

Are you Green yet? – On the Diffusion of Constitutionally Protected Environmental Rights

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Abstract:

Over the last couple of decades, ever more countries have integrated environmental rights into their constitutions. Drawing on different survival analysis techniques, this paper identifies the determinants of the introduction of such rights. It turns out that losses from extreme weather events, the level of democracy, the length of the constitution, legal origins and colonial history are statistically significant predictors of constitutional change. Stated eco-friendly attitudes, the level of income, direct democratic institutions and left-wing governments are not associated with a higher likelihood of introducing constitutional provisions for the protection of the environment. However, we find evidence for a spatial diffusion of constitutional environmental rights among neighboring countries.

Key Terms: Environmental Rights, Constitutional Rights, Endogenous Constitutional Rights.

JEL classification: D02, D23, H41, K11.

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1. Introduction

Over the last couple of decades, ever more countries have incorporated environmental rights into their constitutions. Beginning with Italy in 1948, 141 (74%) of the 190 constitutions in our data set contained an explicit protection of the environment in one form or another as of 2010. Various possible motivations for introducing environmental rights into the constitution come to mind: one would be the simple attempt to appease citizens after environmental catastrophes, another one the increased certainty for future environmental legislation. This paper comes up with many possible explanatory factors and identifies which of them have been decisive for countries that have incorporated environmental rights into their constitution.

Is the entrenchment of environmental rights into nation state constitutions more than just cheap talk? Is it a cheap means of appeasing the population – or does the entrenchment of environmental rights have measurable consequences such as the creation of a ministry of the environment, an increase in the budget allocated to environmental issues or more rigid regulation in favor of the environment? At the end of the day, the entrenchment of environmental rights into constitutions should lead to an improvement in the quality of the environment. In this paper, we do not deal with these questions but confine ourselves to the identification of the most

important determinants leading to the introduction of environmental rights into constitutions.⁴

There is a large variety of techniques by which constitutions protect the environment: some constitutions aim at protecting the environment in its entirety and for its own sake, others aim at protecting specific aspects of the environment and still others put the right of individuals to be protected from environmental harm at center stage – and thus protect the environment only indirectly.

Drawing on a set of survival analysis techniques, we find that per capita income, losses from extreme weather events as a share of GDP, the level of democracy, the length of the constitution, legal origins and colonial history are statistically significant predictors of constitutional change. We also find evidence for a spatial diffusion of constitutional environmental rights among neighboring countries. This paper contributes to the very tiny literature that endogenizes constitutional rules. Various contributions to constitutional political economy have shown that constitutions can have very substantial effects (e.g. Persson and Tabellini 2003). Voigt (2011) surveys the available literature; Hayo and Voigt (2010, 2011) analyze the determinants that lead to changes in the form of government.

The rest of the paper is organized as follows: Section 2 describes the various approaches used to entrench environmental rights into constitutions. In Section 3, a number of factors are discussed that could be determining the inclusion of environmental rights into constitutions. Section 4 presents the data we use and provides a first analysis based on descriptive statistics and non-parametric

⁴ However, these questions are closely connected once the endogeneity in the decision to introduce constitutional environmental protection (CEP) is considered a problem for estimating its effects.

survival analysis. Section 5 is a discussion of the results of both semi-parametric and parametric survival models. Section 6 concludes by pointing to a number of open questions.

2. Approaches to Environmental Rights

The most basic decision that needs to be made with regard to environmental rights is whether the constitution is to assign individuals the right to a sound environment as instrumental for a healthy life or to protect the environment *per se*. The first approach is regularly referred to as *anthropocentric* whereas the second is called *ecocentric*. Furthermore, environmental protection can be designed as an obligation *sui generis* or limited to a responsibility towards future generations, i.e. a particular emanation of the anthropocentric approach. Independent from these conceptual decisions, environmental rights can be protected by various means. The constitution can either focus on the *state* or on the *individual*. In the first case, certain obligations are assigned to the state; in the second, individuals are endowed with certain rights or obligations.

A further aspect of the delineation of environmental rights is the *extent* to which the environment is protected. It can, for example, be protected in its entirety or the protection could be restricted to specific aspects such as mountains, waters, flora or fauna.

Independent from the concrete ways in which environmental rights have been integrated into the constitution, in practice the most important aspect is how these rights are *enforced*. Here, the crucial issue is whether environmental rights are meant to be enforceable at all. In many constitutions, so-called “state goals”

reflect rather broad and long-term goals of a society, but are not intended to be directly enforceable. Given that they are intended to be enforceable, the question is who enjoys standing. This issue is particularly important in case the constitution aims at the protection of the environment per se, as the environment cannot sue.

3. Determinants of Environmental Rights: Some Theory

In this section, we present and briefly discuss a number of factors that could determine the introduction of environmental rights into the constitution. We structure the potential determinants into four groups, beginning with environmental and geographical factors, continuing with economic and preference-related factors and concluding with institutional ones.

3.1 Environmental Factors

Environmental catastrophes make citizens aware of the fragility and scarcity of well-functioning eco-systems and remind them of their value as a basis for human living. This awareness then leads to demands to better protect the environment and prevent similar catastrophes from happening in the future.

We suggest the distinction between two kinds of environmental catastrophes, namely truly exogenous ones on the one hand and man-made ones on the other. Examples of the former include earthquakes, tsunamis, and volcano eruptions, whereas the Bhopal⁵ and Seveso⁶ catastrophes are examples for the latter. We conjecture that man-made catastrophes induce relatively stronger demands to

⁵ India, where a release of various gases from a pesticide plant led to several thousand deaths in 1984.

⁶ Italy, where the inhabitants of a number of small cities were exposed to a poison in 1976.

better protect the environment because their causes can be influenced by policy choices.

Very densely populated areas tend to be detrimental to the conservation of natural habitats. We thus conjecture that a higher share of urban population increases the odds of including environmental rights into the constitution. It is a well-established stylized fact that the quality of institutions increases in the distance from the equator (Hall & Jones 1999). To prevent us from – falsely – attributing the introduction of environmental rights to the quality of a number of institutions, we control for the distance of a country from the equator.

3.2 Economic Factors

We conjecture that a clean and proper environment is a superior good which implies that its constitutional protection should be more likely the higher the respective per capita income. The “environmental Kuznets-curve”, indicating an inverse u-shaped relationship between per capita income and pollution, is well-established in the literature although its empirical validity has been called into question (Stern 2004 for a survey). Taking it into account implies that the probability to find environmental rights protected via the constitution should be higher past a certain per capita income threshold.

A well-functioning eco-system is the crucial precondition for a productive and sustainable agriculture. However, the enhanced protection of the environment comes along with increased production costs at least in the short run. It thus depends on the relative size, market structure and political influence of the agricultural sector whether environmental protection will be promoted.

Ecotourism has been an increasingly important source of income for a number of countries. For it to thrive further, the conservation of the environment is key such that we expect a high share of ecotourism in GDP to lead to a higher likelihood of environmental rights.

The largest share of economically exploitable mineral resources is located in only a few countries worldwide. Especially the population of countries in which oil production makes up a larger share of GDP should *ceteris paribus* exhibit more willingness to trade off damages to the environment as they are associated with higher increases in income.⁷

There are various estimates predicting the costs that different countries will have to bear as a consequence of climate change. If these are expected to make up for a substantial part of GDP, ecological awareness will increase which, in turn, increases the propensity to pass environmental rights.⁸

3.3 Preferences

Governments – no matter whether democratic or not – have an incentive to cater to the preferences of their citizens to enhance the probability to remain in office. If

⁷ An illustrative discussion regarding offshore drilling took place between the Democratic and Republican Party after the Deepwater Horizon oil spill in the Gulf of Mexico in 2010. According to a representative survey by Gallup (2011a), a majority of US Americans still prioritizes the development of energy supplies, even if the environment suffers to some extent.

⁸ However, there might also be a non-linear relationship: If costs induced by climate change are expected to be beyond a certain threshold – and thus appear unbearable – those countries might refrain from pro-environmental policies including the incorporation of environmental rights into their constitutions. This argument has some similarities with the settler mortality idea by Acemoglu et al. (2001). Yet, in previous decades, other kinds of pollutions were perceived as most threatening. In the eighties, there was, e.g., talk of “*le waldsterben*”.

many citizens have strong preferences in favor of protecting the environment, then the entrenchment of environmental rights into the constitution appears more likely.

One specific aspect of individuals' preferences refers to the rate with which they discount the future over the present. A low discount rate indicates that they are almost as concerned with the future as with the present. We hence argue that individuals who have a low discount rate have an implicit preference for the protection of the environment since this can also be interpreted as an investment into the future.

Government policies can be influenced by the preferences of citizens, but they are not entirely determined by them. The ideological position of governments could, hence, be an additional factor. Usually, ideological positions are expressed on a uni-dimensional policy space between left and right. Ex ante, it is, however, uncertain whether left-of-center or right-of-center governments are more likely to introduce environmental constitutional rights. If environmental protection serves primarily the wellbeing of citizens and individuals with higher incomes have the ability to protect themselves privately from the effects of environmental pollution, then left-wing governments might be more in favor of providing this public good. We do, however, expect that "green" parties are strongly in favor of the introduction of such rights. We therefore check whether such a right is more likely to be introduced when they have more influence in parliament.⁹

⁹ Furthermore, it could be argued that the presence of a green party in parliament gives all other parties additional incentive to introduce environmental rights because this could stop the increase in its vote-share.

3.4 Institutional Factors

In countries that have their legal origin in the common law, judges are regularly assumed to have more discretionary leeway at their disposal than their colleagues from civil law countries. Given that environmental rights might be subject to court cases, this implies that politicians' risk to be corrected by judges is higher under common than under civil law. We thus conjecture that countries with a common law legal origin are less likely to adopt environmental rights than countries with a civil law legal origin because politicians do not appreciate to be corrected by judges.

In this paper, we are only interested in environmental rights entrenched in the constitution. The more difficult it is to explicitly change the constitution, the less likely it is to find the environment protected on the constitutional level.

In some countries, constitutional change can also be initiated by citizens' initiatives. Assuming that citizens care for the environment and politicians dislike their policies to be subject to initiatives, this institutional setting can be an additional factor leading to the protection of environmental rights in constitutions.

Above, we referred to environmental preferences expressed via opinion surveys. Expressing one's preferences in such surveys is, however, without any cost and is not necessarily connected with eco-friendly behavior. Membership in NGOs striving for the protection or the improvement of the environment is usually connected with costs, either in terms of money or time. We believe that the share of the population that is a member of such NGOs is a good indicator for the relevance of environmental topics at large. Politicians interested in being re-

elected have an incentive to take this into account. We thus conjecture that the higher the share of citizens that are members in such NGOs, the higher the likelihood that environmental rights will be protected via the constitution (e.g. membership in the World Wide Fund for Nature or Greenpeace).

The last two arguments imply that politicians have incentives to cater to citizens' preferences. This is, however, not everywhere the case to the same degree. We suspect that it depends on the degree of democracy realized.

Regarding institutional factors, the last factor to be taken into account is whether the country has passed any major constitutional revisions. Given that major revisions have been passed it seems significantly more likely that environmental rights were included as a component of such changes.

In addition, we control for the length of constitutions. Longer constitutions simply have a higher probability of including environmental rights. The length of constitutions has also been used as an indicator of societal trust.

3.5 Dynamic Aspects

It would be overly simplistic to assume that countries take the decision on how to design a new constitution or whether to amend their old one in isolation. Elkins and Simmons (2004, 2005) distinguish between two types of diffusion processes. In one, a country's adoption of a policy or institution increases the payoffs of other countries from adopting the same practice. Thus countries' interdependent actions are simply adoptions to altered conditions. A second type of diffusion mechanism does not affect the payoffs from adopting a policy or institution, but it

allows for learning about these payoffs from the actions of others and their consequences. As one country's choice of constitutional environmental protection (CEP) does not imply obvious changes to other countries' payoffs from protecting the environment, except maybe in case of some global common pool resources, we expect only policy diffusion through learning to be relevant for our analysis. It might be one reason why, starting with Italy in 1948, the number of countries with constitutionally safeguarded environmental protection has been steadily increasing. Simmons and Elkins further differentiate learning only from available information, learning from specific reference groups and simple cascading behavior where decision-makers save on information costs and follow some early adopters. Here we conjecture that voters and politicians are more likely to support CEP when a larger share of neighboring countries has already implemented such rules and thus provides respective information for both voters and politicians. Alternatively, political choices could be more dependent on the experiences and practices of very similar countries or a group of countries that are considered to be role models with respect to successful institution making.

4. Data and Estimation Approach

4.1 The Dependent Variable

The Comparative Constitutions Project (Elkins et al. 2009) is an attempt to code all known written constitutions since 1789 using 669 different variables on an annual basis. The Project contains three variables that are directly relevant for this paper. The most straightforward variable (ENV) simply takes into consideration whether the constitution refers to the protection of the environment and it is coded as a dummy variable. We do not consider the exclusive protection of natural parks

or other tourist sights as equivalent to a more general protection of the environment and such protection is hence not coded as the constitutional protection of the environment by us. We cross-check this variable using information by Boyd (2010) and recode by hand where our sources provide contradictory interpretations.

Given that the environment is constitutionally protected, it is asked *how* this is to be done (ENVREF). Four options are distinguished, namely whether it is (1) a duty of the state to protect, (2) a duty of the people to protect, (3) a right of the people to enjoy or (4) a general reference to the protection of the environment is being made. Analysis of this variable allows inferences on the underlying constitutional culture. Again, Boyd (2010) provides a source for comparison.

Given that the environment is constitutionally protected, it is further recognized what specific parts of the environment the constitution refers to (ENVPART). All in all, ten different parts are explicitly taken into consideration ranging from undeveloped land via forests and waters to fauna and flora.

A further interesting research question is under which conditions substantive rights are more likely to be complemented by procedural rights for CEP, like a right to information, political participation or access to the judicial system (PR).¹⁰

We code our dependent variables on a yearly basis from 1946 or the subsequent year at which the country became independent until 2010.

¹⁰ Surprisingly, Austria is the only country that offers its citizens procedural, but no substantive environmental right in its constitution (Boyd 2010:105).

4.2 Independent Variables

We use a one year lagged spatial effect of ENV, which is calculated following Neumayer and Plümper (2010a, 2010b), to control for the diffusion of CEP via contiguous countries. Contiguous countries might provide most of the available information on successful policies that have been implemented in a similar environment. Alternatively, we will employ weighting matrices for reference groups based on similar voting behavior at the UN and civilization dummies (see Cho et al. 2011). Countries with a higher cultural proximity might be a more appropriate reference group to evaluate policy options. The other independent variables will be presented in roughly the same order in which the underlying conjectures have been presented in Section 3, i.e. we start by presenting some geographical and environmental variables.

The Global Climate Risk Index (2011) includes data on weather-related loss events such as storms, floods, heat waves etc. as a percentage of GDP. It is available as an average for the period between 1990 and 2009. Information on a country's distance from the equator is from La Porta et al. (1999) and the CIA World Factbook (2011). We control for politico-geographic differences between countries using the regional classification by Hadenius and Teorell (2005), but we combine the different Asian regions in one category.

The second group of variables refers to economic factors. Data on real per capita income is from the Penn World Tables 7.0 (Heston et al. 2011) and we use its logarithm. The relevance of agriculture is proxied for by its share in GDP. Data is from the World Development Indicators of the World Bank (2011). The World Development Indicators also provide data on the share of urban population. Data

on the world market value of oil production has been provided by Ross (2011). We calculate its share in GDP using information from the Penn World Tables.

The third group of variables refers to preferences regarding the environment. One way of identifying differences in preferences across countries is to rely on the World Value Surveys which have been conducted in various waves beginning in 1981. We are, in particular, interested in environmentally-friendly behavior as that would be more indicative than simple environmentally-friendly statements which can be uttered without costs. To ensure a fairly wide coverage of countries and balance out measurement errors we construct an overall indicator based on eight single variables. The respective questions are listed in Table 3 in the appendix. We code the share of positive answers in total answers for these variables as a value between 0 and 1. To get a composite indicator of environmental preferences, we add up these eight variables and divide by the number of available variables for each country. Alternatively, Gallup (2011) provides surveys on the appreciation of the environment for larger samples of countries than the World Value Surveys.

The ideological orientation of the government was taken into account on the basis of the party of the chief executive as provided by the Database of Political Institutions (Beck et al. 2000). We use a dummy for having a left-wing chief of the executive. To control for the influence of “green parties” for constitutional change, we control for the share of seats such parties hold in parliament. Data are from Armingeon et al. (2010).

We move to the last group of independent variables, namely institutional ones. Among the institutional ones, there are quite a few that can be considered as

“quasi exogenous” as they have often been determined centuries ago. For ascertaining the relevance of legal origins, we rely on data provided by La Porta et al. (1999). These data are to capture long-established traits of the judicial system. To distinguish between legal systems and other forms of colonial heritage, we also control for colonial history based on Hadenius and Teorell (2005). To control for further cultural influences, we take into account the shares of Catholics, Muslims and Protestants in the population, as reported by La Porta et al. (1999) and alternatively by Barrett et al. (2001).

Direct democratic institutions can have many forms: initiatives, referendums and plebiscites are only three possible ones. Blume et al. (2009) show that the effects of these institutions vastly differ among each other. We draw on a dummy variable that is coded 1 if the possibility of an initiative exists, by which the citizens can get CEP on the legislative agenda.

We further conjecture that the realized degree of democracy could have an effect on the likelihood to add environmental rights to the constitution. To proxy for the realized degree of democracy, we rely on the Polity IV dataset provided by Marshall and Jaggers (2002) and more specifically, on their polity2 variable which scores a complete autocracy with -10 and a perfect democracy with 10.

Constitutions vary to an amazing degree in their length. India’s constitution, e.g., is almost twenty times the length of Tunisia’s (Voigt 2009). It is straightforward to assume that the verbosity of the constitution writers could impact upon the likelihood of finding environmental rights included in the constitution. This is why we control for the length of constitutions in words in logarithmic form. The variable is taken from Voigt (2009).

A variable measuring how hard is to change the constitution comes from La Porta et al. (2004). And a measure of major constitutional changes from Banks (2011).

Table 1 provides the summary statistics of the variables in our data set.

Table 1: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Spatial_Lag	4949	.350156	.3683669	0	1
Eastern_Eu~e	4949	.0878965	.283173	0	1
Latin_Amer~a	4949	.1842797	.3877513	0	1
MENA	4949	.0901192	.2863814	0	1
SSA	4949	.3006668	.4585943	0	1
WEurope_an~A	4949	.1725601	.3779047	0	1
East_Asia	4949	.0290968	.1680948	0	1
South_East~a	4949	.059608	.2367831	0	1
South_Asia	4949	.0434431	.203873	0	1
Spanish_col	4949	.1648818	.3711113	0	1
British_col	4949	.2248939	.4175546	0	1
French_col	4949	.1957971	.3968532	0	1
Common_law	4949	.2701556	.4440849	0	1
French_lo	4949	.5346535	.4988481	0	1
Germ_Scand~o	4949	.0852698	.2793109	0	1
Latitude	4949	.2738618	.1921455	0	.7111111
Oil	4949	1.88e+11	1.84e+12	0	5.13e+13
Ln_GDP	4949	8.195218	1.237816	4.764114	10.8388
Climate_Risk	4949	.2795534	.47451	0	3.12
Ln_Con_Len~h	4949	9.73843	.6894802	8.27919	11.26773
Dir_Democ	4949	.2893514	.4535071	0	1
Democ_Level	4949	1.275005	7.354692	-10	10
Ethnic_Frac	4949	.4524223	.2676207	.001998	.930175
Urban_Pop	4949	45.74234	23.28475	2.12	100
Catholics	4949	36.44641	37.1514	0	96.9
Muslims	4949	20.39959	32.65322	0	99.4
Protestants	4949	12.68462	21.02153	0	97.8
Left_wing	2310	.0982684	.2977417	0	1
Green_Party	975	1.354441	2.69115	0	14.4
Preferences	2123	.3541699	.1913765	.1381594	.8437776
Rigidity	1678	2.565554	.6786149	1	4
Major_Change	3123	.0621198	.2440508	0	2

4.3 Descriptive Statistics and Non-parametric Analysis

Our data set covers 190 countries of which 155 had not implemented environmental protection in their constitution in their year of independence. Of these 155 countries on which our survival analysis can be based, 106 (68%) have introduced environmental rights into their constitution by 2010. Missing information on independent variables, however, leads to a further reduction in sample size. Figure 1a shows the non-parametric Kaplan-Meier estimates of the likelihood of a country to remain without constitutional protection of the environment, including a 95% confidence interval. Over the first 25 years the estimated survival curve is almost flat, falling by not even 6%. Afterwards, fairly steady constitutional change can be observed. The unconditional probability of a country remaining without environmental protection falls to 50% after 49 years

and reaches 30% after the total 65 years. We can use this non-parametric technique to compare the estimated survival probability for countries of different legal (Figure 1b) or colonial origin (1c). While common law countries and former British colonies are particularly hesitant to introduce CEP, French and Spanish colonies and countries with French or Socialist legal origin are more likely to do so. Log-rank tests confirm that these differences are highly statistically significant. Although the non-parametric results provide a first impression of potential relationships underlying our data, it has to be kept in mind that they are not conditioned on covariates.

4.4 Semi-parametric Analysis

In the following, we analyze the influence of several covariates on the expected length of time before a country introduces constitutionally safeguarded environmental protection. In other words, we are interested in the effect of specific exogenous country characteristics on countries' likelihood of "failure" in the sense that they include a provision for environmental protection in an amendment or a new constitution. For the estimation of these effects, we first use a semi-parametric proportional hazard model by Cox (1972) that does not depend on the assumption of a particular parametric form of the baseline hazard rate. The hazard rate of a country i that is still at risk of failure (defined here as the introduction of CEP) at time t is given by

$$h_{it} = h_{0t} \cdot \exp \left(\beta_1 x_{1it} + \beta_2 x_{2it} + \dots + \beta_m x_{mit} + \beta_n \sum_k \omega_{ik} \cdot y_{k,t-1} \right),$$

where h_{0t} is a baseline hazard function, β_j denotes a regression parameter and x_{jit} is a potentially time-varying country-characteristic that could be expected to affect

the duration of time before this country fails. The spatial lag is modeled by $\sum_k \omega_{ik} y_{k,t-1}$, where ω_{ik} is a spatial weighting matrix for the relative connectivity between countries i and k and $y_{k,t-1}$ is the value of the dependent variable in other countries in the previous period. The role of the covariates is determined by the estimated hazard ratios (which equal the exponential of the coefficients β_j) being significantly larger or smaller than one, which indicates an increase or decrease respectively in the hazard of failure due to an increase in that covariate. We test the critical proportional hazard assumption of the Cox model with the help of Schoenfeld residuals and fail to reject the assumption of a zero slope at the 5% significance level both for the whole model and the single covariates. The estimation results for our baseline model are reported in Table 2.

Table 2: Cox regression estimation results

Cox regression -- exact partial likelihood						
No. of subjects =	102				Number of obs =	3147
No. of failures =	79					
Time at risk =	3147					
Log likelihood =	-224.58589				LR chi2(24) =	84.65
					Prob > chi2 =	0.0000

_t	Haz. Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
Spatial_Lag	3.41752	2.057065	2.04	0.041	1.050408 11.11896
Eastern_Eu~e	43.76018	85.10979	1.94	0.052	.9673093 1979.67
Latin_Amer~a	2.500317	3.598878	0.64	0.524	.1488684 41.99404
MENA	7.839133	11.09566	1.45	0.146	.4891716 125.6246
SSA	4.047685	5.342514	1.06	0.289	.3045869 53.79008
WEurope_an~A	7.731005	11.05212	1.43	0.153	.4692145 127.3798
Asia	6.282486	8.253872	1.40	0.162	.4784437 82.49587
Spanish_col	.9035975	.8179296	-0.11	0.911	.1532759 5.326921
British_col	.8433079	.7530602	-0.19	0.849	.1465133 4.85395
French_col	3.084218	1.521327	2.28	0.022	1.172951 8.109805
Common_law	.1692712	.2229458	-1.35	0.177	.0128077 2.237143
French_lo	3.193977	3.894894	0.95	0.341	.2926404 34.86015
Germ_Scand~o	1.647137	2.239822	0.37	0.714	.1146154 23.67101
Latitude	5.686917	10.20608	0.97	0.333	.1687565 191.6431
Oil	1	6.61e-14	1.91	0.056	1 1
Ln_GDP	.9547962	.2881356	-0.15	0.878	.528491 1.724979
Climate_Risk	3.044725	1.794651	1.89	0.059	.9590134 9.666549
Ln_Con_Len~h	5.711512	2.183424	4.56	0.000	2.699913 12.08238
Dir_Democ	1.42759	.5078481	1.00	0.317	.7108841 2.866872
Democ_Level	1.06668	.0276926	2.49	0.013	1.013761 1.122361
Ethnic_Frac	2.119105	1.635751	0.97	0.331	.466772 9.620559
Urban_Pop	.9855785	.0135009	-1.06	0.289	.9594693 1.012398
Catholics	.9898802	.0080415	-1.25	0.211	.974244 1.005767
Muslims	.9837811	.0075594	-2.13	0.033	.9690759 .9987094
Protestants	.9896667	.0101911	-1.01	0.313	.9698928 1.009844

We find that there is a significant and positive spillover effect from countries with constitutional provisions for environmental protection to their neighbors. Former French colonies and countries in Eastern Europe are more likely to change their constitution, whereas the expected negative effect of Common law is not statistically significant. Overall institutional quality, proxied by the distance from the equator, per capita income, the share of urban population and ethnic fractionalization are not related to significantly more or less CEP. However, countries that suffer more from extreme weather events, that have a longer constitution or that are more democratic are as expected more likely to protect their environment. In contrast to our expectation, countries with a high share of GDP generated through the production of oil are more likely to protect their environment. Among the large monotheistic religions only Islam exhibits a significant negative relationship with CEP. Figure 2 provides the cumulative hazard function conditional on the covariate vector based on Cox-Snell residuals. As it closely follows the 45° line except for high values of time, our model fits the data very well. When included in the baseline model one at a time, having a left-wing chief executive or a stated eco-friendly attitude and having a constitution that is more difficult to change are not related to environmental constitutional provisions.¹¹ Interestingly, a high share of agriculture in GDP is related to a statistically significantly lower likelihood of constitutional change regarding environmental protection.¹² It is not surprising that the introduction of CEP is strongly related to major constitutional changes.

¹¹ The vote share of green parties reduces the sample such that the ML estimation does not converge.

¹² Result based on a sample size of 90 countries and 2403 observations, p-value: 0.014.

4.5 Parametric Analysis

As an alternative to the semi-parametric estimation approach used so far, we could also use a parametric survival analysis model, if we are willing to assume a particular shape of the hazard rate. Where a suitable distribution is assumed, the parametric model is more informative than the Cox model, it allows for the prediction of survival times and it is more efficient. For our current configuration of the baseline model, it turns out that most parametric models do not converge in the maximum likelihood estimation.

As we are in a discrete time setting, we can also use a probit model that corrects for or models temporal dependence. We estimate a probit model in which we cluster observations in countries and include three equally-spaced cubic splines (see Beck et al. 1998). An F-test confirms that the splines are jointly significant. We find support for our basic results from the semi-parametric Cox model. While the effect of a French colonial history is not robust to changes in the estimation, we now find evidence for the expected negative effect of Common law. Including the share of agriculture in GDP yields again a significant negative coefficient.

Table 2: Probit regression with cubic splines estimation results

Probit regression	Number of obs	=	3154
	Wald chi2(28)	=	.
	Prob > chi2	=	.
Log pseudolikelihood = -301.02659	Pseudo R2	=	0.2006

(Std. Err. adjusted for 103 clusters in ccode)

env	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
Spatial_Lag	.5450586	.2455485	2.22	0.026	.0637923	1.026325
Eastern_Eu~e	1.035559	.8743923	1.18	0.236	-.6782186	2.749336
Latin_Amer~a	-.1084646	.7147106	-0.15	0.879	-1.509272	1.292342
MENA	.4626075	.7551385	0.61	0.540	-1.017437	1.942652
SSA	.5900337	.7431393	0.79	0.427	-.8664926	2.04656
WEurope_an~A	.3752376	.714587	0.53	0.600	-1.025327	1.775802
Asia	.2665879	.7388173	0.36	0.718	-1.181467	1.714643
Spanish_col	-.0059135	.2288033	-0.03	0.979	-.4543597	.4425327
British_col	-.0690009	.2991617	-0.23	0.818	-.6553471	.5173454
French_col	.3450598	.2281465	1.51	0.130	-.1020992	.7922188
Common_law	-1.05728	.420592	-2.51	0.012	-1.881625	-.232935
French_lo	.0729561	.3999601	0.18	0.855	-.7109514	.8568635
Germ_Scand~o	-.0641228	.4737278	-0.14	0.892	-.9926122	.8643666
Latitude	.7789108	.6568115	1.19	0.236	-.508416	2.066238
Oil	3.85e-14	1.34e-14	2.87	0.004	1.22e-14	6.48e-14
Ln_GDP	-.1252088	.1280121	-0.98	0.328	-.3761079	.1256902
Climate_Risk	.6123869	.2263607	2.71	0.007	.168728	1.056046
Ln_Con_Len~h	.6598795	.1530929	4.31	0.000	.3598229	.9599361
Dir_Democ	.0971807	.164682	0.59	0.555	-.22559	.4199514
Democ_Level	.0310269	.012296	2.52	0.012	.0069272	.0551265
Ethnic_Frac	.3786085	.3379295	1.12	0.263	-.2837211	1.040938
Urban_Pop	-.0008403	.0056035	-0.15	0.881	-.0118229	.0101423
Catholics	-.0044256	.0035974	-1.23	0.219	-.0114764	.0026251
Muslims	-.0061007	.0031415	-1.94	0.052	-.0122578	.0000565
Protestants	-.0059794	.0046207	-1.29	0.196	-.0150357	.003077
duration3	-.1164401	.0473213	-2.46	0.014	-.209188	-.0236921
_spline1	-.0000138	.0000173	-0.79	0.427	-.0000477	.0000202
_spline2	-.0005296	.0001967	-2.69	0.007	-.0009151	-.000144
_spline3	.0002863	.0001313	2.18	0.029	.000029	.0005437
_cons	-7.932329	2.27602	-3.49	0.000	-12.39325	-3.471412

5. Discussion of the results

As already indicated by the non-parametric Kaplan-Meier survival curves, we find that having a French colonial history increases while having a Common law legal system decreases the likelihood of a country to introduce any form of CEP. However, both results are not robust to changes in the estimation procedure. Further, having a longer constitutional document or being affected by large losses due to extreme weather events substantially increases the probability that environmental protection will be incorporated. A higher level of democracy is associated with a higher likelihood of safeguarding environmental protection

constitutionally. Having a higher share of Muslims in the population decreases the likelihood that a country introduces environmental protection in its constitution. Finally, we find that the introduction of CEP has a significant positive effect on neighboring countries' likelihood to introduce CEP themselves.

Although the UK is one of the few countries without a written constitution, it is conspicuous that aside from two Scandinavian countries, Liechtenstein and Monaco, all "Western" states without CEP have been strongly affected by British (legal) culture. One possible explanation for this observation might be a stronger reliance on private litigation and a reduced role of statutory frameworks in the Common law system. The positive effect of democratic institutions might be an indication of support for environmental protection among voters. A reduced likelihood of countries with a high share of agriculture to implement environmental protection might not be intuitive. However, it is plausible that agricultural lobby groups have no interest in reducing farmland for the preservation of biodiversity or in stopping deforestation which serves the development of new farmland. Environmental protection that preserves the basis for agricultural productivity in the long run might be associated with substantial short run costs that provoke resistance from members of the agricultural sector. Unsurprisingly, countries that lose a higher share of their GDP due to extreme weather events appear to be more willing to pay the price of enhanced environmental protection, as their expected marginal benefits should be higher and they should be more sensitive to changes in the state of the environment. Finally, a longer constitution is a strong indicator of low levels of trust in society (Voigt and Bjørnskov 2011). Again, politicians in these societies might be more

dependent on an explicit commitment to environmental protection in the constitution.

Probably as interesting as the variables that were found to be relevant are those which turned out to have no statistically significant effect. The effect of geographical differences between countries appears to be negligible, although one might expect them to be somewhat related to the need for and consequently the public demand for environmental protection. Also, previous research on endogenous constitutions found geographical factors to be highly relevant for the choice of a country's form of government (Hayo and Voigt 2010). Distance from the equator is far from conventional significance and even regional effects are only somewhat significant. Income, it seems, is not particularly relevant for the decision to implement CEP. Both left-wing governments and countries with stronger stated preferences for environmental protection are not more likely to introduce respective constitutional provisions. Although we cannot exclude that these results are affected by small sample size, they seem to indicate a gap between rhetoric and action when political action could imply high costs in the short run. Finally, we find no effect of direct democratic institutions after controlling for the level of democracy, maybe indicating that normal democratic institutions are sufficient to align the preferences of the median voter regarding environmental protection with the decisions of politicians. However, the promise of environmental protection in the constitution does not guarantee that political actions will follow. An independent judiciary might be necessary to make these promises credible (see e.g. Voigt and Gutmann 2011).

In further regressions, we will replace our dependent variable with a number of more fine-grained measures of how the environment is protected in the constitution and which parts of the environment fall explicitly under this protection. We also include a few so far neglected independent variables and perform sensitivity analyses for some of our results.

6. Conclusions and Outlook

This paper tries to identify the determinants that lead countries to include environmental protection into their constitutions. Drawing on a Cox proportional hazard model and a probit model with cubic splines, we find that losses from extreme weather events, the level of democracy, the length of the constitution and maybe legal origins and colonial history are relevant predictors of constitutional change regarding the protection of the environment. We find support for the hypothesis that voters and politicians are more likely to support CEP when a larger share of neighboring countries has already implemented such rules.

The inclusion of environmental rights into a country's constitution is not equivalent with an improved protection of the environment or even with an improved quality of the environment. Therefore, we propose to test whether the inclusion of environmental rights is connected with some policy variables (such as the creation of a ministry of the environment, the adoption of environmental legislation and a higher budget share for environmental tasks) or even with outcome variables (such as environmental quality). Establishing causality in the latter dimension is, however, no mean feat.

A more specific question is whether the inclusion of environmental rights in domestic constitutions is systematically correlated with the ratification of international conventions on the environment such as the United Nations Framework Convention on Climate change (UNFCCC) or the Convention on Biological Diversity (CBD).

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Appendix

Table 4: World Value Survey Questions

Code	Question
A103	Now I am going to read out a list of voluntary organizations; for each one, could you tell me whether you are a member, an active member, an inactive member or not a member of that type of organization? – Environmental organization.
B001	I am now going to read out some statements about the environment. For each one read out, can you tell me whether you agree strongly, agree, disagree or strongly disagree? (Read out each

	statement and code an answer for each) – Would give part of my income for the environment.
E238	In 2000, leaders representing almost all the world’s countries agreed to carry out a number of programs to improve the lives of the peoples of low-income countries. These programs are known as the Millennium Development Goals. I’m going to read out some of the problems that these programs involve. I would like you to indicate which of these problems you consider most serious. Which of the following problems do you consider the most serious one for the world as a whole? (Read out and code one answer under “most serious for the world”) – Environmental pollution.
E239	In 2000, leaders representing almost all the world’s countries agreed to carry out a number of programs to improve the lives of the peoples of low-income countries. These programs are known as the Millennium Development Goals. I’m going to read out some of the problems that these programs involve. I would like you to indicate which of these problems you consider the second most serious problem for the world as a whole? (Code one answer under “next most serious for the world”) – Environmental pollution.
E240	In 2000, leaders representing almost all the world’s countries agreed to carry out a number of programs to improve the lives of the peoples of low-income countries. These programs are known as the Millennium Development Goals. I’m going to read out some of the problems that these programs involve. I would like you to indicate which of these problems do you consider the most serious one in your own country? (Code one answer under “most serious for own country”) – Environmental pollution.
E241	In 2000, leaders representing almost all the world’s countries agreed to carry out a number of programs to improve the lives of the peoples of low-income countries. These programs are known as the Millennium Development Goals. I’m going to read out some of the problems that these programs involve. I would like you to indicate which is the next most serious for your own country? (Code one answer under “next most serious for own country”) – Environmental pollution.
B014	Which, if any, of these things have you done in the last 12 months, out of concern for the environment? (Have you decided for environmental reasons to reuse or recycle something rather than throw it away?) – Have you attended a meeting or signed a letter or petition aimed at protecting the environment?
B015	Which, if any, of these things have you done in the last 12 months, out of concern for the environment? (Have you decided for environmental reasons to reuse or recycle something rather than throw it away?) – Have you contributed to an environmental organization?

Figure 1a: Non-parametric KM survival estimate for 190 countries

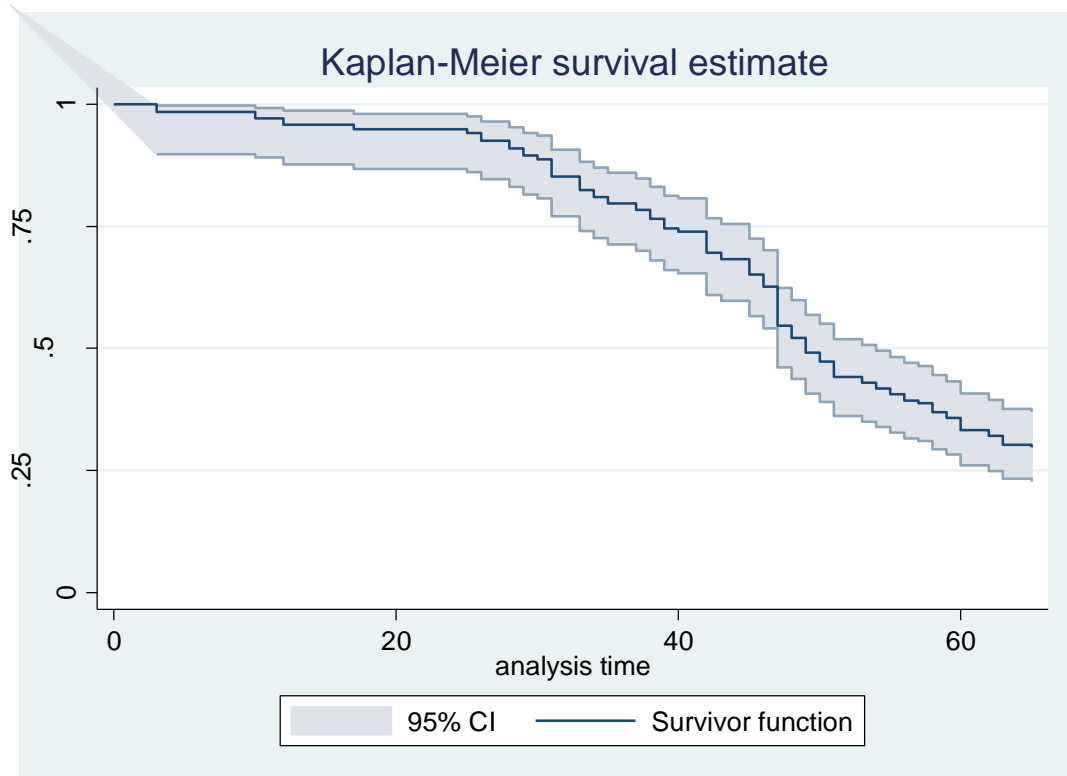


Figure 1b: Non-parametric KM survival estimate for different legal origins

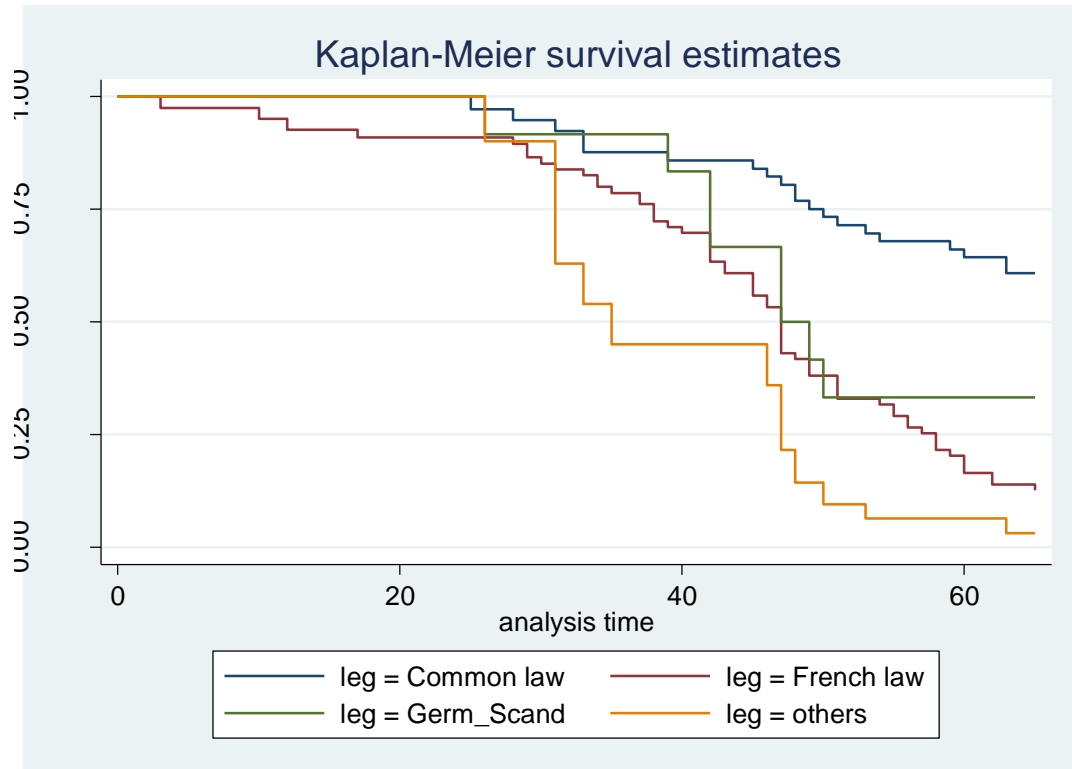


Figure 1c: Non-parametric KM survival estimate for different colonial histories

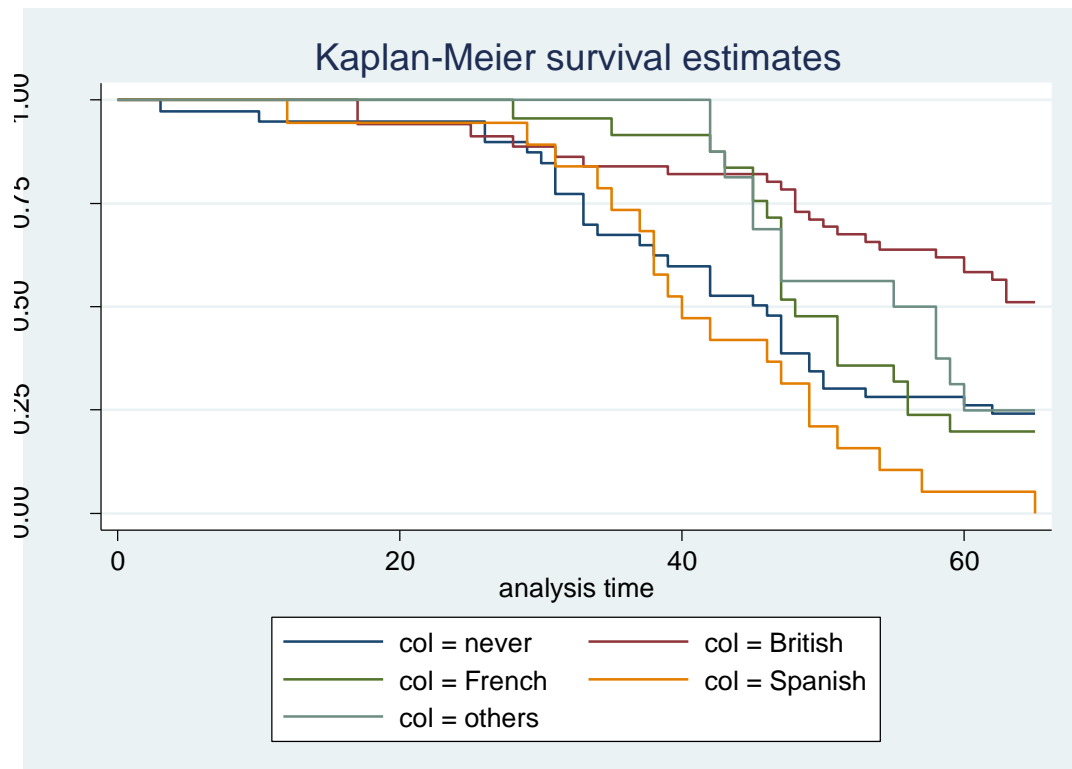


Figure 2: Measure of model fit based on Cox Snell residuals

