2000) report that adopting environmental management practices along the lines prescribed by ISO 14001 improved Mexican facilities' self-reported compliance with public law. This paper contributes to the burgeoning literature on the overall efficacy of voluntary programs.

[4] **Another literature focuses on the stock market's reaction to the *mandatory* releases of environmental information such as the Toxics Release Inventory in the U.S. For example, TRI information is an exogenous shock that analysts had not accounted for when valuing stocks prices. Hence, the release of such information caused stock prices to fluctuate (Hamilton, 1995; Konar and Cohen, 1997; Khanna et al, 1998).**

ISO 14001

The International Organization for Standardization, the Geneva-based international body of national standards institutions, launched ISO 14001 in 1996. Founded in 1947, ISO has established over 12,000 international technical standards to facilitate international trade and commerce. ISO 14001 builds on ISO 9000, the successful voluntary code for quality management launched in the 1980s. In October 1996, the ISO launched the ISO 14000 series, consisting of a 'mandatory' guideline for environmental management (ISO 14001), and several non-mandatory guidelines governing environmental labeling (14020 and 14021), environmental performance evaluations (14031), and life cycle assessment (14040-43, 14048-49).

The explicit goal of ISO 14001 is to improve businesses' regulatory and environmental performance by having participating firms adopt stringent EMSs (ISO, 2002). The theory is that if appropriate management systems are in place, superior performance will follow. To receive ISO 14001 certification, a facility must undertake an initial review of its environmental practices, formulate and implement an action plan with ongoing performance targets and clearly identified internal governance responsibilities for environmental issues, and make necessary corrections to address identified environmental problems. Although firms can self-audit and declare themselves to be in compliance, ISO strongly encourages firms to receive third-party audits and certification (ISO, 2002).

In addition to the cost of hiring auditors, ISO 14001's third-party audits impose an additional intangible cost: external audits may uncover firms' regulatory violations. Firms may be more reluctant to conduct audits without attorney-client privilege protections because government regulators may punish self disclosed violations. Hence, the regulatory context, especially how regulators respond to self-reported violations, could have a crucial bearing on

firms' assessments of the net benefits of joining ISO 140O1 (Pfaff and Sanchirico, 2000).

ISO 14001's institutional design provides grounds for critics' skepticism over whether members will improve their regulatory performance. First, ISO 14001 is sponsored by an NGO and was developed with heavy input from multinational corporations. Environmental groups are suspicious of industry self-regulation. Second, ISO 14001 has loose boundary conditions: all firms are eligible for ISO 14001 membership, even those with poor compliance records. Contrast this with some voluntary programs sponsored by. state governments and the federal government (the so-called performance track programs) that are limited only to firms with established records of superior performance. Third, ISO 14001's membership dues and its asset-specific investments are low. The initial cost of ISO 14001 certification is high: establishing an EMS and having it audited by a third-party can cost from $25,000 to over $100,000 per facility (Kolk, 2000). But once certified, ISO 14001 does not require members to demonstrate improvements in regulatory compliance to maintain membership; it only seeks their commitment to do so and views the establishment of management systems as evidence of such commitment. Further, because membership does not require investment in assets specific to ISO 14001, the costs of ending membership in the club are low. Thus, firms may have incentives to behave opportunistically by joining ISO 14001 without following its mandate (Williamson, 1985). Fourth, ISO 14001 does not have sanctions that are specifically aimed at laggards. Arguably, ISO 14001 is a weak club and presents a difficult case to demonstrate the efficacy of green clubs.

Yet, on other grounds, ISO 14001 may be precisely the type of voluntary program one would expect to be effective. By focusing on management practices, ISO 14001 may provide important private benefits to participants, thus helping to solve the dilemma surrounding the club's collective reputational benefits. In one survey, facility managers reported that adopting

ISO 14001 significantly reduced waste within their facilities' production processes, lowered costs, improved product quality and caused their company to investigate alternative technologies and procedures (Montabon et al., 2000). These private benefits may spur a virtuous cycle of trust begetting more trust, as members are more likely to contribute to the collective good (maintaining the club's reputation) because they trust other members' private incentives to do so as well (Scholz and Lubell, 1998). ISO 14001 may also be effective because its relaxed membership criteria and flexible management standards may make it available to firms with less than perfect regulatory compliance records who have room to realize improvements. And, if facilities' noncompliance stems from poor management, such as ignorance of regulatory requirements (Brehm and Hamilton, 1996) or other internal problems (Dasgupta et al., 2000), ISO 14001's EMS focus may make it not just attractive to potential members, but also effective in improving their regulatory performance. Effective environmental management, such as those prescribed by ISO 14001's standards, can help identify and correct regulatory problems before they become violations. This is particularly true in the context of US air pollution where regulations prescribe control technologies (such as "best available control technology") rather than facility-level emissions limits.

Empirical Model

This paper investigates whether ISO 14001 improves participants' compliance with public law. We are also interested in why facilities join ISO 14001, and whether facilities' compliance status and regulatory climate influence their ISO 14001 certification decisions. We therefore examine whether ISO 14001 appeals more to facilities with better or worse compliance histories compared to those not joining. We focus on facilities regulated under state and federal

air pollution regulations. These facilities meet air pollution emissions thresholds in order to be tracked by the EPA's Toxics Release Inventory (TRI) program and are classified as "major sources" under US clean air laws. We examine air pollution regulation because it is an important policy area and because states exercise some degree of influence in shaping their own regulatory approach (Ringquist, 1993; Potoski, 2001; Gerber and Teske, 2000).

Our analyses are complicated first by the fact that facilities' decisions about whether to participate in ISO 14001 are likely to be endogenous to their regulatory performance. That is, some of the observed and unobserved factors that influence joining ISO 14001 are also likely to influence regulatory performance (Khanna and Damon, 1999; Welch et al., 2000). We use a treatment effects model to account for the effect of non-random assignment among ISO 14001 certified and non-certified facilities on their regulatory performance (Greene 1999; for applications see Schneider et al. 2003; Lubell et al., 2002). Similar to a Heckman correction, this is a two step model that first estimates a probit model for why facilities join ISO 14001 and then estimates a linear model of facilities' regulatory performance with independent variables including a measure of whether a facility joined ISO 14001, adjusted for potential endogeneity between facilities' decisions to join ISO 14001 and their regulatory compliance.

Below we describe the data in our analyses. We begin with firms' motivations for joining ISO 14001 and then discuss factors influencing facilities' compliance during a two year period (2000-2001). The two sets of variables contain considerable overlap. For example, facilities may be more likely to join ISO 14001 if they receive frequent government inspections and frequent government inspections may improve facilities' compliance with environmental regulations. Since ISO 14001 was launched in late 1996, we control for such endogeneity problems by using information from 1995 and 1996 where possible and by using the treatment regression approach

(Greene 1999).

The treatment effects model can be identified in two ways. First, as with instrumental variables models, we can include a variable that is correlated with the endogenous variable that is not correlated with the error term and does not affect the dependent variable conditional on the other variables in the model. We choose to use the emissions variable as our instrumental variable on theoretical and empirical grounds. On empirical grounds, *emissions* is only weakly correlated with our dependent variable (r = .05) and, as we show in Table 2, in its regular and squared forms is strongly correlated with our selection dependent variable (ISO 14001). To some extent, we control for production via facility size (number of employees) and SIC code. Second, the model includes the predictor rho from the first stage equation, in a manner similar to the Inverse Mills Ratio in a Heckman selection model. Since this variable is a non-linear function of the variables in the selection equation, the second stage model is identified even without instrumental variables via the normality assumption for the probit model (see Greene 1999). Our results do not hinge on whether or not we include emissions in the second stage analysis.

We also investigated alternative specifications for our dependent variable, including (1) a probit model where the two categories distinguish whether or not a facility was out of compliance for at least one month, (2) an ordered probit model where the three categories pertain to compliance for the entire period, in compliance for a part of the period, and out of compliance for the entire period, and (3) an event count model for the number of months out of compliance. For these approaches we used two-stage instrumental variables techniques (King and Lenox, 2000; Welch et al., 2000; Khanna and Damon, 1999); the results were substantively identical to treatment effects model presented here.

Motivations for Joining ISO 14001

We measure whether a facility joined ISO 14001 by 2001 with the list of certified facilities published by the Center for Energy and Environmental Management (2000, 2001). We identify several observable factors that can influence a facility's decision to join ISO 14001. Information on facilities' regulatory compliance comes from the AIRS/AFS subsystem of the EPA's Integrated Data for Enforcement Analysis (IDEA) system. Emissions data are from the EPA's Toxics Release Inventory. Other measures are drawn from Dunn and Bradstreet's Million Dollar Directory and other sources as discussed below. Our sample contains 3,798 facilities, 151 (4%) of which were ISO 14001 certified as of December 2001.

We expect that joining ISO 14001 may be least attractive for facilities that are either always in compliance or always out of compliance. This is because the always-in-compliance facilities may not need the additional help from ISO 14001 to remain in compliance, while always out of compliance companies may not believe that ISO can improve their regulatory performance since their problems may be more deeply rooted than what an EMS can fix.[5] The midrange companies - those marginally out of compliance - may find ISO 14001 most attractive because improving their EMS may provide solid benefits for regulatory compliance and in other areas such as waste reduction. To investigate these issues, we include measures of each facility's regulatory enforcement and compliance history drawn from the EPA's AIRS/AFS system and included in its IDEA database. We measure facilities' previous regulatory compliance *(Compliance 1995-6)* with the proportion of months that a facility is out of compliance over two

[5] Arguably, always-in-compliance firms may want external verification of their regulatory performance and ISO 14001 may help in that. Always-out-of-compliance firms may see ISO 14001 as a tool to help them get in compliance, especially in jurisdictions where regulators have indicated that certification will lead to lesser penalties. Our paper provides an empirical analysis of this issue.

year periods (1995-1996). We also include the measure $Compliance_{1995\text{-}96}^{2}$ since the effect of compliance on joining ISO 14001 may vary across levels of compliance.

Emissions is the amount of air pollution emissions released by the facility in 1995 and 1996 as recorded in the TRI data, weighted by the pollutant's toxicity (King and Lennox, 2001). Since additional units of pollution may have a decreasing and perhaps negative marginal impact on whether firms join ISO 14001, we also include the measure $emissions^{2}$ (emissions squared). We expect that joining ISO 14001 may be least attractive for facilities that are either high polluters or low polluters. Again, we expect this is because the low polluters may not need the additional help from ISO 14001 to improve compliance. In addition, there may be a declining marginal benefit from joining ISO 14001 at higher pollution levels.

We measure several dimensions of the state regulatory context facing facilities. We begin with the assumption that green clubs operate in the shadow of public law and public regulatory institutions. Thus, in many ways, the attractiveness of a green club depends on its fit with extant regulatory structures. Governments make such green clubs cohere better with existing institutions through the mix of regulations, enforcement practices, and other programs they offer. Many states have developed their own voluntary self-policing programs, including some that have explicit EMS requirements. Some programs stipulate membership criteria, such as superior compliance histories. We measure states' voluntary programs with two dummy variables, *state EMS program,* scored one if the facility is located in a state that sponsors its own EMS-based voluntary program, and *state non-EMS program,* scored one if the state sponsors a voluntary program that does not include an EMS component as reported in Crowe (2000). Our expectation is that the presence of voluntary programs, particularly EMS-based programs, encourages ISO 14001 adoption.

Regulatory stringency and regulatory flexibility are expected to significantly influence firms' perceptions of the attractiveness of voluntary programs (Scholz, 1991; Winter and May, 2001; Scholz and Gray, 1997; Gormley 1999). Stringent regulations may lower the relative cost of joining ISO 14001 because facilities would have adopted rigorous management systems to comply with regulations anyway. Following Potoski (2001), we measure the stringency of state hazardous air pollutants regulations and ambient air standards with the dummy variables *hazardous air regulations* and *ambient air regulations* each scored one if the state's regulations are more stringent than the corresponding EPA minimum criteria. Our expectation is that facilities located in states with more stringent air pollution regulations are more likely to become ISO 14001 certified.

Part of the cost of joining ISO 14001 is the risk of receiving sanctions for violations uncovered during third-party certification audits. When facilities have reason to believe that regulators will not punish every violation voluntarily discovered and reported, they may be more likely to seek ISO 14001 certification. About twenty-five states provide legal protections to firms that promptly disclose and correct violations uncovered through audits (Housman, 2001). Thus, facilities may be more willing to join ISO 14001 (thereby committing themselves to such audits) if they are located in states that offer legal privilege and immunity to information uncovered during certification audits. We measure states' legal environment with the variable *state audit protection,* scored one if the state provides privilege or immunity protection for information uncovered in facilities' self-audits.

State audit immunity and privilege protection laws and policies may not sufficiently assure firms that they will not be sanctioned for violations uncovered through self-audits.[6] Though the EPA supports voluntary audits and supports regulatory relief programs (1986, 1995a,

[6] **On the broader issue of adversarial legalism, see Kagan (1991).**

1995b, 1997, 1999), it opposes audit protection. Facilities in more litigious legal contexts may be less likely to adopt ISO 14001 out of fear that such self-incriminating evidence may be held against them. We measure *state litigiousness* using the ratio of environmental court cases to TRI facilities in each state.[7]

We also measure the extent to which regulators in each state severely punish violators (Scholz, 1991; Winter and May, 2001; Gormley, 1999). *Enforcement flexibility* is the proportion of out of compliance facilities sanctioned through monetary penalties in the state where the facility is located. Enforcement flexibility may encourage ISO 14001 adoption because firms expect that self-reported violations will not always be severely punished. Finally, we control for states' political contexts with the number of members in the Sierra Club and the National Wildlife Federation per 1,000 residents in 1998. Facilities in states with stronger environmental groups may be more likely to join ISO 14001.

We now turn to facility level characteristics. *Inspections* is the number of state and US EPA inspections in 1995 and 1996. Facilities facing more rigorous inspection regimes are more likely to have regulators discover their violations. Therefore, they may be more likely to join ISO 14001 because they are likely to have already established EMSs to comply with the law. Further, ISO 14001 may help them curry favor with regulators. *Enforcement actions* is the number of enforcement actions including notices of violation levied by state and US EPA officials against each facility in 1995-96. *Penalty* is the dollar amount of any monetary penalty assessed against the facility in 1995-1996. *Inspections, enforcement actions,* and *penalty* are drawn from the EPA's IDEA database. Facility *size* is the number of employees, as reported in the Dunn and Bradstreet database. *Manufacturing* is a dummy variable indicating whether the facility is

[7] **Data are from Lexis Nexus State Case database searches with the key words "air pollution," "water pollution" and "hazardous waste" for the entire 1990s.**

engaged in a manufacturing industry. *Public* is a dummy variable indicating if the facility is owned by a publicly traded company. We also include two dummy variables measuring the facility type, indicating whether the facility is a branch facility *(branch),* single site company *(single),* or company headquarters (scored zero). Finally, we include a series of dummy variables reflecting the facility's two digit SIC code.

Regulatory Performance

The key test of green clubs such as ISO 14001 is whether they improve facilities' compliance with public law. Our dependent variable *(Compliance 2000-01)* measures the proportion of months for which a facility was out of compliance in 2000 and 2001. The important independent variable is whether a facility has joined ISO 14001, *ISO 14001,* adjusted with the first stage analysis. If ISO 14001 improves regulatory performance, facilities with higher predicted probabilities of joining ISO 14001 should be more likely to be in compliance with environmental regulations. Since several state regulatory initiatives seek to improve regulatory performance, we include the measures *state audit protection, state EMS program, state non-EMS program, enforcement flexibility,* and *hazardous air regulations* and *state ambient air regulations.*

Many factors influence facilities' regulatory compliance, some of which we do not directly measure. However, we are able to control for many of these unobserved factors via facilities' previous compliance histories. *Compliance 1995-96* is the proportion of non-compliance months to compliance months in 1995 and 1996. Facilities' previous enforcement experiences may affect their current compliance status; we therefore include controls for *enforcement actions, inspections* **and** *penalty.* Our analyses also include controls for *facility size, facility type,*

manufacturing, and public and SIC code. Table 1 reports descriptive statistics of our data.

Table 1 here

Results

Joining ISO 14001

Table 2 reports results of our first stage analysis examining the diffusion of ISO 14001 across facilities. The dependent variable is whether or not a facility joined ISO 14001 by December 2001 and the independent variables gauge current and past characteristics of the facility and regulatory climate. We are particularly interested in two questions. First, do government programs and regulatory enforcement influence facilities' decision to join ISO 14001? Second, are regulatory laggards more likely to join ISO 14001? Interpreting the first stage coefficients in Table 2 is complicated by probit's non-linear functional form and by the fact that an occurrence of our dependent variables (an ISO 14001 certified facility) is quite rare. Following Long (1997), we calculate the discrete change in probability of our dependent variable occurring (a facility joins ISO 14001) given changes in our independent variables, holding all other variables at their mean. Note that these changes may seem quite small, but they should be interpreted relative to a "baseline" probability, which in our case of facilities joining ISO 14001 is quite small. Only about 4 percent of the facilities in our sample joined ISO 14001; holding all independent variables at their mean, the predicted probability of joining ISO 14001 is only .023. Overall, the first stage model discriminates well among firms subscribing to ISO 14001: the chi-square statistic for the first stage only is 211.86, significant at $p < .001$.

(Table 2 here)

Facilities' compliance histories have an important impact on their ISO 14001 decisions. The relationship between the amount of time a facility was out of compliance in 1995 and 1996

and ISO 14001 registration follows an inverted U-shaped curve. The *Compliance 1995-96* coefficient is statistically significant and positive while the *Compliance/995-96* coefficient is statistically significant and negative. Those facilities that are always in compliance or always out of compliance are the least likely to join ISO 14001. The predicted probability of joining ISO 14001 for facilities in compliance for the entire two year period, .01 is essentially the same as those who are not in compliance for the same time period (.01). For those who are out of compliance for twelve of the 24 months, the predicted probability of joining ISO 14001 is about .025. Firms with strong compliance records may not need to join ISO 14001: their environmental management practices are sufficiently strong to keep them in compliance and they may already have strong reputations for environmental performance. Likewise, improving environmental management through ISO 14001's mandated EMS may do little to improve the compliance status of facilities with severe compliance problems. Firms in the middle group may see significant compliance improvement by adopting ISO 14001's environmental management practices. The statistically significant coefficients for *emissions* and *emissions*^{2} results suggest that low pollution facilities are least likely to join ISO 14001 and that the benefits decline at higher levels of emissions.

Facilities that receive more *regulatory inspections* are significantly more likely to join ISO 14001. For facilities receiving inspections two standard deviations more frequently than the mean, the predicted probability of joining ISO 14001 is .031, about 35% higher than facilities receiving the mean inspection levels, holding the effects of other variables at their mean. For facilities receiving inspections two standard deviations below the mean, the predicted probability of joining ISO 14001 is .016, about 25% lower than facilities receiving the mean inspection levels, holding the effects of other variables at their mean.

Examining the measures of state-level policies, two features stand out. First, facilities in states with more stringent hazardous air pollution regulations are more likely to join ISO 14001. Joining ISO 14001 and adopting its stringent EMS requirements may help facilities meet higher regulatory standards. Second, facilities in states with more litigious legal climates are more likely to join ISO 14001. Our expectation was that the fear of having self-audit information used against them may dissuade some facilities from joining ISO 14001. Yet despite such risks, facilities in litigious climates are more likely to join ISO 14001, perhaps because ISO 14001 offers compliance and other benefits that outweigh disclosure risks in litigious climates. A facility with an effective EMS may avoid lawsuits by remaining in regulatory compliance and if they still have them may be better able respond to them with a "due diligence" defense. Finally, our results indicate that most other government programs, laws, and regulations appear to have little influence on a facility's calculus about joining ISO 14001. None of the coefficients for *enforcement actions, state audit protection, state EMS program, state non-EMS program, ambient air regulations,* **and** *regulatory flexibility* achieved statistical significance in the analysis of why facilities join ISO 14001. Still, larger facilities, those with more employees, are significantly more likely to join ISO 14001.

Together, we can draw some tentative conclusions about why facilities join ISO 14001. First, the net benefits of joining ISO 14001 are stronger for facilities facing moderate compliance problems. This bodes well for the efficacy of ISO 14001 because these facilities may be most ripe to improve their regulatory compliance with a stronger EMS. Second, government inspections spur facilities to join ISO 14001 as do more stringent hazardous air pollution regulations and more litigious regulatory climates. Other government policies appear to have little influence on facilities' ISO 14001 decisions, at least for state-level policies in US air

pollution regulation.

ISO 14001 and Facilities' Regulatory Performance

Table 2 also reports the results of our analysis of the influence of ISO 14001 on regulatory compliance. Interpreting the second stage equations - facilities' compliance status - is more straightforward since the statistical method is akin to OLS. Second stage coefficients can be interpreted as the proportion reduction in time spent out of compliance associated with a one unit increase in the independent variable. ISO 14001-certified firms are more likely to be in compliance with clean air regulations than similarly situated non-certified facilities. The coefficient for *ISO 14001* is statistically significant and negative indicating that those facilities that joined ISO 14001 spend 7.5% less time out of compliance with environmental regulations. Importantly, this result persists while controlling for a variety of factors affecting firms' regulatory compliance, and perhaps most importantly, their previous regulatory compliance. Moreover, joining ISO 14001 was associated with better compliance records when we investigated other possible specifications - OLS, probit, ordered probit, event count models - again while controlling for other factors. Finally, the rho coefficient (.121) and the Wald test for independent equations (12.38) are statistically significant, indicating that our treatment adjustments are justified.

The finding that joining ISO 14001 improves facilities' regulatory compliance has important implications. The credibility of green clubs is not strong among environmental activists (Steinzor, 1998) and the academic literature on their performance is uneven (compare, for example, King and Lenox, 2001 with Khanna and Damon, 1999). Our analysis should support the credibility of ISO 14001 by showing that joining ISO 14001 does improve regulatory

compliance beyond what likely would have occurred had the facilities not joined.

The regulatory compliance results also suggest that several state-level policies are associated with varying levels facilities' compliance performance, although we must be careful about interpreting these coefficients. Regulatory flexibility is associated with improved compliance; facilities in states where regulators are less likely to fine for non-compliance are more likely to be in compliance with clean air regulations. Likewise, facilities in states with government sponsored voluntary programs have better compliance records than facilities in states without these programs. These results are consistent with previous research that suggests that cooperation between regulators and facilities can improve regulatory compliance (Scholz, 1991). Finally, facilities in states with more stringent ambient air quality regulations have stronger compliance records, and facilities in states with more litigious legal contexts and environmental audit privilege and immunity laws have worse compliance records. We should note that our data do not indicate whether these state policies, practices and regulations are a cause or consequence of facilities' compliance performance. For example, states may adopt flexible regulatory enforcement in order to improve compliance or states may be more flexible *because* facilities in their state are already have solid compliance records.

Facilities' compliance histories influence their future compliance status. Facilities that were out of compliance in 1995 and 1996 were significantly more likely to be out of compliance in 2000 and 2001. Likewise, facilities that received more inspections and enforcement actions in 1995 and 1996 were significantly more likely to be out of compliance in 2000 and 2001..

Conclusion

Why firms join voluntary programs and whether these programs improve their

compliance with public law are much debated issues in environmental policy arenas. We investigated these questions in the context of ISO 14001, an important international voluntary code sponsored by the Geneva-based International Organization for Standardization. We conceptualize voluntary codes as club goods that provide non-rival but potentially excludable benefits to firms. Viewing voluntary programs as club goods helped us to identify relevant analytic features - sponsorship, eligibility, program requirements, membership incentives, and sanctions - that may explain why different voluntary regulations work better in some contexts than others. Based on these characteristics, critics view ISO 14001 as a relatively 'weak' club in that it provides weak selective incentives for joining it, and relatively weak sanctions for not complying with club standards. ISO 14001 is therefore a 'hard case' to support the contentions that voluntary codes are widely embraced and are effective in improving firms' compliance with mandatory law.

This paper has shown that joining ISO 14001 improves facilities' regulatory compliance. Incentives for joining ISO 14001 appear to be strongest among facilities with moderate compliance records and those emitting moderate amounts of pollutants. We also found that some government policies such as the frequency with which facilities receive inspections and the stringency of regulations compel facilities to join ISO 14001. However, other government policies appear to have little influence on whether or not facilities join ISO 14001. Instead, facilities appear to base their ISO 14001 decision on their more immediate circumstances.

The lessons we can draw from ISO 14001 are that voluntary programs can be effective if properly designed. Programs should be targeted towards firms who stand to benefit from joining. This means opening up membership to firms with imperfect compliance records and perhaps less than stellar reputations for environmental performance. For firms with clean environmental

records, state of the art EMSs, and strong reputations for progressive environmental practices, the costs of joining ISO 14001 outweigh the marginal benefits.

This brings us to the issue of targeting: if ISO 14001 indeed improves facilities' regulatory performance, how should regulators encourage its adoption? For the various government 'performance track' programs the seeds of failure are embedded in the boundary conditions. Programs that establish high entry barriers by requiring members to have excellent compliance records and meet strict performance criteria are not optimally designed. Not only do such programs target the wrong firms, thereby leading to their poor adoption rates, they also target firms that are less likely to improve regulatory performance. With few private incentives for participation, such programs have a hard time attracting members and ensuring compliance with program standards. We realize that regulators define boundary conditions partly to guard against the accusations of being 'captured' by industry. Nevertheless, such entry barriers target firms with little room for improvement, and not surprisingly, analysts have not found that voluntary programs improve performance.

Club theory offers powerful insights for studying the production, provision, and distribution of collective goods through mandatory (e.g., governments) as well as voluntary clubs. Often times, scholars insist that voluntary programs are very different from public regulation (for example, Cashore, 2002), and need a different theory of governance. We submit that public regulation can be viewed as a mandatory club. It is mandatory because any actor living in its jurisdiction is obliged to obey club rules. Monitoring and enforcement issues suggest that, individuals often have considerable de facto (not de jure) autonomy in responding to governmental law. At a broader level, one could question the assumption behind mandatory clubs that actors do not have credible exit options - the boundary, conditions are strictly defined

to keep insiders in and also to let only selected outsiders in. But boundaries are porous — firms and labor can vote with their feet (Tiebout, 1956; Hirschman, 1970). In fact, much like voluntary clubs, boundary conditions (as reflected in free trade agreements and immigration laws) are not fixed; regulations for the inflow and the outflow of capital and labor are often subjects of heated public debates. Inter-governmental clubs such as the European Union also reflect similar debates about boundary conditions, membership rules, and broader collective goods issues. Thus, in several ways mandatory clubs share with their voluntary cousins similar issues about institutional design and the production and distribution of collective goods. Club theory can identify key characteristics of governance systems and move towards a general theory of governance. Our paper contributes to this objective.

Our inquiry in this paper guests several venues for future research. An obvious extension of this research is to look beyond regulatory compliance and examine whether joining ISO 14001 improves facilities' environmental performance, that is, reduces their pollution emissions. Also, since there are strong theoretical reasons to suspect that the efficacy of voluntary programs varies across policy and regulatory contexts, future research should focus on ISO 14001 and other programs across countries. And finally, the mixed findings on the efficacy of voluntary programs suggest the need for continuing research that explicitly evaluates and compares across program, and how varying program features contribute to the success or failure of different voluntary programs.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev	Min	Max
ISO 14001	0.04	0.20	0	1
Inspections	2.11	2.33	0	42
Enforcement actions	0.43	1.86	0	50
Penalty	6406.87	150284.70	0	9000000
Number of Employees	403.44	822.78	1	17500
Manufacturing	0.86	0.34	0	1
Branch	0.65	0.48	0	1
Single	0.20	0.40	0	1
$Emissions_{1995\text{-}96}$	4.08E+08	1.38E+09	5	2.24E+10
$Emissions_{1995\text{-}96}^2$	2.16E+18	1.86E+19	25	5.04E+20
$Compliance_{1995\text{-}96}$	0.10	0.28	0	1
$Compliance_{1995\text{-}96}^2$	0.09	0.26	0	1
Litigiousness	-2.52	0.83	-4.47	0.97
Hazardous Air Regulations	0.62	0.49	0	1
Ambient Air Regulations	0.11	0.31	0	1
State audit protections	0.52	0.50	0	1
State EMS programs	0.21	0.41	0	1
State non-EMS program	0.42	0.49	0	1
Regulatory Flexibility	6.40	3.89	1.33	24
Environmental Groups	5.92	2.22	0.78	14.17

Sources indicated in text.

Table 2: Treatment effects analysis of facilities joining ISO 14001 and regulatory compliance

	Joining ISO 14001		Regulatory Compliance	
	Coefficient	Std. Error	Coefficient	Std. Error
Facility				
$Compliance_{1995\text{-}96}$	1.521**	0.672	0.281**	0.026
$Compliance_{1995\text{-}96}^2$	-1.693**	0.742	--	--
Inspections	0.029**	0.014	0.008**	0.003
Enforcement Actions	-0.007	0.015	0.006*	0.004
Penalty	-2.89E-08	1.30E-07	1.11E-08	2.20E-08
$Emissions_{1995\text{-}96}$	2.26E-10**	6.97E-11	--	--
$Emissions_{1995\text{-}96}^2$	-1.55E-20*	8.10E-21	--	--
Number of Employees	9.36E-05**	3.24E-05	5.46E-06	6.26E-06
Manufacturing	0.360	0.272	-0.015	0.038
Branch	0.098	0.111	-0.007	0.013
Single	-0.040*	0.143	-0.027*	0.016
ISO 14001	--	--	-0.075**	0.032
SIC code dummies	Yes		Yes	
Policy context				
Litigiousness	0.100*	0.058	0.021**	0.007
Hazardous Air Regulations	0.255**	0.110	-0.003	0.011
Ambient Air Regulations	0.022	0.156	-0.053**	0.016
State audit protections	0.093	0.095	0.054**	0.010
State EMS programs	-0.037	0.120	-0.046**	0.014
State non-EMS program	0.064	0.127	-0.004	0.015
Regulatory Flexibility	-0.005	0.011	-0.006**	0.001
Environmental Groups	0.032	0.021	0.002	0.002
Constant	-3.203**	0.431	0.103**	0.040
N	3798			
Rho	.122**	.073		
Wald (independent eq.)	12.4**			
Wald (overall)	727.4**			

* $p < .10$, ** $p < .05$, two tailed tests

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