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Hierarchy, Networks, or Markets: How Does the EU Shape Environmental Policy Adoptions Within and Beyond Its Borders?

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Abstract

In this study we scrutinize the strength of the European Union's 'external governance' in the area of environmental policy. We explore whether accession candidates and third countries adopted European environmental legislation along with the member states. In doing so, we focus on Community laws that limit nitrogen oxides in the emissions into the air from large combustion plants, introduce the European ecolabel scheme and environmental impact assessments. Our analysis reveals that hierarchical governance is the most significant and robust determinant of policy adoption. Additionally, our results lend some support to the relevance of network governance, indicating that this mode could become more effective at greater length.

Key Words

European Union; external governance; environmental regulations; rule adoption; survival analysis

1 Introduction

Recent research has increasingly paid attention to how European Union (EU) accession influenced the environmental policy arrangements in Central and Eastern European countries. Most of these studies come to the conclusion that the EU had a positive impact on the direction and level of environmental policy reform – either through 'governance by conditionality' (Schimmelfennig and Sedelmeier 2004, 2005) or administrative assistance (Carius et al. 2000). But what impact, if any, has the EU on neighbouring countries that have not yet applied for membership, or countries that will only become members in the distant future? Do these countries reform their environmental policies in accordance with European standards? And if they do so, what is the rationale behind it? So far, these questions have not systematically been investigated.

To remedy this situation, we explicitly address the strength of the EU's 'external governance' in the area of environmental policy. In doing so, we explore the adoption of three European environmental policy measures by 33 European states in the period from 1980 to 2006. Our country sample enables us to grasp the many different interlinkages of European countries with the EU, i.e. as member states, quasi-members, such as in the case of the countries belonging to the European Free Trade Area (EFTA)/European Economic Area (EEA) (cf. Sverdrup, this issue), candidate countries, and neighbouring countries. Our results reveal that hierarchical governance is the most effective form of external governance, showing that the policy of enlargement is not likely to loose its momentum in the near future. Nevertheless, our findings also lend support to the relevance of network governance. While less robust in its explanatory power than hierarchy, there are some hints that network governance could indeed become more effective at greater length.

This article is structured as follows. In a first step, we give an overview of the theoretical discussion regarding the policy-shaping power of the EU. Second, we present an integrated theoretical framework and derive hypotheses on the effectiveness of the different modes of external governance. Third, we explain the measurement of our dependent variables and provide descriptive results for the likelihood of adopting EU environmental legislation. Fourth, we describe the independent variables and outline the estimation technique applied. Subsequently, we report and discuss the results of our data analysis. In the final section, we present our conclusion and point to open questions for future research.

2 State of the Art

It is widely accepted that the EU affects domestic politics, policies and administrative structures. For exploring how the EU matters, Europeanization research has focused on adaptation pressures and the implementation of European directives and regulations (see, for example, Knill 2001, 2005; Cowles et al. 2001; Héritier et al. 2001; Knill and Lehmkuhl 2002; Olsen 2002; Börzel and Risse 2003). The growing policy-shaping power of the EU has also motivated a number of political scientists to ask whether Europeanization leads to cross-national policy convergence (see, for example, Dimitrova and Steunenberg 2000; Hix and Goetz 2000; Knill 2001; Risse et al. 2001; Jordan and Liefferink 2004; Holzinger and Knill 2004, 2005; Holzinger et al. 2008a,b). The overarching result is that regarding environmental policy, the EU has affected some aspects of the policy content in all of its member states.

Obviously, research on Europeanization focuses exclusively on the impact of European integration on member states, thus disregarding other states located geographically in Europe. When by the end of 1998, however, official accession negotiations started with ten candidate countries from Central and Eastern Europe, the scientific attention shifted to how the objective of EU accession and the necessity to adopt the *acquis communautaire* has influenced the policy agenda of these countries (cf. Schimmelfennig and Sedelmeier 2004, 2005). Against this background, a number of scholars (see, for example, Pickles and Pavlínek 2000; Andonova 2004; Carmin and VanDeveer 2005) explored the influence of EU integration on environmental policy arrangements in Central and Eastern Europe. All of these studies confirm the positive impact of the EU accession process on environmental policy reform. However, they also emphasize that there is no automatism between accession negotiations and the adoption of EU environmental policy standards. Andonova (2004), for instance, shows that export-competitive industries in Bulgaria, the Czech Republic, and Poland welcomed the more demanding export standards, while non-competitive industries opposed them. Her insightful analysis clearly stresses that the Europeanization of Central and Eastern European policies cannot be fully understood without taking domestic factors into consideration.

Much less attention has, so far, been paid attention to the potential policy shaping power of the EU in third countries, namely countries that have not (yet) applied for EU accession. Therefore, the emerging scholarly literature on external governance explores whether there is an expansion of the regulatory and organizational boundaries of the EU short of enlargement

(cf. Lavenex 2004; Lavenex and Uçarer 2004; Lavenex and Schimmelfennig, this issue). Our paper seeks to contribute to this novel perspective by scrutinizing the degree to which the EU actually influences the environmental policy arrangements of non-member states.

3 Theory and Hypotheses

Our theoretical considerations are based on the assumption that to understand the EU's external policy effects, we need a framework that accounts for both internal and external effects of Europeanization. We hence consider it a more promising starting point to look for general mechanisms through which the EU might affect environmental policy adoptions at the national level, regardless of whether the countries in question are member states, applicant states or states with no particular interest or chances of joining the EU. The scholarly literature on Europeanization, transnational policy convergence and external governance emphasizes the relevance of three mechanisms in bringing about policy change, i.e. governance through hierarchy, networks, and markets (see, for example, Knill and Lehmkuhl 2002; Lavenex 2004; Lavenex and Uçarer 2004; Knill and Lenschow 2005; Bauer et al. 2007; Lavenex and Schimmelfennig, this issue). These three mechanisms relate the causal relationship between the dependent variable (i.e. the adoption of EU environmental law) and the focal independent variables, namely the degree of political integration, economic integration, and information exchange with the EU. In this vein, they help to overcome the 'black box' problem that arises in all modes of causal inference.

Hierarchical Governance

Hierarchical governance at the EU-level refers to constellations in which the countries involved agree to adopt and comply with legal obligations defined by supranational law or bilateral agreements between the EU and external countries. A specific outcome of hierarchy is harmonization. Here national governments are legally required to adopt similar policies and programs as part of their supranational or international obligations. Governance by hierarchy generally presupposes the existence of interdependencies or externalities which push governments to resolve common problems through cooperation within international or supranational institutions, hence sacrificing some independence for the good of the community (cf. Drezner 2001; Braun and Gilardi 2006). Once established, institutional arrangements will constrain and shape the domestic policy choices, even as they are

constantly challenged and reformed by their member states. This way, international or supranational institutions are not only the object of state choice, but at the same time consequential for subsequent governmental activities (Martin and Simmons 1998: 743).

As this governance mode constitutes the predominant approach of EU policy-making, its effects should of course be most pronounced for the member states of the EU. However, regulatory cooperation at the EU-level need not be restricted to the member states, but might also include bilateral agreements between the EU and third countries, such as, for instance the EFTA/ EEA countries, which indeed agreed to adopt large parts of the *acquis communautaire* and must therefore be seen as quasi-members (cf. Sverdrup, this issue). In addition, hierarchy also extends to applicant countries, which are required to adjust their policies to the *acquis communautaire*, which is essentially the outcome of the formalized relationship between the member states. This pattern is generally referred to as '*acquis* conditionality' (cf. Schimmelfennig and Sedelmaier 2004, 2005). These theoretical considerations lead to the formulation of the following hypothesis.

H1 (hierarchical governance): The more countries are politically integrated with the EU, the more likely they will adopt European environmental policies.

Market governance

The central mechanism through which economic integration might influence national environmental policies is regulatory competition between nation states, to which we refer here as the market mode of governance. With the increasing integration of global markets, the international mobility of goods, workers and capital puts pressure on the nation states to redesign domestic market regulations in order to avoid regulatory burdens restricting the competitiveness of domestic economic actors, mostly industries. This could induce states with high standards to lower their regulatory level ('race to the bottom'), whereas states with low standards could be seduced to keep their regulatory levels low ('stuck at the bottom') (cf. Porter 1999; Knill et al. 2008).

Yet, the concept of market governance does not allow for simple conclusions. According to Vogel's (1995) 'trading up' argument, economic integration can trigger an upward adjustment of regulatory policies in (originally) low-regulating countries. This constellation is likely, if low-regulating countries aim at integrating their economies with high-regulating countries that possess more advanced regulatory systems (Prakash and Potoski 2006: 353). Given their

weak economic position and the – compared to high-regulating countries – much higher relative welfare gains associated with economic integration, low-regulating countries are generally more dependent on intensified trade relations as their more wealthy counterparts. This holds true in particular, if the latter have already well-established free trade regimes with each other, such as in the case of the EU.

The above argument, however, is based on the distinction between product and process standards (see, for example, Scharpf 1997; Holzinger 2003; Holzinger and Knill 2004, 2005). It is especially valid for product standards since all countries would benefit from similar arrangements that avoid market segmentation. As concerns process standards, by contrast, low-regulating states have an incentive to refrain from adopting stricter policies since these might undermine their competitive position.

However, depending on the degree of power asymmetries between the countries seeking market access, high-regulating countries might also be able to render further economic integration with low-regulating countries dependent on the adoption of respective process regulations. To protect the competitive position of their economies, they can factually impose the adoption of stricter regulatory standards in low-regulating countries in exchange for intensified trade relationships. In other words, market access can function as an important instrument to encourage sound environmental standards (cf. Knill et al. 2008). This reasoning is supported by a report of the European Commission (2003: 9), which states that many Eastern countries have expressed interest in working towards the convergence of their countries' environmental legislation with European legislation since the EU represents their most important foreign trading and investment partner.

Following the above considerations, we should hence expect that the number of environmental policy adoptions increases with the relative economic importance of trade relations with the EU as it is stated by the following hypothesis.

H2 (market governance): The more countries are economically integrated with the EU, the more likely they will adopt European environmental policies.

Network governance

Finally, the EU might affect national environmental policies not only by taking the 'hard route' of law and money, but also by softer forms of mere communication and information

exchange, i.e. network governance. Recent quantitative studies have shown that such patterns of transnational communication have a profound effect on the international convergence of environmental policies, almost equalling the strong influences emerging from regulatory cooperation (Holzinger et al. 2008a,b). The relevance of network governance is emphasized by varying theories.

First, as argued by DiMaggio and Powell (1991), frequently interacting organizations, such as national bureaucracies, tend to develop similar structures and concepts over time. This policy convergence results from the striving of organizations to increase their social legitimacy by embracing forms and practices that are valued within the broader institutional environment. States might act mimetically to emulate the successful policies of other states. A demand for similarity of structure and functioning and social legitimacy, rather than increased efficiency drives this mechanism process of domestic policy change. Thus, non-members should also adopt EU rules if they regard them to be appropriate in light of their collective values and norms (cf. Schimmelfennig 2003).

Second, environmental policy adoption can also be based on theories of rational policy learning. For example, the concept of lesson-drawing refers to constellations of policy transfer in which governments rationally utilize available experience elsewhere in order to solve domestic problems. According to Rose (1991), lesson-drawing is based on a voluntary process whereby government A learns from government B's solution to a common problem what to do or what not to do. This kind of learning will be enhanced when countries meet and communicate on a regular basis within international institutions.

Third, it is argued that transnational problem-solving typically occurs within transnational elite networks or epistemic communities, defined as networks of policy experts who share common principled beliefs over ends, causal beliefs over means, common standards of accruing and testing new knowledge and corresponding solutions to address these problems (Haas 1992: 3). The diffusion of professional knowledge via transnational networks or 'epistemic communities' plays an important role in facilitating the cross-national diffusion of policy concepts by deliberation and learning (for an extensive discussion, see Holzinger and Knill 2005). From this perspective, third countries could be convinced of superiority of the EU's rules and adopt them in order to solve domestic problems more efficiently (cf. Lavenex and Uçarer 2004). From this discussion follows that domestic effects of the EU – both internally and externally – might not be restricted to hierarchical and market governance. The

EU may principally trigger domestic policy change in member states as well as neighbouring countries by the fact that it provides an institutionalized infrastructure for the exchange of information and policy learning. This reasoning culminates in the formulation of the third and final hypothesis on the impact of network governance.

H3 (network governance): The more a country exchanges information with the EU, the more likely it will adopt European environmental policies.

4 Measurement of the Dependent Variables

Especially within the context of the Sixth Environmental Action Programme (2001-2010), the EU has strengthened its cooperation with accession candidates and third countries in environmental issues (Lavenex 2004: 691). For the (potential) accession candidates in the Balkans, the European Commission has launched the Regional Environmental Reconstruction Programme that seeks to provide a framework in which environmental actions can be pursued at a regional level. As regards Russia and the Eastern countries, the EU engages in environmental cooperation within the context of the Partnership and Cooperation Agreements and the European Neighbourhood and Partnership Instrument. Moreover, the EU launched a Central Asia Indicative Programme, which also comprises environmental cooperation. Finally, with the countries of the Eastern and Southern Mediterranean the EU cooperates in context of the Euro-Mediterranean Partnership.

Does the occurring cooperation entail the adoption of European environmental policies? What is the rationale behind rule adoption? To address these questions, we first need to clarify how to measure European environmental policy. This task is far from simple since the EU has produced a wide range of legislation addressing air pollution control, water protection, waste policy, nature conservation as well as the control of chemicals, biotechnology and other industrial risks (Knill and Liefferink 2007: 1). Since analyzing the entity of European environmental policy legislation would reach well beyond the scope of this study, we must limit ourselves to three environmental policy items that represent our dependent variables: environmental impact assessments (EIA), the limitation of nitrogen oxide emissions from large combustion plants (LCPs) of 50 megawatts or more, and ecolabelling.

EIA is a process for ensuring that the environmental implications of decisions are taken into account before the decisions are made. The original EIA Council Directive 85/337/EEC and its amendments by the Directives 97/11/EC and 2003/35/EC require that projects likely to have significant effects on the environment by virtue *inter alia* of their nature, size or location are made subject to an assessment. Countries throughout Europe may principally benefit from adopting EIA since it improves the project design through the wider consideration of impacts and alternatives that minimize impacts (Berglund and von Raggamby 2007: 7).

Emission limit values for nitrogen oxides from LCPs, such as power stations or petroleum refineries, have first been regulated by Directive 88/609/EEC in 1988. In 2001, the regulatory framework was replaced by Directive 2001/80/EC, which besides setting emission limit values for nitrogen oxides, sulphur dioxides, and dust aims to gradually reduce the total annual emissions. A main benefit from adopting EU rules for neighbouring European countries would be a lowered risk of air pollution and related to it a greater protection of human health (Landgrebe 2008: 7).

Ecolabels are logos showing all the effects of the product on the environment, together with its composition. They enable consumers to orient their purchasing decisions to environmental characteristics of the product, which in turn may prompt producers to devote more attention to environmental attributes in the product design. Council Regulation 880/92 introduced the European ecolabel scheme, which was amended by Regulation 1980/2000. The EU ecolabel does not force the member states to abolish their national ecolabels, which are often similar to the 'European Flower' (cf. Tews et al. 2003). As a result, in many countries the EU and the national ecolabels exist side by side.

We selected these items on the basis of three theoretical considerations. First, they represent different policy types, i.e. process standards (i.e. EIA and limit values for nitrogen oxide emissions from LCPs) and product standards (i.e. ecolabels), which according to our expectations for market governance may make a difference concerning the likelihood of rule adoption (see Holzinger and Knill 2004, 2005). Second, the three policy items selected vary with regard to the costliness of implementation. In this sense, the limit values for nitrogen oxide emissions from LCPs represents the most costly policy (European Commission 2003: 17), whereas ecolabelling and particularly EIA as a horizontal environmental legislation impose lower costs (see Berglund and von Raggamby 2007: 8). Third, the measures cover different types of environmental policy instruments, including the hierarchical prescription of

substantive standards (LCP), procedural requirements (EIA), as well as the setting of framework conditions for industrial self-regulating (ecolabelling). In view of the differing characteristics of the policy items, it will be interesting to see whether the adoption patterns resemble one another and whether the explanatory factors have a robust cross-policy effect. In this sense, the selection of such different policy items and the checking for robustness of explanatory factors across varying dependent variables adds more leverage to our empirical analysis.

Our three dependent variables are binary, i.e. they have two values, coded as '0' for a negative outcome (that is, no EU rule adoption) and '1' as a positive outcome (that is, complete or partial EU rule adoption). For coding our dependent variables, we mostly relied on national legal acts. [i] However, in the case of EIA, we also employed information on the ratification behaviour of the Espoo Convention since Council Directive 85/337/EEC is annexed to the declaration. Thus, countries ratifying the Espoo Convention also indirectly ratify Council Directive 85/337/EEC. In cases in which we could not access national legal acts, we used reliable secondary sources, such as articles in scientific journals or reports prepared by international organizations.

The data for the three dependent variables is based on 33 countries. Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, the United Kingdom represent 14 of the EU-15 countries.[ii] Iceland, Norway and Switzerland are EFTA/ EEA member states and can be judged as quasi-members of the EU. The Czech Republic, Hungary, Poland, and Slovakia became EU members in 2004, while Bulgaria, Croatia, Romania, and Turkey in 2006 were accession candidates. Albania, Armenia, Azerbaijan, Georgia, and Ukraine are countries that in the mid or longer term may seek accession to the EU, whereas Belarus, Kazakhstan, and Russia represent countries that have not expressed any interest in joining the EU.

The observation period runs from 1980 to 2006. The year 1980 predates the introduction of our most mature policy item (i.e. EIA) and is therefore an ideal starting point since it reduces the risk of left censoring, i.e. a constellation in which the starting and ending time of an event are located before the beginning of the observation window (Blossfeld et al. 2007: 39). Our observation ends in 2006, representing the final year for which data for all independent variables was available.

5 Independent Variables and Method of Data Analysis

We measure hierarchical governance by using three binary variables that indicate whether legal obligations are defined by supranational law (in the case of members and accession candidates and EEA states) or bilateral agreements with the EU (in the case of Switzerland).[iii] Since the legal obligations emerge from the moment of European rule setting, we created separate indicators for each environmental policy items. Accordingly, the variables 'hierarchy EIA', 'hierarchy LCP' and 'hierarchy ECO' take on the value '1' with the enactment of European rules for EIA (1985), emissions from LCPs (1988), and ecolabelling (1992). As concerns countries that became members after the enactment of these policies at the supranational level and official accession candidate, the date of the opening of accession negotiations was taken as the point in time when hierarchical governance is assumed to become effective (cf. Sommerer, Holzinger and Knill 2008). For countries which had not applied for membership by 2006, the value of the hierarchical governance indicator was coded '0'. We calculated the values for 'hierarchy EIA', 'hierarchy LCP' and 'hierarchy ECO' on the basis of the information given on the EU's enlargement site.

For measuring the relevance of market governance, we use the indicator 'EU trade'[iv] for measuring a country's degree of economic integration with the EU. This indicator was calculated as the sum of a state *i*'s exports and imports to and from the EU divided by its gross domestic product (GDP) in year *t*. The data originate from the Direction of Trade Statistics of the International Monetary Fund (IMF).

To account for network governance, we constructed a compound indicator 'EU information exchange', which takes into account the membership of the accession candidates and other European countries with two of the most important European environmental non-governmental organizations, i.e. CEE Bankwatch and Friends of the Earth Europe, as well as with the United Nations Economic Commission for Europe (UNECE). CEE Bankwatch and Friends of the Earth Europe belong to the group 'Green 10', which consists of ten leading environmental non-governmental organizations active at the EU level. UNECE has a Committee on Environmental Policy that annually meets for providing collective policy direction in the area of environment and sustainable development, preparing ministerial meetings, developing international environmental law and supporting international initiatives in the region. Finally, 'EU information exchange' comprises a fourth dimension, namely whether there is an institutionalized communication between the EU and accession candidates

and other European countries via cooperation agreements, such as Partnership and Cooperation Agreements. For the EU-15 states, 'EU information exchange' is assumed to have a constant value of '4' (i.e. high degree of information exchange), while for the accession candidates and other European countries the values vary between '0' (i.e. no information exchange) and '4' over time. It is fairly reasonable to assume that member states communicate more intensively with each other than with non-members due to the institutionalized cooperation and common communication platforms. The data were gathered from the webpages of the EU and the organizations mentioned above.

Although our primary interest is on the evaluation of the external governance framework, we include two additional variables as controls. First, the adoption of EU environmental policies could just be a functional response to existing environmental problems (Hironaka 2002: 72). In view of the immense environmental degradation that the former state socialist states inherited, this scenario seems highly probable for most of the countries included in the county sample. As a result, we include 'environmental pollution'[v] for measuring the degree of per capita carbon dioxide emissions from the consumption and flaring of fossil fuels. The data is taken from the Energy Information Administration (ENIA). Second, in accordance with research literature, we complement our estimation model by introducing the variable 'per capita income', for which the data were also taken from the IMF. The descriptive statistics for the independent variables are given by table 1.

[INSERT TABLE 1 ABOUT HERE]

For analyzing our data in the most adequate manner, we use two different techniques of survival analysis. First, we apply nonparametric estimation methods to describe the characteristics of EU environmental rule adoption throughout Europe. Second, for evaluating the predictions of the external governance framework we use the proportional hazards model proposed by Cox (1972). Since policy adoption represents a process that takes place over time, duration models such as the Cox model are likely to capture the most amount of information regarding EU environmental rule adoption probabilities (cf. Fredriksson et al. 2007). Applying this estimation technique also indicates that we explicitly focus on the process of rule adoption instead of focusing on a particular event (cf. Schimmelfennig 2002).

6 Results

Descriptive Analysis

Nonparametric analysis allows the data to speak for itself (Cleves et al. 2007: 91) and is therefore an ideal tool for descriptive analysis. In view of our research questions, a suitable way of comparing the likelihood of different country groups to adopt EU environmental legislation is given by the estimator developed by Kaplan and Meier (1958). It estimates the 'survivor function' for each country group, which reports the probability that a given country does not adopt European environmental legislation beyond 2006.

Figure 1 presents the plot of the Kaplan-Meier estimate of the survival function. The graph consists of a series of horizontal steps of declining magnitude (illustrated by the black lines), and 95% confidence intervals (illustrated by the grey lines). It compares the survivor functions for the adoption of the European EIA scheme across (quasi)members and non-members. The forming of one group for members and quasi-members can be justified on the basis of Log-Rank, Wilcoxon, Tarone and Ware as well as Peto-Peto-Prentice test statistics[vi], which for all policy items indicated that there is no significant difference between actual EU members and EFTA/EEA countries. The country group termed non-members comprises countries that by 2006 had not become full members, as well as neighbouring European countries.

For this latter country group, the test statistics indicated a significant difference between applicant countries and other European countries. The differences in rule adoption behaviour between these two subgroups are given by figure 2. Here the advantage of the Kaplan-Meier curve becomes apparent as the method takes into account 'censored' data, i.e. countries that by the end of the observation period had not adopted the complete or parts of the European EIA scheme. Accordingly, the figure '2' given in the graph points to the fact that two non-members (i.e. Russia and Georgia) did not introduce European EIA legislation. Additionally, the slope of the applicants' survivor function is clearly steeper, indicating that these countries adopted the European legislation much swifter than the non-applicants. Nevertheless, with 31 adopters of the 3 environmental policy items analyzed here, the EIA schema reveals the highest adoption rate.

[INSERT FIGURES 1 and 2 ABOUT HERE]

Concerning the next policy item, Iceland has been excluded from the sample to avoid bias since there are no LCPs operating on its territory (Decision of the EEA Joint Committee 147/2002). Figure 3 reveals that as compared to EIA the number of countries adopting nitrogen oxide emission limits in accordance with the LCP Directives is lower, and the difference between (quasi)members and non-members is rather straightforward. As shown by figure 4, the survivor function for the non-applicants is a horizontal line at the value of '1', implying that during the observation period these countries were never at 'risk' of adopting the LCP-Directive. Consequently, by 2006 Albania, Armenia, Azerbaijan, Belarus, Georgia, Georgia, Kazakhstan, and Russia had not introduced a corresponding regulation.

[INSERT FIGURES 3 and 4 ABOUT HERE]

A similar adoption pattern can be observed for the third environmental policy item. Overall, 26 countries had adopted the European ecolabel scheme by 2006. As figure 5 shows, the survivor functions' slopes differ notably across the single country groups. The main difference vis-à-vis the LCP Directives is given by the fact that one non-adopter is an applicant (i.e. Turkey), whereas in the previous case all applicants had introduced EU-style legislation. In view of the numerous production industries located in Turkey this finding is surprising. Atilgan (2007: 18), for instance, explains that among other factors, the high cost of eco-labelled production is one reason for the non-adoption in the Turkish textile industry. Nevertheless, the applicants and the non-applicants' survivor functions are different from one another, revealing that the letter group is less prone to adopt the European ecolabelling scheme (see figure 6).

[INSERT FIGURES 5 and 6 ABOUT HERE]

This study's first finding is hence that we have two different overall policy adoption patterns. The first pattern refers to EIA and is characterized by rather steeply declining survivor functions for all countries included into the sample. The second pattern relates to the LCP Directives and ecolabelling. It is characterized by marked differences between applicants and non-applicants. In its most extreme form, the survivor function for the non-applicants was represented by a horizontal line. The question that now emerges is whether these different adoption patterns are caused by the same explanatory factors. Put in other words, will it be possible to identify explanatory factors that have a robust impact on the adoption behaviour across the different environmental policy items? This question is addressed in the next section.

Causal Analysis

To evaluate our hypotheses, we apply the Cox model, which offers an easy way to include time-varying covariates. In contrast to parametric models, the Cox model merely specifies a functional form for the influence of covariates but leaves the shape of the transition rate as unspecified as possible. Since we are mainly interested in the magnitude and direction of the effects of the modelled covariates, it represents a highly attractive estimation technique. The merits of this technique are also reflected by the proliferation of studies using Cox models. Fredriksson at al. (2007), for instance, use a stratified Cox model to test whether more corruptible governments are more responsive to the demands of environmental lobbying. While the stratification according to country characteristics would have also been a feasible option for this analysis, we decided to run basic Cox models since the tests[vii] of the proportional hazard assumption were positive. Furthermore, the indicators for measuring hierarchical governance are constructed in a manner to take the differences across country groups into account, countervailing the need for setting up a country-stratified model.

Table 2 presents the estimation results for the likelihood of adopting EU-like EIA schemes. Model 1 evaluates the external governance framework, whereas in model 2 we included the control variables. The third specification serves as a control model, which comprises the variables 'environmental pollution' and 'per capita income' only. The results reveal that the most influential factor is hierarchical governance. In substantive terms, this implies that the exposure to hierarchical governance, i.e. EU membership, application for membership, or bilateral agreements with the EU, increases the likelihood of EIA adoption by about 277% ((exp(1.327) – 1)*100% ≈ 276.97) and 272% ((exp(1.314) – 1)*100% ≈ 272.10), respectively. This finding is somewhat surprising since EIA as a horizontal EU environmental legislation has often been associated with processes of voluntary policy adoption. Yet, our results show that the European EIA scheme apparently does not function as a benchmark for voluntary policy transfer.

[INSERT TABLE 2 ABOUT HERE]

Table 3 reports the estimation results for the likelihood of adopting nitrogen emission standards as defined by the LCP Directives. Again, the hierarchy variable is the most influential factor. In addition, this time network governance also turns out to be significant, implying that it enhances the adoption chance by about 107%. However, the effect of network

governance collapses once the income variable is introduced by model 2, clearly showing that the effect is not robust.[viii] This finding is particularly interesting since the rules defined by the LCP Directives are generally regarded as rather costly. Thus, information exchange with the EU could be seen as supportive factor for enabling the introduction of comparatively costly environmental legislation throughout Europe.

[INSERT TABLE 3 ABOUT HERE]

We get the same results for the final policy item. As table 4 shows, the likelihood that a country adopts the European ecolabel scheme is affected by hierarchy and network governance. This time, network governance even turns out to be the most significant factor, increasing the likelihood of policy adoption by about 121% ((exp(0.795) – 1)*100% ≈ 121.44). However, the result again collapses after including the variable 'per capita income'.

[INSERT TABLE 4 ABOUT HERE]

Our results remain stable across various replications by using parametric Weibull and lognormal regressions.[ix] In general terms, the external governance framework seems to apply equally well for all policy items under scrutiny, regardless of whether we looked as horizontal or more demanding EU environmental legislation.

Our findings clearly indicate that the most robust factor accounting for EU rule adoption is hierarchical governance. Consequently, we can confirm hypothesis 1 on the effectiveness of hierarchical governance. There are, however, also hints that network governance is effective, but the effect is not robust. Once 'per capita income' is included into the estimation, network governance becomes insignificant. One way of checking the relationship between 'per capita income' and 'EU information exchange' in more detail would be the inclusion of an interaction term, but on theoretical considerations such a relationship is not straightforward. For hypothesis 3 on the effectiveness of network governance this implies that no clear-cut evaluation is possible. Yet, taking into consideration that our research design may suffer from left-censoring (i.e. a country adopts EU environmental legislation after 2006), we should not discard the potential long-terms effect of network governance. A more satisfactory evaluation of hypothesis 3 may thus need to look well beyond 2006, which we cannot accomplish in this study.

In strong contrast to state-of-the-art theoretical work, for none of the three policy items trade with the EU does display a significant effect on the likelihood of adopting European environmental legislation. This implies that we can reject hypothesis 2 on the effectiveness of market governance. One explanation for this finding could be that that the potential effects of market governance on environmental policy adoptions of (quasi)members and accession candidates – which dominate the country sample – is outweighed by the effects of hierarchy (cf. Holzinger and Knill 2004). An ideal way of checking this relationship would be given by re-estimating the models for varying country samples since the effect reported here may stem from the large share of EU member countries in the sample. This represents another promising venue for future research in this field.

7 Conclusion

In this study we scrutinized the effectiveness of the EU's external governance in the area of environmental policy. Our descriptive analysis showed that some neighbouring European countries indeed adopt European environmental policies. Of the three policies selected for this analysis, the highest likelihood of adoption by non-members was observable for the European EIA scheme. By contrast, there was a higher reluctance of non-members to adopt nitrogen oxide emissions limits corresponding to the LCP Directives and ecolabelling schemes. Despite this variation in the policy adoption patterns, the external governance framework turned out equally suitable for all three environmental policy items under study. The only notable variation was given for the variable 'EU information exchange', which turned out to have a positive and significant impact on nitrogen oxide emissions limits and ecolabelling schemes but not for EIA. The Cox estimations principally highlighted that hierarchical governance is the most robust and influential form of external governance. Somewhat surprisingly, market governance turned out to be a factor of minor relevance despite the far-reaching implications of environmental regulations for economic competitiveness and the predictions of the theoretical literature.

From this perspective, our findings could be interpreted as if 'governance by enlargement' represents the most promising way for bringing about environmental policy reform throughout Europe. However, our analysis also revealed an impact of information exchange with the EU indicating a certain positive – though not robust – impact of network governance

on the likelihood of adopting European-style nitrogen oxide emissions limits and ecolabelling schemes. In view of the temporal limitation of our study, we believe that it is not too daring to carefully conclude that this mode of governance could become more effective at greater length.

There are in fact some recent developments that lend additional support to this view. The Energy Community, for instance, was founded in 2005 and comprises Albania, Bosnia and Herzegovina, Croatia, the Former Yugoslav Republic of Macedonia, Montenegro, Serbia, the United Nations Interim Administration Mission in Kosovo along with EU member states as participants as well as Georgia, Moldova, Norway, Turkey and Ukraine as observers. The contracting parties have committed themselves to adopt EU legal acts in the area of electricity, gas, environment, and renewable energy. The means through which this shall be established is an intensified exchange of information and close cooperation. Another example is given by the EU-Russia Environmental Dialogue launched in 2006, which prepares the convergence of environmental policies. There are thus hints that network governance may provide a effective mode for rule transfer in those countries in which the hierarchy affect of the EU is absent. To make this finding more solid, we encourage systematic in-depth analyses of the processes underlying network governance as well as quantitative studies using different indicators for measuring the degree of information exchange between the EU and other European countries.

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Tables and Figures

Table 1: Summary statistics of the independent variables

Variable	Obs	Mean	SD	Min	Max	Source
hierarchy EIA	891	.446	497	0	1	EU
hierarchy LCP	891	.403	.491	0	1	EU
hierarchy ECO	891	.339	.474	0	1	EU
EU trade	778	13.895	77.171	.0021	947.704	IMF
EU information	891	2.92	1.45	0	4	Various
exchange environmental	784	4257201	3103101	59.49672	9979900	ENIA
pollution per capita income	780	14550.56	9571.285	6.693	50234	IMF

Figure 1: Kaplan-Maier estimate for EIA adoption, (quasi) members versus non-members

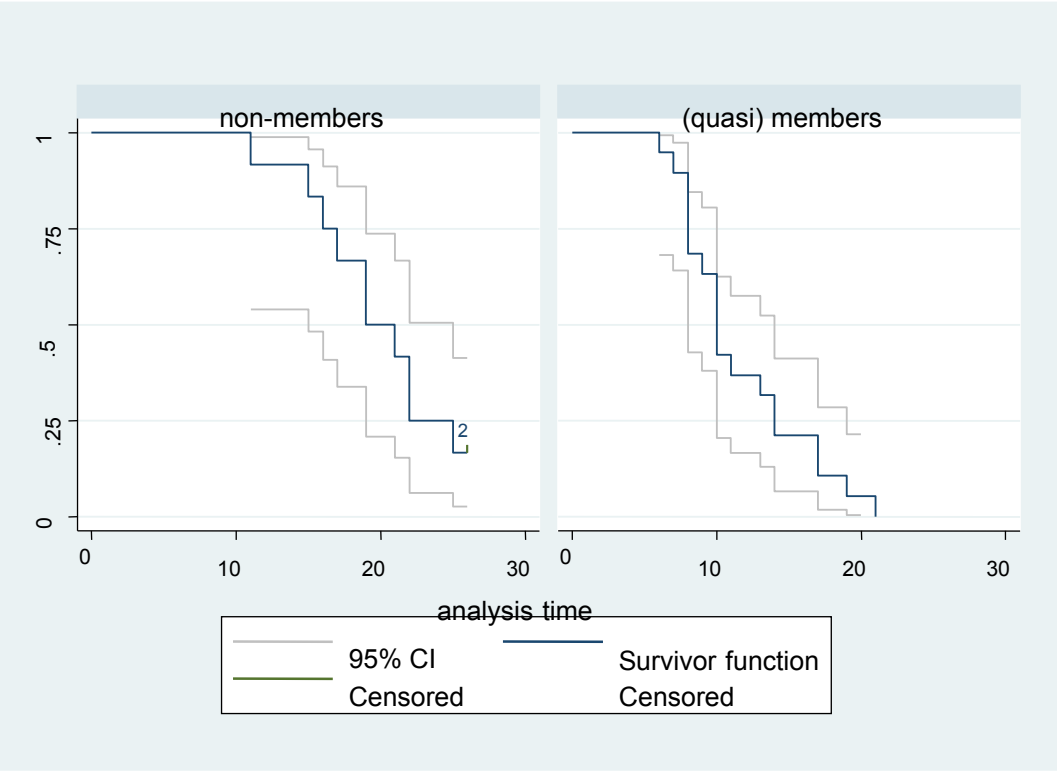

Figure 2: Kaplan-Maier estimate for EIA adoption, applicants versus non-applicants

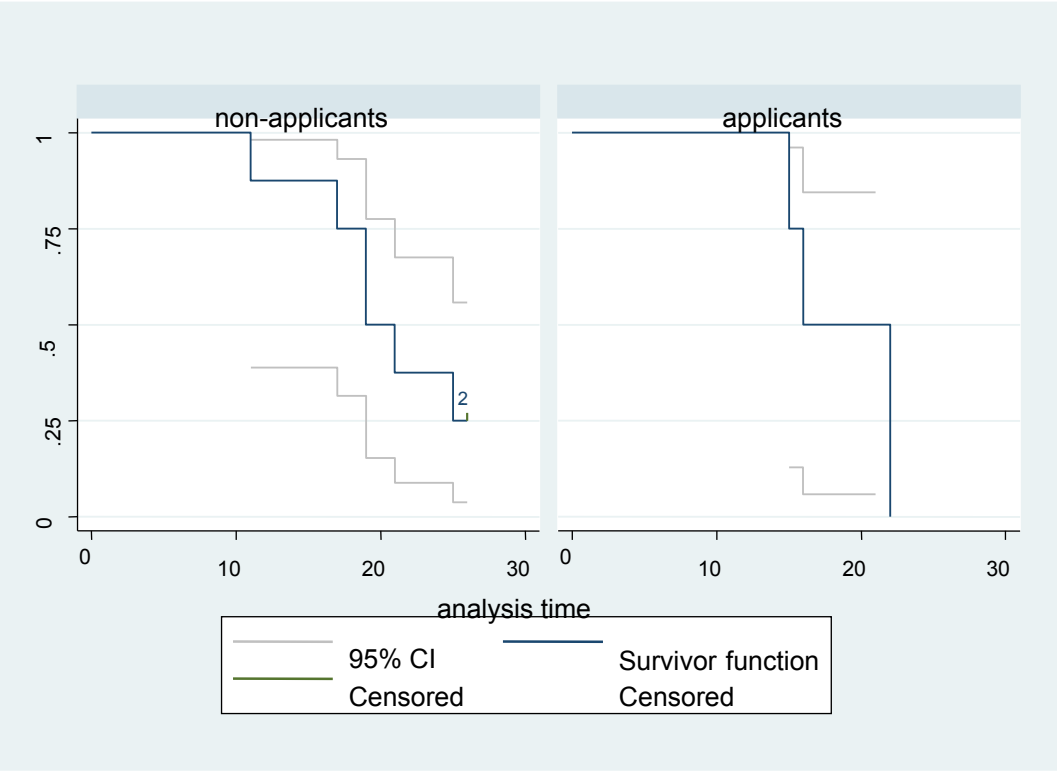

Figure 3: Kaplan-Maier estimate for LCP adoption, (quasi) members versus non-members

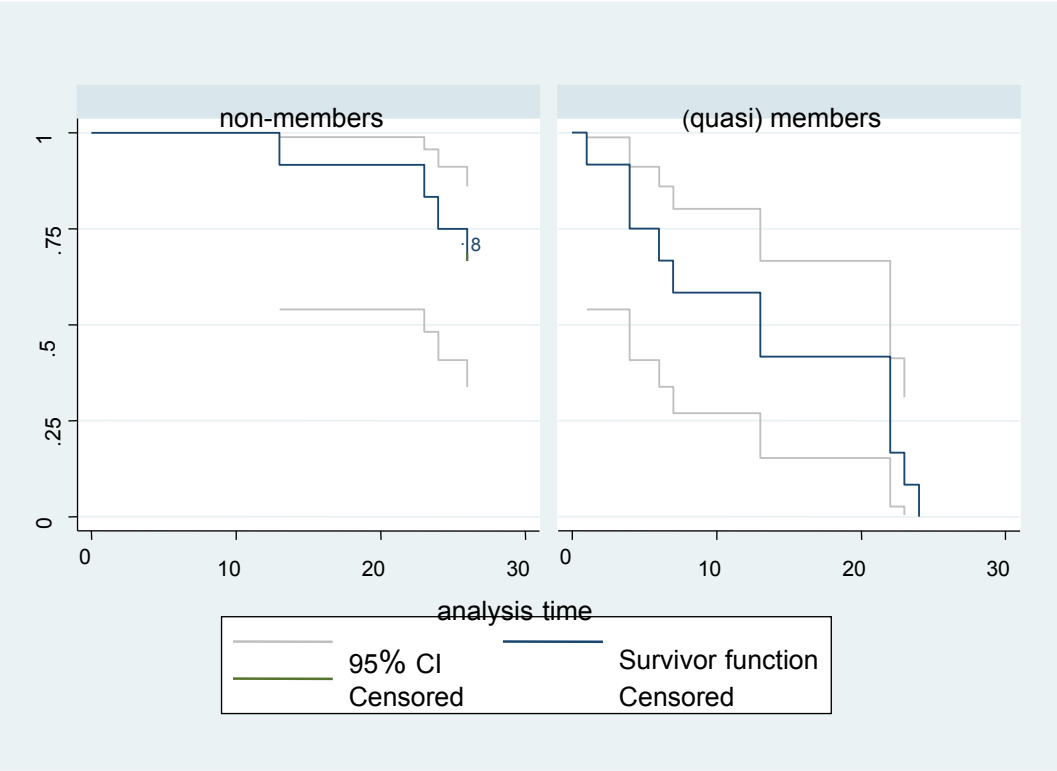

Figure 4: Kaplan-Maier estimate for LCP adoption, applicants versus non-applicants

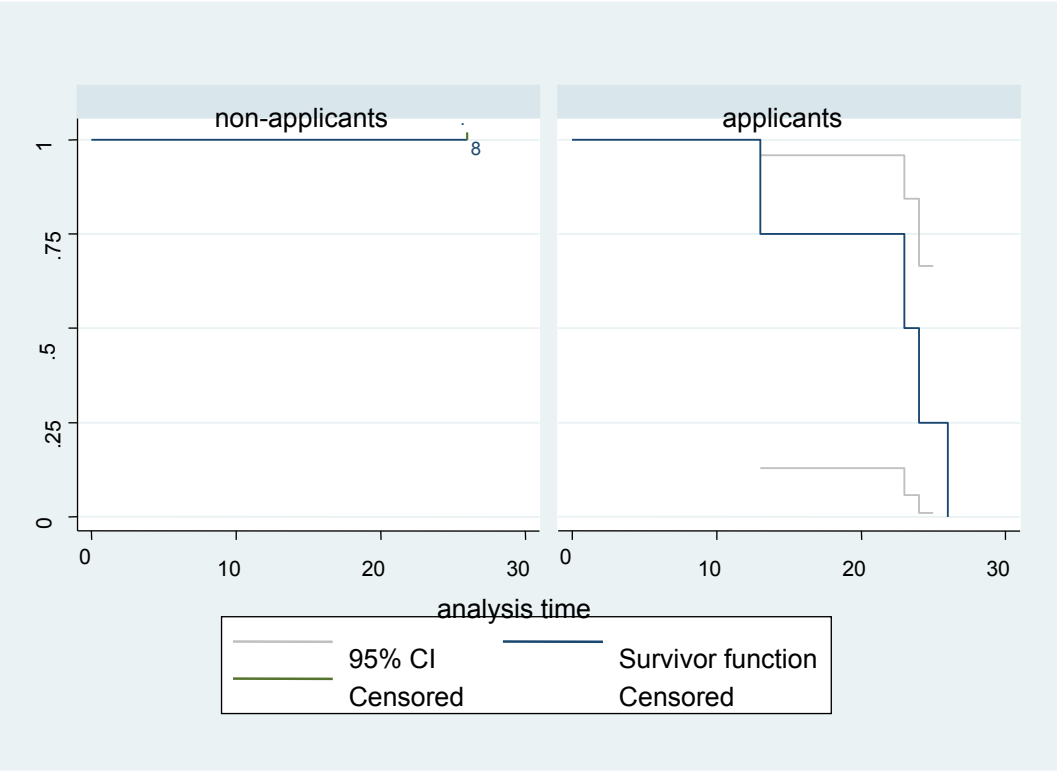

Figure 5: Kaplan-Maier estimate for ecolabel adoption, (quasi) members versus non-members

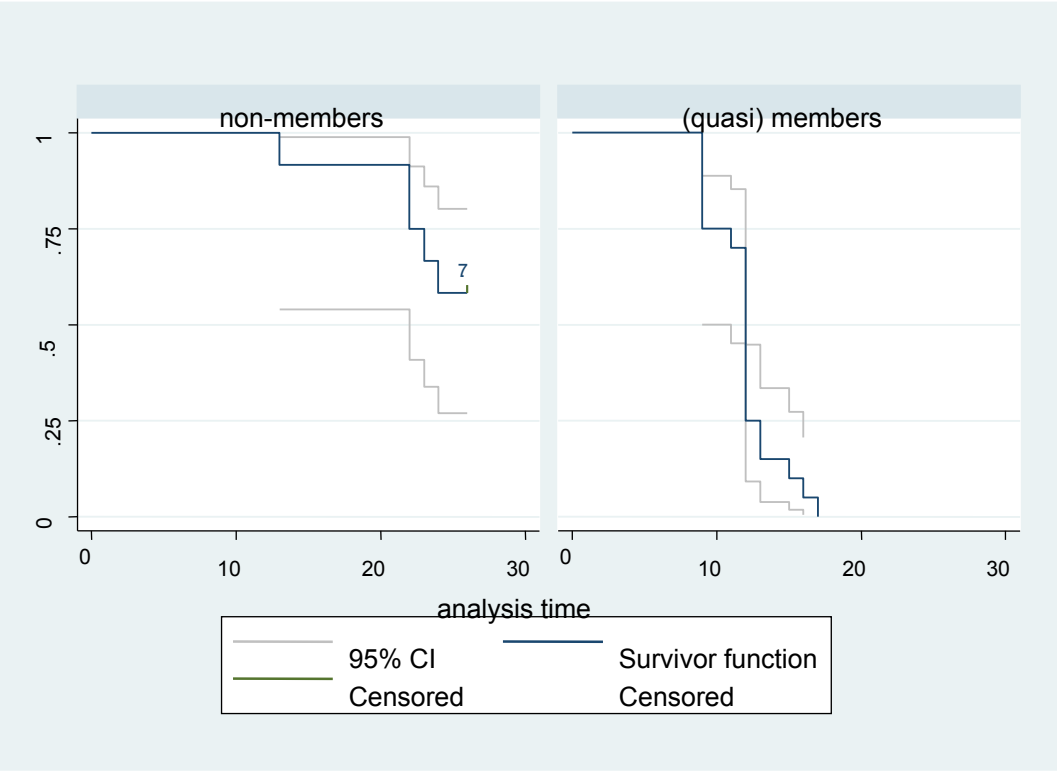

Figure 6: Kaplan-Maier estimate for ecolabel adoption, applicants versus non-applicants

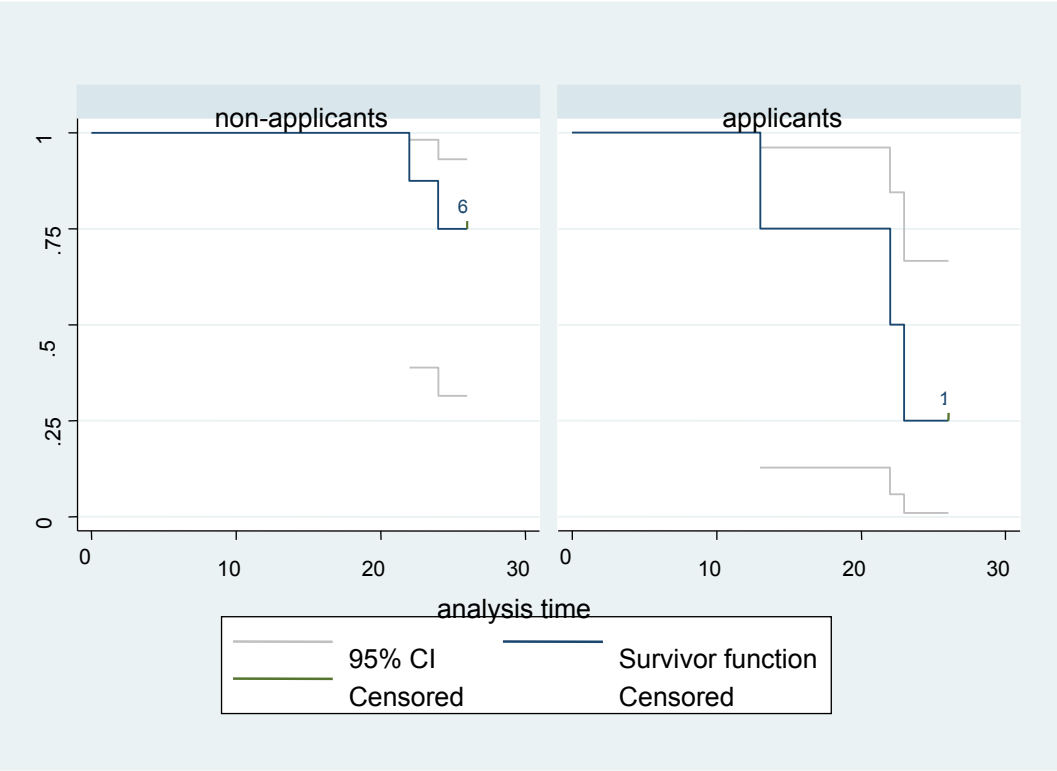

Table 2: Estimation results for EIA

Covariates	**(1) External governance Model**	**(2) Full Model**	**(3) Control Model**
hierarchy EIA	1.327 (2.44)**	1.314 (2.32)**	-
EU trade	0.085 (0.90)	0.079 (0.77)	-
EU information exchange	0.244 (1.02)	0.243 (0.89)	-
environmental pollution	-	-0.000 (0.07)	-0.000 (0.30)
per capita income	-	0.000 (0.07)	0.000 (3.02)***
observations	355	345	347
log likelihood	-62.11	-58.99	-65.23
Absolute value of z statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%			

Table 3: Estimation results for LCP

Covariates	**(1) External governance Model**	**(2) Full Model**	**(3) Control Model**
hierarchy LCP	2.788 (2.48)**	2.756 (2.36)**	-
EU trade	-0.048 (0.52)	-0.110 (0.74)	-
EU information exchange	0.729 (1.98)**	0.524 (1.32)	-
environmental pollution	-	0.000 (0.77)	0.000 (1.18)
per capita income	-	0.000 (1.02)	0.000 (3.68)***
observations	351	351	353
log likelihood	-28.78	-27.98	-35.01
Absolute value of z statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%			

Table 4: Estimation results for Ecolabelling

Covariates	**(1) External governance Model**	**(2) Full Model**	**(3) Control Model**
hierarchy ECO	1.717 (1.91)*	1.777 (1.95)*	-
EU trade	0.044 (0.46)	0.039 (0.35)	-
EU information exchange	0.795 (2.72)***	0.513 (1.46)	-
environmental pollution	-	0.000 (0.53)	0.000 (1.27)
per capita income	-	0.000 (1.32)	0.000 (3.99)***
observations	420	420	422
log likelihood	-58.87	-57.87	-63.43
Absolute value of z statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%			

Notes

[i] For 21 countries, the data is taken from the dataset of the ENVIPOLCON project (see Holzinger et al. 2008a). ENVIPOLCON is the acronym of 'Environmental governance in Europe: the impact of international institutions and trade on policy convergence'. The EU-funded project was carried out between 2003 and 2006. The dataset of the ENVIPOLCON project can be downloaded as a SPSS file. For further details see: http://www.uni-konstanz.de/FuF/Verwiss/knill/projekte/envipolcon/project-homepage.php.

[ii] Luxembourg has been omitted from the sample due to lacking access to data.

[iii] The bilateral agreements II signed in 2004 in Luxembourg include environmental issues.

[iv] Divided by 1000 for a more straightforward interpretation.

[v] Divided by 100.000.000 for a more straightforward interpretation.

[vi] The results of the tests are not reported here, but they are available by request.

[vii] We performed tests based on reestimation, Schoenfeld residuals as well as graphical methods (see Cleves et al. 2007: 197-206). All of them showed that the proportional hazards assumption is not violated.

[viii] There is a positive correlation among INCOME and NETWORK, but it is less than perfect.

[ix] The results are not reported here, but are available by request.

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