International and Domestic Aspects of the

Institutionalization of Environmental Policies in Industrial Countries[1]

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Abstract

The paper analyzes the degree of environmental policy institutionalization among 21 OECD countries from 1960 to 2005. The institutionalization of environmental policy will be analyzed on the one hand, by focusing on the way domestic policy instruments have been applied in OECD countries. On the other hand I will investigate international institutionalization of environmental policy by means of involvement in international treaties and agreements. The paper concludes that highly industrialized societies have institutionalized a high degree of environmental policy over the last decades in both areas. However, environmental institutionalization is clearly divided into a domestic and international realm. Although both areas are linked, different factors explain their respective implementation. Domestic environmental institutionalization is above all determined by domestic political factors (environmental movements, government positions, veto player functions) and international factors (EU membership, diffusion). The analysis is much less successful in explaining international environmental institutionalization. The most robust results of the analysis clearly contradict the findings of earlier studies in this field. International integration does not seem to be a driving force for international participation in environmental treaties among OECD countries. While the paper can answer a great deal of open questions concerning domestic environmental institutionalization, further research is needed in order to explain international environmental institutionalization and why some OECD countries participate in international treaties more often than others.

The most developed societies have particular responsibility in preventing further environmental degradation. These countries have reached a high level of economic wealth and social security. However, this achievement is a result of a long period of industrialization which has often been accompanied by severe environmental transgressions. In the last decades environmental problems have

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become more obvious and in some cases they have even endangered the quality of life in the most advanced societies. Oftentimes these transgressions have resulted in consequences which clearly reach beyond national borders. As a result of this development most highly industrialized countries have taken efforts to limit their environmentally harmful activities. Efficient ways of achieving this have been both the creation of environmental institutions and the participation in international regimes aimed at preventing further environmental degradation. In short, the institutionalization of environmental policies may be a crucial precondition for the improvement of the environment (Jahn 2008). However, not all countries have contributed to environmental improvement to the same degree. In fact substantial variance can be observed among the most advanced societies with regard to the degree of environmental policy institutionalization over the last decades. In this paper I will investigate which factors explain this variance in environmental policy institutionalization.

The institutionalization of environmental policy will be analyzed in two areas. First, I will focus on the way domestic policy instruments have been applied in OECD countries. Domestic environmental institutions range from establishing environmental ministries, enforcing environmental laws to providing environmental incentives through fiscal policy or persuasion. Since domestic environmental policies are country-specific, I assume a close relationship between country-specific factors and the respective policies. Secondly, I will investigate the international institutionalization of environmental policy by means of involvement in international treaties and agreements. In this context I will look at the amount of international treaties each of the analyzed OECD countries put into force. I assume that international environmental institutionalization is less determined by country-specific factors and domestic politics. Nevertheless similar models of environmental institutionalization will be used in order to determine the degree to which both domestic and international institutionalization can be traced back to the same determinants. I also inquire whether there is a link between both aspects, thereby giving a comprehensive overview of environmental policy activity in OECD countries.

Section 1 of this article will present an analytical framework for the examination of environmental policy institutionalization. I will specify the basic variables, speculate about their impact on environmental institutionalization, and operationalize the analytical concepts. Section 2 and 3 present indices for domestic and international environmental institutionalization followed by two sections devoted to multi-variate analysis. After justifying the model and statistical procedures chosen, I will outline the basic results for both the domestic and international realm. Section 6 concludes the paper with a comparison of both areas. While domestic environmental institutionalization can be explained quite well with variables of the political process and the impact of international factors, participation in international environmental agreements appears to be dependent on different factors.
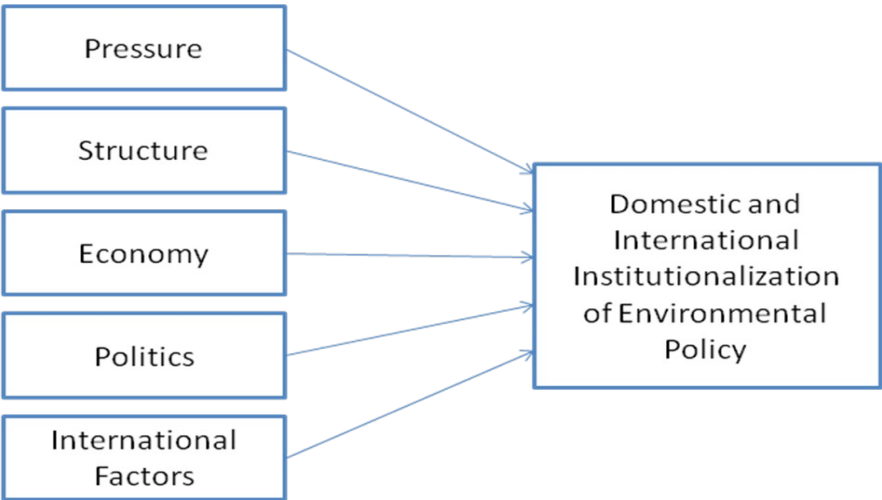
Determinants of Environmental Institutionalization

While there are analyses on domestic environmental institutions (Tews et al. 2003; Holzinger et al. 2008), as well as international environmental agreements

and treaties (Young 1989; Haas et al. 1993; Mitchell 2003), in both areas very little attempts have been made to systematize which factors are important for the institutionalization of environmental policies. Studies do neither include nor compare both domestic and international environmental institutions nor do they develop a theory of environmental policy institutionalization. In this light, it is no surprise that there are no elaborated theoretical concepts. So far there are some lines of arguments for domestic environmental policies and policy outcomes (Scruggs 2003). The most elaborate coherent concept in this context is Martin Jänicke's (1997) Environmental Policy Explanation Model. He argues that economic performance and the structure of the problem influence the actors' strategies which are in turn influenced by economic, institutional and situational factors. However, this framework provides only very little orientation for an empirical study. First, the concepts in this framework are very vague and there are no hints of specific variables. Secondly, the model includes so many variables that everything appears to be important in explaining environmental policies and outcomes. In particular, the unspecified "situational factors" may intervene in any causal argument and make the whole model highly contingent and ambiguous. Given the state of the art, I can only focus on a subset of indicators which represent one strand of argument only.

The general assumption is that environmental problems cause certain responses. This notion is the basis of the OECD's Pressure-State-Response Model (PSE) (OECD Environmental Indicators 2005) which serves as a guideline for data collection. The basic idea is that human activities produce environmental problems (pressure) which can be measured as the conditions of environmental and natural resources (state). Economic, environmental and social agents react to changing environmental and natural conditions on the one hand and to human activities on the other. While this framework serves as a device for data collection, it tells us little about the causal mechanisms. Nevertheless it can serve as a starting point for the identification of factors which affect environmental institutionalization. T

Figure 1: Analytical Framework for the Institutionalization of Environmental Policy

Pressure is likely to have an impact on the institutionalization of environmental policy. The idea behind this argument is that countries with the greatest

environmental problems will create domestic environmental institutions and join international regimes in order to improve their environmental conditions either directly (by means of domestic institutions) or indirectly (by means of improving the global environment). However, it has often been demonstrated that pressure isn't always a sufficient condition for action. In the following I use three measures for environmental pressure. First, population density, secondly the biocapacity , and thirdly the ecological footprint. In highly populated countries environmental problems tend to be more obvious than in countries with vast territory and it is therefore more likely to put stress on highly populated countries to combat environmental problems. In smaller countries environmental problems can also raise environmental awareness since they are immediately visible to a large part of the population. A more direct indicator for environmental pressure would be the state of the environment in each country. Admittedly it is difficult to find data for this aspect. In order to approach this measure I used data from the Ecological Footprints (Wackernagel and Rees 1996).[2] This data set relates countries' biocapacity (environmental and natural resources) to their ecological footprints. A country with vast territory and high biodiversity possesses a high degree of biocapacity. In turn the ecological footprint captures man-made degradation of the environment and is used as my third pressure variable. In the analysis I included both variables the biocapacity and the ecological footprint of each country.

In addition, structural factors such as the size of the production and service sectors could be decisive for the institutionalization of environmental policy. In particular countries with large service sectors could be receptive to environmental concerns as services are cleaner than industrial production. Furthermore, service sector employees are more likely to advance post-material values than their counterparts in other sectors. In general, people with post-material values are more concerned about the environment than people with materialist values (Inglehart 1997). Therefore I will use the variable employees in the service sector to explain environmental institutionalization. Granted that this indicator is very rough, another related aspect will be taken into account: a countries' way of industrial production. Societies with a high demand in natural resources such as industries with a high need for energy are more likely to introduce environmental policies as societies with less energy-hungry industries. This aspect is measured by means of two variables: the amount of energy consumption in the industrial sector and the dependence on energy imports. While it appears to be obvious that high-energy consumption leads to laxer environmental measures, high-energy dependency presumably works in the other direction. In order to become less dependent on foreign energy measures will be taken to limit energy consumption. One such measure might be the increase of environmental standards in order to reduce waste of energy.

The analysis of the impact of economic factors on the environment has a long tradition in the social sciences. However, the relationship between economic and environmental performance is not straightforward. With regard to the environmental outcome (pollution levels, waste generation, emissions, etc.) it is

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[2] See also: http://www.footprintnetwork.org/. The data have been supplied to the author by the Global Footprint Network.

hypothesized that environmental conditions deteriorate when the economy is growing (prosperity pollution hypothesis). Another hypothesis states that environmental conditions improve in rich societies as these possess the technological means and the environmental awareness to improve environmental conditions (prosperity cleaning up hypothesis) (Jahn 2008). The two hypotheses could imply that we have to deal with a curvelinear relationship. Its turning point will be reached once a certain level of economic performance is achieved. In economics this relationship has been discussed in terms of the Kuznets curve regarding social equality. Simon Kuznets (1955) postulates that income inequality increases and then decreases during the process of industrial development. Transferred to the field of environmental studies this means that up to a certain level a positive relationship between economic growth and environmental pollution can be observed which reverses itself after reaching a turning point (Andreoni and Levinson 1998, Ekins 2000: chapt. 7, Grossman and Krueger 1995, Harbaugh et al. 2002, Mátyás et al. 1997, and Selden and Song 1994). However, economic conditions are not unidimensional. I therefore include two aspects in this study: first, the economic wealth of a society (GDP per capita) and its economic growth and secondly, the unemployment rate, the latter being more important as high unemployment might put pressure on social actors to advance economic aspects over environmental ones.

Most of the causalities mentioned so far must be expressed through political processes and priorities. However, there are various political aspects which might also influence the institutionalization of environmental policy. Political scientits often contend that there is a positive correlation between a high degree of corporatism and a high degree of environmental institutionalization (Jahn 1998; Scruggs 1999). This means that the coordination and mediation of political priorities leads to an environmentally benign policy. Surprisingly, comparative studies have so far paid very little attention to the political process in the analysis of environmental policies. If at all, this aspect entered the analysis by measuring whether Left (or Right) ideologies have been dominant forces in society (Recchia 2002). As this measure is very crude, it would be more appropriate to capture the ideological positions of governmental parties. Such approaches of resource mobilization (Korpi 1983; Esping-Andersen 1990; Garrett 1998) postulate that left party governments implement left policies, e.g. policies leading to high equality. One established way of analysis in this tradition is to look at the strength of left parties in government which often includes green parties as well. I apply this variable by using data on the annual strength of left governmental parties (percentage of seats of left governmental parties). However, this indicator does not take into consideration that Left – and for that matter also Right or Centrist – governments may advance different environmental policy positions. Not all left parties are environmentally friendly and not all parties in the right spectrum oppose environmental claims. In comparison to the German Social Democratic Party (SPD), the Swedish SAP can oftentimes be considered hostile with regard to the environment while Swedish and Norwegian center parties as well as the Norwegian Liberal Party are parties to the right which are particularly open to environmental concerns. Therefore I apply the ideological positions of governments on a Left/Right scale as well as on a Green/Growth scale. For this purpose governmental positions have been deduced from the information of the

Party Manifesto Project (Budge et al 2001; Klingemann et al. 2006). Both scales have been inferred from statements of political parties in their election manifestos (Jahn 2009). These indicators are time and country variant. Furthermore, by means of these indicators it is possible to test the hypothesis whether the Left/Right dimension absorbs the Green/Growth dimension and whether left-leaning governments are more environment friendly than other governments.

In recent political science research more elaborated concepts have been developed to model the political process in modern societies. George Tsebelis' (2002) veto player approach is an outstanding example in this respect. He postulates that many veto players with highly different positions maintain the status quo and make policy change less likely. Since the institutionalization of environmental policy is a rather new policy area, it can only be successful if policy change is possible. Therefore I argue that a high veto function is associated with a low degree of environmental institutionalization. Again the strength of the veto function will be tested with regard to the Left/Right and Green/Growth dimensions.[3]

Resource mobilization theory does not exclusively focus on party politics. The research in the field of social policy it turns out that strong trade unions are important actors as well (Korpi 1983; Garrett 1998). In the field of environmental policy, environmental movements might serve as equivalents. However, only very few studies included the impact of environmental movements on

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[3] The veto player function has been operationalized according to the number of veto players and their ideological distance on the Left/Right and Green/Growth dimension. In this study veto players are (a) coalition governments, (b) second chambers, and (c) presidents. I always included the widest range and in case a veto players lies within the range I ignored it (absorption rule; Tsebelis 2002: 26-30). I included second chambers and presidents in case they have a substantial impact on the political process (Tsebelis and Money 1997; Lijphart 1999; Riescher 2000). For Austria, Canada, Denmark, Finland, Greece, Ireland, New Zealand, Norway, Spain, and the UK I used the ideological range of the coalitions (if existing). That entails that I ignored the second chambers in Canada, Spain and the UK. Countries with strong (symmetrical) second chambers are Australia, Germany, Italy, Japan, the Netherlands, Sweden (until 1972), and Switzerland. In these cases we included the second chamber in order to calculate the range. Countries with strong presidents are Portugal and Finland (until 1993). For the USA we use the range between Senate, House and President. However, in some countries we observe substantial changes over time. For Belgium I included the second chamber until 1993, after the reform I analyzed only the range of the coalition. In France the situation is more complicated. In periods without cohabitation I treated the French system as presidential. Although the French president doesn't have many formal powers (Huber 1996: 24-30) the president has informal power positions in its own (governmental) party in periods of united government. This means that I use the range of the coalition, the Senate and the president as the veto player range. However, since in this study the position of the president is identical with the president's party position, the president's position is within the range of the coalition and therefore absorbed. In times of cohabitation I ignore the position of the president: "Cohabitation demonstrates that in the absence of a coherent majority in support of the president, the president is relatively powerless in influencing even the direction of political change." (Huber 1996: 29) Therefore, in case of cohabitation, I use the range between the coalition parties and the second chamber. The Senate in France is normally considered to be a medium strong second chamber (Lijphart 1999). However, it has been demonstrated that the French Senate has a profound impact on the legislative process (Tsebelis and Money 1997: Chapter 7). In particular in periods of non-cohabitation the Senate was often able to influence policy (Ruß 2000).

environmental policy in their research designs (Guigni 2004; Kolb 2007). These studies have only focused on a couple of countries and have almost never included environmental movements as a driving force for the institutionalization of environmental policy (exceptions are Jahn 1998; Bernhagen 2008).[4]

In order to analyze the impact of social movements on environmental institutionalization I apply information from studies on environmental movements (Rucht 2006) and anti-nuclear movements (Rüdig 1990; Kolb 2007). Strong environmental movements are movements which have higher-than-average mobilization and which have developed a strong counter-cultural ideology. In particular this was the case in Switzerland, Germany and the Netherlands. The anti-nuclear conflict has – given that it occurred at all– often been very fundamental and has triggered more radical forms of environmental protests (Kitschelt 1989; 1993). Therefore I also include the strength of the anti-nuclear power movements in this study. This has been done on two dimensions: First with regard to mass mobilization, secondly with regard to local resistance (Rüdig 1990; Kolb 2007). All in all a scale from 2 to 13 has been reached which has been standardized for further analysis.

In the age of globalization, international factors seem to gain momentum in explaining state activities (Rodrik 1997; Jahn 2006). Yet in the field of environmental studies, the causal link remains unclear. Some say that increasing international competition is likely to lead to a liberalization of environmental standards (race to the bottom) and can therefore hinder environmental institutionalization. Others claim that international involvement may lead to the establishment of higher environmental standards (Vogel 1995) and international cooperation (Meyer et al. 1997). Again, various aspects in the field of international factors have to be taken into consideration. First of all I apply the established indicator for international involvement by looking at the degree of international trade. I use the amount of imports and exports as part of the GDP as an indicator (oprnness). Another aspect is the membership in supranational organizations. In particular an organization such as the European Union (EU). I therefore use a dummy variable for EU membership. Finally, globalization has been operationalized in terms of diffusion. In recent years special spatial regression models have been applied for such an analysis (Simmons and Elkins 2004; Beck et al. 2006; Jahn 2006; Franzese and Hays 2008). Spatial regressions are used in all our models by utilizing a 21 x 21 matrix of trade exchanges (imports and exports as part of world imports and exports) among the 21 analyzed OECD-countries. These are then multiplied with the respective dependent variable.

In the way that we use one set of variables to explain the variance of both the domestic and international institutionalization of environmental policy, we ask the question, if both kinds of institutionalization are dependent on the same factors. Alternatively there could be different factors explaining the domestic

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[4] Jahn (1998: 123) includes the strength of environmental movements (weak, middle, strong) into an index of new politics mobilization along with the electoral strength of left-libertarian parties. Bernhagen (2008: 94; 109) uses the percentage of people stating membership or activism in conservation, environment, ecology, or animal rights groups (data is taken from the world value survey).

institutionalization, on the hand, and the international institutionalization, on the other. I assume that domestic factors such as pressure, structure, economy and politics are the most successful in explaining domestic environmental institutionalization while international factors (e. g. international embeddedness, diffusion) are more useful in explaining international environmental institutionalization.

Domestic Institutionalization of Environmental Policy

Domestic environmental policy has a long history. Environmental problems have been known for a long time triggering local actors' responses. Environmental regulations have in particular become more common in the post-World War Two period. The London smog in 1952 represented a watershed for that matter. As a consequence, a Clean Air Act was passed that encouraged people to use heaters fueled by gas, oil, and electricity rather than coal. Later another law was passed to make sure that industries used taller chimneys. Around the world, the London smog disaster called many people's attention to the dangers of air pollution. Highly industrialized states have later on developed various kinds of policy instruments to combat environmental degradation. Different environmental instruments have been used in different times. In the following I will focus on five different dimensions of policy instruments and their respective implementation in 21 highly industrialized OECD countries: the establishment of national agencies which regulate environmental issues (1) and the enforcement of national environmental laws (2). While these measures are rather punctual, other, more comprehensive measures have been introduced as a reaction of the Brundtland Commission's work. These national environmental instruments have a more holistic perspective and aim at achieving sustainable development (3). More recently, new policy instruments (NEPIs) have been introduced which either focus on economic incentives, so-called economic instruments (4), or build on voluntary and informal aspects of persuasion (5).

The empirical identification of these instruments is intrinsically tied to several methodological challenges. First, it is not easy to estimate whether similar environmental instruments have the same meaning and scope in different countries. In this analysis I therefore refrain from judging the character of different policy instruments. I identify the introduction of policy instruments by coding the year when a policy measure was taken. Although this is a very crude measure of analyzing the introduction of policy instruments, it is the only way to compare 21 countries. Secondly, different policy instruments have different goals and intentions. Some, such as environmental ministries, normally have a broad scope while specific environmental laws focus on special aspects. Although we only consider broader environmental measures, such as laws against air or water pollution, some certainly have a more limited scope than the establishment of environmental ministries. I will take this difference into account by weighing the individual measures within and across various policy dimensions. Despite being aware of the fact that this only represents a first step in the analysis of comparing different environmental instruments, it is essential in order to obtain a more complete idea of the institutionalization of environmental policies. Thirdly,

the following analysis focuses on the level of the central state. By doing so I underestimate the activities of federal states which is particularly meaningful in the case of Australia. Fourthly, the overall index of the institutionalization of domestic environmental policy sums up the measures taken with regard to the five dimensions mentioned above. Since there are various numbers of indicators in the different areas, each dimension can be weighed equally. Finally, functional equivalents are taken into account. For instance environmental agencies such as the one in the United States are equivalent to environmental ministries or departments in other countries. Some countries established both environmental agencies and environmental ministries. In this case both institutions may share the task of organizing national environmental policy. In order to not overestimate these states' activities, only the first institution is being counted. Although each instrument and country is treated equally, a margin of ambiguity remains. In order to limit this ambiguity, I will outline the detailed coding instructions in the following section.[5]

(a) Domestic Environmental Laws

Environmental laws are among the first environmental instruments which have been introduced in certain countries as soon as the 19th century. Environmental laws can be distinguished depending on whether they deal with broad issue areas or whether they are media-specific. In the first case I speak of environmental framework laws whereas in the second case I analyze laws dealing with pollution (e.g. air, water, soil).

Although capturing a broad field, framework laws take a different form in each of the countries analyzed. The United States' National Environmental Policy Act (1969) for instance regulates basic principles and procedures of environmental policy and environmental law relatively loosely. Other framework laws regulate the control of emissions and the legal consequences. In comparison, New Zealand's Resource Management Act (1991) is relatively comprehensive (Bührs and Bartlett 1993; Bührs 2006). More general laws regulate to what extent the public has a right to be informed concerning specific environmental issues or situations. In some countries such information laws are specific to environmental issues while being included in general information laws in other countries. One of the oldest general information laws has been introduced in Sweden in the 18th century. In the United States such regulation has existed since the 1960s. The aims of such laws are to improve citizens' participation in environmental matters and to make administrative and governmental activities more transparent.

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[5] The data base builds on the data set developed by the Research United Environmental Policy of the Free University Berlin. Most information has been taken from Binder (2002) and Busch and Jörgens (2005). The data base has been revised, up-dated, and complemented by the author of this paper. In addition only highly reliable indicators are being used. As stated by the Berlin Research Group (Binder 2002: 39-43), some information in the original data base is only little or moderately valid. This data, given that it has been used in this data base, has been checked. Footnotes indicate the instances in which the data deviates from Binder's (2002) set of data.

Specific environmental laws cover various areas. Here the focus is on basic legislation which deals with either air, water or soil pollution, waste regulation or nature protection laws. Some laws cover more than one medium and occasionally result in overlaps. Furthermore, as my focus is on national environmental laws, the legal activity of federal states where some laws refer to the sub-national level might be underestimated.[6]

It is important to weigh individual activities in this area. As specific environmental laws (air, water, soil, waste, and nature) only cover limited areas, the dimension of domestic environmental laws is only weighed by a measure of 50 percent. Furthermore, information laws may not have the same value as general environmental framework laws. Therefore information laws are weighed by a measure of 20 percent as opposed to framework laws with 30 percent. Even though weighing procedures are somewhat arbitrary, counting all laws equally would have produced an even stronger bias.

Environmental laws have the longest history in OECD countries. In this respect Sweden is a forerunner. However it needs to be mentioned, that not all countries have introduced environmental laws in each of the categories. Only the Netherlands, Denmark, Greece, Portugal, New Zealand and Japan have been active in all areas of environmental legislation.

(b) Domestic Governmental Organizations

The introduction of environmental ministries or departments is an obvious effort to take the environment more seriously. Although some (Müller 1986) criticize that the introduction of environmental ministries moves environmental issues from main stream politics to the periphery, environmental ministries often have a strong symbolic impact. However, it needs to be mentioned that environmental ministries fundamentally differ from country to country with regard to competencies and scope. Some countries– above all the United States, Switzerland, Japan, and Denmark – did not introduce an environmental ministry at all. Instead in 1968, an environmental agency was established in the US which took on similar tasks. Therefore environmental ministries and environmental agencies are considered to be functional equivalents. In case either one of these institutions has been introduced, I consider the provisions to be fulfilled. Between 1967 and 1996, all OECD countries have introduced environmental ministries or environmental agencies with Spain being the last country to do so.

(c) Strategies for Sustainable Development

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[6] The data has been checked by consulting the Ecolex data bank (www.ecolex.org; December 17, 2008) as well as OECD publications. As a result the National Park and Wildlife Conservation Act (1975) is counted as a national nature protection law for Australia (OECD 1998: 47).

Strategies for sustainable development focus on integrated concepts of environmental policies which incorporate different societal groups and actors in a broader environmental concept. As mentioned above, the strategy of sustainable development became prominent through the report of the World Commission of the Environment and Development (WCED). A follow up program of the Agenda 21 were introduced for specific policy areas (O'Riordan and Voisey 1998). The idea of sustainability puts the environment into a bigger framework and emphasizes the interplay between environmental, economic and social aspects.

Policy instruments which foster the idea of suitable development are the creation of sustainability councils in which various interest groups and experts join together to discuss environmental issues with regard to their economic and social consequences. Sustainability councils are created by domestic governments and are composed of important (business associations, trade unions, etc.) and relevant (environmental groups and experts) interest group representatives as well as scientists. They are set out to exist for longer periods of time.[7]

Another form to promote the idea of sustainable development is the formulation of a sustainability strategy or an environmental plan. These strategies are developed by a group of experts and members of important and relevant interest organizations and have been initiated by government agents. The strategies are comprehensive, long-lasting, coordinated and integrated in domestic environmental plans.

While sustainability councils and strategies are newer environmental instruments, environmental reports date back a while. Environmental reports were the first attempt to get an overview of the domestic state of the environment. In contrast to sustainability councils and above all strategies, environmental reports didn't formulate strategies as to how environmental problems should be dealt with. Since environmental reports do not intend to reach specific goals, they are assigned less weight than sustainability councils and strategies.[8]

In OECD countries, sustainability strategies started in the mid 1970s. Comprehensive strategies have been developed in Sweden, Finland, Belgium, the Netherlands, France, Portugal, Austria, Switzerland, Ireland, Canada, Australia, New Zealand, Japan and Great Britain. Until 2005, no such strategies had been initiated in Greece. The United States established a sustainability council in 1993 but abolished it in 2000.

(d) Economic Environmental Instruments

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[7] Sustainability councils were added to the original data set for New Zealand (2002) (http://www.sustainabilitynz.org/docs/SCNZnews2.pdf; 25 December 2007) and Spain (2004), after the councils were reorganized and were endowed with more competencies. (http://www.eeac-net.org/; 25. December 2007).

[8] In this respect I deviate from the original data set. The introduction of an environmental plan for Belgium is changed to 1979 and to 1970 for the USA. For details see: Jörgens (1996: 7), and Jänicke and Weidner (1997: 316).

The last two environmental instruments belong to the group of New Environmental Instruments (NEPIs) (Jordan et al. 2007). These instruments aim at promoting eco-friendly behavior through either economic or other incentives. In the following, the elaboration of economic instruments is succeeded by discussing persuasive instruments.

The spectrum of economic instruments as well as their functioning and impacts are manyfold (OECD 1999). As a consequence, they are difficult to compare making it unavoidable to limit the analysis to some economic instruments. All instruments chosen deal with energy policy. First, I collected data about the introduction of taxes on Carbon Dioxide (CO_2). However, it is not an easy task to identify which energy taxes are motivated by environmental concern. In many countries we find energy taxes on petrol or fuel oil since the 1970s. These taxes are levied due to economic reasons and do not aim at promoting environmental causes. Therefore CO_2 taxes with a clear environmental motivation need to be identified.

Other indicators I use with regard to economic instruments are economic measures to promote alternative energy production. These are Energy Feed-in Regulations and Energy Quota Rules and oftentimes serve as functional equivalents. CO_2 taxes, Energy Feed-in Regulation or Energy Quota Rule are therefore assigned the same weight in this analysis.

Among the OECD countries, Sweden, Denmark, Belgium, the Netherlands, Italy, Germany, Austria and the United Kingdom have introduced economic instruments, Norway, Finland, France, Spain, Greece, Portugal, Switzerland, Australia, and Japan have either used CO_2 taxes or promoted alternative energy. Only, Ireland, Canada, New Zealand, and the United States refrained from introducing any economic instruments.

(e) Voluntary and Informational Instruments

Voluntary and informational instruments are NEPIs which intend to demonstrate that products or actors are eco-friendly. The implication is that the market value of products or services increases when they are produced in a sustainable way. These kinds of measures are often initiated by private actors rather than governmental agencies (Arts 2006). Many voluntary and informational NEPIs have been put into action. I have picked two NEPIs with broad targets for this analysis: ecolabels and the degree to which companies and businesses have certified the ISO 14001 status.[9]

The ecolabels considered in this analysis have a broad scope and need to meet certain legal standards. For EU countries these ecolabels have been made compulsory in 2004.

The ISO standard 14001 is a requirement of the ISO (International Organization of Standardization) that firms and businesses have to introduce an infrastructure

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[9] Some ecolabels such as ecolabels for refrigerators and freezers have been excluded as they do not cover a broad range of products and also have low validity (Binder 2002: 42).

and supply resources for environmental measures and actions. The ISO has a codified standard which companies have to abide by if they want to receive or obtain the ISO14001 status (www.iso.org). Studies demonstrate that companies with an ISO 14001 status have a better environmental performance than those without it (Sayre 2006; Prakash 2000; Potoski and Prakash 2005; 2006). It has been found out that environmental standards improve when firms with an ISO 14001 status move to or invest in other countries (Potoski and Prakash 2005). The results show that ISO 14001 may be a suitable indicator for informational NEPIs.

The ISO regularly publishes how many companies in a country have been awarded ISO 14001 status.[10] In order to compare the degree of institutionalization of ISO 14001, the number of companies is standardized in reference to the country's GDP. This is common practice in social science research although it would be more suitable to analyze the proportion of certified companies in relation to all companies in a country. We used the median for all OECD countries over all the years as a cut-off point for the dummy variable. This was clear for all but two cases. Austria and the Netherlands dropped below the median after the year they passed it. In these cases we coded the dummy variable 1 from the year when the respective country passed the median for the second time.

Voluntary and informational NEPIs are very popular in Scandinavian countries where they were introduced starting in the 1980s. By 2000, all Scandinavian states had implemented all NEPIs included in this analysis. In other OECD countries, voluntary and informational NEPIs are also common with the exception of Switzerland, Greece and the United States. These countries were more reluctant to engage in this kind of environmental legislation. The table below summarizes the indicators used for domestic institutionalization of environmental policy. The table also outlines information on weighing procedures and the use of functional equivalents. T

Table 1: Indicators for Domestic Institutionalization of Environmental Policy

Dimension	Institutions	Weight within each dimension	Total weight
1st Dimension: Governmental Institutions	Environmental Ministry or Environmental Agency	100 %	20 %

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[10] In order to obtain a time series from 1995 to 2005 I use ISO 2001, 2006, 2007.

2nd Dimension: Legal Institutionalization	Environmental	20%	20%
	Framework Law	30%	
	Specific Laws ○ Air ○ Water ○ Waste ○ Soil ○ Nature	10% 10% 10% 10% 10%	
3rd Dimension: Institutions for Sustainable Development	Environmental Reports	20%	20 %
	Sustainability Council	40%	
	Sustainability Strategy / Environmental Plan	40%	
4th Dimension: Economic Instruments	Carbon Dioxide Taxes	50%	20 %
	Energy Feed-in Regulation or Energy Quota Rule	50%	
5th Dimension: Informational Instruments	Ecolabel	50%	20 %
	ISO 14001	50%	

With regard to domestic institutionalization, only the Netherlands have made use of all environmental instruments. In addition, Sweden, the United Kingdom, Belgium, Austria, and Denmark belong to the group of countries which use a broad spectrum of environmental instruments. Canada, Ireland, Greece, and above all the United States, which are rather reluctant to use a broad spectrum of environmental instruments, are at the other end of the spectrum. The speed with which Portugal introduced various environmental instruments after joining the EU in 1986 is astonishing. Figure 2 gives an account of the institutionalization of environmental policy in 21 OECD countries from 1960 to 2005. T

Figure 2: Domestic Institutionalization of Environmental Policy in 21 OECD Countries (1960-2005)

Graphs by country_name
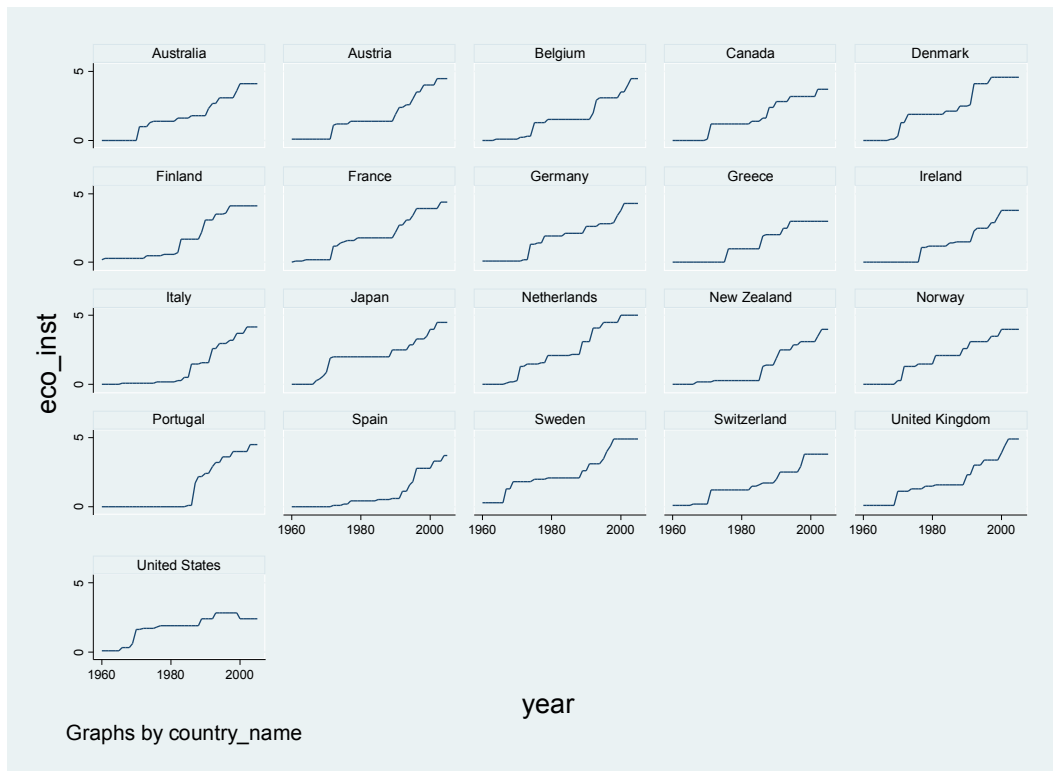
International Institutionalization of Environmental Policy

International institutionalization of environmental policy refers to international agreements in which individual countries participate. I use all multilateral agreements which are in force in each country. In recent years, scholars have moved away from case study research and collected data for a high number of environmental regimes and countries. In particular the Columbia Center for International Earth Science Information Network (CIESIN 2007), Breitmeier et al. (2006) and Mitchell (2003a, b) have collected such data. However, most of this information is not suitable for the present purpose. The major problem is that either the unit of analysis deviates from the research interest in this paper or that the data does not cover the countries and time periods investigated in this study. Therefore the data has been collected from the Ecolex database (www.ecolex.org) in December of 2007 for the 1945-2005 time period. This database is run by the UNEP, IUCN, and FAO.[11]

In general I have applied Ronald Mitchell's coding scheme (2004) who suggests coding environmental agreements and amendments as independent instances. Furthermore he considers a significant modification of an agreement to be a new entry into the data set.

I code each OECD country's participation in a multilateral environmental agreement. The date when the agreement comes into force in the respective

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[11] UNEP is the Environmental Department of the United Nations (*United Nations Environmental Program*), the IUCN (*The World Conservation Union*) is a network of environmental organizations and the FAO (*Food and Agriculture Organization*) is the United Nations' organization for food and agriculture.

countries is decisive for the coded year. Again I construct an index that includes a couple of sub-categories. These categories are:[12]

    (a) Nature Protection
    (b) Agricultural Issues and Pollution
    (c) Air (including Climate)
    (d) Soil
    (e) Waste
    (f) Habitat
    (g) Oceans
    (h) Protection of Plants and Animals
    (i) Transport on Open Sea
    (j) Transport on Land

I did however not use the category "energy, nuclear issues and conflict (weapons)" and other agreements that don't have a direct environmental impact such as the „Agreements governing the Activities of States on the Moon and other Celestial Bodies". Since different categories include various numbers of agreements we standardize each category by the maximum number of agreements ratified in each category. In the next step I use the sum of all categories as a general index for international institutionalization of environmental policy. The index varies from 0 to 1.

The data shows that Sweden is leading (.91). Other countries which have been active in joining international agreements on environmental regulations are Switzerland, Australia, France, the United Kingdom, Denmark, Finland, and the Netherlands. Spain's high participation rate is surprising in that regard. Austria, Belgium and the United States are at the bottom of the scale. Figure 3 gives an overview of international institutionalization of environmental policy in the 21 OECD countries from 1960 to 2005. T

A comparison of the OECD countries' domestic and international institutionalization of environmental policy shows a high correlation in a bi-variate regression analysis where all values have been z-scored (B = .907; N = 966). However, since both variables are highly trending, I have included a trend variable which counts throughout the years in order to absorb the impact of a linear trend. The inclusion of this variable reduced the coefficient to .458 which is still highly significant on the .001 level. When lagging one of the variables, it leads to the domestic environmental institutionalization (.476) having a slightly higher impact on international environmental institutionalization than the reverse relationship (.446).

Since there is very little variation before 1960, the multi-variate empirical analysis starts in 1960. The decision to keep the years before 1960 out of the analysis thereby brings about a second advantage: It was possible to collect information on the independent variables for all countries. These hadn't been available for the years before 1960. The analysis terminates in 2005 for which the most recent data was available.

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[12] Again I use Mitchell categories but modify them for my purpose: see „International Environmental Agreements (IEAs) Defined." http://iea.uoregon.edu/page.php?query=static&file=definitions.htm; 5. December 2007.

Figure 3: International Institutionalization of Environmental Policy in 21 OECD Countries from 1960 to 2005

Graphs by country_name
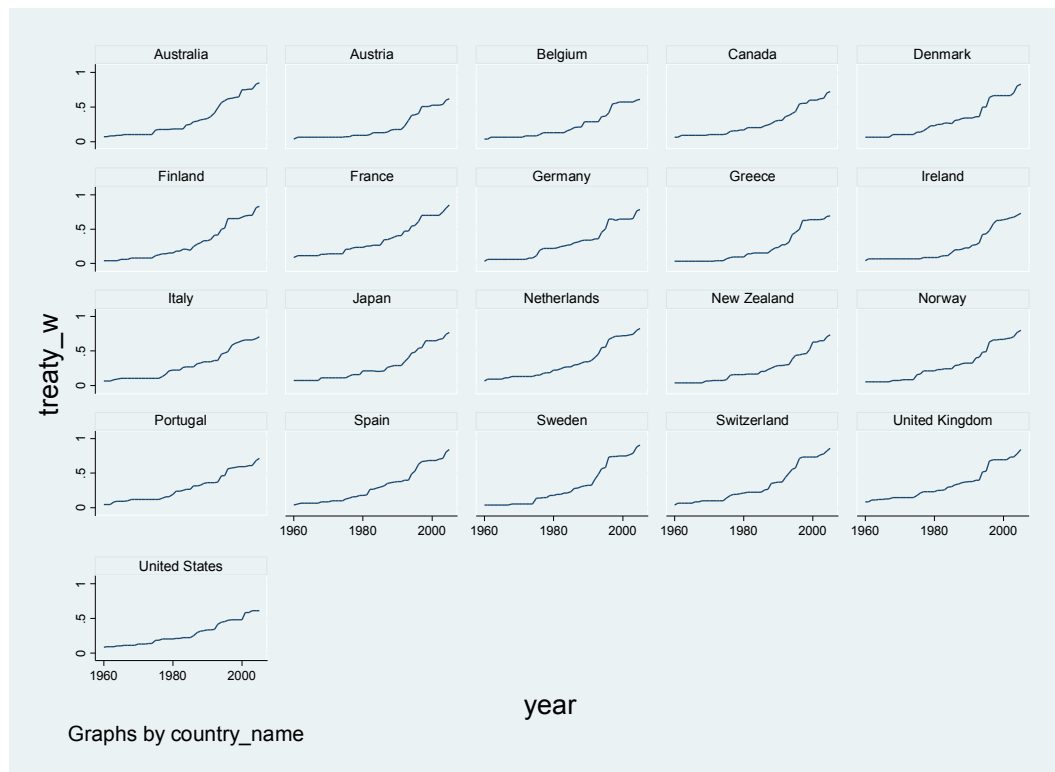
Analysis

The analysis is conducted as a time-series—cross-sectional (TSCS) analysis. I use a Prais-Winsten model with panel-corrected standard errors. This model eliminates serial correlation of errors. Furthermore I have corrected autocorrelation for the first order. Since there is substantial disagreement whether or not to include country (fixed effects; FE) and period dummies (period effects; PE) in such a model (Beck and Katz 1995; 2004; Plümper et al. 2005; Wilson and Butler 2007; Beck 2008), I have calculated four models: without any dummies, with fixed effects, with period dummies, and with fixed effects and period dummies. I did not include a one-year lagged dependent variable in the level analysis since the literature seems to agree that the inclusion of a lagged dependent variable does more harm than it helps (Achen 2000; Plümper et al. 2005). The problem with year dummies is that they may absorb most of the theoretically interesting time-series variance in the data. Similar reservations apply with regard to fixed effects: "… if the theory says something about level effects on levels or on changes, a fixed effects specification is not the model at hand. If a theory predicts level effects, one should not include unit dummies." (Plümper et al. 2005: 334) In any case this means that FE eliminates an analysis of country differences and PE eliminates an analysis of variation over time.

There is no doubt that there is a strong trend in our dependent variables. Some precaution has been taken in controlling for non-stationarity. First, I have included a trend variable in order to control for this problem. Trend variables can serve as a proxy for a variable that affects the dependent variable and is not directly observable but is highly correlated with time. I have also included a variable which controls for common shocks. This is the average growth rate of 18 OECD countries.[13] Furthermore, I have tested the impact of the oil crisis in 1973 and 1978 as well as the impact of major environmental disasters.[14] None of these variables came close to generating significant results and have therefore not been included in this analysis. Finally, I have conducted first difference models which are supposed to be a solution for non-stationarity. However, first difference models shift their focus of analysis from long-term trends to short-term trends.

As to the substantial variable, some remarks are in order. The veto player function for the Green/Growth dimension has only been included from 1978 onwards because this dimension had not really been present before this period. The impact of environmental movements on environmental institutionalization also is time-dependent. These movements emerged in the mid-1970s and were at the peak of their activity until the mid 1980s. A more precise analysis arrives at the conclusion that their impact was not significant before 1978.[15] The impact peaked in 1984 and 1985 and dropped thereafter. From 1987 onwards the impact was insignificant again. In consequence, I have included the impact of environmental movements from 1978 through 1986 in that I have interacted the variable environmental movement with a respective period dummy.[16]

In the analysis of the level of environmental institutionalization the dependent variables are also used as level variables (with the exception of Economic Growth). In the first difference analysis I have also applied the first differences for Biocapacity and Ecological Footprints, the party positions and veto function. The diffusion index has always been calculated with the corresponding dependent variable.

All independent variables enter the model with a one year lag and being z-transformed. The only exceptions are the positions of parties and the veto

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[13] Here the 18 established OECD countries with the exception of Portugal, Spain and Greece are used.

[14] Dummy variables have been included for the years when a major environmental disaster occurred. The disasters chosen were Seveso (1976), Love Chanal (1978 when the scandal was revealed), Three Mile Island's near nuclear disaster (1979), Bhopal (1984), Chernobyl (1986), Spanish wastewater spill (1998), Baia Mare cyanide spill (2000) as well as major oil spills (1978, 1988, 1989, 2002). Data was taken from Lenntech (http://www.lenntech.com/environmental-disasters.htm; January 2009). The major anthropogenic environmental disasters were chosen by death toll, injuries, (lasting) damage and media exposure.

[15] The relationship was significant concerning domestic environmental institutionalization only. There were only weakly significant results on the .1 level in 1977 and 1978 for international environmental institutionalization.

[16] I did not include the x (the period dummy from 1978 to 1986) and z (the degree of mobilization of environmental movements) in the model in order to use xz because it is not necessary from a theoretical point of view (Kam and Franzese 2007: 99-102). In addition I have run tests for hierarchical models with the result that x and z don't necessarily need to be included for statistical reasons.

function. For the positions of parties a lag of two years was most efficient, three years for the veto function. Therefore I have used these variables with a two and three year lag in all models. I have also tested the other variables with other time lags but the reported one year lags are best fit for all variables. As Plümper and his colleagues (2005) argue, a one year time lag is not always appropriate and one should refrain from using t-1 schematically. Janoski and Isaac (1994: 35-36) also point out that time lags may vary substantially with regard to policy areas.

In all models I have analyzed identical variables. However, in the first difference models I have also included a lagged dependent variable. This is appropriate since a lagged dependent variable in a first difference model is not as deterministic – or kleptomaniac as Achen (2000) puts it – as in level data analysis. Instead it can be identified whether or not there is a continuing trend of environmental institutionalization. In the first difference models I have additionally included level variables. These show whether there is a catch-up trend (significant negative relationship) among the countries.

This paper has focused on the most highly developed industrialized countries most of which are members in the OECD. Therefore I have analyzed established OECD member countries, namely Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the USA. The period of analysis spans from 1960 to 2005.

Results

First, I analyze domestic environmental institutionalization. As table 2 shows there are various factors which promote domestic environmental institutionalization. However, pressure (population density, biocapacity and ecological footprint) and economic variables are not the major driving forces. There seems to be a weak negative correlation between high unemployment and environmental institutionalization. This confirms the hypothesis that high unemployment reduces environmental commitment. Economic growth has no impact and wealth is – if at all – a negative influence on domestic environmental institutionalization. Some hints can be found that a negative Kuznets Curve exists, meaning that richer and poorer countries are less likely to promote environmental institutionalization than countries with medium wealth. T

Structural factors have shown to have some unreckoned impacts. The size of the service sector is negatively correlated with the level of domestic environmental institutions. However it is positively correlated with first differences. Countries with high energy-consuming industries have more domestic environmental institutions while energy-dependent countries have less. This result slightly contradicts what was to be expected. It seems that national politics aim at supporting domestic industries over the reduction of energy dependency by use of environmental measures. The significance of these variables is particularly strong for short-term changes (in the first difference models).

The political variables show highly interesting results. First, corporatism seems to support domestic environmental institutionalization. This is true in all models without fixed effects.[17] This reflects the findings of most analyses (Jahn 1998; Scruggs 1999). Environmental movements have also had a positive long-term effect on domestic environmental institutionalization. However, their impact cannot be identified in the short-term (first difference models). This means that environmental movements are likely to raise the awareness for environmental issues in a society rather than having an immediate impact.

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[17] Since corporatism correlates highly with country units it is not surprising that the explanatory power decreases with the inclusion of FE in the regression model.

Table 2: Explaining Domestic Environmental Institutionalization

	(1) Level	(2) Level FE	(3) Level PE	(4) Level FE & PE	(5) First Difference	(6) First Difference FE	(7) First Difference PE	(8) First Difference FE & PE
Δ Environmental Institutions$_{t-1}$					0.0269 (0.0440)	0.0504 (0.0437)	0.00946 (0.0447)	0.0500 (0.0446)
Environmental Institutions$_{t-1}$					-0.790*** (0.114)	-1.167*** (0.141)	-0.819*** (0.123)	-1.395*** (0.165)
Treaties&	0.162*** (0.0485)	0.172*** (0.0453)	0.156* (0.0610)	0.0784 (0.0632)	0.0108 (0.0407)	0.00354 (0.0412)	0.0237 (0.0477)	0.00386 (0.0462)
Density	0.0258 (0.0385)	0.955** (0.304)	0.0331 (0.0380)	0.967** (0.304)	-0.0229 (0.0477)	1.195+ (0.695)	-0.0359 (0.0470)	1.413* (0.697)
Biocapacity&	0.0552 (0.0387)	-0.0790 (0.119)	0.0540 (0.0389)	-0.0274 (0.116)	1.858 (3.709)	0 .	2.112 (3.712)	0 .
Ecological Footprints&	0.0175 (0.0219)	0.0214 (0.0225)	0.0108 (0.0227)	0.0228 (0.0234)	0.143 (0.153)	0.140 (0.151)	0.0966 (0.154)	0.118 (0.152)
Service Sector	0.000577 (0.00147)	-0.00238+ (0.00122)	0.000956 (0.00158)	-0.00198 (0.00137)	0.0159*** (0.00393)	-0.00322 (0.00463)	0.0173*** (0.00399)	-0.00156 (0.00500)
Unemployment	-0.0598* (0.0268)	-0.0434 (0.0286)	-0.0527+ (0.0285)	-0.0231 (0.0299)	-0.148* (0.0591)	-0.154+ (0.0904)	-0.163** (0.0600)	-0.0856 (0.0956)
GDP^2	-0.0564 (0.0512)	-0.114+ (0.0599)	-0.0227 (0.0516)	-0.0934 (0.0602)	-0.173* (0.0757)	-0.240+ (0.144)	-0.171* (0.0753)	-0.183 (0.141)
Growth	-0.00514 (0.00699)	-0.00559 (0.00723)	-0.00667 (0.00688)	-0.00651 (0.00710)	-0.0224 (0.0472)	-0.0406 (0.0531)	-0.0287 (0.0468)	-0.0583 (0.0524)
Energy Industry	0.0644 (0.0490)	0.121* (0.0567)	0.0848+ (0.0515)	0.157* (0.0649)	0.485*** (0.0982)	0.512** (0.185)	0.520*** (0.101)	0.607** (0.207)
Energy Import	0.0260 (0.0379)	-0.0375 (0.0348)	-0.0173 (0.0407)	-0.0866* (0.0386)	-0.178** (0.0617)	-0.237** (0.0917)	-0.189** (0.0625)	-0.292** (0.0958)
Corporatism	0.144*** (0.0318)	0.213+ (0.116)	0.144*** (0.0312)	0.0968 (0.111)	0.159** (0.0486)	0.353 (0.229)	0.156** (0.0488)	0.275 (0.225)
Movements	0.0287* (0.0119)	0.0367** (0.0114)	0.0291* (0.0117)	0.0366** (0.0112)	0.0184 (0.0370)	0.0539 (0.0360)	0.0221 (0.0375)	0.0753* (0.0363)
Left Position&	0.00956 (0.00973)	0.00945 (0.00961)	0.00844 (0.00966)	0.00772 (0.00947)	-0.0363 (0.0622)	-0.0382 (0.0609)	-0.0261 (0.0624)	-0.0310 (0.0611)
Left Veto&	0.0128 (0.0142)	0.0178 (0.0142)	0.0106 (0.0141)	0.0159 (0.0140)	0.151+ (0.0903)	0.125 (0.0886)	0.135 (0.0897)	0.0968 (0.0869)
Green Position&	-0.0338* (0.0163)	-0.0352* (0.0158)	-0.0206 (0.0162)	-0.0178 (0.0157)	-0.161 (0.108)	-0.152 (0.106)	-0.117 (0.107)	-0.121 (0.103)
Green Veto&	-0.0480** (0.0162)	-0.0445** (0.0161)	-0.0473** (0.0168)	-0.0403* (0.0165)	-0.377*** (0.109)	-0.352** (0.107)	-0.389*** (0.115)	-0.357** (0.110)
Openness	-0.0286 (0.0321)	-0.0150 (0.0411)	-0.0370 (0.0317)	-0.0329 (0.0402)	-0.0464 (0.0502)	-0.0969 (0.111)	-0.0235 (0.0488)	-0.0204 (0.100)
EU-Membership	0.0687** (0.0250)	0.0751** (0.0269)	0.0774** (0.0246)	0.0787** (0.0264)	0.132* (0.0530)	0.206* (0.0875)	0.147** (0.0531)	0.204* (0.0861)
Diffusion&	0.323*** (0.0571)	0.379*** (0.0563)	0.199** (0.0630)	0.218*** (0.0634)	0.208*** (0.0396)	0.219*** (0.0402)	0.126** (0.0486)	0.158** (0.0484)
Shock	-0.0141 (0.00929)	-0.0110 (0.00964)	0.0161* (0.00760)	0.0202** (0.00740)	0.0452 (0.0611)	0.0693 (0.0624)	0.0174 (0.0470)	0.0476 (0.0462)
Trend	0.527*** (0.0820)	0.500*** (0.100)	0.599*** (0.101)	0.735*** (0.127)	0.874*** (0.139)	1.447*** (0.223)	0.789*** (0.139)	1.486*** (0.237)
Constant	-0.0900 (0.129)	0.0386 (0.127)	-0.0461 (0.140)	0.0345 (0.137)	-0.884*** (0.227)	0.0380 (0.247)	-1.194*** (0.224)	-0.135 (0.288)
N	848	848	848	848	828	828	828	828
R^2	0.647	0.777	0.676	0.800	0.148	0.189	0.210	0.254

Panel Corrected Standard errors in parentheses; $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$; variables with "&" are level in models 1-4 and Δ in model 4-8. FE = fixed effects; PE = period

effects.

The programmatic direction of governments is a relevant question in political science. "Do parties matter" is the basic question here. However, while it makes sense that left parties in government promote social welfare (Garrett 1998; Allan and Scruggs 2004) this is not so clear for the institutionalization of environmental policy. I have used three variables to address this aspect. First, I used a simple index which looks at the strength of left parties in government. Given that left parties govern alone, the index receives a value of 100 (percent).[18] This index did not accomplish to generate a significant result and is therefore not outlined in this paper. The other two indices focus on the Left/Right dimension as well as on the Green/Growth dimension. It is clear that the former has no impact on domestic environmental institutionalization. The Green/Growth dimension has an impact in the expected direction: the more government positions incline to the green side (negative values), the higher the degree of domestic environmental institutionalization. However, the significant results are only true for the analysis of the level variable without PE.

The negative impact of veto players is unquestioned. The stronger the veto player function (i.e. the wider the ideological range between a country's relevant veto players), the fewer domestic environmental institutions can be found. This is true for all models. However, the results also clearly show that the environmental issue works on its own dimension. The highly significant impact of the veto function on the Green/Growth dimension stands in contrast to the nonsignificant impact of the Left/Right veto player index.[19]

Apart from political variables, international variables also contribute to the explanation of domestic environmental institutionalization. In all models it can be observed that the EU has a positive impact on domestic environmental institutionalization. The opposite seems to be true for trade openness. Although not significant, the sign is always negative, indicating that a high degree of trade openness correlates with a low degree of domestic environmental institutionalization. Finally, a very significant diffusion of domestic environmental institutionalization can be found in all models.

The first difference models show that there is a clear catch-up effect. The level of domestic environmental institutionalization and the changes are highly significant and the coefficient is negative.

In short, corporatism, unobstructed green mobilization (either in the form of environmental movements or "green" governments), the impact of the EU and diffusion contribute to explaining domestic environmental institutionalization. Hereby the function of veto players is most impressive. A strong veto player function on the Green/Growth dimension results in fewer environmental

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[18] The data used was taken from Armingeon (2008).
[19] A two-dimensional veto player function of the Left/Right and Green/Growth dimension (city block model) is still significant on the .1 level, even though it is much less powerful in explaining domestic environmental institutionalization than the Green/Growth dimension alone.

institutions. Furthermore, it is obvious that the Green/Growth dimension has strong explanatory power vis-à-vis its Left/Right counterpart.

But can these factors also explain international environmental institutionalization? In the analysis of level data I have at least been able to identify a significant relationship between the degree of domestic and international environmental institutionalization. The results of the analysis of international environmental institutionalization seem not to back up this conclusion. As table 3 outlines, there hardly is a strong relationship. T

Table 3: Explaining International Environmental Institutionalization

	(1) Level	(2) Level FE	(3) Level PE	(4) Level FE & PE	(5) Differences	(6) Differences FE	(7) Differences PE	(8) Differences FE & PE
Δ Treaties$_{t-1}$					-0.123 (0.0770)	-0.124 (0.0766)	-0.0764 (0.0746)	-0.0320 (0.0720)
Treaties$_{t-1}$					-0.960 (1.271)	-1.534 (1.507)	-1.756$^+$ (0.941)	-5.745*** (1.350)
Environmental Institutions$^\&$	0.101** (0.0384)	0.0870* (0.0413)	0.0404$^+$ (0.0238)	0.0116 (0.0225)	-0.0150 (0.0452)	-0.0225 (0.0441)	-0.00820 (0.0306)	-0.0122 (0.0293)
Density	-0.0162 (0.0289)	0.153 (0.228)	-0.0439$^+$ (0.0263)	0.0963 (0.191)	-0.00126 (0.0558)	0.151 (0.697)	-0.0364 (0.0487)	-0.114 (0.651)
Biocapacity$^\&$	0.0344 (0.0373)	-0.387** (0.129)	-0.0443 (0.0325)	-0.168 (0.103)	0.165 (5.036)	0 .	1.189 (4.772)	0 .
Ecological Footprints$^\&$	-0.0501$^+$ (0.0255)	-0.0785** (0.0267)	0.00661 (0.0156)	0.00502 (0.0154)	0.0107 (0.215)	-0.0119 (0.214)	0.0504 (0.149)	0.0198 (0.144)
Service Sector	0.00221$^+$ (0.00118)	0.000318 (0.00111)	0.00203 (0.00137)	0.0000880 (0.00128)	0.00318 (0.00457)	-0.00521 (0.00629)	0.00416 (0.00403)	-0.00543 (0.00661)
Unemployment	0.0215 (0.0308)	-0.00791 (0.0307)	0.0485** (0.0170)	0.0410* (0.0171)	0.0978 (0.0690)	0.0957 (0.121)	0.0598 (0.0398)	0.133$^+$ (0.0716)
GDP^2	0.157*** (0.0470)	0.0651 (0.0524)	0.0956** (0.0334)	0.0473 (0.0338)	0.0223 (0.0758)	-0.0134 (0.143)	0.0305 (0.0649)	0.126 (0.105)
Growth	0.00166 (0.00594)	0.00375 (0.00668)	-0.000957 (0.00492)	0.000828 (0.00486)	-0.0168 (0.0457)	0.00659 (0.0533)	-0.0227 (0.0412)	0.00932 (0.0447)
Energy Industry	0.0265 (0.0384)	0.0818 (0.0548)	0.0314 (0.0435)	0.118* (0.0587)	0.0648 (0.112)	0.143 (0.256)	0.0889 (0.105)	0.568* (0.245)
Energy Import	0.0115 (0.0352)	0.0365 (0.0370)	-0.0747* (0.0340)	-0.106** (0.0338)	-0.0857 (0.0781)	-0.128 (0.133)	-0.0828 (0.0715)	-0.175 (0.116)
Corporatism	-0.00902 (0.0278)	0.318*** (0.0818)	0.0203 (0.0228)	0.00811 (0.0703)	0.0943$^+$ (0.0535)	0.336 (0.244)	0.0677 (0.0440)	0.126 (0.229)
Movements	-0.000667 (0.00998)	-0.000128 (0.0102)	0.00214 (0.00817)	0.00157 (0.00800)	-0.0160 (0.0382)	-0.0304 (0.0428)	-0.0128 (0.0348)	-0.0269 (0.0377)
Left Position$^\&$	0.00962 (0.01000)	0.0104 (0.00972)	0.00699 (0.00720)	0.00744 (0.00652)	-0.000593 (0.0699)	-0.00315 (0.0691)	0.0230 (0.0582)	0.0226 (0.0559)
Left Veto$^\&$	0.00382 (0.0136)	0.00100 (0.0141)	-0.00231 (0.00928)	-0.00353 (0.00903)	0.0221 (0.107)	0.0159 (0.104)	-0.0134 (0.0790)	-0.0253 (0.0747)
Green Position$^\&$	0.0249 (0.0179)	0.0192 (0.0160)	0.0251** (0.00940)	0.0250** (0.00851)	0.229 (0.140)	0.230$^+$ (0.138)	0.203* (0.0796)	0.191* (0.0762)
Green Veto$^\&$	0.0183 (0.0179)	0.0218 (0.0173)	0.0293** (0.0113)	0.0323** (0.0104)	0.0929 (0.150)	0.0962 (0.146)	0.165$^+$ (0.0939)	0.160$^+$ (0.0899)
Openness	-0.0988**	-0.0370	-0.0582*	-0.0175	-0.132*	-0.298	-0.0737$^+$	-0.0353

	(0.0383)	(0.0576)	(0.0242)	(0.0304)	(0.0624)	(0.187)	(0.0444)	(0.105)

EU-Membership	0.0383	0.0173	0.0423*	0.0220	0.0114	0.00995	0.0263	-0.0370
	(0.0244)	(0.0252)	(0.0165)	(0.0157)	(0.0566)	(0.0854)	(0.0417)	(0.0600)
Diffusion$^\&$	0.426***	0.642***	-0.0566	-0.0268	0.197$^+$	0.198$^+$	0.0467	0.0529
	(0.106)	(0.0976)	(0.0661)	(0.0569)	(0.105)	(0.104)	(0.0857)	(0.0825)
Shock	-0.0157	-0.0179	-0.00590	0.0755***	-0.162	-0.151	-0.0821	0.0502
	(0.0190)	(0.0203)	(0.00476)	(0.00795)	(0.146)	(0.148)	(0.0666)	(0.0728)
Trend	0.369**	0.207$^+$	1.142***	1.118***	0.435	0.738$^+$	0.370$^+$	1.286***
	(0.115)	(0.118)	(0.0835)	(0.0675)	(0.305)	(0.406)	(0.216)	(0.328)
Constant	0.168	0.420**	-0.151	0.100	0.0512	0.638	0.139	1.894***
	(0.139)	(0.146)	(0.108)	(0.0994)	(0.326)	(0.435)	(0.361)	(0.536)
N	848	848	848	848	828	828	828	828
R^2	0.806	0.903	0.885	0.947	0.194	0.212	0.541	0.577

Panel Corrected Standard errors in parentheses; $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$; variables with "&" are level in models 1-4 and Δ in model 4-8. FE = fixed effects; PE = period effects.

In level models without FE there is some proof that international environmental institutionalization goes together with the environmental Kuznets Curve and there are also hints stating that high unemployment rates are associated with international environmental institutionalization. There is a positive relationship between international energy dependency and international environmental institutionalization, a negative one between domestic industrial energy consumption. This relationship is in accordance with the hypothesis formulated at the beginning of this paper. Nevertheless, all results turn out to not be very robust.

The variable regarding government position and veto player function even correlates in the "wrong" direction. It seems that governments with fewer green positions are more often prepared to sign international environmental treaties than governments with a green orientation.

One of the most stable results is the negative relationship between economic openness and international environmental institutionalization. This is true for all models without FE. This means that such a relationship seems to work between the countries. If country variance is controlled, the relationship becomes insignificant. In the realm of international environmental institutionalization, diffusion also seems to be at work. However, this relationship is not significant anymore when period effects are controlled. Diffusion is thus time-dependent even though it wasn't possible to specify the time effect.

In order to explain international environmental institutionalization, globalization variables have also been included. According to Meyer et al. (1997) international embeddedness promotes participation in international environmental treaties. This aspect has been measured with political globalization data (Embassies in Country, Membership in International Organizations, and participation in UN Security Council Missions). Even if the sign is positive, the variable would never approach significance. I have also included other variables from the KOF globalization index on economic, social, and political globalization.[20] Significant results for the level of treaties could only be obtained by means of a subset of

[20] The KOF (Konjunkturforschungsstelle (Swiss Economic Institute) at the Eidgenössische Technischen Hochschule Zürich) has developed globalization indices for economic, social, cultural, and political indicators from 1970 to 2005 for more than 120 countries (http://globalization.kof.ethz.ch/ January 18, 2009).

social globalization, namely information flows. If countries have a high information flow (high amount of telephone mainlines, internet hosts and users, cable TV, daily newspapers, and radio), they are more involved in international environmental treaties.[21] However, significant results disappear when period dummies are included.

All in all, the model performs fairly poorly with regard to international environmental institutionalization. The results also contradict earlier studies which postulate that international integration promotes the participation in international environmental treaties. On the contrary, it has been identified that international competition may cause the opposite effect.

Conclusion

Highly industrialized societies have institutionalized a high degree of environmental policy over the last half century. This is true for both domestic environmental institutions and international environmental agreements and treaties. However, environmental institutionalization is clearly divided into a domestic and international realm. Although both areas are linked, different factors explain their implementation. Domestic environmental institutionalization is above all determined by domestic political factors and international factors. This analysis has clearly pointed out a Green/Growth dimension in OECD countries' politics. This dimension has been identified in the position of governments and the mobilization of environmental movements. Another aspect of the Green/Growth dimension also confirms the veto player theory. Given that there is a great veto function in this dimension, institutionalization of environmental policy is effectively obstructed. The main international factor promoting domestic environmental institutionalization is EU-membership. The EU seems to promote the introduction of stricter environmental regulations in its member countries. Finally, there is a large degree of diffusion in the introduction of environmental policies among OECD countries.

In conclusion, the analysis was much less successful in explaining international environmental institutionalization. The most robust results of the analysis clearly contradict the findings of earlier studies in this field. As others have suggested, international integration does not seem to be a driving force for international participation in environmental treaties (Meyer et al. 1997). This is true at least for the OECD-countries which have been analyzed in this study. For both domestic and international environmental institutionalization economic integration seems to support a race to the bottom with regard to environmental regulation.[22] Another finding which is valid for both domestic and international environmental institutionalization is that a great deal of diffusion is at work.

While this paper could answer a great deal of open questions concerning domestic environmental institutionalization, further research is needed in order

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[21] However, information flows and to a lesser degree political globalization does also correlate with the level of domestic environmental institutionalization.
[22] This result is also supported from an analysis of the data of the economic globalization from the KOF data set.

to explain international environmental institutionalization and why some OECD countries participate in international treaties more often than others.

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