GOVERNMENT PROMOTION OF CORPORATE SOCIAL RESPONSIBILITY: EVIDENCE FROM THE EU ECO MANAGEMENT AND AUDIT SCHEME

Andrew B. Whitford
University of Georgia

Colin Provost
University College London

Abstract

Governments play an active role in promoting corporate social responsibility (CSR) and specifically environmental management system (EMS) programs, but few studies have examined the impact of such support on the decision of businesses to adopt EMS programs. We ask two questions in this paper: how does government support for EMS programs affect adoption of such programs? Second, what effect does this government support have on the pace of adoption of such programs? The answer to the first question can reveal how effective government programs are in boosting membership in EMS programs. The answer to the second reveals to what extent businesses within EU member states are converging upon particular EMS standards. We examine these questions in the context of the European Union's Eco-Management and Audit Scheme (EMAS), 2010-2014. There is significant variation in government support of EMAS across the EU and at the same time, EMAS competes for business attention with the more established ISO 14001. Our quantitative and qualitative analyses therefore reveal the effectiveness of government programs in boosting adoption, but also to the extent to which such programs cause convergence upon EMAS in the face of a competing standard such as ISO 14001.

INTRODUCTION

Corporate social responsibility (CSR)—defined by Vogel as "practices that improve the workplace and benefit society in ways that go above and beyond what companies are legally required to do" (2005)—was long considered to be a set of business activities that substitute for and operate separately from government policy. More recent research has challenged this assumption, recognizing that domestic institutions may affect the type of CSR programs businesses adopt (Jackson and Apostolakou 2010; Kinderman 2012; Knudsen 2017; Knudsen, Moon and Slager 2015; Matten and Moon 2008; Moon and Vogel 2008; Steurer 2010). Governments have an interest in promoting such programs, so that market failures can be mitigated with fewer monitoring and enforcement costs (Potoski and Prakash 2004) and so that firms become aware of the benefits and the logistics of complying with such programs (Delmas 2002; Kollman and Prakash 2002).

At the same time, firms should be receptive to such government promotion efforts, as there are a number of benefits to joining CSR programs. Specifically, environmental management standards (EMS) often carry competitive business advantages and help support economic growth (Kollman and Prakash 2002; Murray and Montanari 1986; Porter and Van der Linde 1995; Potoski and Prakash 2005a, 2005b; Russo and Fouts 1997). The desire to gain competitive advantage may even drive firms to seek stringent standards with which other firms cannot comply (Auld 2014; Buthe and Mattli 2011). However, firms often prefer to adopt a standard that others also would adopt rather than design firm-specific compliance strategies. Convergence on a standard increases benefits for all firms (Prakash and Potoski 2006), as training and labor costs fall, along with monitoring or auditing costs. Affiliation is a club good (Potoski and Prakash 2005a, but see Green 2017); regulator familiarity with a given standard's

value increases. As given standards become more familiar and widely accepted by regulator and business alike, pressure on remaining firms to join becomes more significant and more difficult to ignore (Guler et al. 2002; Reinecke et al. 2012; Terlaak 2007).

Despite these mutual interests of government and business, variations in government promotion of EMS programs persist across countries, as do national participation rates (Delmas 2002; Kollman and Prakash 2002; Neumayer and Perkins 2004; Potoski and Prakash 2004). In this paper, we ask two interrelated questions about government EMS promotion: first, what is its effect on program membership and second, what effect does promotion have on the pace of adoption? We ask these questions specifically with regard to the European Union's Eco-Management and Audit Scheme (EMAS), an EU-wide EMS, introduced in the late 1990s. This question has received some attention with respect to government support and ISO 14001 (Delmas 2002; Kollman and Prakash 2002) and scholars have made significant recent contributions to our understanding of the relationship between government institutions and business CSR activity (Brown and Knudsen 2015; Jackson and Apostolakou 2010; Kinderman 2012; Knudsen 2017; Knudsen, Moon and Slager 2015; Moon and Vogel 2008; Matten and Moon 2008; Steurer 2010). While we acknowledge the importance of domestic institutions in evaluating CSR initiatives, these studies focus less on the effects of government support for specific initiatives. Here, we try to bridge that gap by examining the specific effects of support for EMAS on EU member state adoption.

Second, we ask what the effect of government support for EMS programs is on the pace of adoption within nations. This is an important question as the answer reveals to what extent businesses within EU member states are converging upon EMAS as an EMS standard. If certain EMS or CSR programs become widely adopted, pressure for non-members to adopt the standard

can increase, as trading, supply chain and procurement relationships may dictate membership as a condition of continuing these business relationships. Thus, if EMAS rises in popularity over time, there may be economic pressure for firms to join, thus creating convergence around the standard (Guler et al. 2002; Terlaak 2007). In these instances, a lack of government support for EMAS might produce disjointed and episodic adoption rates, whereby firms belatedly realize the benefits of joining and struggle to catch up. At the same time, government support of EMAS is more likely to produce a stable pattern of incremental adoption over time, whereby firms learn of the benefits of EMAS and work to systematically implement the program.

This phenomenon resembles the process of "punctuated equilibrium" first articulated as a policy process by Baumgartner and Jones (1993). Subsequent research found that organizations often experienced large or disjointed changes in outputs because standard operating procedures or the costs of collective action impeded more incremental change until pressure for change built up to a boiling point (Jones, Sulkin and Larsen 2003; Robinson 2004). We believe that the collective process of converging upon EMAS presents a similar dynamic for the aggregate firms deciding whether to adopt, in the absence of government support programs.

Government support for EMAS may produce a different dynamic among EU firms, however. Support may generate sudden spikes in membership, as firms respond favorably to incentives, but if these incentives are withdrawn or are incomplete to begin with, the adoption rate may suddenly reverse or firms may even drop their EMAS affiliation. From this point of view, few government supports may produce a smoother adoption pattern of little change. This may be because it takes a while for interest in the program to register or if standardization pressures are low, there may be little interest in the program to start with in the absence of government support. A third possibility is that standardization may fail to bring about coercive

pressure if competing standards allow for differentiation of programs with similar goals (Reinecke et al 2012). Membership in ISO 14001 may be seen as sufficient for firms in EU nations which do not promote EMAS.

In our analysis, we measure the impact of government support for EMAS on the adoption of EMAS across EU member states from 2010 through 2014. We consider this question in a world in which ISO 14001 already exists and is widely adopted among European businesses, thus raising questions about convergence upon EMS standards, as well as competition between EMS standards within the EU and how government support for EMAS standards interacts with these phenomena. Although we analyze country-level responses to EMS promotion campaigns and not differing firm characteristics, our work is borne partly from the literature that examines how government policy can affect firm decision making (e.g. Cashore and Vertinsky 2000; Matten and Moon 2008; Moon and Vogel 2008). Thus, we do not analyze differing characteristics across business organizations, rather we analyze firm responses to country-level EMS promotion campaigns. In so doing, we also analyze this process in the aggregate, describing the masses of firm adoption decisions as a policy process within CSR and environmental management.

We measure promotion with regard to five different tools used to promote EMAS: legal tools which reduce compliance requirements for participating firms; financial tools which provide monetary inducements; informational tools which provide specific information about the program's benefits and logistical information about implementing the program; promotional tools which advertise EMAS to firms and finally, a specific program within EMAS called "Global EMAS" which enables firms to register their sites located in other EU countries and in non-EU countries.

We conduct two quantitative analyses of the effects of government EMAS support; first, we examine the cumulative effect of government support on the share of EU EMAS adoptions that occur in a given EU member nation. This analysis illustrates whether government support for CSR and EMS programs can boost membership in those programs. Second, we also examine the effect of the same government support programs for EMAS on the change in adoption shares across EU member nations. This second analysis shows us the impact of support programs on the pace of adoption and whether it gradually increases, whether it experiences episodic bursts or whether it remains fairly flat and does not change at all. A gradual increase reveals a smooth convergence upon EMAS as a strong EMS standard, whereas disjointed bursts reveal a more fractured convergence, characterized by the need to learn about EMAS quickly and catch up. An overall low rate of adoption that does not change much reveals a lack of convergence, where little pressure to join EMAS is seen and perhaps there is greater satisfaction with alternatives, such as ISO 14001. To complement the findings from both models, we also present evidence from semi-structured interviews with environmental and EMAS registration officials, as well as EU Commission documents.

In our analyses of the effects of government promotion of EMAS on adoption of the program throughout the EU, we make three contributions. First, few studies have examined the impact of specific support programs on adoption rates. This is an important question, as governments have an interest in boosting participation rates and mitigating market failures. Second, CSR support programs also speak to the literature on varieties of capitalism and program adoption. Studies from this literature suggest that domestic institutions do shape CSR programs (Jackson and Apostolakou 2010; Kinderman 2012; Knudsen 2017), but also that other factors such as intra-industry concerns shape CSR practices (Brown and Knudsen 2015). Given

that our study examines the majority of EU states, it cuts across the VoC boundaries of liberal market economies (LMEs) and coordinated market economies (CMEs) to show where support affects adoption and pace of adoption. If support programs do have an effect across LME, CME and other types of nations, it suggests that national-level institutions are not crucial conditioning variables in this relationship. Finally, examining the pace of EMAS adoption as a result of government support, when the highly popular ISO 14001 already exists, can inform our understanding of EMS standardization and convergence. Are there standardization pressures to move away from ISO 14001 and toward EMAS? The answer can shape our knowledge of the potential pressures of convergence in the presence of competing standards.

In the next section of this paper, we broadly review the literature on government and CSR, looking in particular at government support of EMS programs and how this support can affect levels of program adoption. Here, we present our first hypothesis. We then discuss how government support of EMS programs potentially affects program convergence in the presence of competing standards. We also discuss how these dynamics in EMS program adoption resemble the dynamics of punctuated equilibrium in policymaking. In this section, we present rival hypotheses about this more complex relationship. We then present our research design and describe in more detail the types of government support which we analyze. In order to test our hypotheses, we present the results of two quantitative models, as well as our qualitative data. We then conclude with thoughts about the implications of our research, as well as directions that other future studies on CSR and government support may take.

CORPORATE SOCIAL RESPONSIBILITY, BUSINESS, AND GOVERNMENT

Most scholars now agree that even though CSR and EMS systems are the primary domain of businesses, governments still play a strong role in the process of adopting and implementing EMS programs (Delmas 2002; Jackson and Apostolakou 2010; Kinderman 2012; Knudsen 2017; Knudsen, Moon and Slager 2015; Kollman and Prakash 2002; Matten and Moon 2008; Moon and Vogel 2008; Steurer 2010). They can promote it through specific policies, they can shape it indirectly through domestic institutions or they can downplay the importance of particular programs by failing to support them. After all, regulatory authorities can benefit if voluntary regulation programs improve regulatory performance due to lower monitoring and enforcement costs, and improved compliance (Wall and Beardwood 2001; Potoski and Prakash 2004; Andrews et al, 2003; but also see Clapp 1998; Markowitz and Rosner 2002).

Regulators also know that firms can benefit from EMS membership by preventing potentially costly government command and control measures (Kollman and Prakash 2001; Russo and Fouts 1997), by enhancing the firm's image and profitability (Dangelico and Pontrandolfo 2015; Murray and Montanari 1986), by obtaining enhanced reputational benefits in the form of club goods (Cormier and Magnan 2015; Kollman and Prakash 2001; Clapp 1998; Porter and van der Linde 1995) and finally by improving environmental performance (Murray and Montanari 1986; Kollman and Prakash 2001; Russo 2009).

Most firms are unlikely to join an EMS program based solely on these benefits alone and may join due to other factors or not join at all. For example, many firms that join ISO 14001 do so due to external pressure from stakeholders or the media (Darnall 2006; Neugebauer 2012). Firms also may participate in CSR programs, if they see other firms within their industry doing the same thing, thereby imitating their peers (Aerts, Cormier and Magnan 2006) or if the

program becomes well established and the benefits become more widely known (Nikolaeva and Bicho 2011). On the other hand, there may be instances when the benefits of joining clubs are small and membership is more variable as a result (Green 2017). As we discuss in the next section, competition between EMS standards—most notably between ISO 14001 and EMAS—can result in one standard being favored over another and therefore being adopted by firms with much greater frequency.

At the same time, firms may not participate in EMS programs because they do not know or understand the benefits of joining a given EMS program or they are unsure about the process of implementing it (Delmas 2002; Kollman and Prakash 2002; Wurzel, Zito and Jordan 2013). Firms may fear that the reputational benefits of joining do not justify the potential costs of implementing an EMS program. Participating in such a program requires undertaking costly procedures, such as training employees in environmental management, reviewing existing production processes and finding ways to integrate environmental management into the entire production process. Some firms fear that not only do the costs not justify the benefits, but the costs may be higher than anticipated if an internal review reveals illegal polluting practices, for which the government could punish the firm.

For this reason, governments that do promote EMAS or ISO 14001 may find that it pays to reward participating firms with a break on compliance requirements, such as exemption from inspections. In these instances, governments may see the benefit of moving from simple "endorsement" policies to "facilitation" policies whereby governments provide tangible incentives for firms to join EMSs (Fox, Ward and Howard 2002; Knudsen, Moon and Slager 2015). Potoski and Prakash argue that relief from regulatory requirements, combined with good-faith self-policing on the part of firms can do a better job of achieving regulatory goals at a lower

cost, assuming cooperation from both sides (2004b). They show that American states that offer incentives in the form of regulatory relief tend to have higher rates of ISO 14001 membership. Conversely, Eisner argues that the United States has a low ISO participation rate because the U.S. EPA is not able or willing to give firms relief from federal environmental laws (2007). Similarly, Potoski and Prakash find that nations with more regulatory flexibility in their enforcement have higher rates of ISO membership, even when those nations have strict standards (2004a). Finally, Neumayer and Perkins find that states with higher levels of government intervention produce correspondingly fewer ISO 14001 members (2004). Thus, regulatory relief and other forms of information provision and promotion can help to boost a given nation's membership in EMS programs.

Recent studies indicate that many governments do promote CSR or EMS programs with these regulatory benefits in mind. Much of the work on government and CSR has utilized the "Varieties of Capitalism" approach (Hall and Soskice 2001) to examine whether the domestic economic institutions of nations shape the CSR programs that firms adopt (Jackson and Apostolakou 2010; Knudsen 2017; Knudsen, Moon and Slager 2015). Within this thread of research, there is evidence that domestic institutions matter and affect the measures of support that governments put forward. Within the E.U., Brown, Knudsen and Slager (2015) find that Scandinavian and Northern European governments tend to actively promote CSR initiatives through specific incentive and structural programs ("facilitation"), while Mediterranean governments tend to use a less involved "endorsing" approach to CSR. Consequently, the authors argue that Northern European nations are converging upon active government policies for CSR promotion. The varieties of capitalism approach to CSR has also shown that other factors, such as industry similarities or competitive pressures influence adoption patterns (e.g.

Brown and Knudsen 2015). While this work has looked at the broad impact of domestic institutional structures, there has been less work examining specific government programs to support CSR or EMS systems. Studies have shown that government support for ISO 14001 tends to boost adoption rates with the respective nation (Delmas 2002; Kollman and Prakash 2002). We build on this work in crafting Hypothesis 1.

> *Hypothesis 1: EU member states that have specific programs to promote EMAS will have higher adoption rates of EMAS.*

GOVERNMENT SUPPORT FOR CSR AMIDST COMPETING STANDARDS

We hypothesize that firms will adopt EMAS more in member states where it is explicitly promoted, but this hypothesis does not consider the presence of competition among EMS standards. EMAS is a rigorous program that can improve firm environmental performance and bring strong reputational benefits, but it competes for firm attention with the more established ISO 14001. The choice between the two systems is not a choice between equals (Oluoch-Wauna, 2001). ISO 14001 is a generic management system standard meant to reduce the effects of production on the environment; it also offers management mechanisms for the continual improvement of environmental performance. Unlike ISO 14001, EMAS focuses on compliance and is substantially different from ISO 14001. EMAS requires an initial environmental review prior to the design and implementation of the EMS, as well as the public release of final audit findings. EMAS certification also requires systems that each facility develop and disseminate its own environmental management system and external auditing that is meant to identify any liabilities. Finally, since Regulation (EC) No 1221/2009 (which was implemented in late 2009, EMAS requires each registrant to produce an annual statement measuring its progress against a number of key indicators (Wurzel, Zito and Jordan 2013) and membership in EMAS can be

suspended if progress is not deemed sufficient. If organizations have multiple sites, then each site must meet the EMAS requirements as well.

The presence of competing standards presents us with the question of whether there is pressure for firms to converge on one particular standard. Specifically, do firms that choose to adopt EMS standards choose EMAS or ISO 14001 and what pressures are there to join one standard over another? Firms may choose to adopt particular EMS standards because reputational benefits are strong. As adoption of the standard spreads, information about the benefits of the program also spread (Nikolaeva and Bicho 2011), increasing the likelihood that firms mimic one another (Aerts, Cormier and Magnan 2006). Gradually, pressure upon non-adopters increases, as adopters require membership of trading and supply chain partners (Guler et al 2002; Terlaak 2007). Previous work shows that nations can experience increases in ISO 14001 membership when trading with other nations with strong rates of ISO participation (Neumayer and Perkins 2004; Potoski and Prakash 2004; Prakash and Potoski 2006).

Seen from this point of view, EMS reputational benefits eventually give way to mass membership and the global pressures of standardization, giving non-adopters a strong incentive to join the standard, or remain frozen out of global economic opportunities.[1] The first firms to adopt are likely to be those in nations that promote membership in that program. In these nations, we expect adoption to proceed gradually and incrementally, as national support helps firms to learn about the program in a predictable manner. As the pressures of standardization come to bear, firms in nations that do not promote the standard may struggle to suddenly catch up and become part of the standard. Consequently, we witness large spikes or punctuations in

[1]Some scholars find that freezing out competitors may be a strong motivation to craft strong private standards in the first place (Auld 2014; Buthe and Mattli 2011).

membership in these nations, as firms here do not benefit from the initial advantage of state information and support.

Theories of punctuated equilibrium in public policy can help us to understand the dynamics with which firms coalesce (or do not coalesce) around voluntary regulatory standards. Baumgartner and Jones improved upon existing theories of incrementalism by showing that public organizations often make significant policy changes (1993). Jones, with others, refined this work to show that within some organizations, the costs of collective action are high and consequently, incremental decisions are prevented until finally the organization must react with substantial change or what appears to be an overreaction (Jones, Sulkin and Larsen 2003). Conversely, Robinson finds that in Texas, bureaucratized school districts enable decisions to be made more easily, thus making outputs more incremental and less subject to punctuated equilibrium (2004). Here, we characterize the mass adoption decisions, in the presence or absence of government EMS support, as a policy process.

> *Hypothesis 2a: Adoption patterns in states that support EMAS will be characterized by smooth and incrementally increasing adoption patterns.*
>
> *Hypothesis 2b: Adoption patterns in states that do not support EMAS will be characterized by large annual changes in membership.*

There is, however, a rival scenario to what can occur to the pace of adoption as a result of government EMAS support programs in the face of competition from ISO 14001. ISO 14001 is already a highly popular EMS standard which is an indicator that a great deal of convergence upon ISO 14001 has already occurred. Additionally, ISO 14001 has requirements that are easier for many firms to meet than does EMAS. Reinecke et al. (2012) suggest that simultaneous dynamics of convergence upon standards and competition between standards can occur when standards pursue the same goal, but allow for some differentiation at the program level. Thus, if

there is pressure to adopt EMS standards, but all this pressure ultimately gets directed towards ISO 14001, then EMAS might lose out and there may be no corresponding standardization pressure to adopt EMAS as a standard. There has been evidence to support this point of view as well, as a number of EU countries experience lower than expected EMAS participation (Neugebauer 2012; Wurzel, Zito and Jordan 2013) and as of 2007, EMAS certifications lagged ISO 14001 certifications in EU member states (Bracke and Albrect 2007). This evidence suggests that in member states that do not support EMAS, adoption rates may be low to begin with and may simply remain that way with little change because of sufficient satisfaction with ISO 14001. Consequently, we also consider and test Hypotheses 3.

> *Hypothesis 3: Adoption patterns in states that do not support EMAS will experience little annual change.*

In summary, we test four hypotheses in our quantitative and qualitative analyses. First, we expect that EU member state support programs for EMAS will boost adoption rates in those states, while adoption rates will remain lower in states without such support. In order to test the effects of government EMAS support programs in the context of standardization pressures and competing standards, we present competing sets of hypotheses. First, we hypothesize that if there is significant pressure to converge upon EMAS, member states with support programs will see smooth, gradual rates of adoption, while those without support programs will see disjointed, episodic rates of adoption, as firms struggle to catch up quickly. Our rival hypothesis postulates that standardization pressures for EMAS are weak in the face of a more dominant standard—ISO 14001—and that member states that do not support EMAS will see little change in annual adoption rates, as they remain low overall. In the next section, we present our quantitative analysis of each hypothesis.

DATA ANALYSIS

To analyze the effect of EMS program promotion on national levels of membership, as well as pace of program adoption, we constructed a cross-sectional time series dataset for the years 2010 to 2014 from data from the European Union on EMS incidence at the facility and organization levels. This time span is important because it represents the time period after which data are available for both facilities and organizational adoptions of EMAS. 2010 is also the year in which the latest iteration of EMAS—EMAS III—went into effect, as a result of the EU Commission adopting Regulation 1221/2009. This regulation promulgated the current requirements which mandate that companies produce statements on environmental performance, to be benchmarked against key indicators (Wurzel, Zito and Jordan 2013). Thus, EMAS III represents a new iteration and a new phase of the program, which makes 2010 a convenient starting point for our data collection. Our data on EMAS are from Eurostat.[2]

Our dependent variable is the incidence of EMAS across time, countries, and types of adoptions. The data are available only at the EU member state level and thus our unit of analysis is country-years.[3] In order to adjust for the size of each member state and its economy, we examine each nation's shares in EMAS registrations – its proportion of total EU EMAS registrants at organization and site level. For our second model in which we examine the rate of change in registrations, we examine the absolute value of annual change in these membership shares.

[2] See http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsdpc410

[3] Organizations may lose their registration status over the observed time period. Furthermore, sites within organizations may add or lose their EMAS status, but ultimately these are reflected in the data for each country-year, as each observation represents the total number or the share of registrations in a given country for a given year.

To examine the impact of EMAS promotion on member state adoption as well as pace of adoption, we analyze five potential types of promotion. Information about member state use of promotion tools comes from an EU Commission document entitled, "EMAS Promotion and Policy Support in the Member States" (EU Commission 2015). The document lists member states that participate in each type of promotion tool, as well as gives detailed information on what is involved in the use of each tool. The first tool is the least costly to utilize and that is the category of "marketing and promotion". Nations that market and promote EMAS offer information about the benefits of joining EMAS and provide a general advertisement for the program. The second category, "informational instruments" overlaps with "marketing and promotion" in that both tools are about distributing information. However, as the Commission emphasizes, "informational instruments primarily provide detailed information on EMAS registration, implementation, maintenance and best practice" (EU Commission 2015: 26). It is this level of detailed, instructional information that separates this tool from the more general marketing and promotion tool. Both tools, however, can be thought of as fitting into the weaker category of "endorsement", as governments do not take stronger measures beyond providing information (Fox, Ward and Howard 2002; Knudsen, Moon and Slager 2015).

The third tool of "legal instruments" is costlier to implement and therefore has fewer states utilizing it. Legal instruments are essentially regulatory incentives for firms to join EMAS, such as "a reduction in the frequency of environmental inspections", "exemptions from meeting certain environmental requirements" or "accepting EMAS registration…as proof of compliance with certain environmental requirements" (EU Commission 2015: 15). As we indicated in the previous section, such regulatory benefits can give firms incentives to join EMS programs (Eisner 2007; Neumayer and Perkins 2004; Potoski and Prakash 2004a and 2004b) and can thus

be effective in boosting membership. While such incentives have been shown to increase membership, they can also be risky for the government, if exemptions in regulatory requirements do not help to produce better compliance or environmental outcomes. In this regard, the use of legal instruments represents a greater commitment to the adoption of EMAS, than do marketing, promotion and information tools which do not generate the same kind of risk.

The fourth EMAS promotional tool is the category of "financial and economic instruments". Whereas the category of "legal instruments" is about providing firms with some sort of regulatory relief, "financial and economic instruments" is about providing financial incentives to help firms allay some of the costs of implementing the EMAS plan. Joining EMAS can be seen as a financial investment in that production processes become more efficient and less energy-intensive, but these savings are not likely to be observed right away. Rather, firms must absorb the costs of implementing their EMS, training staff in environmental management and creating new procedures to ensure that EMAS requirements are met (EU Commission 2015). As the Commission document states, these costs are not insignificant and can be quite high for smaller firms. Thus, offering tax breaks, funds, grants or rebates to "offset the costs of EMAS implementation or consultancy" can enhance the attractiveness of joining EMAS (EU Commission 2015: 21). Both "legal" and "financial and economic" tools are costlier for governments to offer, but also present more tangible incentives for firms to join EMAS and therefore represent a shift from "endorsement" to "facilitation" tools (Fox, Ward and Howard 2002; Knudsen, Moon and Slager 2015).

The final promotional tool we analyze with respect to EMAS membership and pace of adoption is the use of the "EMAS Global" tool. EMAS Global is a tool—not offered by all EU member states—that offers EMAS organizations the opportunity to also certify their sites that are

in other EU countries or non-EU countries. This enables firms to streamline the process of ensuring all their sites comply with EMAS standards, but more importantly, it enables multi-national companies to a show that they have harmoniously strong environmental performance records across all their sites, regardless of the nations in which they are based. Such a feature also makes it easier to trade across borders, especially if firms need to reassure trading partners that all relevant sites are EMAS-certified. The potential reduction in transaction costs afforded to participating firms by EMAS Global makes it more of a "facilitative" than an "endorsement" tool (Fox, Ward and Howard 2002; Knudsen, Moon and Slager 2015). Table 1 presents a matrix of each EU member state and x marks to signify which promotional tools they utilize and which they do not.

[Insert Table 1 about here]

Our empirical analysis proceeds as follows. First, we present descriptive data in Tables 1 and 2. Table 1 includes information about the promotional tools employed by each member state, while Table 2 contains descriptive statistics related to the shares in membership figures for both organizations and sites for all years in the dataset (2010-2014). We use the descriptive data to make initial references about both the overall rate of adoption across EU nations, as well as the pace of adoption. Second, we present a generalized estimating equation (GEE) model estimating the impact of EU member state EMAS support on shares in EMAS adoption. This model serves to test Hypothesis 1. Third, we present a GEE model estimating the impact of member state EMAS support on the annual level of change in adoptions, which provides tests for Hypotheses 2a, 2b and 3. Finally, we complement both these analyses with qualitative data from semi-structured interviews and secondary source documents, primarily dealing with the implementation and promotion of EMAS.

[Insert Table 2 about here.]

Table 2 shows that across countries and across time, there exists significant variation in the number of organizations or sites (facilities) with EMAS adoption. For the 130 country-year observations, the average is 165 organizations and 301 sites. Yet, the standard deviation for the number of organizations in a country in a given year that has EMAS is 369 and for number of facilities it is 530. Moreover, the ranges of those variables are also high. Yet, levels are less useful than a measure that addresses the contribution of the country's uptake of EMAS to overall EU adoptions; for this reason, Table 2 also shows the adoption data in terms of shares. In this case, the average is a 0.04 share for organizations and a share of 0.04 for sites. Yet, the standard deviations for these shares measures are different. This variation provides initial support for Hypothesis 1, which predicts that there would be significant differences in adoption rates across member states.

Next, we analyze the kurtosis of the adoption distributions in order to understand the annual degree of change in shares of adoptions (for Hypotheses 2a, 2b and 3). This is similar to a hypothesis-testing method developed by True, Baumgartner and Jones (1999) in which they analyze the kurtosis of distributions to determine whether the changes are incremental or episodic and punctuated. Normal distributions will cluster closer to the mean, whereas systems with more punctuations will have the "slender peaks and fat tails", as discussed by Jones (1999). In this case, nations with large annual changes in adoption rates have the distributions with the slender peaks (representing few changes) and the fat tails (representing large changes).

Recall that changes for shares of the total EMAS registrations are a measure of the pace of adoption and whether it is incremental or characterized by punctuations in adoptions. There are three notable aspects of the data for changes in shares. First, the distributions are centered on

zero. Second, the distributions have peak values that far exceed the peak of the hypothetical normal distribution. Table 2 shows that the mean change for organizations shares is 0.25 and for sites it is 0.40. The standard deviations are different though, as the changes in sites shares distribution is much wider. Third, while the peak of the distribution is much higher than the hypothetical normal distribution, the tails are much "fatter". There is also systematic right skew. For changed in shares of organizations, the skewness measure is 10.02; kurtosis is 107.35. For changes in shares of sites, skewness is 7.21 and kurtosis is 63.86. The level of kurtosis provides evidence for the idea that there have been punctuations in the adoption of EMAS, as some nations experience sudden and high levels of changes in the rate of adoption. This indicates that shares for some countries change little over the time period in question, while some change quite a lot over the same time period.

Descriptive statistics are helpful for providing initial reference, but they fail to control for other important factors, so we now discuss our quantitative models. The different types of government support for EMAS complement and reinforce each other in important ways. Therefore, the next step is to consider their composite effect on the levels of adoption for organizations and sites, as well as on the changes in shares. To do so, we create a factor index for the five measures. The details of this procedure is located in the Technical Appendix, but we obtained a single factor from a principal factors analysis. A single-factor model fits the data well; the likelihood ratio test of an independent versus saturated model rejected the null at a high level of significance ($\chi^2 = 235.33$, df $= 10$); only one eigenvalue was above 1.0. For this reason, we retained only one factor and then scored each country and each year based on the scoring coefficients from this model.

We now test our hypotheses. The first is that government support for EMAS increases national shares in EMAS adoption, for both organizations and sites. The subsequent hypotheses examine the effect of government support on the volatility of adoption. We assess this by reshaping our dependent variable in the following way. The change of shares is folded at zero by obtaining the absolute value; we expect that support will reduce the size of the change in shares, but we believe it can affect both positive and negative changes in shares. This reshaped dependent variable is available for both organizations and sites. To reiterate, our dependent variable in the first model (which tests Hypothesis 1) is the annual share in (or proportion of) EMAS membership for each EU member state, for each year between 2010 and 2014. Our dependent variable in the second model (which test Hypotheses 2a, 2b and 3) is the absolute value of annual changes in share in (or proportion of) EMAS membership for each EU member state, for each year between 2010 and 2014. Our primary independent variable is the single-factor representing the five EU member state promotional tools for EMAS.

In addition, we assess the impacts of other variables that may also be associated with our dependent variables. We include the natural logarithm of per capita Gross Domestic Product (in chained dollars) in order to capture economic activity across each nation and these data come from Eurostat. The natural logarithm of exports within the EU is included to also gauge economic activity, but potential standardizing pressures, often felt through trading relationships (Prakash and Potoski 2006). We also include the presence of international environmental groups in the country that year in order to account for pressures from civil society on business to become more involved in EMS programs. These data come from the EU Transparency Registry. Finally, because the presence of a rival standard—ISO 14001—is crucial to understanding the possible convergence upon EMAS, we also include the natural logarithm of take-up of ISO

14001 certifications in the country in a given year. We do not include variables for other national level factors, such as varieties of capitalism classifications, as use of government support appears to cut across these boundaries. For example, the four nations that employ all five promotional tools are Austria, Germany (both CME) and Italy and Spain, which are neither LME or CME. We provide descriptive statistics on each of these variables in the Technical Appendix.

Table 3 provides details of the GEE estimation for our model including the support factor and the controls for the dependent variables of EMAS adoption measured at the organizational and sites levels. We estimate these models for the years 2010-2014 to insure time compatibility with the support measures. We estimate the models by generalized estimating equations (GEE), a procedure that accounts for three important features of the data generating process; GEE is a generalization of generalized linear models (Liang and Zeger 1986; Zeger, Liang, and Albert 1988). First, this allows us to account for heteroskedasticity, given that the variance for each panel (year) may differ and the units may have variation of scale. Second, this approach also relaxes the assumption of the independence of observations from individual countries. This is important because long-run development differences (that may not vary within this specific time period but contribute to overall level differences in development) can complicate interpretation of differences in EMAS adoption. Third, this approach also addresses concerns about immeasurable country-level effects.

Both regressions fit well using standard statistics. For both dependent variables, as the support factor increases, the shares for organizations and sites both increase. This provides strong support for Hypothesis 1—that member states that promote EMAS will have higher uptake of EMAS membership than those that do not. Surprisingly, GDP per capita is not

significant and the level of ISO adoption is also not a significant predictor of EMAS adoption. Exports is a significant predictor in the case of sites. We note, though, that these latter findings are consistent with the use of a panel data estimator for short panels.

[Insert Table 3 about here.]

Our tests of Hypotheses 2a, 2b and 3 appear in Table 4, which shows the results for two GEE analyses for our folded "changes in shares" variables.[4] The table shows that we also have statistically significant results in this case. While the control variables are insignificant, we find for both organizations and sites that as support increases, the size of the changes in shares falls. That is, those changes in shares are smaller in countries where there is enhanced support for adoption of EMAS. This is consistent with the distributional analysis of our descriptive statistics above and the inference here is support for Hypotheses 2a and b: governments with lower promotion of EMAS are more likely to see lower overall levels of membership followed by punctuated spikes in adoption. We infer from this finding that there is indeed some pressure to standardize and converge upon EMAS, as firms in nations without support struggle to catch up and we subsequently witness large spikes in adoption.

[Insert Table 4 about here.]

Can we identify useful cases for additional study? One way to do so is to standardize the changes by converting them into Z-scores, and then look for those that are outliers. While additional case study is outside the scope of this paper, this exercise does point to fruitful research strategies for those who document the country-level dynamics of EMAS or other EMS

[4] Because the dependent variables are centered on zero, when we fold them by taking the absolute value, there are many values close to the zero level. Clearly for this absolute value measure and the shares measure, we cannot allow for negative values. To account for these possibilities, we estimated all models here by random effects Tobit analysis for panel data to insure robustness; Tobit analysis corrects the estimates by bounding the dependent variable at zero. In that case, we also checked for fragile estimation given potential variation in the results based on quadrature. All results remain as shown in this paper. We present the GEE results for simplicity.

adoption. These are the cases that are interesting for our study of convergence. In the case of organizations, the relevant growth cases (with Z-scores above 2) are: Greece (2006), Hungary (2007), Poland (2007), and Cyprus (2013). In the case of sites, the relevant growth cases are: Greece (2009), Slovenia (2009), Hungary (2007), Cyprus (2013), Luxembourg (2012), Poland (2007), and Estonia (2013). These are the most extreme cases of non-smooth convergence, where significant punctuations occur in EMAS membership. None of these countries employ all five support systems.

We acknowledge that there may still be rival explanations for our findings in Table 4. For example, environmental disasters may cause more firms to sign up for EMAS out of fear of more stringent government regulation, or external shocks to the economy or the policymaking environment may have the effect of creating spikes in EMAS adoption for reasons other than standardization pressures. Thus, we provide additional qualitative evidence as further tests of our main hypotheses. We conducted semi-structured interviews with a number of member state environmental officials, most of whom work for their member state EMAS competent bodies—the organizations responsible for administering and implementing EMAS. To complement these data, we also scrutinized EU publications, such as case studies of member state support from both the EU Commission and from the member states themselves. We found that this qualitative evidence also provides support for Hypotheses 1, 2a and 2b, although with some caveats.

First, most environmental officials we spoke with agreed that support from member state governments has a notable impact on adoption. That is, EMAS adoption will only increase if member states provide adequate support for businesses, so that they can learn more about the program, as well as gain assistance in implementing it. EU Commission documents also

supported this narrative, showing how specific support measures could boost membership within member states (EU Commission 2015).

Second, this evidence at least partially bolstered the idea that broad, comprehensive support for implementing EMAS produces a smooth, gradual adoption process, largely free from punctuations or spikes in the rate of adoption. One official from Germany—a nation that employs all support tools—said, "one shouldn't expect that introducing certain measures will lead to sudden peaks of interest in EMAS. It always takes time before the information is spread…" Additionally, Austria employs all five tools of promotion and between 2005 and 2015, there were very small annual changes in organization registrations (EU Commission 2016).

Austria did experience a surge in membership between 1999 and 2002, followed by a decline until membership stabilized in 2005. The EU Commission authors argue that "the initial rise can largely be ascribed to the direct financial support that the Austrian government offered to organizations implementing EMAS until 2001" (EU Commission 2016). The funding, however, was only meant to support companies through their initial registration and when it expired in 2001, a number of companies declined to continue with EMAS. In Austria today, funding for EMAS is still available on a more limited basis, but the Commission argues that, "once organizations enter the scheme, it is crucial to provide them with structural, long-term support to keep them inside" (EU Commission 2016). "Structural" support in this case refers to regulatory or legal support that provides companies with regulatory incentives to stay in the program. The idea that financial support may lead to a spike in membership, followed by a decline upon the withdrawal of that support was also echoed by an official from Ireland—a nation that only offers promotional support for EMAS: "…if the government threw money at

EMAS registered companies…there of course would be a spike in membership…followed by a drop-off immediately if the perks were withdrawn."

Finally, our qualitative research revealed new information on the relationship between ISO 14001 and EMAS. Companies in EU nations without EMAS support may see ISO 14001 as a sufficient program for improving environmental performance. Only if there are EMAS support mechanisms do they bother to take the next step from ISO 14001. The EMAS official from Ireland, where only promotional activities are employed, said as much: "There is almost no take-up (of EMAS) in Ireland. The Irish government agencies have not given EMAS a higher priority in terms of assistance, funding etc. than ISO 14001. This is because it is felt that ISO 14001 registration achieves the same aim." Similarly, the Netherlands, which employs no support mechanisms for EMAS, has been characterized elsewhere as an "EMAS laggard", as businesses do not seek more stringent standards than those employed by ISO 14001 (Wurzel, Zito and Jordan 2013). This evidence therefore provides some support for Hypothesis 3—in the absence of government support for EMAS, the adoption rate remains low with few punctuations, and in this case the evidence suggests that satisfaction with ISO 14001 may be the reason.

What this evidence shows in total is that use of all or nearly all of the different support mechanisms leads to a smooth and gradual adoption process, while a mix of support mechanisms can actually lead to the spikes we predicted seeing in nations with no support mechanisms. Specifically, failing to provide legal or regulatory support that helps firms in the longer run can lead to spikes of new adoptions, followed by drop-offs if they are not backed up by other measures of support. What we did not predict and what is not borne out by the quantitative model is that nations with no (or very few) support mechanisms may have little volatility in EMAS adoption because there is little interest in the first place. Such a lack of interest may be

due to business satisfaction with ISO 14001, as is the case in Ireland and the Netherlands. Thus, nations can employ support tools, but unless they think carefully about which ones to utilize, it can produce disjointed and episodic rates of adoption, whereas utilizing most or all of the support tools is more likely to lead to a gradual and smooth rate of adoption.

DISCUSSION

In this paper, we hypothesized that government support for EMS programs, such as EMAS, would lead to higher rates of adoption of that program. We also presented rival hypotheses about the potential effects of government EMAS support on the annual level of change in EMS program adoption shares within each nation, particularly in the presence of a rival standard, such as ISO 14001. If there is strong pressure through trading and supply chain relationships to converge upon a more rigorous standard, such as EMAS, then we should see disjointed and episodic spikes in EMAS membership, as EU nations struggle to catch up and join the program. At the same time, government EMAS support should foster a smooth and incremental adoption rate over time. On the other hand, if there is little pressure to converge upon EMAS through the global economy and ISO 14001 is seen as a sufficient standard for businesses, governments and civil society, then we are more likely to observe low adoption rates and little change in those rates in nations that do not provide EMAS support.

Our models present support for our hypotheses, but also some support for each of the rival hypotheses, presenting an intriguing picture with respect to the effects of government CSR promotion, competing standards and the pressures of standardization. Our first model reveals that government support for EMAS has a significant and positive effect on EMAS membership in EU nations. This is consistent with previous research on the subject and reveals that there are many ways in which firms can benefit from government promotion, information and incentives

revolving around particular CSR or EMS programs. Our qualitative evidence reveals the importance of utilizing all five promotional tools or at least deploying the right mix of those tools. For example, utilizing financial incentives while failing to give longer-term, legal and structural support may result in short-term spikes in membership that then collapse if financial incentives disappear.

Our GEE model that examines annual changes in EMAS membership also provides support for the idea that a lack of government support for EMAS produces more disjointed spikes and punctuated equilibrium in EMAS membership. We believe that this model bolsters the idea that there is pressure to converge upon EMAS as a stronger standard than ISO 14001. The spikes in membership reveal the efforts of firms in non-promoting countries to catch up to firms in promoting countries, which occur partly as a result of standardizing pressures that occur through global trading relationships and supply chains. On the other hand, our qualitative data also found that in some non-promoting member states, interest in EMAS was not that strong, as many firms did not see the need for moving beyond ISO 14001 to EMAS.

Taken together, our findings suggest a number of intriguing dynamics. First, government support of EMAS boosts participation in the program, but at the same time in some member states, firms see ISO 14001 as sufficient without a need to graduate to EMAS. Second, a lack of government support generates more spikes in membership according to our quantitative model, but in some member states without EMAS support, the lack of interest in EMAS translates into low adoption rates with little change. These findings suggest that in some member states, low government support causes spikes in membership driven by the pressures to standardize and converge upon EMAS, whereas in other member states with low support, such pressures are nowhere to be found. The answer for future research may lie in the conditional relationship to be

played by ISO membership. Non-promoting nations that experience punctuated equilibrium in EMAS membership may also suffer from low ISO membership, in which case firms feeling standardizing pressures have no EMS frame of reference with ISO. An examination of the conditional relationships involved may tell us more about where specifically pressures to standardize within the EU economy originate.

There are other ways in which this paper offers a "next step" approach to understanding the EMS program adoption process. The leptokurtic distributions found in non-promoting nations that are characterized by a high average incidence of no change, along with the "fat tails" of large changes are evidence of collective bounded rationality decision processes (Jones 1999). Therefore, our focus in this paper is the aggregate effects of firm-level decisions about the adoption of voluntary regulatory compliance systems like EMAS. Our work provides a stepping stone for more firm-centered research that attempts to understand the adoption decision (or non-decision) for each individual firm. Further research could examine firm-specific characteristics and how they interact with the presence or absence of promotional tools to affect the decision to adopt programs like EMAS. As mentioned above, such research could also examine these decisions in light of standardizing pressures and competing EMS programs, such as ISO 14001. Finally, examination of firm characteristics can also utilize the work of Jones, Robinson and others to determine how bounded rationality at the firm level affects the decision to join voluntary environmental programs. For example, Jones (1999, 2003) has argued that some organizations will have "stickier" decision making processes, as the costs of collective action or standard operating procedures will be higher in some firms than in others. These processes will ultimately have varying effects on the decision to join voluntary programs.

This study reveals that government promotion of voluntary programs not only boost membership in those programs, but also influence the pace at which they are joined. We believe that future research can look more carefully at firm level characteristics to analyze how they interact with government promotion programs to influence levels of firm membership. If scholars and observers believe that membership in voluntary environmental programs is beneficial for the environment, then there is significant value added to such research.

REFERENCES

Aerts, Walter, Denis Cormier and Michel Magnan. 2006. "Intra-Industry imitation in corporate environmental reporting: an international perspective," Journal of Accounting and Public Policy. 25: 299-331.

Andrews, Richard N. L. et al. 2003. "Project Final Report." National Database on Environmental Management Systems. Accessed online at http://ndems.cas.unc.edu/ on 1 July 2004.

Arora, Seema and Shubhashis Gangopadhyay. 1995. "Toward a Theoretical Model of Voluntary Overcompliance." Journal of Economic Behavior and Organization. 28:289-310.

Auld, Graeme. 2014. Constructing Private Governance: the Rise and Evolution of Forest, Coffee and Fisheries Certification. New Haven: Yale University Press.

Benson, Christina. 1996. "The ISO 14000 international standards: Moving beyond environmental compliance." North Carolina Journal of International Law and Commercial Regulation. 22:307-64.

Bracke, Roeland, and Johan Albrect. 2007. "Competing Environmental Management Standards: How ISO 14001 outnumbered EMAS in Germany, the UK, France, and Sweden." Environment & Planning C: Government & Policy 25:611-627.

Buthe, Tim and Walter Mattli. 2011. The New Global Rulers: the Privatization of Regulation in the World Economy. Princeton: Princeton University Press.

Cashore, Benjamin and Ilan Vertinsky. 2000. "Policy Networks and Firm Behaviors: Governance Systems and Firm Responses to External Demands for Sustainable Forest Management," *Policy Sciences*, 33: 1-30.

Clapp, Jennifer. 1998. "The Privatization of Global Environmental Governance: ISO 14000 and the Developing World." Global Governance. 4:295-316.

Cormier, Denis and Michael Magnan. 2015. "The economic relevance of environmental disclosure and its impact on corporate legitimacy: an empirical examination," Business Strategy and the Environment 24(6): 431-450.

Cornes, Richard and Todd Sandler. 1986. The Theory of Externalities, Public Goods, and Club Goods. New York: Cambridge University Press.

Dangelico, Rosa Maria and Pierpaolo Pontrandolfo. 2015. "Being 'green and competitive': the impact of environmental actions and collaborations on firm performance," Business Strategy and the Environment, 24(6): 413-430.

Darnall, Nicole. 1996. "Why Firms Mandate ISO 14001 Certification," Business and Society. 45: 354-381.

Delmas, Magali. 2002. "The diffusion of environmental management standards in Europe and the United States: an institutional perspective," Policy Sciences. 35: 91-119.

Eisner, Marc Allen. 2007. Governing the Environment: the Transformation of Environmental Regulation. Lynne Rienner Publishers.

European Union. 2004. "EMAS Executive Summary." Accessed online at http://europa.eu.int/comm/environment/emas/about/summary_en.htm on 30 March 2004.

European Union Commission. 2015. EMAS Promotion and Policy Support in the Member States: Compendium 2015. Accessed online at: http://ec.europa.eu/environment/emas/pdf/other/EMAS_Compendium_2015.pdf on 25 April 2017.

Fox, Tom, Halina Ward and Bruce Howard. 2002. Public Sector Roles in Strengthening Corporate Social Responsibility: A Baseline Study. Washington D.C.: World Bank.

Green, Jessica. 2017. "The Strength of Weakness: Pseudo Clubs in the Climate Regime," Climatic Change, 144: 41-52.

Guler, Isin, Mauro Guillen and John Muir Macpherson. 2002. "Global Competition, Institutions and the Diffusion of Organizational Practices: The International Spread of ISO 9000 Quality Certificates," Administrative Science Quarterly, 47: 207-232.

Hall, Peter and David Soskice. 2001. Varieties of Capitalism: The Institutional Foundations of Comparative Advantage. Oxford: Oxford University Press.

Hart, S.L. 1995. "A Natural Resource-Based View of the Firm" Academy of Management Review. 20:986-1014.

Jackson, Gregory and Androniki Apostolakou. 2010. "Corporate social responsibility in Western Europe: An institutional mirror or substitute?", Journal of Business Ethics 94, 371–94.

Jones, Bryan D. 1999. "Bounded Rationality." Annual Review of Political Science.

Jones, Bryan D. 2003. "Bounded Rationality and Political Science: Lessons from Public Administration and Public Policy." Journal of Public Administration Research and Theory. 13: 395-412.

Jones, Bryan D., Tracy Sulkin and Heather A. Larsen. 2003. "Policy Punctuations in American Political Institutions." American Political Science Review. 97: 151-169.

Kinderman, Daniel. 2012. "Free us up so we can be responsible! The co-evolution of corporate social responsibility and neo-liberalism in the UK, 1977—2010," *Socio Economic Review*, 10 (1): 29–57.

Kollman, Kelly, and Aseem Prakash. 2001. "Green by Choice? Cross-National Variations in Firms' Responses to EMS-Based Environmental Regimes." World Politics. 53:399-430.

Kollman, Kelly, and Aseem Prakash. 2002. "EMS-based Environmental Regimes as Club Goods: Examining Variations in Firm-level Adoption of ISO 14001 and EMAS in U.K., U.S. and Germany." Policy Sciences. 35:43-67.

Knudsen, Jette. 2017. "Government Regulation of International Corporate Social Responsibility in the U.S. and U.K.: How Domestic Institutions Shape Mandatory and Supportive Initiatives," British Journal of Industrial Relations.

Knudsen, Jette, Jeremy Moon and Rieneke Slager. 2015. "Government Policies for Corporate Social Responsibility in Europe: A Comparative Analysis of Institutionalisation." Policy and Politics, 43(1): 81-99.

Liang, Kung-Yee, and Zeger, Scott L. 1986. "Longitudinal Data Analysis Using Generalized Linear Models." Biometrika. 73:2:13-22.

Markowitz, Gerald and David Rosner. 2002. "Corporate Responsibility for Toxins." The Annals of the American Academy of Political and Social Science. 584:159-174.

Matten, Dirk and Jeremy Moon. 2008. "'Implicit' and 'Explicit' CSR: A Conceptual Framework for a Comparative Understanding of Corporate Social Responsibility," Academy of Management Review, 33 (2): 404-424.

Moon, Jeremy and David Vogel. 2008. "Corporate Social Responsibility, Government and Civil Society," in the Oxford Handbook of Corporate Social Responsibility, eds. Andrew Crane, Dirk Matten, Abagail McWilliams, Jeremy Moon and Donald Siegel. Oxford: Oxford University Press.

Murray, Keith B., and John R. Montanari. 1986. "Strategic Management of the Socially Responsible Firm: Integrating Management and Marketing Theory." The Academy of Management Review. 11: 815-827.

Neugebauer, Friederike. 2012. "EMAS and ISO 14001 in the German industry—complements or substitutes," Journal of Cleaner Production. 37: 249-256.

Neumayer, Eric and Richard Perkins. 2004. "What explains the uneven take-up of ISO 14001 at the global level? A panel-data analysis," Environment and Planning. 36: 823-829.

Nikolaeva, Ralitza and Marta Bicho. 2011. "The role of institutional and reputational factors in the voluntary adoption of corporate social responsibility standards," Journal of the Academy of Marketing Science. 39: 136-157.

Oluoch-Wauna, Lucas O. 2001. "EMAS and ISO 14001: A Comparison." Environmental Policy and Law. 31(4-5):237-49.

Porter, Michael E. 1990. The Competitive Advantage of Nations. New York: The Free Press.

Porter, Michael E., and Charles van der Linde. 1995. "Toward a new conception of the environment-competitiveness relationship." Journal of Economic Perspectives. 9:97-118.

Potoski, Matthew and Aseem Prakash. 2004. "Regulatory Convergence in Nongovernmental Regimes? Cross-National Adoption if ISO 14001 Certifications." The Journal of Politics 66:885-905.

Potoski, Matthew and Aseem Prakash. 2005a. "Green Clubs and Voluntary Governance: ISO 14001 and Firms' Regulatory Compliance." American Journal of Political Science. 49(2): 235-248.

Potoski, Matthew and Aseem Prakash. 2005b. "Covenant with Weak Swords: ISO 14001 and Firms' Environmental Performance." Journal of Policy Analysis and Management. 24(4):745-769.

Prakash, Aseem and Kelly Kollman 2003. "Biopolitics in the US and the EU: A Race to the Bottom or Convergence to the Top?" *International Studies Quarterly* 47:609-633

Prakash, Aseem and Matthew Potoski. 2006. *The Voluntary Environmentalists: Green Clubs, ISO 14001, and Voluntary Regulations.* Cambridge: Cambridge University Press

Reinecke, Juliane, Stephan Manning and Oliver von Hagen. 2012. "The Emergence of A Standards Market: Multiplicity of Sustainability Standards in the Global Coffee Industry," Organization Studies, 33 (5-6): 791-814.

Rugman, Alan M., and Alain Verbecke. 1998. "Corporate Strategy and International Environmental Policy." Journal of International Business Studies. 29:819-834.

Robinson, Scott E. 2004. "Punctuated Equilibrium, Bureaucratization and Budgetary Changes in Schools." Policy Studies Journal. 32: 25-39.

Russo, Michael V., and Paul A. Fouts. 1997. "A Resource-Based Perspective on Corporate Environmental Performance and Profitability." Academy of Management Journal. 40:534-559.

Russo, Michael V., and Paul A. Fouts. 1997. "A Resource-Based Perspective on Corporate Environmental Performance and Profitability." Academy of Management Journal. 40:534-559.

Schauer, Frederick. 1991. Playing By the Rules: A Philosophical Examination of Rule-Based Decision-Making in Law and in Life. Oxford:Oxford University Press.

Schelling, Thomas C. 1960. The Strategy of Conflict. Cambridge, MA: Harvard University Press.

Steurer, Reinhard. 2010. "The Role of Governments in Corporate Social Responsibility: Characterising Public Policies on CSR in Europe," Policy Sciences, 43(1): 49-72.

Terlaak, Ann. 2007. "Order Without the Law? The Role of Certified Management Standards in Shaping Socially Desired Firm Behaviors," Academy of Management Review, 32 (3): 968-985.

Tucker, Justin and Andrew B. Whitford. 2012. "Focal Points in Public Policy: Evidence from Voluntary Regulation." Review of Policy Research.

Union of International Organizations. 1997. Yearbook of International Organizations. München, Germany: K.G. Saur.

United Nations Development Program. 2001. Human Development Report 2001. New York: Oxford University Press.

Van der Veldt, D. 1997. "Case studies of ISO 14001: A New Business Guide for Global Environmental Protection. Environmental Quality Management. 7(1):1-19.

Vogel, David. 2005. *The Market for Virtue: The Potential and Limits of Corporate Social Responsibility*. Washington D.C.: Brookings Institute Press.

Wall, Ellen, and Barbara Beardwood. 2001. "Standardizing Globally, Responding Locally: The New Infrastructure, ISO 14000, and Canadian Agriculture." Studies in Political Economy. 64:33-57.

Weinthal, Erika and Yael Parag. 2003. "Two Steps Forward, One Step Backward: Societal Capacity and Israel's Implementation of the Barcelona Convention and the Mediterranean Action Plan." Global Environmental Politics. 3:51-71.

Wurzel, Rudiger, Anthony Zito and Andrew Jordan. 2013. Environmental Governance in Europe: A Comparative Analysis of New Environmental Policy Instruments. Cheltenham: Edward Elgar Publishing.

Zeger, Scott L; Liang, Kung-Yee; and Albert, Paul S. 1988. "Models for Longitudinal Data; A Generalized Estimating Equation Approach." Biometrics. 44:4:1049-60.

Table 1: Member State use of Promotion Tools

Member State	Marketing and Promotion	Information Provision	Legal	Financial	Global EMAS
Austria	x	X	x	x	x
Belgium	x	X		x	x
Cyprus					
Czech Republic					
Denmark		X		x	x
Estonia		X		x	
Finland		X		x	x
France	x		x	x	
Germany	x	X	x	x	x
Greece		X	x	x	
Hungary	x	X		x	
Ireland	x				
Italy	x	X	x	x	x
Latvia					
Luxembourg		X			
Malta	x	X	x	x	
Netherlands					
Poland	x	X	x	x	
Portugal		X	x		x
Romania	x	X		x	
Slovakia	x	X		x	
Slovenia					
Spain	x	X	x	x	x
Sweden	x	X	x		
United Kingdom	x	X	x		

Table 2: Descriptive Statistics for EMAS Adoption Variables

Variable	N	Mean	SD
Organizations	130	164.86	369.05
Sites	130	300.59	530.39
Shares of organizations	130	0.04	0.09
Shares of sites	130	0.04	0.07
Absolute value of changes in shares of organizations	123	0.25	0.92
Absolute value of changes in shares of sites	123	0.40	1.06

Table 3. GEE Analysis for EMAS Adoption in EU Member States, 2010-2014

Variable	Shares of Organizations	Shares of Sites
Support	0.049**	0.039**
	(0.017)	(0.013)
GDP Per Capita	-0.005	-0.008
	(0.013)	(0.018)
ISO	0.001	0.002
	(0.002)	(0.003)
Exports	0.008	0.013*
	(0.005)	(0.006)
Groups	0.000	0.000
	(0.000)	(0.000)
Constant	-0.071	-0.146
	(0.086)	(0.106)
Observations	130	130
Wald χ^2	13.74*	22.37**

** $p < 0.01$, * $p < 0.05$ (one-tailed for main hypotheses)
Grouped by country identifier. Link function is identity. Gaussian distribution. Exchangeable correlation matrix.

Table 4. GEE Analysis of Changes in Shares in EMAS Adoption Rate, 2010-2014

Variable	Organizations	Sites
Support	-0.179*	-0.194*
	(0.083)	(0.087)
GDP Per Capita	0.120	0.003
	(0.257)	(0.271)
ISO	0.081	0.030
	(0.078)	(0.108)
Exports	-0.222*	-0.196*
	(0.102)	(.108)
Groups	0.001	0.000
	(0.000)	(0.000)
Constant	2.410*	2.252
	(1.377)	(1.454)
Observations	123	123
Wald χ^2	21.01**	21.74**

** $p < 0.01$, * $p < 0.05$ (one-tailed for main hypotheses)
Grouped by country identifier. Link function is identity. Gaussian distribution. Exchangeable correlation matrix.

TECHNICAL APPENDIX

This technical appendix provides details on the factor analysis used for assessing the composite effects of the five support variables. It also provides details on the control variables included in the regression and tobit analyses.

Table A1 provides details on the factor analysis. In this case, a single-factor model fits the data well; the likelihood ratio test of an independent versus saturated model rejected the null at a high level of significance ($\chi^2 = 235.33$, df $= 10$); only one eigenvalue was above 1.0. For this reason, we retained only one factor and then scored each country and each year based on the scoring coefficients from this model.

Table A1. Factor Analysis

Factor Analysis

Factor

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	1.43	1.05	1.04	1.04
Factor 2	0.38	0.34	0.28	1.32
Factor 3	0.04	0.24	0.03	1.35
Factor 4	-0.20	0.09	-0.14	1.21
Factor 5	-0.28		-.021	1.00
Observations	270	270	270	270

Loadings

Variable	Factor 1	Factor 2	Factor 3	Uniqueness
Financial	0.70	-0.22	0.01	0.46
Legal	0.57	0.28	-0.07	0.59
Promotional	0.38	0.42	0.02	0.68
Informational	0.47	-0.06	0.16	0.75
EMAS Global	0.50	-0.28	-0.09	0.66

Scoring Coefficients (Regression Method)

Variable	Factor 1
Financial	0.41
Legal	0.26
Promotional	0.17
Informational	0.18
EMAS Global	0.20

Table A2 provides details on the controls used in the regression and tobit analyses.

Table A2: Descriptive Statistics for Control Variables

Variable Name	Description	Mean	Standard Deviation
Support Score	Factor analysis of basic support measures	0.02	0.83
GDP Per Capita	The natural logarithm of per capita Gross Domestic Product (in chained dollars)	-3.51	0.35
ISO	The natural logarithm of take-up of ISO 14001 certifications in the country in a given year	7.19	1.72
Exports	The natural logarithm of exports within the European Union	10.65	1.62
Groups	The presence of international environmental groups in the country in a given year	91.45	174.19