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The Economics of Green Constitutions

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Abstract: Over the last decades, more and more countries have integrated environmental protection into their constitution. In this article, we argue that a simple economic model can explain why some countries have adopted the legal innovation of constitutional environmental protection, while others have not. Environmental protection can be thought of as an investment that only pays off over the long term, and may even imply intergenerational redistribution to the advantage of future generations. Moreover, the adoption of constitutional environmental protection leads to the provision of public goods, which redistributes resources among all members of a society. Taken together, these arguments imply that democratic states with a culture that favors future-oriented behavior are more likely to entrench environmental protection in their constitution. We study the adoption of constitutional environmental protection in a panel dataset for 122 countries using semi-parametric survival analysis techniques. Our results suggest that future-oriented preferences are a robust determinant of a country's propensity to adopt a green constitution. Political institutions are less important and do not exert a statistically significant effect.

Keywords: democracy; endogenous constitutional rights; environmental protection; future orientation; long-term orientation.

JEL classification: D02; D23; H41; K11.

1 Introduction

Over the last decades, more and more countries have incorporated environmental protection into their constitutions. Beginning with Venezuela in 1947, 148 countries have entrenched the protection of the environment explicitly in their constitution. Various motives for introducing environmental protection come to mind. One motive might be the simple attempt to appease citizens after environmen-

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tal catastrophes. Another might be the creation of a legal basis and structure for future environmental legislation, decreasing uncertainty about the behavior of the state. This paper concentrates on two factors that may have a strong influence on the entrenchment of environmental protection in a country's constitution. The first factor is whether or not the country is democratic (i.e. whether politicians are incentivized to provide redistributive environmental public goods). The second factor is the degree to which the society's time preferences are future oriented (i.e. its discount rate is low).

In recent years, research regarding the environmental commitment of states has focused primarily on the international level, that is, on the adoption of global environmental agreements as an instrument of states to commit themselves to environmental policy actions and goals (Young 1994; von Stein 2008; Perrin and Bernauer 2010; Roberts, Parks, and Vásquez 2004; Fredriksson and Gaston 2000). There is less research analyzing domestic measures to protect the environment. Here, we focus on domestic measures, specifically the adoption of constitutional rules aiming to protect the environment. We choose constitutional provisions because they typically have more proximate consequences than international treaties.

In recent years, constitutional environmental protection (CEP) has received increasing attention in the empirical legal literature. Boyd (2012a) describes the breadth of the global trend towards CEP, and analyzes the situation in Canada (Boyd 2012b). May (2006) reviews fundamental environmental rights worldwide, including the pros and cons of their introduction (see also Hayward 2005). May and Daly (2013, 2015) describe different substantive and procedural constitutional environmental rights.¹ Bruch, Coker, and VanArsdale (2001) study the emergence of CEPs in Africa.

Only a handful of studies have analyzed the determinants of the introduction of CEP quantitatively. Gellers (2012), for example, analyzes pairs of regions and tests whether countries are *per se* more likely to adopt CEP if they are part of a particular region or if it is decisive whether a high share of countries in that region have already adopted CEP. The empirical set-up of his study is, however, very basic and allows only for a comparison of some regional trends. Gellers (2015) is a more sophisticated empirical analysis, which tests six alternative hypotheses regarding the determinants of CEP adoption. The results suggest that pressure from civil society and the quality of political institutions are important predictors of the introduction of CEP.

¹ A third category, called solidarity rights, appears so far only in academic debates (see Gellers 2012).

This paper aims at contributing to the literature on the domestic commitment of states to environmental protection. It provides insights into the determinants of introducing CEP with a focus on two domestic factors.² Drawing on a survival analysis of an unbalanced panel dataset covering 122 countries over the period from 1960 to 2014, we find that future-oriented preferences are a robust determinant of a country's propensity to adopt CEP. Political institutions favorable to redistribution are less important and do not exert a statistically significant effect.

In Section 2 we describe the different approaches used to entrench environmental protection into constitutions. Section 3 presents the two domestic factors redistribution and future-oriented time preferences as potential determinants for the inclusion of CEP. Section 4 presents the data and the estimation approach. Section 5 is a discussion of the results. Section 6 concludes by pointing to a number of open questions.

2 Approaches to Environmental Protection in Constitutions

The process of introducing environmental protection on the constitutional level starts with two conceptual decisions that have to be made up-front. The first decision is whether the constitution assigns individuals the right to a sound environment as instrumental for a healthy life, or whether it protects the environment *per se*. The first approach found its way into constitutions starting in the 1970s and is referred to as anthropocentric, the second approach is called ecocentric.³ The second important decision concerns the extent to which the environment is legally protected. It can be protected in its entirety, or the protection might be restricted to or emphasized for specific elements of the environment, such as mountains, waters, flora or fauna.

After these decisions are taken, the constitutional clause can focus either on the individual or on the state. In the first case, private individuals are endowed with rights or obligations. In the second case, "statements of public policy" are introduced. They comprise directives, guidelines, and objective

² We also contribute to the limited literature on endogenous constitutional rules. Voigt (2011) surveys this literature. Various contributions to constitutional political economy more generally have shown that constitutions have substantial effects (see, e.g. Persson and Tabellini 2003).

³ This ethically contentious decision becomes less important as soon as one realizes that even from an anthropocentric point of view environmental protection needs to be comprehensive, since the future needs of humankind are unknown today.

state goals (Brandl and Bungert 1992, p. 16). Statements of public policy reflect rather broad and long-term goals of a society and serve as rules for the three branches of government, but generally need to be implemented first by the legislature.

The main (and most important) difference between the two designs is their enforceability. Whereas individual environmental rights are directly enforceable (i.e. people have a right to sue), statements of public policy are not. However, the latter can make the enforcement of already existing environmental law more likely because constitutionally entrenched state goals cannot be ignored completely by the three branches of government. The crucial question here is who enjoys standing to bring a lawsuit (Brandl and Bungert 1992, p. 19). This issue is particularly important if the constitution aims at protecting the environment *per se*.

3 An Economic-Theory of Constitutional Environmental Protection

In this section we outline a general theory about why countries introduce environmental protection. We argue that their propensity to do so is shaped primarily by two factors. First, more future-oriented time preferences make the introduction more likely, because improvements in environmental quality take time, whereas costs of environmental policies accrue immediately. Second, political institutions that make redistribution via the provision of public goods more attractive for politicians also make the provision of environmental public goods more likely. In a sense, the first factor is concerned with the demand for CEP, whereas the second one concerns the incentives of politicians to supply CEP.

3.1 Future-Oriented Time Preferences

Although some environmental problems can be solved quickly, the vast majority of measures to protect or improve environmental quality do not have an immediate effect. The most prominent example is probably climate change, but the same is true for the quality of air and water or the threat of desertification. The results of measures addressing these problems materialize in the future and require a long-term policy supported by the politicians and the population of a country. Therefore, future-oriented time preferences are needed for politicians to pursue

and for citizens to demand such policies.⁴ Gupta and McIver (2016) argue that people in countries with a long-term orientation are more inclined to engage in environment friendly practices, and they provide evidence that firm-level corporate environmental performance is indeed positively related to long-term orientation. Here we argue that more future-oriented time preferences held by a country's population increase the probability of introducing CEP.

Some might argue that CEP is less relevant in societies with future-oriented preferences, because there is seemingly a consensus on the implementation of long-term policies, including environmental precautions. However, this argument is not convincing. First, general agreement about the desirability of environmental protection does not imply that citizens are in favor of specific environmental policies that might affect them negatively on an individual level. This problem may be described as a prisoners' dilemma. CEP can serve to lay down the consensus that a society aspires to protect environmental goods and it can specify who is responsible or authorized to take the necessary actions (i.e. the state or the citizens). Second, the implementation of environmental protection may require that actions and decisions of the three branches of government violate individual rights, for example, when environmental standards interfere with individual property rights. Without CEP, many laws and policies would be successfully challenged in court.

Finally, the willingness of politicians to implement future-oriented policies not only depends on their own preferences, but also on the incentives embedded in political institutions. It has, for example, often been argued that hereditary monarchs are incentivized to act in a more forward-looking manner, because their offspring are likely to enjoy the payoffs from their current policy decisions.⁵ This leads us directly to our second argument concerning the incentives of politicians to implement policies in line with the preferences of their citizens.

3.2 Political Institutions Favoring Redistribution

Political institutions are the rules of the game that constrain and enable politicians. These institutions make some types of behavior more attractive for

⁴ Frederick, Loewenstein, and O'Donoghue (2002) is a general overview of the economic literature on time discounting and Goulder and Stavins (2002) deals specifically with discounting in environmental policy.

⁵ See, e.g. Bjørnskov and Kurrild-Klitgaard (2014) with regard to monarchs and McGuire and Olson (1996) on differences between autocratic and democratic governments regarding their time preferences.

politicians and other types more costly and, hence, less attractive. Here we describe how the very broad set of political institutions that define democracy makes the provision of environmental protection more likely. We argue that democracy is the single most appropriate indicator of the incentives political leaders face to provide public goods, which implies redistribution from the rich to the poor members of society (see Acemoglu et al. 2015 for a critical discussion of this assumption).

There are two key reasons for this assertion. First, political power is relatively more evenly distributed among groups in a democracy. Political leaders are, thus, incentivized to provide public goods. The concentration of political power in dictatorships, however, favors spending on transfers targeted at specific groups (Deacon 2009). To receive the support of as many voters as possible, it makes sense in a democracy to provide public goods such as environmental protection (McGuire and Olson 1996). Additionally, autocratic leaders receive an income share above the median, and due to uncertainty regarding their tenure they have a shorter time horizon than democratically elected leaders (Congleton 1992). However, a rational autocrat will still provide some public goods in order to protect his tenure and increase tax collection (Congleton 1992; McGuire and Olson 1996).

The second reason for higher levels of environmental protection in democracies concerns the costs of the provision of these specific public goods, that is, the prevention or removal of damages to the environment. Most of the costs of environmental protection accrue in a country's industrial sector, which in an autocracy is generally owned by members of a small elite (Spilker 2013, p. 56). This elite has to bear most of the costs of adopting environmental policies. Therefore, autocratic leaders opt for lower environmental quality than the median voter who drives political decisions in democracies.⁶

Yet another argument can be made based on the fact that citizens in democracies enjoy more civil rights. Especially important in this context are freedom of speech, freedom of the press, freedom of assembly, and freedom to vote. These freedoms enable citizens to get information, to inform democratic leaders about their preferences and discontents, and to assemble and lobby for their interests. All this enables the public to force political leaders to address their concerns, for example, concerning the environment (Payne 1995; Neumayer 2002).⁷

⁶ In this context, the median voter refers to a voter relative to whom 50% of the population prefers more (or respectively less) environmental protection.

⁷ However, Bernauer, Böhmelt, and Koubi (2013) demonstrate that a high level of democracy can also complicate the policy making process of environmental law since various players (i.e., different Environmental NGOs) are involved, and pleasing the different expectations is difficult.

All of these arguments lead us to conjecture that the introduction of CEP in democratic countries is more likely than in countries under an autocratic regime.

4 Data and Estimation Approach

4.1 The Dependent Variable

The Comparative Constitutions Project (Elkins, Ginsburg, and Melton 2009) is an attempt to code all written constitutions since 1789 on an annual basis using 669 different variables. Their dataset contains a set of variables capturing the existence and design of CEP. The most general variable among them (ENV) reflects whether or not the constitution of a country prescribes the protection of the environment.⁸ We update the dataset to 2015 and cross-validate the variable using information from Boyd (2012a) and other data sources. For the purpose of our analysis, we do not consider the duty of landowners to fight land erosion and the protection of natural parks or other tourist sites as equivalent to a more general protection of the environment. Hence, we do not code such rules as a constitutional protection of the environment. The same is true for constitutional provisions that only mention a legislative competence regarding environmental issues without any obligation to use it and for constitutional provisions that allow expropriation in case of danger to the environment.

Here, we focus on the entrenchment of CEP, leaving the specificities of its design to future research. We code our dependent variable on a yearly basis from 1946 (or the first year after the country became independent) until 2015 (or when the country ceased to exist). Our dependent variable takes the value one if CEP exists, and zero otherwise. Some countries abolished environmental protection (for example, in interim constitutions) only to reintroduce it a few years later. The timing of these reintroductions, most likely, cannot be explained with our theory. Thus, we focus our analysis on the first time a country introduces CEP, ignoring any repeated events. Appendix 1 lists our final coding for all countries.

⁸ The other ones deal with the specific design of the CEP. ENV_REF codes whether the constitution provides a duty for the state to protect, a duty for the people to protect or a right of the people to enjoy the environment. ENV_PART lists the different parts of the environment that are explicitly mentioned in the constitution, for example air or water.

4.2 Independent Variables

Our independent variables of primary interest are those used to test the hypotheses outlined in Section 3 above. To measure societal time preferences, we draw on all indicators that are publicly available for a large cross-section of countries. These are five different indicators, some of which exist in more than one operationalization. To measure democracy, we use a dichotomous regime classification because this indicator is most suitable to test our theoretical argument.

Measuring the future-orientation of the preferences held by a society's members, let alone the time preferences of politicians, is no mean feat. We draw on various sources, the most well-known being an indicator by Hofstede, Hofstede, and Minkov (2010) for "long-term orientation." In their words, "long-term orientation stands for the fostering of virtues oriented toward future rewards – in particular, perseverance and thrift" (p. 239). Because measuring something intangible and abstract, such as the future-orientation of a society, unavoidably suffers from considerable measurement problems, we use four alternative indicators to check the robustness of the results we obtain based on Hofstede's indicator (see Neumayer and Plümper 2016 for more on robustness tests). First, we rely on an indicator for "future-orientation" from the GLOBE study on cultural values in 62 societies (House et al. 2004). In line with the authors of this study, we rely on their indicator of future-oriented values instead of an alternative indicator for future-oriented business practices. This indicator measures "the degree to which a collectivity encourages and rewards future-oriented behaviors such as planning and delaying gratification" (House et al. 2004, p. 282). Just as the indicator by Hofstede, also the GLOBE-indicators are based on value judgments expressed in surveys. Hofstede, Hofstede, and Minkov (2010, p. 260) are very critical of the GLOBE-indicator, which was an attempt to replicate their measure for long-term orientation and in that sense "completely failed" as the two indicators are negatively correlated.

Another indicator we use to measure future-oriented preferences is the "long-term discount factor" by Wang, Rieger, and Hens (2016). It exists for 53 countries and the data is from an international survey conducted by the University of Zurich. Respondents were asked about their preferences for either an immediate payment or alternatively a larger payment that would be delayed for one (or ten) years. We use the mean value of this discount factor in the surveyed population of a country and higher values indicate more forward-looking decisions. Wang, Rieger, and Hens (2016) also show that future-oriented preferences are associated with higher national gasoline prices, which they interpret as a proxy for policies adopted to internalize environmental externalities.

Chen (2013) provides an indicator that measures the degree to which the languages spoken by the population of a country use future-time reference (FTR). Languages are differentiated by whether they require future events to be grammatically marked when formulating predictions. Country scores are then calculated and weighted based on the composition of the population and the languages spoken. Cross- and within-country regressions support that the use of weak-FTR languages is associated with more future-oriented decisions in various monetary and non-monetary behaviors. We also use Chen's indicator.

Finally, we draw on an indicator by Galor and Özak (2015) for the caloric suitability of land for agriculture. It captures the average potential crop yield in countries worldwide in terms of calories per hectare per year. Galor and Özak (2016) set out to test the idea that geographical variation in the natural return to agricultural investment has a persistent effect on the distribution of time preferences across societies. We use their indicator for the post-1500 era in three different versions as calculated by Galor and Özak. The differences are due to the exclusion of unproductive cells or crops from the calculation of the average productivity levels. All versions of the indicator are ancestry adjusted to account for crop yield in the countries from which the ancestors of the current population migrated. Galor and Özak (2016) use these indicators to explain the level of long-term orientation of the population, as measured by Hofstede, Hofstede, and Minkov (2010), across and within countries. The caloric suitability index, hence, serves as an exogenous proxy of future-oriented time preferences that is unaffected by human intervention (Galor and Özak 2015).

In Section 3 we argue that the most important political institution conducive to CEP is democracy. To test this hypothesis, we use a binary democracy indicator by Cheibub et al. (2010). The coding of this indicator is simple. Democracy is defined as a regime in which leaders are selected in contested elections. This definition is both sharp and minimalistic, which avoids confusing democracy with other concepts that are better kept apart. Alternative indicators measure broader concepts of democracy that capture either a range of political and civil liberties or diverse institutional measures that hold political leaders accountable. With these broader definitions, the causal mechanism to be tested becomes less clear. We prefer to use the indicator by Cheibub et al. (rather than those produced by, for example, the Polity-project or Freedom House), because our theoretical arguments are compatible with a minimalist definition of democracy.

Aside from the variables that represent our main hypotheses, we take into account a set of basic country characteristics that may be relevant for the adoption of CEP. First, we take into account a country's log-income per capita and its log-population. Both indicators are part of the World Development Indicators. It is straightforward to argue that future-orientation may increase as income per

capita increases, making it essential to control for it in a regression analysis. Second, we control for whether a country is of a common law legal origin, as categorized by La Porta et al. (1999). It has been argued repeatedly that different legal origins represent very different approaches to thinking about the state and its functions. This would also apply to CEP (see, e.g. La Porta, Lopez-de-Silanes, and Shleifer 2008). Third, we include a dummy variable by Spolaore and Wacziarg for countries located on small islands (2013). Jagers et al. (2016) argue that small island states can be expected to outperform continental states in environmental protection. Fourth, to control for regional policy diffusion we take into account the share of countries in a region where environmental protection was part of the constitution in the previous year. Finally, we control for region fixed effects to account for time-invariant differences in the region-specific propensity to implement CEP.⁹

4.3 Estimation Approach

For our empirical analysis, we draw on an estimation model that has become the standard tool in event history analysis in the social sciences (Box-Steffensmeier and Jones 2004). The Cox (1972, 1975) proportional-hazard model is a semi-parametric regression model which allows us to take into account that the adoption of CEP is a time dependent process without having to specify the functional form of the hazard rate. This hazard rate can be defined for the i^{th} country as:

$$h_i(t) = h_0(t) \exp(x_i' \beta) \quad (1)$$

where h_0 is the baseline hazard rate and $x_i' \beta$ are the covariates and the regression parameters to be estimated. Note that the particular form of the baseline hazard rate is left unparameterized. Thus, it is not necessary to speculate how the probability of adopting CEP (conditional on a set of covariates) has evolved over time. A common mistake in using this class of models is not testing the validity of the proportionality assumption (Box-Steffensmeier and Zorn 2001). Using a proportional-hazard model even though the hazards are non-proportional will result in biased coefficient estimates and less powerful significance tests.

⁹ The concrete regions are: (1) Eastern Europe & post-Soviet Union (2) Latin America, (3) the MENA region, (4) Sub-Saharan Africa, (5) Western Europe & North America, and (6) Asia.

We test the proportional-hazards assumption for our regression models based on Schoenfeld residuals. The null hypothesis of this test is that the log hazard-ratio function is constant over time. We find that this null hypothesis has to be rejected and the assumption of proportional hazards appears to be violated. Our test indicates that the effects of common law legal origin and income per capita are non-proportional over time. We account for this problem by including interaction terms between the two variables and a log-transformed time trend in all regression models. We do not report these coefficients in the following to save space, but the interaction terms are jointly and individually significant at the 1% level. After including the interactions, the model passes the proportional hazards test without problems ($\chi^2 = 9.34$, degrees of freedom = 15, $p = 0.86$). Finally, tied failures are handled by Efron's (1977) method to approximate the exact marginal likelihood. This is necessary since exact methods to handle ties are not compatible with clustered standard errors, which we prefer to use.

5 Discussion of the Results

Table 1 shows the first set of results from our regression analysis. The model in Column 1 only includes a number of standard control variables. Among these, the only coefficient estimate that is statistically significant is the share of countries in the region that have already introduced CEP. We report hazard ratios instead of regression coefficients to facilitate the interpretation of the results. Hazard ratios larger than one indicate a positive effect, whereas hazard ratios below one hint at a negative effect on the likelihood of introducing CEP. Accordingly, if all other countries in a region entrenched environmental protection in their constitution, regional diffusion pressure could increase the hazard rate by up to a factor of 4.6. This effect, however, is not robust to the inclusion of region fixed effects in Column 2. A closer look at regional effects indicates that countries located in the MENA region, Western Europe or North America are less likely to introduce CEP.

In Column 3, we add binary indicators for democracy and monarchy, other dictatorships are the omitted category. As expected, democracies appear to be almost twice as likely to introduce CEP, and also monarchies are more likely to introduce it than other autocracies. These differences are, however, not statistically significant. In a next step, we add one indicator at a time to our baseline specification in Column 3 to proxy for a society's future-oriented time preferences.

Table 1: Baseline Model.

	[1]	[2]	[3]
Small Island	0.59 (– 1.34)	0.44 ^b (– 2.04)	0.34 ^b (– 2.47)
Regional diffusion	4.47 ^c (3.09)	1.36 (0.43)	0.94 (– 0.02)
Log-population size	1.04 (0.64)	1.10 (1.16)	1.09 (0.99)
Log-income per capita	Yes	Yes	Yes
Common law	Yes	Yes	Yes
Eastern Europe and post-Soviet Union		0.47 (– 1.20)	0.33 (– 1.59)
Latin America		0.40 ^a (– 1.74)	0.33 ^a (– 1.95)
North Africa and Middle East		0.14 ^c (– 3.02)	0.14 ^c (– 2.65)
Sub-Saharan Africa		0.58 (– 1.32)	0.59 (– 1.20)
Western Europe and North America		0.27 ^b (– 2.10)	0.17 ^b (– 2.48)
Asia		0.35 ^a (– 1.90)	0.31 ^a (– 1.87)
Democracy			1.95 ^a (1.70)
Monarchy			1.29 (0.59)
Years	1960–2011	1960–2011	1960–2011
Observations	3355	3355	3355
Countries	122	122	122
Failures	87	87	87

Hazard ratios, z-values in parentheses based on country-clustered standard errors, income per capita and common law are included as main terms and as interaction terms with the log-time trend, ^a*p* < 0.1, ^b*p* < 0.05, ^c*p* < 0.01.

In each of the regressions in Table 2, the number of countries and observations drops substantially relative to the baseline model. Column 1 starts by adding the indicator of long-term orientation by Hofstede, Hofstede, and Minkov (2010) to the baseline model. In Columns 2, 3, and 4, we replace the indicator by Hofstede, Hofstede, and Minkov with those from the GLOBE study, Wang, Rieger, and Hens (2016), and Chen (2013). In all models, we find a positive effect on the probability of entrenching CEP. Only the estimated hazard ratio in model 4 is not statistically significant at the five-percent level. This is not surprising, as the indicator by Chen (2013) reduces the sample size considerably. Besides, when compared with the other indicators we employ, the use of FTR in a language is a rather crude proxy of future-oriented time preferences. Taken together, our results suggest that future-oriented preferences are significantly correlated with the introduction of CEP. In models 1–3, the estimated effect of democracy is positive and comparable in size to the baseline model. Yet, the estimated hazard ratio is never statistically significant. Political institutions, thus, seem not to be decisive.

In Table 3, we add three versions of the caloric suitability index by Galor and Özak (2015, 2016) to our baseline model. All three serve as proxies of

Table 2: Time Preferences I.

	[1]	[2]	[3]	[4]
Future-orientation	1.95 ^b (2.19)	3.40 ^b (2.03)	2.05 ^b (2.22)	1.16 (0.35)
Democracy	1.88 (0.94)	3.96 (1.46)	1.64 (0.40)	0.80 (− 0.17)
Monarchy	0.60 (− 0.49)	2.19 (0.48)	–	–
Control variables	Yes	Yes	Yes	Yes
Years	1960–2011	1960–2011	1960–2011	1960–2011
Observations	1903	1232	988	991
Countries	62	43	37	35
Failures	44	31	26	23

See Table 1, “control variables“ refers to all independent variables in Table 1, [1], Hofstede, Hofstede, and Minkov (2010); [2], GLOBE; [3], Wang, Rieger, and Hens (2016); [4], Chen, monarchy and small islands omitted from [3] and [4] because of collinearity.

Table 3: Time Preferences II.

	[1]	[2]	[3]
Future-orientation	1.46 ^b (2.44)	1.55 ^b (2.22)	1.46 ^c (2.58)
Democracy	1.91 (1.59)	1.90 (1.61)	1.97 ^a (1.66)
Monarchy	1.09 (0.18)	1.01 (0.02)	1.07 (0.13)
Control variables	Yes	Yes	Yes
Years	1960–2011	1960–2011	1960–2011
Observations	3158	3158	3158
Countries	114	114	114
Failures	83	83	83

See Table 1, “control variables“ refers to all independent variables in Table 1, indicators for future-orientation by Galor and Özak, [1], average calories post-1500CE (excl. unproductive crops); [2], average calories post-1500CE (excl. unproductive cells); [3], average calories post-1500CE (incl. all cells and crops).

future-oriented time preferences and the estimates reconfirm the relevance of future-orientation for the adoption of CEP. The robustness of the result for future-orientation is particularly surprising given that our indicators are rather crude proxies and none of them are highly correlated with each other. Since our proxies for future-oriented time preferences are standardized, it is not difficult to interpret the effect size. Increasing a society’s future-orientation by one standard deviation increases the hazard of introducing CEP by a factor of between 1.4 and 3.4, although only the indicator from the GLOBE study yields a hazard ratio larger than 2.

6 Conclusions and Outlook

This paper examines two domestic factors for their effect on a country's probability to include environmental protection in its constitution. Future research should deal explicitly with the instruments implemented in the constitution for environmental protection and the scope of their application. The inclusion of environmental protection into a constitution does not automatically lead to policies aimed at protecting the environment or even an improved quality of the environment, although the extant empirical literature suggests environmental rights do make a difference.

Therefore, we propose to test whether the introduction of CEP is related to policy variables or even outcome variables of interest. Some possible policy variables are the creation of a ministry of the environment, a higher budget share for such a ministry or environmental tasks in general, the introduction of eco-audit systems and eco-labels, and increased production of national laws on environmental topics.

The introduction of CEP could also result in a stronger participation of a country in international cooperation regarding environmental issues, for example, in 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). Environmental quality can be seen as an outcome variable, but establishing causality in this dimension is no mean feat.

Appendix 1

Countries in Sample and Year CEP was Introduced.

Algeria	–	Gambia	1970	New Zealand	–
Argentina	1994	Germany	1994	Nicaragua	1974
Australia	–	Ghana	1979	Niger	1992
Austria	1984	Greece	2001	Nigeria	1989
Bahamas	–	Grenada	1992	Norway	1995
Bahrain	2002	Guinea	1990	Oman	1996
Bangladesh	2011	Guinea-Bissau	–	Pakistan	–
Barbados	2007	Guyana	1970	Paraguay	1992
Belgium	1994	Hungary	2003	Peru	1979
Benin	1990	Iceland	–	Philippines	1987
Bhutan	2005	India	1978	Qatar	2003
Bolivia	2002	Indonesia	2000	Romania	2003
Botswana	–	Iran	1979	Rwanda	2003
Burkina Faso	1988	Iraq	2005	Samoa	–
Burundi	1992	Ireland	–	Saudi Arabia	1992
Cambodia	1999	Israel	–	Senegal	2001
Cameroon	1996	Italy	1967	Seychelles	1993
Canada	–	Japan	–	Sierra Leone	1961
Cape Verde	1992	Jordan	–	Singapore	–
Central African Republic	1994	Kenya	2010	Solomon Islands	–
Chad	1996	Korea, South	1987	South Africa	1993
Chile	1980	Kuwait	–	Spain	1978
China	1978	Laos	1991	Sri Lanka	1978
Colombia	2005	Lebanon	–	Suriname	1987
Congo	1992	Lesotho	1993	Swaziland	2005
Congo, Democratic Republic	2003	Liberia	–	Sweden	1998
Cote d'Ivoire	2000	Libya	–	Switzerland	2002
Cuba	1976	Luxembourg	2007	Syria	2012
Cyprus	–	Madagascar	1960	Tanzania	1995
Denmark	–	Malawi	1994	Thailand	1974
Djibouti	–	Malaysia	–	Togo	1992
Dominica	–	Mali	1992	Tonga	–
Dominican Republic	2010	Malta	–	Trinidad and Tobago	–
Ecuador	1983	Mauritania	–	Tunisia	2014
Egypt	2007	Mauritius	–	Turkey	1961
El Salvador	1983	Mexico	1987	United Kingdom	–
Equatorial Guinea	1982	Mongolia	1992	United States	–
Fiji	1990	Morocco	2011	Uruguay	1996
Finland	1995	Mozambique	1990	Zambia	1996
France	2005	Nepal	1990	Zimbabwe	2013
Gabon	1994	Netherlands	2002		

Sample according to baseline model in Table 1.

Appendix 2

Descriptive Statistics.

Variable	N	Mean	SD	Min	Max
Small Island	3351	0.14	0.35	0	1
Regional diffusion	3351	0.29	0.21	0	0.95
Log-population size	3351	15.62	1.84	11.01	20.68
Log-Income per capita	3351	7.81	1.64	4.24	11.38
Common Law	3351	0.39	0.49	0	1
Eastern Europe and post-USSR	3351	0.01	0.09	0	1
Latin America	3351	0.11	0.32	0	1
North Africa and Middle East	3351	0.15	0.36	0	1
Sub-Saharan Africa	3351	0.32	0.47	0	1
Western Europe and North America	3351	0.20	0.40	0	1
Asia	3351	0.14	0.35	0	1
Democracy	3351	0.40	0.49	0	1
Monarchy	3351	0.08	0.27	0	1
FO: Hofstede, Hofstede, and Minkov (2010)	1899	− 0.24	0.92	− 1.67	2.62
FO: GLOBE	1228	− 0.03	0.92	− 2.66	1.53
FO: Wang, Rieger, and Hens (2016)	984	0.09	0.93	− 2.19	2.13
FO: Chen	987	− 0.13	1.05	− 1.67	0.62
FO: Galor and Özak I	3154	− 0.13	0.95	− 2.33	2.30
FO: Galor and Özak II	3154	− 0.11	0.94	− 3.05	2.42
FO: Galor and Özak III	3154	− 0.14	0.93	− 2.20	2.33

Sample according to baseline model in Table 1.

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