

FOREST CERTIFICATION IN EUROPE: EXPLORING THE DETERMINANTS OF CROSS-COUNTRY VARIATION

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Abstract

The European states usually form a relatively homogenous cluster in larger country samples with regard to the adoption of environmental policy instruments promoted by international organizations. Considering the European Union's efforts to regulatory cooperation and harmonization that often affects not only the member states but also neighbouring countries, this homogeneity comes as no surprise. In light of this general empirical picture, however, it is rather surprising that there is variation in the European countries' membership in the Programme for the Endorsement of Forest Certification. This article develops a demand-side theoretical argument for explaining this cross-country variation, which is tested by means of an event history analysis. The empirical analysis reveals that the value of the forest products and the size of forest areas are the two most important triggers of membership with the Programme for the Endorsement of Forest Certification.

Keywords: European Union; forest certification; sustainable forest management

AVRUPA'DA ORMAN SERTİFİKASYONU: ÜLKELER ARASI DEĞİŞKENLİĞİN BELİRLEYİCİ UNSURLARININ KEŞFİ

Özet

Avrupa Devletleri uluslararası örgütlerce desteklenen çevre politikası araçlarını benimseme konusunda genellikle görece homojen bir küme oluşturmaktadır. Avrupa Birliği'nin sadece üye devletleri değil komşu ülkeleri de etkileyen düzenleyici işbirliği ve uyuma yönelik çabaları göz önüne alındığında, söz konusu görece homojenlik şartırtıcı değildir. Bu görece istikrarlı ampirik tablo karşısında ise Avrupa ülkelerinin Orman Sertifikasyonu Onay Programı'na üyelik açısından sergilediği farklılık oldukça şartırtıcıdır. Bu makale ülkeler arası değişkenliği açıklamak amacıyla olay tarihi analiziyle test edilen talep-yönlü teorik bir argüman geliştirmektedir. Ampirik analiz Orman Sertifikasyonu Onay

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Programı'na üyeliğin en önemli iki iticisinin orman ürünlerinin değeri ve orman alanlarının büyüklüğü olduğunu ortaya koymaktadır

Anahtar Kelimeler: Avrupa Birliği, orman sertifikası, sürdürülebilir orman yönetimi

Introduction

Forests are an important feature of the landscape of Europe and play a crucial role in mitigating climate change, stimulating economic development and increasing the quality of life of the citizens living in urbanized areas by providing possibilities for recreation. These characteristics of forests have been recognized by the European states for a long time, culminating in the creation of the Ministerial Conference on the Protection of Forests in Europe (renamed into FOREST EUROPE) in 1990. Most essentially, FOREST EUROPE elaborates strategies for the 46 European signatory countries and the European Union (EU) for an effective protection of forests and strengthening sustainable forest management (SFM). The role played by FOREST EUROPE for SFM must be seen as an important one since many definitions of this principle exist.¹ This specific form of permanent cooperation of the European ministers responsible for forests has entailed important achievements in economic, environmental and social terms. In this context, FOREST EUROPE has been the key actor in developing the Pan-European Indicators for SFM, which represent the main tool to monitor, evaluate and report status and trends in forests progress towards sustainability (see, e.g., Bowers, 2005; Wijewardana, 2008).

An alternative instrument to promote SFM is provided by forest certification, i.e. a voluntary process whereby an independent third-party assesses the quality of forest management in relation to a set of predetermined requirements. After a successful assessment, the third-party provides written assurance that a certain forest product or forest management process conforms to the requirements specified in the standard (Rametsteiner and Simula, 2003). It is important to note that forest certification mainly aims to facilitate the identification of those wood products that originate from forests whose production generates greater benefits in terms of SFM than products arising from forests managed in a conventional manner. In this way, forest certificates do not only aim to regulate the behaviour of the producers but also that of the consumers of wood products. The demand shall be driven away from products from uncertified forests and towards products from certified forests. While forest certification has increased steeply since the 1990s around the world, Europe is the most important region in terms of certified areas (Gulbrandsen, 2010).

Two schemes dominate forest certification in Europe: those of the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest

¹ The SFM concept can most generally be defined as an endeavour for attaining balance between the social, economic and environmental values associated with forest resources in order to preserve them for future generations (Hickey, 2008).

Certification (PEFC). FSC (founded in 1993) is generally preferred by influential environmental organizations such as the World Wildlife Fund for Nature or Friends of the Earth (see, e.g., Klooster, 2005; Overdevest, 2010). In 1998, the PEFC was established as a producer-backed certification scheme, which facilitates the mutual recognition of national schemes and provides them a common ecolabel (Auld, Gulbrandsen and McDermott, 2008). While forest certification is mostly associated by the uptake of internationally defined schemes by producers, in the case of the PEFC the national level is very important. The PEFC Council is composed of national governing bodies and the national member organizations are also responsible for developing their own set of standards, which are subsequently evaluated by PEFC International (Cashore, Auld and Newsome, 2003). To get national forest certification standards internationally endorsed, a national PEFC organization has to be in place.

The PEFC scheme is generally perceived to leave forest companies with less stringent SFM standards than the FSC, and greater leeway to apply those standards (Gulbrandsen, 2004, 2005). In light of the systematic inclusion of producer interests and the flexibility offered by PEFC for the national members, one would expect that all European countries – which were willingness to establish FOREST EUROPE in order to foster SFM – would join this certification scheme. In reality, however, there is notable variation across the European countries with regard to their membership in PEFC.

It is therefore the objective of this study to explore in detail the cross-country variation in PEFC membership for the 27 EU member states, the accession candidates (Croatia and Turkey), Iceland and Norway as member states of the European Economic Area (EEA), and Switzerland.² In so doing, this study poses the following principal research question: Which factors determine national membership in the PEFC scheme? To evaluate this question, the article develops a demand-side theoretical model, which builds on insights provided by the rich literature on forest certification. It is important to note that this study seeks to shed light on factors at the national level that are likely to affect the governments' support for the establishment of a national PEFC organization; it does not model the factors inducing forest producers to seek PEFC certification. The explanatory model is empirically evaluated on the basis of times-series cross-sectional data for the 32 European states for the period from 1998/1999 to 2011. For analyzing the data this study utilizes parametric event history analysis as a procedure that is particularly suitable for modeling dynamic outcomes.

The article is structured as follows. Section 2 provides a brief description of the PEFC scheme and outlines the development of national membership during the

² The other two accession candidates, i.e. the Former Yugoslav Republic of Macedonia and Montenegro, could not be included in the sample due to serious constraints regarding data availability. In addition, Liechtenstein is excluded from the country sample despite being a member of the EEA, which is again a consequence of data restrictions.

observation period. The theoretical framework is introduced in section 3. Section 4 first prepares the empirical analysis by explaining the characteristics of the data and the estimation models, which is followed by a presentation and discussion of the results in section 5. Section 6 summarizes the key findings and elaborates a conclusion.

I. An Overview of PEFC Certification in Europe

There are three types of membership in the PEFC. The first group is composed of the national governing bodies, which are independent organizations established with the aim to develop and implement a PEFC system within their respective country. The second group is about the international stakeholders, including non-governmental organizations (NGOs) and companies. The third category of extraordinary membership includes international associations and organizations that support the objectives of PEFC International. This analysis only takes into account the national governing bodies and explores whether and why they were established in European countries. In this way, the study seeks to better understand the role played by national governments with regard to the PEFC. There is consensus in the literature that governments are important for forest certification, but the empirical insights provided are mostly limited to FSC certifications (Auld, Gulbrandsen and McDermott, 2008).

It is important to stress that there is a difference between national membership and the endorsement of national certification systems. Membership means that a national organization was set up with the objective to support the implementation of forest certification in accordance with the standards defined by PEFC International. This involves that management practices meet requirements for best practice in SFM, including the maintenance of biodiversity of forest ecosystems and the range of ecosystem services that forests provide, the substitution of chemicals by natural alternatives, the protection of workers' rights, and the encouragement of local employment. In most cases, these organizations are easily recognizable as they carry 'PEFC' in their names complemented by the name of the respective country, such as 'PEFC Czech Republic'. However, there are also cases in which the organizations' names do not allow for a direct association with PEFC International, such as in the cases of the Estonian Forest Certification Council, the Slovak Forest Certification Association or the Slovenian Institute for Forest Certification.

The establishment of a national PEFC organization is also a precondition for national certification systems to apply for endorsement to gain access to global recognition and market access through PEFC International. PEFC requires five-year revisions of national standards. PEFC-endorsed national systems allow wood to be identified by means of a specific ecolabel. Any national certification system seeking to obtain PEFC endorsement or re-endorsement is submitted to a comprehensive assessment process, including independent evaluation and public consultation.

Between the setting up of a national PEFC organization and (re-)endorsement there can be a considerable time lag as illustrated by the following cases. PEFC

Ireland and PEFC Netherlands were both founded in 2008, but by 2011 the national certification schemes were not endorsed. Even more impressive is the case of PEFC Lithuania, which was already created in 2002 but still lacked endorsement in 2011. However, it is not only endorsement that can take some time due to the numerous conditions that the national actors have to fulfill. In 2010, PEFC Bulgaria was established, but it is still not accepted by PEFC International.

By the end of 2011, no PEFC organizations existed in Croatia, Cyprus, Greece, Hungary, Iceland, Malta, Romania, and Turkey. Of these, the non-membership of Romania with PEFC is particularly surprising as the Romanian government has adopted an extensive and very explicit set of guidelines for SFM (Sandulescu et al., 2007). In this context, it is interesting to note that the Romanian government generally seems to attach high priority to the implementation of SFM as it exempts companies from paying their contribution to the national environmental fund if they buy their wood from certified forests. Conversely, if they purchase non-certified wood the companies have to pay a contribution of 3 per cent of the value of the wood to the environmental fund (Environmental Technologies Action Plan, 2007). In other cases, the lacking of PEFC national organizations is less surprising. Regarding Turkey, for instance, Türkoglu (2009) argues that the Turkish government has paid insufficient attention to forest certification despite its commitment to SFM (for a more general overview, see Baskent, Terzoglu and Baskaya, 2008).

Since this study aims to illustrate the national-level determinants for seeking involvement in PEFC, it concentrates on national PEFC membership only and leaves unconsidered aspects related to endorsement of national forest certification schemes. This analytical focus also entails that PEFC Bulgaria is taken into consideration as the creation of this organization is a clear signal of the country's willingness to participate in this particular forest certification scheme. Table 1 gives an overview of the European countries that created national PEFC organizations and those that still lack such organizations.

Table 1 Overview of National PEFC Involvement, 1999-2011

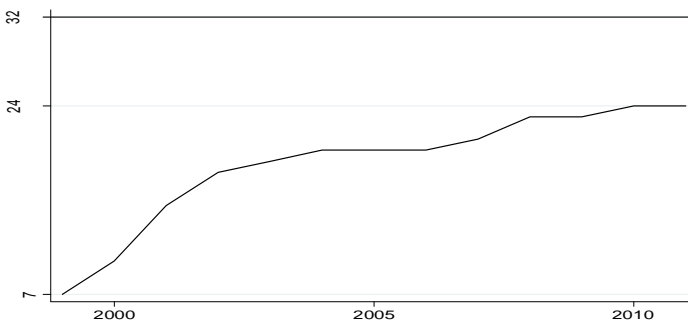
Year	Countries with National PEFC Organizations	Number
1999	Austria, Denmark, Finland, Germany, Latvia, Norway, Spain	7
2000	France, Sweden, United Kingdom	3
2001	Czech Republic, Estonia, Italy, Portugal, Switzerland	5
2002	Lithuania*, Luxembourg, Slovak Republic	3
2003	Poland	1
2004	Slovenia	1
2005	–	0
2006	–	0
2007	Belgium	1

2008	Ireland*, Netherlands*	2
2010	Bulgaria**	1
2011	–	0
Sum		24
Countries Without National PEFC Organizations		
	Croatia, Cyprus, Iceland, Greece, Hungary, Malta, Romania, Turkey	8
Sum		8
Total sum		32

Remarks: * national forest certification systems not endorsed; **not formally accepted by PEFC International.

To illustrate the dynamics of PEFC membership, figure 1 outlines the diffusion process between 1999 and 2011. The diffusion curve is based on the cumulative number of countries that established national PEFC organizations as reported in table 1. Thus, the diffusion curve can be easily reconstructed by adding up the numbers reported in the final column in the first part of the table which refers to the PEFC members.

Figure 1 Diffusion of PEFC Organizations



Remarks: Own elaboration based on www.pefc.org.

Diffusion processes – assessed on the basis of the cumulative number of countries adopting a certain policy or joining international organizations – usually follow an S-shaped curve. The shape of the curve indicates that adoption rises slowly at first when relatively few governments participate in the diffusion process. Then, the curve takes off as more governments join in. After a while, however, most governments will have become members and the diffusion curve begins to level off. If all countries joined the diffusion process, this would mean that the maximum value of 32 is reached as this corresponds to the size of the country sample. Since eight countries have been unwilling to become members of the PEFC, the diffusion curve does not reach this maximum value, i.e. the diffusion

process remains incomplete. It is also interesting to note that the diffusion curve for PEFC membership deviates from the classical S-shaped curve for its slope at the beginning of the observation period is remarkably steep. This is a direct consequence of the unusually high increase in membership density between 1999 and 2001.

To sum up, table 1 and figure 1 point to two sources of variation with regard to the European states' involvement in the PEFC. Firstly, there is variation concerning the establishment of a national PEFC organization. To be sure, only two thirds of the countries under study are PEFC members despite all of them being signatories to FOREST EUROPE. Secondly, there is variation concerning the timing of the establishment of a national PEFC organization. The next section will present some theoretical arguments that can potentially explain the observed cross-country variation.

II. Explaining the Establishment of National PEFC Organizations

There are generally two sides to the diffusion of international forest certification schemes: the supply side that explains why such schemes emerge and a demand side that sheds light on the motivation why they are adopted. The supply of international forest certification can be explained by those factors that are generally found to stimulate international regulatory cooperation, namely the existence of negative externalities, the prospect of economic gains, and the diffusion of norms (see, e.g., Cashore, Auld and Newsom, 2003). This article focuses on the demand side and sheds light on those factors that might induce governments to support the establishment of national PEFC organizations. That being said, this study follows the perspective put forward by Gulbrandsen (2004) that forest certification acts as a supplement to national forest policies. From this perspective, treating countries as units of analysis is reasonable since national governments can be expected to play a major role in setting out the general policy and institutional framework, which can have a positive or negative impact on the voluntary process of forest certification. In addition, national governments can be directly affected by the forest certification standards as forest owners or buyers of wood products (see Koleva, 2005).

Based on the extensive literature on the determinants of forest certification (for an overview, see Auld, Gulbrandsen and McDermott, 2008), four sets of explanatory factors are identified, which provide the theoretical framework of this study. The central explanatory variables are economic gains from wood products, involvement in transnational communication process, and legitimacy concerns.

Economic Gains from Wood Products

The first argument holds that forest certification entails economic gains, and that the main beneficiaries of PEFC membership are countries with export interests. In this context, being involved in PEFC can have two consequences. Firstly, it can imply a direct comparative advantage through an optimization of forest management processes. Secondly, it can yield an indirect positive effect through

circumventing a potential comparative disadvantage by avoiding barriers to market access on grounds of lacking certification (see Auld, Gulbrandsen and McDermott, 2008). This second point is underscored by the reasoning of van Kooten, Nelson and Vertinsky (2005), who explain that forest companies are rather concerned about a negative perception of their activities and product boycotts than the costs of certification. Consistent with the positive consequences of forest certification, governments of countries with open economies and strong business interests in producing and exporting wood products should be supportive of the establishment of national PEFC organizations.

Accordingly, the likelihood of a national PEFC organization being established increases with the countries' overall economic openness, the value of forest products, and the quantity of paper production. The relevance of the quantity of paper production is illustrated by Cashore et al. (2007) for the Finnish case. According to the authors, the production of high-quality printing paper has been decisive for the adoption of forest certification. To be sure, the PEFC-authorized Finnish Forest Certification Scheme has been very successful with 95 per cent of all Finnish forests being certified in the first year. These considerations give way to the following three hypotheses:

Hypotheses on the role of economic gains from wood products:

H1a: The more open a country's economy, the more likely its government will support the creation of a national PEFC organization.

H1b: The higher the value of a country's forest products, the more likely its government will support the creation of a national PEFC organization.

H1c: The higher the quantity of a country's paper production, the more likely its government will support the creation of a national PEFC organization.

Involvement in Transnational Communication Processes

As already explained in the previous section, forest certification is a voluntary process directed at market-based actors (see Cashore et al., 2005). Nevertheless, governments can affect the setting up of national PEFC organizations by providing positive incentives. In addition to economic considerations, 'positive lessons' (Rose 1991) from other jurisdictions might induce governments to support forest certification. With regard to the effects, Holzinger and Knill (2008) argue that lesson-drawing or learning should entail that governments adjust their policies to pioneer models (see also Simmons and Elkins, 2004). It is, however, important to emphasize that lesson-drawing and learning are not only limited to governments. In fact, it is equally conceivable that NGOs learn about the positive impacts of forest certification for SFM and put pressure on the governments' to provide corresponding incentives for private actors to embrace this instrument. From this it follows that the more governmental and societal actors are involved in transnational communication processes, the more likely they are to learn about the positive

effects of forest certification, which should, in turn, have a positive impact on the odds of a national PEFC organization being established.

How can transnational communication processes be assessed empirically? This is indeed one of the main challenges when seeking to test the occurrence of lesson-drawing or learning (see Radaelli, 2009). There is one international forum that deals extensively with all topics related to environmental protection, including forest conservation, and for which information about national members can be accessed, i.e. the International Union for Conservation of Nature (IUCN). Membership of governmental organizations and NGOs in IUCN is an appropriate proxy for assessing the degree of which key domestic actors are involved in processes of transnational communication. Indeed, the IUCN has been particularly important in influencing the global discourse on SFM (Arts and Buizer, 2009), which can be expected to have positive repercussions on the spread of forest certification as well. From this it follows that the greater the number of national IUCN members, the more likely are governments to support the establishment of a national PEFC organization. This relationship is formalized by the following hypothesis.

Hypothesis on the role of involvement in transnational communication:

H2: The greater the number of IUCN members in a country, the more likely its government will support the creation of a national PEFC organization.

Legitimacy Concerns

Legitimacy concerns can have an important impact on governments' decision to support the establishment of a national PEFC organization. There are two kinds of legitimacy concerns that are relevant for the present study. The first one is about symbolic imitation, which is based on the idea that governments behave in certain ways to demonstrate that they are acting properly or adequately (Meyer and Rowan, 1977; Braun and Gilardi, 2006). In this regard, the number of national PEFC organizations already in place might induce the governments of countries without such an organization to mimic the behaviour of the others simply for reducing uncertainty and doing the 'right thing' (Meyer and Rowan, 1977; Jordana and Levi-Faur, 2005; Holzinger, Knill and Sommerer, 2008). Therefore, the greater the number of national PEFC organizations elsewhere, the greater are the chances that the government of a country where no such organization exists to start questioning the legitimacy of its own behaviour. In response, this might trigger the establishment of a national PEFC organization.

The second source of legitimacy concerns is restricted to those European countries that only recently became members of the EU in 2004 and 2007, respectively, or are still negotiating their accession. States aspiring to become members of the EU have to transpose the *acquis communautaire*, i.e. the accumulated legislation, legal acts, and court decisions that form the entirety of Community law. The incorporation of this 80.000 pages strong body of Community law represents an immense political and administrative effort. The use of the *acquis*

communautaire has indeed provided an effective means for reforming environmental policy arrangements in the ‘new’ member states and candidate countries (see, e.g., Izci, 2005; Schimmelfennig and Sedelmeier, 2005; Knill and Tosun, 2009). It is difficult to over-emphasize how much direct and indirect pressure the accession candidates in Central Eastern and South Eastern Europe experienced particularly with regard to their environmental protection standards as the old member states feared the occurrence of a race-to-the-bottom (see, e.g., Knill, Tosun and Heichel, 2008; Knill and Tosun, 2009).

The overriding political goal during accession candidacy is almost exclusively oriented towards adopting the *acquis communautaire* in order to conclude the accession process and to join the EU. To achieve this goal, many of the new member states did not limit their environmental policy reforms to those changes requested by EU law, but sought to demonstrate their commitment to environmental protection in many additional ways, simply to minimize the risk of lacking legitimacy and therefore being hindered to enter the EU. Consequently, it could be a strategy of the past and present accession candidates to earn their credentials as reliable future member states in terms of environmental policy and sustainable development by supporting the establishment of a national PEFC organization. The considerations about legitimacy concerns give way to two hypotheses.

Hypotheses on the role of legitimacy concerns:

H3a: The greater the number of countries with national PEFC organizations is, the more likely will the government of a country where no such organization exists support the creation of a national PEFC organization.

H3b: If a country is an EU accession candidate, its government will be more likely to support the creation of a national PEFC organization.

Issue Salience

The fourth factor is based on the idea that in countries with scarce forest areas the issue of forest certification should be of lower importance to governments relative to other environmental concerns. In contrast, countries with large forest areas should have developed dependence from this particular resource because of its relative economic, social and cultural importance. In this context, it should also be noted that large forest areas help to achieve economies of scale in production, that is, an increase in production lowers the average cost of output per unit. This suggests that large forest areas can be associated with greater potential economic gains. Thus, there should be a direct link between issue salience as assessed by the extent of forest area in a given country and the odds of creating a national PEFC organization.

Hypothesis on the role of issue salience:

H4: The greater the forest area in a country, the more likely its government will support the creation of a national PEFC organization.

III. Measurement and Estimation Procedure

The objective of this section is to prepare the empirical testing of the hypotheses. The dependent variable is the establishment of a national PEFC organization between 1998 and 2011 in the 32 European countries constituting the sample. The starting year of the observation results from the fact that even though PEFC was only founded in 1999, the estimation strategy to be applied requires an anticipation of the event of interest by at least one year. The ending year of the observation corresponds to the data available at the time of writing. The dependent variable is binary and takes the value 1 if a national PEFC organization was established and 0 otherwise. This coding entails that over time the event of interest, i.e. the creation of a national PEFC organization, can only be observed once. Given this data structure, event history analysis is the most appropriate method of analysis (Box-Steffensmeier and Jones, 2004). This technique models the probability of the occurrence of events, i.e. the transition from one state (= no national PEFC organization exists) to another (= national PEFC organization exists).

One can generally choose between parametric and semi-parametric event history models to test the importance of multiple potential explanatory factors. The main advantage of event history models over other estimation techniques for binary outcomes such as logit or probit regressions is that they allow for directly modeling the time dependency exhibited in the data. The modeling of time dependency is accomplished by specifying a distribution function for the ‘failure’ time, i.e. the time that passes until a certain event occurs, which can be conceived to be increasing, decreasing or constant over time. Event history models that are based on such a particular distribution function are known as parametric models. Under the condition that the shape of the hazard rate (i.e. the probability that an event occurs in a given time period) of the parametric model is specified correctly, it may provide very precise estimates of covariate parameters. Incorrectly parameterized, however, the conclusions drawn from the event history model can be wrong. In light of the specific shape of the adoption process, a parametric lognormal model is employed.³

To evaluate the hypotheses on the role of economic gains from wood products, the following indicators are employed. To empirically assess OPENNESS, exports plus imports as a share of the Gross Domestic Product (GDP) is employed as an indicator. The data were taken from the World Development Indicators (WDI), a comprehensive database provided by the World Bank. The variable VALUE measures the forest rents as a percentage of GDP, which are based on roundwood harvest times the product of average prices and a region-specific rental rate. The data for VALUE were again taken from the WDI. PAPER is the measurement of the total paper and paperboard production in thousands of tons as reported by

³ The model selection is based on a comparison of different parametric models on the basis of Akaike’s Information Criterion to minimize the risk of incorrect parametrization.

Eurostat. To make the empirical information comparable across countries, the production amounts were divided by the population size as reported by Eurostat.

Turning to hypothesis H2 on the role of a country's involvement in transnational communication, the key explanatory variable is the cumulative number of national IUCN members. To construct a time-varying variable, the counts are based on the year in which a given governmental organization or NGO became a member of IUCN. These data are generated by means of the information provided on the website of IUCN. The cumulative number of IUCN members is adjusted by the size of the population.

The next explanatory variables refer to legitimacy concerns. The DIFFUSION variable is generated by the cumulative number of countries in which a national PEFC organization was created except for the country in question. It is important to note that the legitimacy pressure ends when a national PEFC organization is established. Once this is the case the DIFFUSION variable should not be effective anymore. This logic is adequately reflected in the event history analysis since after the occurrence of the event of interest, the subsequent observations for the country in question are dropped. This characteristic of event history models also explains why the observation already starts in 1998: starting in 1999 would have meant losing the observation for the seven pioneering countries.

In the dataset, however, the DIFFUSION variable is reported for the entire observation period with the last value observed before the dependent variable turned from 0 into 1. For example, Estonia created a national PEFC organization in 2001. At that time, 14 other national PEFC organizations were already in place elsewhere. The event history model will not use any information after 2001, but in the dataset the DIFFUSION variable for Estonia is 14 for all subsequent years. The reporting of the data is just motivated by providing a complete time series for each variable.

ACCESSION candidature is a binary variable taking the value 1 for those years between 1998 and 2011 in which the countries constituting the sample hold the status as accession candidates. The variable takes the value 0 if the countries have not been giving this status yet or if they had become EU members. A second indicator is employed for assessing whether old member states, new members, EEA members and accession candidates are different from each other with regard to the establishment of national PEFC organizations. The corresponding ordinal-scale variable STATUS ranges from 3 (= member state) to 0 (= accession country). The value of 2 is associated with EEA members as they also have to implement the *acquis communautaire* and thus can be regarded as quasi-member states of the EU. Finally, the value of 1 is associated with the new member states. In the case of STATUS, a negative relationship would support our reasoning that accession countries and new member states – which are coded as 0 and 1, respectively – are more likely to establish national PEFC organizations to increase their legitimacy vis-à-vis the old member states.

Turning to the dimension of issue salience, the variable FOREST reports the share of forest area of a country's overall land area. The data – which were taken from the WDI – vary over time, but the values are only reported for five-year intervals. Table 2 gives an overview of the summary statistics of the explanatory variables and the data sources.

Table 2 Summary Statistics of the Explanatory Variables

Variable	Mean	SD	Min	Max	Source
Openness	103.85	49.33	38.73	321.00	WDI
Value	0.27	0.48	0.00	3.32	WDI
Paper*	2.29	4.63	0.00	27.16	Eurostat
IUCN**	9.40	11.88	0.00	68.83	IUCN
Diffusion	12.75	6.84	0.00	24.00	Own coding
Accession	0.22	0.42	0.00	1.00	Own coding
Status	1.97	1.05	0.00	3.00	Own coding
Forest	30.84	17.27	0.09	73.74	WDI

Remarks: N= 449; SD = Standard Deviation; *multiplied by 10.000; **multiplied by 10.000.000.

Before proceeding to the event history analysis, it is necessary to check whether the variables are correlated with one another. Thus, table 3 presents the correlation matrix based on Pearson's *r*. When inspecting the table, it becomes apparent that there is a correlation of 0.6 between PAPER and FOREST. Likewise, there is a correlation of 0.6 between ACCESSION candidature and STATUS. This means that the estimation models must be specified in a way to include these variables sequentially rather than simultaneously.

Table 3 Correlation Matrix

	Openness	Value	Paper	IUCN	Diffusion	Accession	Status	Forest
Openness	1.00	–	–	–	–	–	–	–
Value	0.04	1.00	–	–	–	–	–	–
Paper	-0.16	0.17	1.00	–	–	–	–	–
IUCN	0.34	-0.21	-0.04	1.00	–	–	–	–
Diffusion	0.26	-0.20	-0.30	0.15	1.00	–	–	–
Accession	-0.02	0.32	-0.20	-0.22	0.03	1.00	–	–
Status	-0.07	-0.30	0.31	0.19	-0.33	-0.60	1.00	–
Forest	-0.03	0.50	0.63	-0.23	-0.28	-0.01	0.01	1.00

Remarks: N= 449.

IV. Presentation and Discussion of the Findings

To evaluate the hypotheses put forward in section 3, five models are specified. The models presented by table 4 are based on the variable *ACCESSION*. Model 1 is the full model, including all variables, irrespective of potential multicollinearity problems. In model 2, the variable *PAPER* is included, whereas model 3 employs *FOREST*. Models 4 and 5 are then further reduced by excluding the *DIFFUSION* variable to check whether it adsorbs the effects of the other variables.

Before turning to the findings, it should be noted that the coefficients of the lognormal event history models are interpreted as follows: a positive coefficient implies that a given variable delays the establishment of a national PEFC organization. A negative coefficient, in contrast, indicates that a given variable accelerates the occurrence of the event of interest.

The estimation models reveal that the *VALUE* of forest products and the area of *FOREST* land produce significant and negative coefficients in accordance with hypotheses H1b and H4. The coefficients of *VALUE* are significant in models 2, 4 and 5. Concerning *FOREST*, the coefficients are significant in all models that include this variable, namely models 1, 3 and 5. Likewise, the coefficient of the variable *PAPER* displays the anticipated sign in models 2 and 4, but it is only significant at the 10%-level and therefore it cannot be regarded to provide a robust confirmation of hypothesis H1c.

Thus, the models mainly demonstrate that greater economic gains from forest products and large forest areas entail a significant reduction in the time it takes to establish a national PEFC organization. Surprisingly, however, the *DIFFUSION* variable is found to significantly delay the occurrence of the event of interest. Therefore, the reasoning underlying H3a about legitimacy concerns cannot be supported. Similarly, in models 4 and 5 the *ACCESSION* variable produces significant and positive coefficients, which again contradict H3b. In less technical terms, this finding suggests that accession countries do not seem to be affected by legitimacy concerns which would induce them to mimic the behaviour of the member states. Finally, no significant coefficients are produced by *OPENNESS* and *IUCN*.

Table 4 Lognormal Models Employing the Variable Accession Candidature

Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
Openness	-	(0.00)	-	(0.00)	-	(0.00)	0.00	(0.01)	0.00	(0.00)
Value	0.00	(0.03)	0.00	(0.02)	0.00	(0.03)	-	(0.15)	-	(0.18)***
Paper	0.04	(0.00)	0.08	***	0.04		0.76	***	0.52	
IUCN	0.00	(0.00)	-	(0.00)	-		-	(0.03)	-	
Diffusion	0.00	(0.00)	0.01	*	0.00	(0.00)	0.05	*	0.02	(0.02)
	0.14	(0.00)	0.14	(0.00)	0.14	(0.00)	-		0.02	(0.02)
		***		***		***				

Accession	0.08	(0.06)	0.07	(0.06)	0.08	(0.05)	1.34	(0.48) ***	1.35	(0.43)***
Forest	-	(0.00) ***	-		-	(0.00) **	-		-	(0.01)**
Constant	-	(0.11) ***	-	(0.10) ***	-	(0.11) ***	1.20	(0.51) **	1.75	(0.60)***
Initial LL	-51.55		-51.55		-51.55		-51.55		-51.55	
Model LL	-15.67		-17.58		-15.72		-39.53		-38.01	
Wald Chi2 (DF)	1516.49		1545.83		1504.92		33.72 (5)***		38.91 (5)***	
N	196		196		196		196		196	
Cases	32		32		32		32		32	

Remarks: Dependent variable = establishment of national PEFC organization (binary choice); DF = degrees of freedom; robust standard errors in parentheses; LL = Log pseudo-likelihood; * significant at 10%; ** significant at 5%; *** significant at 1%.

The lognormal models are now re-estimated by replacing ACCESSION by STATUS to check the robustness of the findings. When inspecting table 5 it becomes clear that the performance of all models is better with the variable STATUS as indicated by the more constant significance levels of the coefficients across the different replications. Most importantly, the findings for VALUE and FOREST are confirmed and are even more robust this time. Therefore, once again hypotheses H1b and H4 can be confirmed. Likewise, the delaying effect of the DIFFUSION variable continues to exist, which allows for rejecting hypothesis H3a about the role of legitimacy concerns. Furthermore, the stable findings for STATUS also allow for safely rejecting hypothesis H3b about accession candidates feeling obliged to mimic the behaviour of the member states to increase their legitimacy. What models 1 through 5 actually show is that the member states are significantly swifter in establishing national PEFC organizations. This is an important finding since accession candidates are apparently less easily affected by the behaviour of the member states than sometimes argued in the literature. However, this finding only holds true for environment-related reforms that lie outside the *acquis communautaire*.

Table 5 Lognormal Models Employing the Variable Membership Status

Variab les	Model 1		Model 2		Model 3		Model 4		Model 5	
Openne ss	0.00	(0.00)	-	(0.00)	-	(0.00)	0.0	(0.00)	0.0	(0.00)
Value	-	(0.02)*	.00	(0.03)**	.00	(0.03)*	-	(0.11)	-	(0.12)**
	0.05		0.0	*	5		0.7	***	0.4	*
			9				0		8	
Paper	0.01	(0.01)	-0.01	(0.00)	-		-	(0.03)	-	
							0.0			
							3			
IUCN	0.00	(0.00)	0.0	(0.00)	0.0	(0.00)	0.0	(0.02)	0.0	(0.01)
			0		0		2		1	
Diffusio	0.13	(0.01)**	0.1	(0.01)**	0.1	(0.01)**	-		-	

n	*	4	*	3	*				
Status	- (0.03)**	- (0.03)**	- (0.03)**	- (0.03)**	- (0.03)**	- (0.17)**	- (0.15)**	- (0.15)**	- (0.15)**
	0.08	0.0	0.0	0.0	0.7	*	0.7	*	
Forest	- (0.00)**	-	-	- (0.00)**	-	-	-	- (0.01)**	- (0.01)**
	0.01	*		0.0			0.0	*	
Constan	- (0.16)	- (0.12)**	- (0.12)**	- (0.15)*	2.9	(0.57)**	3.4	(0.57)**	(0.57)**
t	0.26	0.4	0.2	0.2	1	*	2	*	
		0	8						
Initial	-51.55	-51.55	-51.55	-51.55	-51.55	-51.55	-51.55	-51.55	-51.55
LL									
Model	-13.42	-13.42	-13.42	-15.82	-15.82	-36.12	-36.12	-34.21	-34.21
LL									
Wald	1806.52 (7)***	1806.52 (6)***	1806.52 (6)***	1504.52 (6)***	1504.52 (6)***	56.09 (5)***	56.09 (5)***	60.35 (5)***	60.35 (5)***
Chi2									
(DF)									
N	19	196	196	196	196	196	196	196	196
	6								
Cases	32	32	32	32	32	32	32	32	32

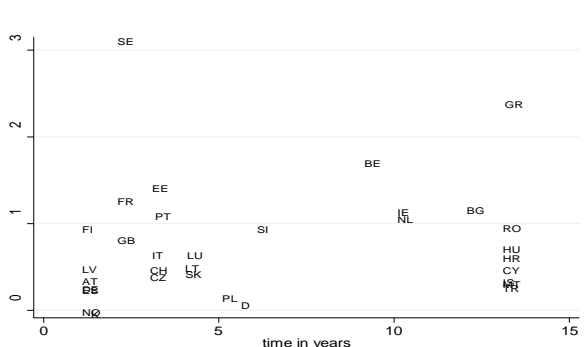
Remarks: Dependent variable = establishment of national PEFC organization (binary choice); DF = degrees of freedom; robust standard errors in parentheses; LL = Log pseudo-likelihood; * significant at 10%; ** significant at 5%; *** significant at 1%.

The findings for the DIFFUSION variable are certainly the most striking observation, also because this variable clearly improves the performance of the estimation models as indicated by the lower values for model log pseudo-likelihood in those models that include it. In table 5, for instance, the model log pseudo-likelihood is notably lower in models 1, 2 and 3 than in models 4 and 5, which are estimated without the DIFFUSION variable. This suggests that the DIFFUSION variable is indeed of relevance when exploring the establishment of national PEFC organizations in European countries. Based on the findings, however, it is unlikely that the classical arguments about the wish to increase legitimacy by mimicking the behaviour of the other countries hold true. Rather, there seems to be something distinct about DIFFUSION in the present case, which could be picked up by future studies.

In a final step, it is examined whether the models suffer from influential outliers. Figure 2 presents the cumulative Cox-Snell residuals for model 3 estimated with STATUS since it is the model that performs best across all replications. The figure reveals that it is the observation for Sweden that shows a large value for the Cox-Snell residual, albeit the residual is also considerable for Greece. Interestingly, Sweden is a case where the establishment of a national PEFC organization occurred very swiftly, whereas Greece has no such organization in place yet. The other observations are clearly more in line with the theoretical model as indicated by the lower values for the Cox-Snell residuals. Consequently, in-depth studies of Greece

and Sweden might be helpful for better understanding the causal mechanisms underlying the creation of a national PEFC organization.

Figure 2 *Diagnostics for Influential Outliers*



Remarks: *Own calculation.*

Concluding Remarks

This study aimed to illustrate the role of forest certification schemes as a complementary instrument for achieving sustainable development, which is based on the idea of taking local policy actions for mitigating global climate change (see Cerit Mazlum, 2009). Forest certification is a voluntary system that seeks to provide information to consumers that a certain product is derived from a sustainably managed forest. Although forest certification schemes predominantly address market-based actors, i.e. producers and consumers, a scholarly debate has emerged that has drawn governments into the discussion. Governments across all countries are involved in this process by setting the legal framework for SFM and by elaborating public procurement policy for wood products (Koleva, 2005). Acknowledging the role played by governments, this study explored under which conditions they are more likely to support the establishment of a national PEFC organization.

The empirical analysis has produced numerous insights. Firstly, the descriptive analysis has shown that between 1999 and 2011 only two thirds of all European countries established a national PEFC organization. This incomplete diffusion is surprising since all countries analyzed in this study are signatories to various European agreements seeking to define criteria for SFM. The countries that do not participate in PEFC are Croatia, Cyprus, Greece, Hungary, Iceland, Malta, Romania, and Turkey. Secondly, the event history models have shown that the value of forest products and the magnitudes of forest areas are the most important drivers of national membership with PEFC. This shows that economic concerns are the dominant drivers of forest certification in accordance with the PEFC scheme.

In this context, it was also interesting to observe that the old member states rather than the new member states or accession candidates are likely to establish a national PEFC organization. Even more remarkable was the finding that increasing numbers of PEFC members does not impose pressure on abstaining countries to follow the example of the others. While this result could be attributed to the measurement of the diffusion variable, the test statistics for assessing the model fits in fact suggested that this variable matters. However, the present study cannot provide a clear-cut answer to the negative relationship between this diffusion variable and the dependent variable. To be sure, this is only one of many questions that lie outside the purview of this analysis. Another limitation refers to the lack of attention paid to the relationship between PEFC and FSC, which has been stressed in the literature (see, e.g., Cashore, Auld and Newsom, 2003; Gulbrandsen, 2004, 2005; Auld, Gulbrandsen, and McDermott, 2008; Overdevest, 2010). For example, in Turkey no national PEFC organization exists, but in December 2011 76 producers had FSC certification. Likewise, the number of FSC-certified producers in Croatia corresponds to 153 (FSC, 2011). Is there a negative relationship between the dominance of FSC and the likelihood of establishing a national PEFC organization? This question cannot be answered on the basis of findings presented here. Furthermore, the graphical diagnostic of the estimation models indicated that the cases of Greece and Sweden cannot be fully explained by the theoretical framework adopted by this study. From this it follows that in-depth analyses of these two cases could be a rewarding complement to the findings presented by this study. Concerning Sweden, this can be easily implemented by reviewing the existing scholarship (see, e.g., Eriksson, Sallnas, and Stahl, 2007; Gulbrandsen, 2005, 2010), but for exploring the Greek case new data will be needed.

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