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Europeanisation and the uneven convergence of environmental policy: explaining the geography of EMAS

FINAL VERSION

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Abstract

This paper seeks to advance current understanding of uneven convergence in the context of EU environmental policy, and specifically, the Eco-Management and Audit Scheme (EMAS). Using a large sample, quantitative methodology, we examine three broad sets of determinants hypothesised to influence geographic patterns of policy convergence: (1) cross-national market integration; (2) compatibility between the domestic regulatory context and European policy requirements; and (3) bottom-up pressure from market and societal actors. Our analysis provides empirical support for all three hypothesised determinants. We find that measures of import-export ties, regulatory burden, past policy adoptions, environmental demand from civil society and levels of economic productivity, are all statistically significant predictors of national EMAS counts. Against a backdrop of geographically diverse regulatory institutions, societal conditions and trading relationships, we conclude that unevenness is an inevitable feature of Europeanisation.

1 Introduction

Despite strong top-down pressures from the European Union (EU), few accept the idea that member states are converging, or indeed will converge, to a single "European" model of administrative structure, practice or policy. Instead, as is well-documented, the outcomes of Europeanisation have proved far more complex, characterised by elements of convergence, divergence and persistent national diversity (Cornelisse and Goudswaard, 2002; Jordan et al, 2003; Marginson and Sisson, 2002; Weale et al, 2000). This paper attempts to explain these geographically uneven patterns of convergence and non-convergence in the context of European Union (EU) environmental policy, and specifically, the Eco-Management and Audit Scheme (EMAS).

EMAS is a voluntary scheme that seeks to assist firms[1] in evaluating, reporting and improving their environmental performance (Honkasalo, 1998). By offering flexibility and various market-based benefits, the European Commission hoped that EMAS would be readily adopted by firms across the EU. Yet this has not happened. Uptake of the standard has been highly uneven. While EMAS has proved popular amongst firms in several member states (e.g., Germany), adoption has been far lower in others (e.g., Portugal).

What explains these geographically uneven patterns of policy adoption? The existing empirical and theoretical literature on policy diffusion, convergence and Europeanisation identifies three broad sets of determinants that might account for empirically observable patterns of convergence and non-convergence across the EU (Bennett, 1991; Drezner, 2001; Knill, 2001; Potoski and Prakash, 2004; Tews et al,

[1] The term "firm" is used broadly here to denote all private and public sector entities capable of registering to EMAS.

2003; Weale et al, 2000). These are: (1) the geography of intra-EU market integration; (2) "goodness-of-fit" between the domestic regulatory context and European policy requirements; and (3) "domestic mobilisation" (Börzel, 2003) by market and societal actors. Previous empirical studies have predominantly concentrated on the second of these determinants, focusing, in particular, on instances of non-convergence arising from "misfitting" EU policy (Bailey, 2002; Olsen and Peters, 1996; Szarka, 2003). By contrast, far less work exists on either of the other two determinants, and especially market integration. The result is that considerably more is known about the factors that impede convergence than those which drive or support it.

Responding to these shortcomings, this paper investigates the role of all three hypothesised determinants in explaining cross-national variations in the adoption of EU environmental policy. To do so, we use a quantitative methodology to analyse cross-national variations in EMAS registrations, based on a sample that includes 15 EU member states[2], that is novel to the literature in this field. Inevitably, our large-sample, econometric approach is constrained by the availability of measurable proxies and, moreover, cannot provide the kind of contextual detail afforded by previous small-sample, qualitative studies. However, our quantitative methodology is well-suited to identifying the generic determinants of adoption, and hence confirming or rejecting theoretical predictions about the causes of uneven policy convergence across the EU.

The paper is organised as follows. Section 2 details the origins and nature of EMAS. Section 3 develops our hypotheses, Section 4 outlines the data, measures and methods used in the study, and results follow in Section 5. Finally, Section 6 provides discussion and conclusions.

[2] The EU 15 prior to the accession of 10 new member states in May 2004

2 EMAS: a new approach to regulating environmental behaviour

Since the launch of its First Environmental Action Programme in 1973, the bulk of EU environment policy has comprised mandatory ("command-and-control") regulations prescribing uniform, legally-binding standards for environmental performance and/or procedures. Over the past decade, however, the EU has experimented with a number of so-called "new environmental policy instruments" (NEPIs). Setting the agenda for this revised approach, the Commission's Fifth Action Programme (1992-2000) recognised the limits to traditional mandatory regulation, and called for a broadening of EU environmental policy approaches. Thus, in addition to traditional top-down command-and-control measures, it was suggested that the EU should adopt more bottom-up, partnership-oriented and market-based ones (Weale et al, 2000).

The EU's Eco-Management and Audit Scheme (EMAS) was a product of this thinking. Launched following the early success of ISO 9000, the series of quality management standards developed by the International Organization for Standardization (ISO), EMAS was heralded as a new model of industrial environmental regulation, in that participation is voluntary. Furthermore, EMAS does not impose substantive "performance" requirements on firms; official registration to the scheme is conditional on participating organisations following set "procedures" intended to promote continual improvements in environmental performance.

These procedures are: (1) the adoption of an environmental policy; (2) a comprehensive review of environmental issues, impacts and performance associated with the firm's activities; (3) the introduction of an environmental management system (EMS) to co-ordinate and control the various environment-related tasks in the

organisation; (4) an environmental audit to evaluate whether the EMS is suited to meeting the firm's environmental policy; and (5) the preparation of a public environmental statement which, inter alia, specifies the outcome of the organisation's environmental programme and the extent to which this meets its policy objectives (Kahlenborn and Dal Maso, 2001).

Two additional steps are required in order to receive EMAS registration. The firm must first commission an independent EMAS verifier to confirm that the environmental review, EMS, audit procedure and environmental statement have been correctly undertaken. The validated environmental statement must thereafter be sent to the national body responsible for registration.

Although voluntary, in the sense that firms can choose whether to participate, the EMAS legislation (Council Regulation 1836/93) requires individual member states to take various actions to support the scheme. They are obliged to establish an accreditation system for independent verifiers and appoint a certification body responsible for maintaining a record of registered sites. The EMAS regulation also calls on member states to promote participation in the scheme, particularly among small-and-medium-sized enterprises, through incentives ranging from information provision to financial assistance for applicants to the scheme (Glachant et al, 2002; Gouldson and Murphy, 1998; Honkasalo, 1998).

EMAS is not the only standardised EMS standard. ISO 14001, the international voluntary code developed by the ISO, has been available to European firms since 1996. In common with EMAS, the ISO standard requires participating organisations to produce an environmental policy, implement an EMS and carry out periodic internal audits. However, ISO 14001 does not require compliance with statutory environmental

rules and regulations. Instead, firms must simply demonstrate a "commitment" to legal compliance in their environmental policy. Additionally, disclosure of performance information is discretionary for ISO 14001 certified facilities, whereas EMAS registered ones must produce a public environmental statement detailing their environmental impacts. Finally, certification to ISO 14001 is left in the hands of firms themselves, who have the choice to self-certify or seek third-party accreditation.

For these reasons, ISO 14001 is less rigorous and demanding on firms than EMAS, and consequently, has proved more popular. As shown in Table 1, the number of ISO 14001 certifications across the 15 EU member states is over four times greater than the EMAS total. In fact, ISO certifications far outnumber EMAS registrations in all but two member states, Austria and Germany. Moreover, take-up of EMAS is also more unevenly distributed, with the bulk of EMAS registrations accounted for by a single country, Germany. Even after deflating EMAS counts by population size, considerable variations remain. Four countries, Austria, Germany, Sweden and Denmark, emerge as clear frontrunners in EMAS adoption, with participation rates ranging from 23.84 to 44.52 registrations per million inhabitants. Finland (6.94) and Spain (4.01), although lagging far behind the leading four, also have comparatively high per capita counts. The remaining nine member states all have participation rates below 2.5 registrations per million. The UK, for example, has 1.29, Greece 0.66, and France a mere 0.59 registrations per million inhabitants.

< Insert Table 1 about here >

Such cross-country variations in the take-up of EMAS raise a number of important questions about the uneven geography of Europeanisation. Why have firms in some countries proved more receptive to the EU standard than others? Are there specific geographic factors that have supported the adoption and diffusion of EMAS and, hence, convergence? Conversely, are there factors that have discouraged take-up of the standard, and therefore acted as a source of resistance to the homogenising pressures of the EU? The present paper addresses these questions, but before doing so, we explain our theoretically-derived hypotheses.

3 Explaining cross-national variations in EMAS

Registration to EMAS is potentially a costly process for firms. Steger (2000, page 27), for example, reports that the costs of acquiring the standard generally lie in the range €50,000-100,000. As a voluntary scheme, therefore, we expect participation to depend on the existence of offsetting benefits. Previous studies have defined these benefits in largely monetary terms (Glachant et al, 2002; Khanna and Anton, 2002). Arguing that managers are self-interested and rational agents, it is assumed that firms will only adopt an EMS where the financial benefits exceed the financial costs.

We agree that the costs, benefits and profitability of EMAS are major factors shaping firms' decisions to implement and register to the standard. Yet they are unlikely to be the only ones. Recent work in economic sociology suggests that firms often adopt organisational innovations for reasons that have little to do with enhancing efficiency or profitability. Rather, adoption may be triggered by managers' quest for external legitimacy, and specifically, the need to conform to widely held beliefs of

rational and efficient management practice (Abrahamson, 1996; Meyer and Rowan, 1977). These dynamics are said to account for the fad-like spread of management practices which are unprofitable, or whose benefits are questionable.

Our conceptual approach therefore recognises that participation in EMAS is likely to be shaped by two sets of factors. The first are geographic factors influencing the financial costs, benefits and profitability of the scheme, or indeed, the supply of information about these. The second, meanwhile, are ideational forces, and notably, the requirements of external stakeholders – suppliers, peers, etc – who define EMAS as a model of organisational "best practice." Indeed, given the ambiguous cost-benefit ratio of EMS standards (Steger, 2000), we expect institutionalised forces to play an especially important role in the decision to adopt EMAS (Delmas, 2002; DiMaggio and Powell, 1983; Guler et al, 2002; Kollman and Prakash, 2002).

Drawing from the recent literature on policy diffusion, convergence and Europeanisation (Bennett, 1991; Börzel, 2003; Drezner, 2001; Knill, 2001; Potoski and Prakash, 2004; Tews et al, 2003), the following sub-sections detail three sets of factors that, directly or indirectly, might influence economic and institutional incentives in relation to EMAS. They are: (1) the geography of intra-EU market integration; (2) "goodness-of-fit" between the domestic regulatory context and European policy requirements; and (3) the level of "domestic mobilisation" by market and societal actors.

3.1 Cross-national market integration

The notion that market integration drives policy convergence is a popular one. Indeed, it underpins arguments, widely articulated in the academic and popular literature, that globalisation results in homogenisation (Drezner, 2001). One of the most important and long-standing forms of market integration is international trade. Environmentalists, together with many economists, have reasoned that increased trade leads to a regulatory "race to the bottom." Governments, regulators and firms, faced with intensified market competition, will seek to minimise compliance costs by opting for the lowest environmental standard (Clapp, 2001). Other analysts have challenged this logic, however, arguing that increased economic interdependence may result in the strengthening of environmental regulations. Vogel (1997), for example, highlights the possibility of "trading-up", as high environmental standards in one country compel firms in another to adopt the same standards in order to build and/or maintain export share.

Applying these revisionist arguments to EMSs suggests that trade between countries may create positive incentives for "upwards" policy convergence. A growing number of firms, and especially large and/or multinational ones, are requiring their foreign suppliers to be certified to a standardised EMS as a condition of contracting. Moreover, consistent with the notion of "trading-up", reports suggest that these requirements are generating pressures for the adoption of an EMS through regional and/or global supply chains (Bansal and Bogner, 2002; Morrow and Rondinelli, 2002; Steger et al, 2002).

The practical implications of these requirements are likely to vary depending on a country's trading partners (Kern et al, 2001; Marginson and Sisson, 2002; Tews et al,

2003). Where they are predominantly located outside the EU, or comprise EU member states with low numbers of EMAS registrations, firms may well opt for ISO 14001, since it is an internationally-recognised standard, accepted in markets across the globe (Glachant et al, 2002). By contrast, firms in countries that primarily export to member states with high levels of EMAS participation are more likely to register to the EU standard. EMAS is exclusively European, and therefore offers clear commercial advantage only to firms supplying EU member states, where EMAS is preferred over ISO 14001 (Delmas, 2002; Epstein and Roy, 1998; Steger, 2000).

Another way in which market integration might drive policy convergence is through cross-national communication networks (Bennett, 1991; Kern et al, 2001; Tews et al, 2003). The importance of so-called "weak ties" (Granovetter, 1973), that is, linkages between heterogeneous communities, in the cross-national diffusion of organisational innovations is well-documented (Arias and Guillén, 1998). After Guler et al (2002), we expect interactions between buyers and suppliers in different countries to facilitate the transfer of information, knowledge and expertise about EMAS, reducing the search and implementation costs for potential adopters. Trade linkages also provide conduits for the dissemination of norms, rhetorics and professional expectations, defining EMAS as a model of "best practice." Influenced by their trading partners, domestic managers may adopt EMAS in order to conform to institutionalised ideas and norms of rational management practice, and avoid the impression of backwardness (Drezner, 2001).

Taken together, the above discussion indicates that market integration provides positive economic and institutional incentives for "upwards" convergence to EMAS.

We therefore expect take-up of the standard to be greater by firms in member states linked via import and/or export ties to registered facilities in other member states.

Hypothesis 1. States that are closely linked by trade to other member states with high levels of EMAS participation will themselves have a larger numbers of registrations.

3.2 Domestic regulatory styles, traditions and experience

Just as market integration has emerged as one of the most popular explanations for policy convergence so domestic regulatory institutions are frequently portrayed as a leading source of non-convergence (March and Olsen, 1979). Central to this thinking is the idea that each country possesses a unique set of policy styles, structures and experiences that define how different regulatory issues are approached and administered. An influential body of "institutionalist" work argues that domestic regulatory institutions are a key determinant of European policy usage (Jordan et al, 2003; Knill and Lehmkuhl, 2002). According to these approaches, EU policy is most likely to be adopted and/or effectively implemented where it "fits", in the sense of conforming to domestic systems of regulation. Conversely, "misfitting" polices which do not match pre-existing regulatory approaches are likely to be opposed, or simply ignored, resulting in low levels of take-up or implementation at the national level. Empirical studies generally confirm these predictions finding that the degree of fit has a significant influence on the acceptance or rejection of "downloaded" EU policy by member state governments, regulators and firms (Bailey, 2002; Knill and Lenschow, 1998; Szarka, 2003).

One aspect of the domestic policy environment that might influence goodness-of-fit in relation to EMAS, and hence geographic patterns of adoption, are traditions of regulatory interventionism. Two factors are important here. First, voluntary environmental policies are likely to fit better with less interventionist, "business-friendly" styles of policy-making and implementation. With their emphasis on self-regulation, flexibility and market-centeredness, voluntary policies are unlikely to be accepted by highly interventionist governments. Here, the incorporation of voluntary approaches such as EMAS will require changes to pre-existing regulatory arrangements, suggesting resistance or, at least, low levels of public support (Knill, 2001; Wilson, 2002; Weale et al, 2000). Instead, voluntary approaches are far more likely to be accepted and incorporated in countries with less interventionist, market-friendly regulatory styles and structures. Favouring voluntaristic, market-led approaches, we expect public regulators in these countries to look upon voluntary environmental policies positively, supporting their deployment with a range of incentives.

These incentives are known to be of considerable importance in the decision to adopt EMAS. A number of detailed comparative studies have found that cross-country variations in the degree of regulatory relief (reduced reporting requirements, inspections, etc) or financial support (subsidies, etc) offered by public regulators explain much of the willingness of firms in several member to adopt EMAS compared with their counterparts in others (Delmas, 2002; Kollman and Prakash, 2001). These findings are not entirely surprising. The level of regulatory incentives significantly impacts the cost-benefit calculus of EMAS registration and hence the financial incentive for firms to adopt the standard (Glachant et al, 2002).

A second reason why EMAS is likely to fit better with less interventionist, market-friendly regulatory approaches concerns firms themselves. Kollman and Prakash (2001, page 417) argue that past experience of stringent regulation '…make industry suspicious' of government regulation. This, they argue, includes government-sponsored voluntary environmental policy instruments whose uptake depends, to a greater or lesser extent, on the goodwill of industry and co-operative relations with public regulators (Delmas and Terlaak, 2002). These features are unlikely to be found in countries where firms have traditionally been subject to heavy-handed, burdensome and erratic regulatory interventions. Rather, we expect the capacity and willingness of firms to adopt government-sponsored voluntary initiatives will be greater in countries characterised by less stringent, more business-friendly approaches to regulation.

Hypothesis 2. Countries with less interventionist, burdensome styles of business regulation are likely to have a higher number of EMAS registrations.

Another factor influencing compatibility is the legacy of policy usage. A common assumption of institutionalist approaches is that instrument choice is path-dependent in that past policy adoptions shape future ones (Delmas, 2002; Kollman and Prakash, 2002; Szarka, 2003). Adoption of a policy is more likely, in other words, where it is already widely diffused. There are two reasons why we should expect path-dependencies in the case of EMAS. First, past experience of the standard is likely to reduce the information and implementation costs for subsequent adopters, and therefore improve its economic viability. For example, where EMAS is already widely diffused, applicants may profit from well-developed support and consultancy services.

A second reason for the existence of path-dependencies are "bandwagon effects" (Rosenkopf and Abrahamson, 1999) whereby adoption by some actors increases the pressure on others to adopt. Bandwagon effects may be the result of increased information about profitability and/or efficiency that comes with a larger user base. However, given the uncertain cost-benefit ratio of EMSs, many analysts point to the critical importance of emulative processes (DiMaggio and Powell, 1983; Guler et al, 2002; Mendel, 2002; Rosenkopf and Abrahamson, 1999). Here, adoption decisions are primarily driven by popularity of the standard, as opposed to its profitability or efficiency. These dynamics may be reinforced by market requirements as pressures on firms to adopt a particular standard grow with the number of EMAS compliant firms (Bansal and Bogner, 2002; Glachant et al, 2002).

An important consequence of bandwagon effects is that patterns of policy convergence are likely to be self-reinforcing. We therefore expect early adoption of EMAS to be amplified over time:

Hypothesis 3. Countries with a high initial take-up of EMAS are likely to have a greater number of registrations in subsequent years.

Taking this hypothesis further, one might conclude that member states with a high number of EMAS registrations are likely to have a low number of ISO 14001 certifications, and vice versa. Both EMAS and ISO 14001 perform broadly similar functions, yet because of the advantages enjoyed by the EMS with the largest number of adopters in terms of compatibility, observability, etc (Rogers, 1995), a single standard is likely to dominate the market for certifications (Glachant et al, 2002). This

expectation accords with historic studies of technological diffusion which show that long-term market leadership often goes to the standard which gets ahead first (David, 1985). In these situations, high rates of early adoption set in motion a "snowballing" effect wherein a larger number of users encourage others to adopt the standard, thereby reinforcing its market advantage. Through this process, a single standard becomes preferred over others, potentially "locking-out" competitors which do not benefit from a similarly large user base (Arthur, 1989; Foray, 1997).

Assuming that EMAS and ISO 14001 are competing standards, therefore, we expect take-up of the EU standard to be influenced by the respective number of cumulative adoptions of ISO 14001.

Hypothesis 4. Countries with a higher number of ISO 14001 certificates are likely to have a lower number of EMAS registrations.

3.3 Domestic mobilisation

The idea that incompatibility between EU policy requirements and the domestic regulatory context impedes adoption or implementation, and hence convergence, has been criticised as excessively deterministic (Knill, 2001). Critics, for example, point to policy "misfits" which have nevertheless been adopted and/or effectively implemented by member states. To explain these anomalies, scholars have focused their attention on "bottom-up" pressures from domestic actors. Where a specific EU policy provides new strategic opportunities and benefits, it is suggested that domestic actors may mobilise behind it, for instance, pressuring domestic policy-makers, regulators or regulated

parties to adopt, enforce or otherwise support the policy (Börzel, 2003; Glachant et al, 2002). In this way, even misfitting EU policies may be effectively adopted and implemented by member states.

One of the most obvious sources of bottom-up pressure identified in the literature comes from civil society (Gouldson and Murphy, 1998; Kern et al, 2001; Weale et al, 2000). Over recent decades, firms have come under pressure from civil society groups to adhere to high levels of environmental performance. Traditionally firms could meet these requirements by complying with relevant statutory environmental laws and regulations. Increasingly, however, it is suggested that firms are required to go beyond the statutory minimum, and conform to norms of acceptable behaviour defined by civil society (Grolin, 1998).

One way for firms to meet these enhanced requirements is by implementing a voluntary EMS. Indeed, evidence suggests that "reputation", "green image" and "response to stakeholders", are amongst the leading motivations for implementing and certifying an EMS (Clausen et al, 2002; Steger, 2000). An important question in the present context is why firms should opt for EMAS over ISO 14001. The enhanced procedural requirements of EMAS, particularly in terms of formal documentation, suggest that profit-maximising firms will opt for the ISO standard. On the other hand, EMAS is a more environmentally rigorous standard than ISO 14001, and therefore, carries greater credibility with the public (Glachant et al, 2002; Honkasalo, 1998; Wilson, 2002). The provision of a public statement detailing environmental performance, in particular, sends '…a clear and positive signal to stakeholders concerning firms' commitment to improvements in environmental performance'

(Delmas, 2002, page 105). We therefore expect firms to adopt EMAS where civil society's environmental expectations are high.

Hypothesis 5. Countries with a higher level of environmental demand are likely to have a higher number of EMAS registrations.

While conventional wisdom maintains that firms will necessarily resist additional environmental regulations, there is growing recognition that, under certain conditions, they may actively mobilise behind them. According to Porter and van der Linde (1995), for example, higher levels of environmental performance can enhance firm-level competitiveness, providing an economic incentive to lobby for and/or voluntarily adopt more stringent standards. Cost-savings arising from increased energy and/or resource efficiency are one potential source of improved competitiveness. 'A good EMS will…allow the firm to uncover ways in which the firm can reduce its environmental impacts while simultaneously reducing costs or increasing productivity' (Bansal and Bogner, 2002, page 272). No doubt this economic driver explains why, alongside meeting stakeholder requirements, cost savings are recurrently cited as one of the most important motives for adopting an EMS standard (Bansal and Bogner, 2002; Corbett and Kirsch, 2000; Delmas, 2002; Morrow and Rondinelli, 2002).

Yet the economic incentive to invest in EMSs on productivity grounds varies. Firms that already achieve high levels of productivity stand to gain little from an EMS in terms of efficiency since they will have exhausted many of the profitable investments in cost savings and process enhancements (Steger, 2000). By contrast, for firms characterised by low levels of productivity, an EMS can greatly assist in the

identification and implementation of low-cost operational improvements (Raines, 2002). The return on investment for an EMS may be higher in these situations, increasing the economic incentive for adoption. Neumayer and Perkins (2004a, b) demonstrate this negative relationship between productivity levels and take-up for ISO 14001 and ISO 9000 at the global level. Therefore, we expect:

Hypothesis 6. Countries characterised by low levels of productivity are likely to have a larger number of EMAS registrations.

4 Empirical analysis

The dependent variable used in this study is the number of EMAS registered facilities per one million inhabitants (*EMAS p.c.*) as published by European Commission (2003). The data cover the period 1997-2001[3] although we omit the first year due to the use of the initial EMAS count as one of the independent variables (see below).

Our full set of explanatory variables are as follows. In order to measure the influence of cross-national trade ties, we adapt Guler et al's (2002) cohesion model used in their study into the global spread of ISO 9000. We measure the trade cohesion effect using the following formula:

$$\text{Trade cohesion effect of country i in year t} = \sum_j \text{EMAS}_{jt} \cdot (\text{Trade}_{ijt}/\text{Trade}_{it})$$

[3] Changes to the scheme, whereby companies with multiple sites could apply for a single registration, mean that our analysis purposely excludes data from 2002 onwards.

where EMAS is the number of registered sites, $Trade_{ijt}$, is the sum of exports and imports between country i and country j in year t and $Trade_{it}$ is country i's total trade with other EU member states in year t. The trade cohesion effect is a non-negative number that rises with the number of EMAS registered sites in important trading partners. Thus, countries trading more with Germany than Italy, for example, will score higher on the trade cohesion variable. Trade data are taken from OECD (2003).

As a proxy for the style of regulatory interventionism, we use a sub-component of the Index of Economic Freedom, published by Heritage Foundation (2003). The variable seeks to measure the regulatory burden imposed on private business (*REGULATORYBURDEN*) on a one-to-five scale. A country is rated one if existing regulations are applied uniformly, and where public regulatory interventions impose a comparatively light burden on business. At the other end of the scale, a rating of five is reserved for countries where regulations are applied unevenly, and high levels of regulatory interventionism by governments impede new business creation.

Ideally, we would like to control for self-reinforcing diffusion dynamics with the help of a lagged dependent variable, since doing this would allow better identification of other determinants of EMAS registration. Yet our sample is too small and covers too few years to do so. We therefore control for the fact that high initial take-up of EMAS is likely to result in an ever larger number of registrations in later years by including the number of EMAS certified facilities per capita in 1997 (*EMASINITIAL p.c.*). To measure the impact of the competing ISO standard on EMAS registrations, we use the number of facilities certified to ISO 14001 in per capita terms (*ISO14000 p.c.*). ISO certification data are derived from ISO (2002) and population data from World Bank (2003).

To measure demand from civil society, we make use of two variables. First, we take the percentage of people who said they trust environmental protection associations 'when it comes to environmental issues' in the Eurobarometer 58.0 survey (*TRUST ENV. ORG.*) (EORG, 2002).[4] Although we would have liked to use a question that directly asks about public support for such associations, no such question is contained in the survey. In its absence, we take trust as a proxy for support. Additionally, to measure environmental demand, we include per capita gross domestic product in thousand US$ (*GDP p.c.*). The use of this measure is consistent with economic theory, which predicts that demand for environmental quality is a normal good, in that demand rises with income. It also fits Inglehart's (1990) proposition that the share of individuals with post-materialist values, including concern for the environment, rises in more economically advanced societies. Data in purchasing power parity (PPP) are taken from World Bank (2003) and converted to constant prices for 1996 in US$. Again using World Bank (2003) data, we estimate the impact of domestic productivity levels on registration activity by dividing GDP in PPP by the size of the labour force, yielding a measure of product per worker in thousand US$ (*GDP per worker*). Table 2 provides summary descriptive variable information. Table 3 details the respective mean values of dependent and independent variables over the study period.

< Insert Tables 2 and 3 about here >

We estimate the following model:

[4] Note, although this variable refers to the late-1990s and is time-invariant, the level of demand is unlikely to have changed much over the study period.

$$y_{it} = \alpha + \beta x_{it} + \gamma_t T_t + v_{it}.$$

The subscript i represents each country in year t, y is the number of EMAS certifications per capita and x is the vector of explanatory variables. The year-specific dummy variables T capture general developments such as the Europe-wide spread of awareness about the standard. The v_{it} is a stochastic error term. We estimate equation (1) with Beck and Katz's (1995) commonly applied time-series cross-sectional estimator with panel-corrected standard errors. The error term is presumed to be heteroskedastic and contemporaneously correlated across panels. We tested the data for serial correlation, for which we found evidence, such that the error term is presumed to be subject to a common autoregressive error of order one.

< Insert Table 4 about here >

5 Results

Table 4, column 1 reports our estimation results. Trade linkages with countries that have a higher number of EMAS registrations exert a positive influence on up-take of the standard. A member state is more likely to have a high number of EMAS registrations, in other words, where it trades extensively with other states which themselves have a high per capita EMAS count. Our econometric estimations, of course, say nothing about the mechanisms through which trading relationships might influence registration activity. Yet our findings are consistent with recent theoretical work suggesting that such linkages act as conduits for the transfer of coercive pressures, information and norms of "best practice", compelling, inducing or

encouraging firms to adopt particular organisational practices (Arias and Guillén, 1998).

Consistent with a priori expectations, our variable measuring the regulatory burden imposed on private business is statistically significant, with the expected negative coefficient sign. Again, our estimations do not allow us to draw inferences about the underlying determinants of this relationship, although the result is intuitively plausible. With its emphasis on self-regulation, flexibility and market-centeredness, EMAS is likely to fit better with less interventionist, business-friendly policy-making and implementation styles (Knill, 2001).

The initial number of EMAS registrations has a positive and highly statistically significant impact on registration counts in subsequent years. This result is consistent with theoretical predictions concerning increasing returns to adoption, bandwagon dynamics and path-dependency. Of particular note, the positive coefficient for *EMASINITIAL p.c.* strongly suggests that geographic patterns of convergence are self-reinforcing, with initial differences in member states' receptiveness to new policy initiatives amplified over time. Contrary to expectations, however, we do not find that a higher number of ISO 14001 certificates is associated with a lower number of EMAS registrations. The estimated *ISO14000 p.c* variable is statistically significant with a positive coefficient sign. This contradicts theoretical models of "lock-in" which predict that a single standard will come to dominate the market for EMSs (David, 1985). Yet our results may simply reflect two special characteristics of current EMS standards. First, the procedural differences between EMAS and ISO 14001 are comparatively small (Steger, 2000). Indeed, it is relatively straightforward for facilities certified to the ISO standard to go on to register for EMAS, and vice versa (Glachant et al, 2002).

Second, in order to meet the requirements of customers in EU and non-EU markets, a number of large European firms have adopted both EMAS and ISO 14001.

As expected, both the *TRUST ENV. ORG.* and *GDP p.c.* variables are positive and statistically significant, indicating that a higher level of demand from civil society is associated with a larger number of EMAS registered sites. Most likely this reflects the greater pressure faced by firms to demonstrate high levels of environmental performance in states characterised by strong post-materialist values (Weale et al, 2000). Public regulators in these countries are also more likely to be willing to support the adoption of EMAS using a range of financial and regulatory incentives. Finally, we find that a higher *GDP per worker* is associated with a lower number of EMAS registrations, confirming predictions that EMS standards are more likely to be adopted where the productivity gains from adoption, and hence economic returns, are higher.

< Insert Table 4 about here >

Rho, the estimated autocorrelation parameter, is somewhat close to one, supporting our specification of the error term being subject to first-order autocorrelation. The explanatory power of the estimated model is quite high with an R-squared of almost .78. *EMASINITIAL p.c.* accounts for a large part of the explanatory power of the model. If we remove this variable from the model, the R-squared drops to .47 (see column 2 of Table 4). This is unsurprising given that we use the initial EMAS count in place of a lagged dependent variable. For the same reason, it is unsurprising that the value of *rho* now increases, since a lagged dependent variable (or, in its absence, a proxy variable for it) typically reduces autocorrelation of the error term. Estimation results for the

remaining explanatory variables in terms of coefficient sign and statistical significance are hardly affected, with one exception: *REGULATORYBURDEN* becomes insignificant. This finding makes sense since neither Germany nor Austria, the two countries with the highest per capita EMAS counts, have a particularly low regulatory burden. A low regulatory burden can promote EMAS uptake, therefore, but the statistical significance of the effect is contingent on controlling for differences in initial uptake.

6 Discussion and conclusions

Despite strong top-down, integrationist pressures, the outcomes of Europeanisation remain geographically uneven. In this paper we seek to advance current understanding of uneven convergence in the context of EU environmental policy. To this end, we investigate the determinants of cross-national variations in EMAS, a voluntary EMS developed and promoted by the EU. Our study is unique within the relevant literature in that we take a large sample, quantitative approach to understand patterns of Europeanisation. This allows us better to identify causal relationships across member states and, in doing so, draw more widely applicable conclusions than previous small sample, qualitative work.

Existing research into the uneven adoption or implementation of EU policy at the domestic level has predominantly focused on the winnowing effect of regulatory styles, structures and traditions (Bailey, 2002; Liefferink and Jordan, 2002; Olsen and Peters, 1996; Szarka, 2003). This body of work has identified a major role for the domestic regulatory context in supporting and/or impeding European policy

convergence. Our analysis corroborates these findings. Suggesting that certain regulatory environments are more compatible with EMAS than others, therefore, we find that EMAS registrations are higher in member states with less interventionist, burdensome styles of regulation. We also find that past and/or accumulated policy experience influences adoption patterns. The initial number of EMAS registrations and ISO 14001 certification counts are positively correlated with EMAS registration activity. This is consistent with the idea that certain countries develop a "management system culture" (Delmas, 2002; Knill, 2001) that facilitates acceptance and diffusion of EMS standards.

At the same time, however, our analysis suggests that the degree of compatibility ("goodness-of-fit") between EU policy and the domestic regulatory context provides at best only a partial explanation for uneven policy convergence. Other geographic factors are also important. One is the level of bottom-up support from domestic actors, that is, "domestic mobilisation." Our findings provide empirical support for the idea of civil society "pulling down" (Börzel, 2003) European policy to the domestic level. According to our estimations, the level of environmental demand from civil society positively influences EMAS registrations, presumably reflecting enhanced pressures on firms (and regulators) to support more stringent policy. Additionally, our results corroborate the claim that firms may mobilise behind a new EU policy if it provides an opportunity to enhance competitive advantage (Knill, 2001; Weale et al, 2000). Take-up of EMAS is greater in countries with lower levels of economic productivity where, intuitively, we expect the financial returns to adoption are greater.

Our findings also suggest that market integration drives policy convergence and that uneven patterns of adoption reflect differences in the degree to which individual member states are linked to each other through trade (Marginson and Sisson, 2002; Vogel, 1997). The number of domestic EMAS registrations is found to be directly related to the popularity of the standard in member states with which a country shares strong import-export ties. Previous work, based exclusively on case-study evidence from a handful of member states, has struggled to provide convincing empirical support for these linkages (see Steger et al, 2002). Our analysis uniquely provides robust evidence for trade as a conduit of policy diffusion across the EU based on a sample that includes 15 member states.

Several caveats, of course, accompany these findings. EMAS is only one example of European policy and, moreover, a policy instrument with some peculiar characteristics. Unlike the majority of EU environmental policy, EMAS is voluntary, meaning that adoption decisions are taken directly by firms. Precisely for this reason, we expect geographic factors influencing acceptance or rejection of the standard to differ, albeit more in degree than in kind, from conventional regulatory instruments (Tews et al, 2003). Another important qualification is that our empirical analysis only focuses on the adoption of EMAS. It says nothing about cross-national differences in the practical implementation of the standard. This is significant. Previous research shows that formal incorporation of EU policy by member states rarely implies homogeneity in patterns of implementation (Bailey, 2002; Liefferink and Jordan, 2002). Indeed, convergence in policy content may be accompanied by divergence in implementation approaches. The results of our work therefore shed light only on one aspect of policy convergence. A major task for future research is to investigate the

determinants of convergence in both policy content and implementation for a range of conventional and new environmental instruments.

Our study nevertheless provides two valuable lessons. First, it cautions against univariate explanations of uneven policy convergence across the EU. While theoretically elegant, the notion that the domestic regulatory context, in and by itself, determines patterns of adoption may be too simplistic. Consideration needs to be given to other social, economic and political factors, a point recognised in a number of recent studies, which have argued for more sophisticated, differentiated and multivariate explanations of uneven European policy adoption, implementation and convergence (Börzel, 2003; Kern et al, 2001; Knill, 2001). The second lesson from our work is the inevitability of unevenness in the Europeanisation process. Many of the factors we identify as supporting and/or impeding policy convergence exhibit, to a greater or lesser extent, a high degree of stability (Weale et al, 2000). Although the demand for environmental protection, regulatory styles, trade flows, and so on, change over time, experience suggests that they do so only very slowly. We therefore expect current patterns of uneven Europeanisation and weak policy convergence to continue long into the future.

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Table 1 EMAS and ISO 14001 counts in EU member states in 2001

Country	EMAS registrations	EMAS registrations per million inhabitants	ISO 14001 certifications	ISO 14001 certifications per million inhabitants	Ratio of EMAS/ISO
Austria	362	44.52	223	27.42	1.62
Belgium	14	1.36	130	12.62	0.11
Denmark	170	31.72	919	171.49	0.18
Finland	36	6.94	687	132.42	0.05
France	35	0.59	1092	18.45	0.03
Germany	2662	32.35	3380	41.07	0.79
Greece	7	0.66	66	6.23	0.11
Ireland	8	2.08	247	64.34	0.03
Italy	74	1.28	1295	22.37	0.06
Luxembourg	1	2.27	9	20.41	0.11
Netherlands	24	1.50	942	58.88	0.03
Portugal	2	0.20	88	8.80	0.02
Spain	165	4.01	2064	50.22	0.08
Sweden	212	23.84	2070	232.74	0.10
UK	76	1.29	2722	46.29	0.03
EU 15	3848	10.18	15934	42.15	0.24

Sources: Authors' own calculations based on ISO (2002), European Commission (2003) and World Bank (2003).

Table 2 Descriptive variable information

Variable	Obs	Mean	Std. Dev.	Min	Max
EMAS p.c.	60	7.81	11.40	0	44.52
TRUST ENV. ASS.	60	47.33	8.55	30	66
GDP p.c.	60	22.74	6.18	14.03	44.12
TRADECOHESION	60	182.38	139.18	55.24	715.12
REGULATORYBURDEN	60	2.72	0.49	2	4
EMASINITIAL p.c.	60	1.79	3.44	0	13.59
ISO 14001 p.c.	60	36.96	45.92	0.95	232.74
GDP per worker	60	47.40	15.67	28.77	103.42

Table 3 Country-specific period-averaged values of dependent and explanatory variables

Country	EMAS p.c.	TRUST ENV. ASS.	GDP p.c.	TRADE-COHESION	REGULATORY-BURDEN	EMAS-INITIAL p.c.	ISO 14001 p.c.	GDP per worker
Austria	30.42	47	23.15	617.21	3	4.34	22.02	49.46
Belgium	1.05	44	22.84	120.50	3	0.20	9.91	54.95
Denmark	24.41	49	25.08	165.10	2	2.84	105.04	45.43
Finland	5.22	45	20.81	105.88	3	2.72	90.40	41.41
France	0.55	41	20.98	198.59	2.50	0.12	10.86	46.44
Germany	26.29	59	22.24	103.83	3.25	13.59	19.01	44.68
Greece	0.21	53	14.92	200.72	3	0	3.26	34.59
Ireland	1.79	44	22.09	116.12	2	0.54	40.95	52.34
Italy	0.66	55	21.49	175.54	3	0	9.44	48.26
Luxembourg	2.30	49	41.91	168.25	2	0	17.23	98.15
Netherlands	1.43	49	24.08	351.58	3	0.58	38.85	51.78
Portugal	0.08	30	15.39	135.31	3	0	4.45	30.39
Spain	2.07	41	17.65	78.82	3	0.03	20.85	30.03
Sweden	19.50	66	27.34	72.73	3	1.70	129.41	40.84
United Kingdom	1.18	38	21.17	125.45	2	0.26	32.67	42.33

Table 4 Estimation results

	(1)	(2)
TRUST ENV. ASS.	0.125	0.471
	(3.75)**	(4.13)**
GDP p.c.	1.389	1.377
	(5.14)**	(3.20)**
TRADECOHESION	0.041	0.046
	(4.39)**	(3.43)**
REGULATORYBURDEN	-4.700	-3.430
	(4.09)**	(1.32)
EMASINITIAL p.c.	1.998	
	(6.07)**	
ISO 14001 p.c.	0.038	0.033
	(3.40)**	(2.03)*
GDP per worker	-0.626	-0.687
	(5.05)**	(3.43)**
R-squared	0.772	0.468
Chi squared	4352.30	207.10
(p-value)	(0.000)	(0.000)
Rho	0.688	0.864
Number of observations	60	60
Number of countries	15	15

Notes: Dependent variable is EMAS p.c. Prais-Winsten regression with correlated panel-corrected standard errors and common autoregressive error of order one. Coefficients of year-specific time dummies not shown. Absolute z-statistics in parentheses. * significant at .05 level ** at .01 level.