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ANALYSIS

The determinants of individuals' attitudes towards preventing environmental damage

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ABSTRACT

This paper investigates empirically the determinants of individuals' attitudes towards preventing environmental damage in Spain using data from the World Values Survey and European Values Survey for the periods 1990, 1995 and 1999/2000. Compared to many previous studies, we present a richer set of independent variables and found that strongly neglected variables such as political interest and social capital have a strong impact on individuals' preferences to prevent environmental damage. An interesting aspect in our study is the ability to investigate environmental preferences over time. The results show strong differences over time. Finally, using disaggregated data for Spanish regions, we also find significant regional differences.

1. Introduction

There is a wide range of studies that have valued environmental preferences. Interest in environmental attitudes began in the early 1970s (Bord and O'Connor, 1997). The preferences for protecting environmental goods have been a controversial issue in the last few years. It is a promising line to consider empirically citizens' environmental preferences and search for factors that shape it.

One of the key aims in this paper is to present compared to previous studies a richer set of independent variables to better isolate the impact of a specific variable on individuals' environmental attitudes. This helps to analyze several hypotheses that are not well discussed in the literature. For example, we will investigate the impact of political interest or political awareness on environmental attitudes. Moreover, the rapid growth of the social capital literature inspired our efforts to check the importance of these variables on the environmental attitudes. Furthermore, we are interested to observe attitudinal changes over time and differences within regions, two aspects that require more attention in the environmental literature.

Such an empirical investigation requires a well-elaborated data set. Thus, we take advantage of relatively new surveys such as the *World Values Surveys* (WVS) or the *European Values Survey* (EVS) that allow to prove our intentions. This attempt is

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in line with the growing inclination among economists to use surveys.[1] One reason might be that survey research now uses more sophisticated statistical techniques and designs compared to early years. Furthermore, a main advantage is that surveys include many control variables. The World Values Survey provides a rich set of independent variables that help to investigate in detail what shapes individuals' environmental values in Spain. Another main advantage of our study is to work with several datasets collected at three different points in time, which allows us to observe trends over time and thus assess the robustness of our results.

A clear advantage of national studies in this field is the possibility to design country-level environmental initiatives. It also allows to go from a general perspective to a local one, assuming that regional information is available. Such an approach would allow, for example, designing optimal fiscal decentralization policies (Shapiro, 1996).[2] Moreover, a cross country and cultural comparison with a single item measure as the one used as dependent variable in this paper can pose some problems, as values are not free from cultural or institutional influences. Focusing on one country, Spain, and thus conducting a country case study helps to reduce such problems.

The results indicate that political interest and political awareness have a strong impact on individuals' environmental preferences. Similarly, also social capital strongly affects in a positive manner environmental attitudes towards preventing environmental damage. Moreover we find that factors such as ideology, financial satisfaction and to certain extent also identification shape individuals' environmental attitudes. Finally, we also find regional differences and differences over time.

Before considering the findings in detail, Section 2 of the paper first includes a review of the literature, showing the main factors considered in previous studies. Next, Section 3 introduces the way individuals' environmental attitudes are defined, provides information about the *World Values Surveys* and the *European Values Survey*, and the variables we have used in the estimations. In Section 4 we present the empirical findings, and Section 5 finishes with some concluding remarks.

2. Factors that affect environmental attitudes: a review

The majority of the studies, which have analyzed environmental preferences, have focused on specific and limited environmental goods or areas (Whitehead, 1991; Stevens et al., 1994; Danielson et al., 1995; Cameron and Englin, 1997; Blomquist and Whitehead, 1998; Carlsson and Johansson-Stenman, 2000; Popp, 2001; Dupont, 2004; Bulte et al., 2005). Thus, it is difficult to find contributions related to a country or a group of countries or that considered an environmental damage perspective as a whole (Engel and Pötschke, 1998; Witzke and Urfei, 2001; Israel and Levinson, 2004). They furthermore have the disadvantage of an excessive simplification, because individuals are asked about the environment in general. As Witzke and Urfei (2001, p. 208) pointed out, this is likely to bias downwards environmental preferences, because people did not know what they should pay for. However, with a general perspective, embedding effects, which are usually linked to specific environmental commodities, can be avoided (Diamond and Hausman, 1994).

In general, there are several factors commonly included in this kind of studies (both specific and global ones). Some usual variables considered are age[3] and gender and other socio-demographic and socio-economic factors (Whitehead, 1991; Cameron and Englin, 1997; Blomquist and Whitehead, 1998; Engel and Pötschke, 1998; Witzke and Urfei, 2001; Dupont, 2004; Israel and Levinson, 2004; Hidano et al., 2005). To provide a structured overview of previous studies, we review the literature based on the variables often included in the specifications. We also discuss in several parts the theoretical impact on tax attitudes. In sum, this provides a good starting point for the empirical section.

Several studies have stressed that age is negatively correlated with the willing to contribute for additional environmental protection, since older people will not live to enjoy the long-term benefits of preserving resources (Whitehead, 1991; Carlsson and Johansson-Stenman, 2000). Howell and Laska (1992) found that younger people are more concerned about environmental problems than older ones. However, there are two age effects, a *life cycle* or *aging effect* due to being at a certain stage of age and a *cohort effect* resulting from belonging to a specific generation. The cohort effect covers the difference of attitudes between different age-cohorts due to generational differences in socialization, life experiences and economic conditions (Vlosky and Vlosky, 1999). In this sense, Nord et al. (1998) showed a strong relationship between age and environmental concern.

Gender is another specific variable. Experimental and empirical studies have shown gender differences in other areas such as charitable giving, tax morale, bargaining or household decision making (Brown-Kruse and Hummels, 1993; Nowell and Tinkler, 1994; Andreoni and Vesterlund, 2001; Eckel and Grossman, 2001; Torgler, 2006). It is often argued that traditional gender socialization, cultural norms, the women's roles as caregivers and nurturers, encouragements to be cooperative and feel compassion lead to a higher concern for the maintenance of life and environment. The "traditional" domain of working at home induces a greater likelihood to engage privately in behaviors aiming at the preservation of the environment (for an overview see Hunter et al., 2004). Zelezny et al. (2000) find strong evidence that environmentalism does not begin in adulthood, which contradicts the statement that gender differences arise due to motherhood and child protection. Regardless

[1] See, e.g., Knack and Keefer, 1997, for social capital studies, or Frey and Stutzer, 2002, who intensively investigated happiness, or Torgler, 2006, focusing on tax morale.

[2] It has been argued that if there is heterogeneity among jurisdictions, centralization is suboptimal (Peltzman and Tideman, 1972; Oates and Schwab, 1996). This is because strong differences in preferences among governments could lead to important efficiency losses for some jurisdictions (Burtraws and Portney, 1991; Dinan et al., 1999).

[3] An alternative specification related to age has been proposed by Popp (2001), in order to test the existence of weak and strong altruism towards future generations in the context of environmental issues. In that study, he included the individuals' life expectancy, calculated from their age and the life expectancy using the *Statistical Abstract of the United States*.

of age, women show more concern for the environment than men. However, literature reviews in the 80s report that the relationship between environmental attitudes and gender is meager and inconsistent (Van Liere and Dunlap, 1980; Hines et al., 1986–87; Mohai, 1992). The meta-review of Zelezny et al. (2000) covering the years 1988 and 1998 reports that out of 13 studies, 9 found that women are significantly more active in pro-environmental behaviors than men, 3 found no statistically significant difference between males and females and one study reports a greater participation of men. Davidson and Freudenburg (1996), Bord and O'Connor (1997), Berrens et al. (1997) and Zelezny et al. (2000), Hunter et al. (2004) found higher values for women, while Cameron and Englin (1997), Swallow et al. (1994) and Kealy et al. (1990) found the opposite result. Finally, Brown and Taylor (2000) did not find any gender difference. It can also be criticized that studies relying on self-reports might be biased if women give more socially desirable responses in surveys. However, Zelezny and Yelverton (2000) report that social desirability is not related to gender.

Additionally, marital status might influence environmental attitudes as well. It can be argued that married people are more compliant or more concerned about environmental degradation than others, especially compared to singles, because they are more constrained by their social network and often strongly involved in the community (Tittle, 1980). They further might be more concerned with local environmental problems than singles as the "parent effect" makes them seek their children's future welfare (Dupont, 2004).

Regarding educational issues, the literature has shown that formal education[4] has a significant influence on environmental willingness to contribute. There is a tendency in the literature that a higher levels of education lead to higher preferences for environmental protection (Blomquist and Whitehead, 1998; Engel and Pötschke, 1998; Witzke and Urfei, 2001; Israel and Levinson, 2004; Veisten et al., 2004). On the other hand, also informal education matters (Whitehead, 1991; Blomquist and Whitehead, 1998; Carlsson and Johansson-Stenman, 2000; Hidano et al., 2005). Well-informed citizens who know about environmental problems might have stronger environmental attitudes, because they are better aware of the possible damage (Danielson et al., 1995).

The economic situation of an individual is a significant aspect too. It can be argued that the protection of the environment or in our case the prevention of environmental damage is not only a public good, but also a normal good. Thus, demand may increase with income (Franzen, 2003). Wealthier citizens may have a higher demand for a clean environment and less environmental damages. Income has in general been considered in the literature (Whitehead, 1991; Stevens et al., 1994; Blomquist and Whitehead, 1998; Popp, 2001; Witzke and Urfei, 2001; Bulte et al., 2005; Dupont, 2004; Israel and Levinson, 2004; Veisten et al., 2004; Hidano et al., 2005). Usually, a positive relationship between income and environmental preference to contribute has been found. Sometimes, several income categories have been included in the estimations (Israel and Levinson, 2004).

An additional variable that approaches and complements the economic situation of individuals is their occupational status. Witzke and Urfei (2001) found that some labour groups, such as persons engaged in the household or on maternity leave, had higher environmental preferences. Veisten et al. (2004) showed that unemployed people present, occasionally, lower preferences for environmental protection policies. However, the latter relationship sometimes is neither clear nor significant at all (Engel and Pötschke, 1998; Witzke and Urfei, 2001).

Other factors, which have been included in previous studies, are related to politics or active participation in environmental organizations. The party individuals vote for (Engel and Pötschke, 1998; Witzke and Urfei, 2001) and their ideology are important aspects too. For example, voters who choose 'green' parties have strong preferences for environmental protection. It has been observed that left parties' voters show a higher sensitivity for environmental problems (Witzke and Urfei, 2001). The latter finding can be explained by the higher preferences for economic growth 'right-wing' parties' voters have. Additionally, a few studies have considered the participation in voluntary environmental organizations (Whitehead, 1991; Blomquist and Whitehead, 1998; Carlsson and Johansson-Stenman, 2000). Usually, individuals who participate actively in environmental institutions have higher preferences for environmental protection.

Finally, the literature has investigated factors such as the city/town size (Carlsson and Johansson-Stenman, 2000; Israel and Levinson, 2004), the rural/urban character of the place where a household is located[5] (Danielson et al., 1995; Veisten et al., 2004), or the proximity to the damaged area (Bulte et al., 2005). In general, the sign of the relationship is not clear. On the one hand, small towns are more "rural" which may lead to higher environmental values. But, on the other hand, medium and big cities are in general more active in implementing environmental polices. So, that fact leads to higher preferences for environment protection.

In summary, different kind of factors have been analyzed in previous studies. Some of those studies are summarized in Table A1 in the Appendix. However, there are some aspects neglected or poorly treated in the literature, such as political interest or political awareness and social capital. In this paper we consider a broad range of variables, such as show in the next section.

3. Data, model and hypotheses

3.1. *Data*

The data used in the present study are taken from the World Values Survey (WVS, years 1990, 1995, 2000) and the 1999 European Values Survey (EVS).[6] The World Values Survey is a worldwide investigation of socio-cultural and political change,

[4] The formal education is usually specified by levels or degrees. It has been alternatively approached by means of the number of years (Blomquist and Whitehead, 1998).

[5] In this respect, Witzke and Urfei (2001) included the variable 'households in the building' as a proxy of the rural/urban character of the town/city.

[6] A dummy variable has been included to differentiate between WVS and EVS.

based on representative national samples. It was first carried out in 1981–83, and subsequently in 1990–91, 1995–96 and 1999–2001. However, economists have just started to work with the WVS/EVS. To assess environmental attitudes of individuals in Spain we use the following question from these data sets throughout the whole paper:

> *I would agree to an increase in taxes if the extra money were used to prevent environmental damage (0=strongly disagree, 3=strongly agree)*

Although we are not conducting a contingent valuation study (CV), the question offers the chance to investigate environmental preferences. However, the question is not free of problems. The statement is relatively vague. "Environmental damage" is not clearly specified. Different people may think of different kinds of environmental damages. The level of improvement and the degree of tax increase are not clarified either. So people are not aware of how much they have to pay.[7] The consequences of taxation are not mentioned either. No information is provided to which extent income tax, value added tax or other taxes are supposed to increase. Thus, it is not clear who will have the highest tax burden. On the other hand, unspecified payment schemes will increase the variance, but may influence the willingness to contribute (Witzke and Urfei, 2001). An unspecified statement still helps to measure preferences and values and to reduce strategic behavior via influencing the quantity or quality of environmental goods — people might intentionally indicate false willingness to contribute values in order to match their own preferences (Hidano et al., 2005). When neither specific goods nor quantitative values are used, the attributes of the environmental goods in questions do not have to be thoroughly explained to be sure that respondents understand and respond with the appropriate willingness to accept an increase in taxes.[8]

A critical aspect of surveys is the fact that studies can be biased if they do not cover a representative share of the population. A high response rate is therefore essential. We work with well-known data that cover many countries and have been conducted on a regular basis. These surveys pay especial attention to the representativeness of the data set. Furthermore, the environmental question was only part of a larger survey, which may reduce environmental *framing biases*. We have the advantage to be able to control for many factors in a multivariate analysis, but also the disadvantage that only a limited number of environmental aspects can be investigated. However, in a specific environment survey the expressed environmental attitudes might be overstated if the respondent takes the interviewer to be an environmental activist and would feel guilty if stating a low willingness to accept an increase in taxes; such an upward bias should occur less in the database we use (Witzke and Urfei, 2001).

Finally, it can also be discussed whether it is more adequate to use an index instead of a single question to measure environmental values. Many studies that examine environmental attitudes typically measure environmental values using a single item.[9] A single question has the advantage that problems associated with the construction of an index can be avoided. Furthermore, an index might be designed to fit best the theoretical argumentations. As we analyze one specific country, problems based on differences in the interpretation of the question or due to differences in the political institution, which may influence environmental values, do not appear. Working with more than one survey and thus considering different time periods allows to reduce biases due to a "time specific mood".

3.2. Model and hypotheses

We take advantage of the scaled structure using ordered probit estimations rather than establishing a voting or referendum situation with a "yes or no" structure. Thus, an ordered probit model helps to analyze the ranking information of the scaled dependent variable. This allows to consider also intermediate values between strong agreement and disagreement, and therefore to make full use of the data available. Our variable furthermore measures the marginal and not the total willingness to accept a tax increase. This implies that the change over time is also influenced by the change of governments' environmental activities. Environmental improvements over time may reduce that willingness to be spent to prevent environmental damages, as might the current level of the tax burden. Nevertheless, only a limited number of papers investigate environmental preferences over time, controlling in a multivariate analysis for additional factors.

We also estimate weighted ordered probit models to correct the samples and thus to get a reflection of the national distribution. As we pool several years and data sets together we have integrated an additional weighting variable (*weighted var 1*). The original weight variable was multiplied by a constant to get an equal number of weighted observations (around 1500) for each survey (*weighted var 2*). The data sets provide the weighting variables. To measure the quantitative effect of a variable on environmental values, the marginal effects are calculated, as the equation has a nonlinear form. The marginal effect indicates the change in the percentage of citizens (or the probability of) having a specific environmental level value, when the independent variable increases by one unit. For simplicity, in all estimations the marginal effects are only presented for the highest value. Furthermore, "I don't know" answers and missing values were omitted in all estimations.

The willingness to contribute for preventing environmental damage is specified as follows:

$$\begin{aligned}\mathrm{ENVAT}_i = {} & \beta_0 + \beta_1 \cdot \mathrm{SOCIODEM}_i + \beta_2 \cdot \mathrm{EDUC}_i + \beta_3 \cdot \mathrm{POLINT}_i \\ & + \beta_4 \mathrm{IDEOLOG}_i + \beta_5 \cdot \mathrm{ECONSIT}_i + \beta_6 \cdot \mathrm{EMPLOY}_i \\ & + \beta_7 \cdot \mathrm{SCAPITAL}_i + \beta_8 \cdot \mathrm{IDENTIFIC}_i + \beta_9 \cdot \mathrm{URBANI}_i \\ & + \beta_{10} \cdot \mathrm{REGION}_i + \beta_{11} \cdot \mathrm{YEAR}_i + \varepsilon_i \end{aligned} \quad (1)$$

[7] It has been shown that the preferences to protect the environment (regarding causes and consequences of environmental damages) depend on the level of information the questionnaire includes (Bulte et al., 2005).

[8] For a detailed discussion regarding possible survey biases see Carson and Mitchell (1995).

[9] For a review see, e.g., Zelezny et al. (2000).

where $ENVAT_i$ measures an individual's attitudes towards preventing environmental damages, $SOCIODEM_i$, a bundle of socio-demographic variables (AGE, GENDER and MARITAL STATUS) that may have an important influence on environmental preferences, $EDUC_i$ formal education, $POLINT_i$ political interest, $IDEOLOG_i$, individuals' ideology, $ECONSIT_i$ and $EMPLOY_i$ the economic and employment situation, $SCAPITAL_i$ generalized trust and the membership in a voluntary environmental organization, $IDENTIFIC_i$ national pride and individuals' geographic identification, and $URBANI_i$, the level of urbanization in which a person lives. Finally, regional and temporal dummies ($REGION_i$, $TIME_i$) have been included.

Next we are going to develop hypotheses that investigate underexplored aspects in the literature. The predicted sign of all other variables are reported in Table A2 in the Appendix. The expected signs are due to the tendencies observed in previous studies.

First, our paper has the intention to go beyond formal education that we measured as the age at which individuals complete or will complete their time education. We stress that not only formal education should have an impact on the willingness to accept an increase in taxes, but also informal education. One possibility is to measure the individuals' political interest. On the other hand, it can be assumed that politically interested people are well-informed and have a high level of current knowledge about what is going on in politics and thus may also be aware of environmental issues and problems which are supposed to lead to a higher willingness to contribute. Compared to other determinants, the aspect of political interest has been widely neglected in the environmental literature.

Hypothesis 1. Not only formal education has positive effect on individuals' willingness to prevent environmental damages, but also political interest and political awareness. The more citizens are interested in politics, the higher their willingness to prevent environmental damages.

We will use several proxies of political interest to investigate this main hypothesis and therefore to check the robustness of the results (level of: DISCUSSING POLITICS,[10] INTEREST IN POLITICS[11] and IMPORTANCE OF POLITICS[12]). This brings us to a further factor connected to politics, namely ideology, which is also in general a quite unexplored factor that requires more attention. We use the degree of RIGHTIST POLITICAL ORIENTATION[13] as a proxy for ideology, expecting that people with more accentuated right ideology are less fond of protecting the environment. This is also visible when looking at party programs. Environmental concerns are usually stronger elaborated among left parties.

Hypothesis 2. Ideology might be a basis for attitudes towards preventing environmental damages. More left oriented people are more likely to have higher preferences for protecting the environment.

Also when looking at the economic factors we will go beyond considering only as a proxy for income (perceptions of people's ECONOMIC CLASS).[14] Individuals with a higher income have less pressing economic problems and are therefore more willing and able to reduce their standard of living to spend more money on global environmental problems. Additionally, we have also included several EMPLOYMENT STATUS CATEGORIES.[15] Perception of pressure may depend on the financial satisfaction of an individual and not per se on the level of income. Financial dissatisfaction might negatively influence the preference to pay more taxes in order to protect the environment. Such dissatisfaction can create a sense of distress, especially when taxes have to be paid and there is a discrepancy between the actual and the aspired financial situation. Thus, taxes might be perceived as a strong restriction, which increases the incentives not to contribute. As in one case the income variable is integrated in the equation, we can analyze the "stress" component of financial dissatisfaction. To consider this, we include as a novelty the variable Financial satisfaction.

Hypothesis 3. The willingness to spend money in environmental protection increases if people perceive themselves to be more financially satisfied.

An aspect which has been strongly neglected in the literature is social capital. This topic has been studied by many different disciplines. It has advanced to an important concept in social sciences, enforcing the interdisciplinary social discourse among researchers. The rapid growth of the social capital literature underlines a widespread unease with the standard explanations for the differential political and economic performances not only across nations but also across sub-national jurisdictions (Ostrom and Ahn, 2003; Schaltegger and Torgler, 2007). According to Paldam (2000, p. 630), there are three families of social capital concepts: trust, cooperation and network. He points out "most people build *trust* in and *networks* to others and come to *cooperate* with them" (p. 629). Trust and cooperation are closely related. Consequently, trust could be a crucial aspect in explaining also individuals' attitudes to contribute for environmental protection. In this respect, we have used two social capital proxies. First, we investigate the impact of generalized TRUST[16] and

[10] Question: 'When you get together with your friends, would you say you discuss political matters frequently, occasionally or never?'

[11] Question: 'How interested would you say you are in politics?'

[12] Question: 'How important is politics in your life?'

[13] Question: 'In political matters, people talk of "the left" and "the right." How would you place your views on this scale, generally speaking? Scale from 1 to 10'.

[14] Investigating also environmental attitudes in different Spanish regions, we find it is important to maximize the number of observations and thus to choose an alternative measure of income. In this paper, we include economic situation variables sequentially into the estimations, due to the relatively high number of missing values.

[15] Although it is well-known that people who have a position where it is almost impossible to fire them (e.g., civil servants, teachers etc.) have higher preferences for protecting the environment, it has been impossible to include more detailed information about individuals' occupational status to take this aspect into consideration.

[16] Question: 'Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?'

thus the belief to which extent most people can be trusted affects environmental attitudes. This allows to develop the following hypothesis:

Hypothesis 4. The more the citizens trust the society, the higher their willingness to contribute to the society through protecting the environment.

As an alternative measurement, the social capital literature uses membership in voluntary organizations. Additionally, it is useful to investigate the MEMBERSHIP IN A VOLUNTARY ENVIRONMENTAL ORGANIZATION as a variable. It can be expected that individuals who participate actively in environmental institutions have stronger preferences for environmental protection, as one of the major aims in an environmental group is the provision of public environmental goods through voluntary contribution. Thus, the following hypothesis can be developed:

Hypothesis 5. Participation in environmental organizations is correlated with stronger environmental preferences to reduce environmental damages.

However, the causality is not clear. There may be a potential *selection bias*. People with strong environmental preferences may choose to participate in a voluntary environmental organization. Such an argument would imply a reverse causality. To control for such a problem, we will use an instrumental approach in the empirical part to check the robustness of the results.

Another interesting and relatively novel aspect is to investigate the identification with the state, which may induce a higher cooperation among individuals and a higher preference to preserve a country's environmental conditions. NATIONAL PRIDE[17] can be used as a proxy for national identification. Tyler (2000) argues that in general pride influences people's behavior in groups, organizations and societies. It gives a basis for encouraging cooperative behavior. However, contrary to the trust variables, which have been thoroughly analyzed by social capital researchers, the variable pride has been completely neglected[18] in economics although it is a widespread phenomenon (Boulding, 1992). The following hypothesis can be developed:

Hypothesis 6. Pride might be a basis for encouraging environmental attitudes through national identification, which leads to a higher willingness to protect the environment.

Close to the concept of national identity are individuals' perceptions to which geographic groups they belong first of all (GEOGRAPHIC GROUP[19]). This is an unexplored issue. It is difficult to obtain a clear prediction. Individuals' attitudes depend on the importance of the different types of environmental problems (global, national, regional etc.). Our question has the disadvantage of not specifying whether the environmental damages are at the local or global level. Individuals who see themselves as citizens of the world as a whole may have relatively high environmental values, due the fact that in many cases environmental pollution produces high externalities at the world level. On the other hand, individuals strongly attached to the local area are less likely to act as free-riders and have a stronger willingness to reduce environmental damages at the local level and thus a higher willingness to accept higher taxes in order to preserve the environment.[20] As our dependent variable does not give clear information about the environmental damage, both aspects can have an impact on individuals' environmental attitudes.

Regarding spatial issues, and in line with previous studies we use a proxy of the rural/urban character of the town, by means of different SIZES OF TOWNS as dummy variables. Additionally, the survey provides the information of individual lives in Spanish REGION.[21] Thus, one of the main advantages in this study is the chance to control for regional differences. Witzke and Urfei (2001) point out that 'empirical knowledge about regional differences in demand for environmental goods is usually difficult to come by' (p. 213).[22]

Finally, a TIME variable has been included. Franzen (2003, p. 297) argues that the general level of concern for the natural environment has globally increased in the last 50 years. This can also be observed by the rise in international environmental treaties, the number of national environmental ministries and the increase in international nongovernmental organizations. However, the preference to pay higher taxes in order to prevent environmental damage may be strongly connected to the environmental efforts made by the governments. If people are more satisfied with the environmental policy, they may believe that it is not necessary to pay additional taxes to reduce environmental damages. The level of taxation is another aspect that matters too. By one side, higher levels of taxation reduce willingness to accept tax increases. By the other side, if the government reduces taxation, that fact can lead to a clear attitude against tax increases.

4. Empirical results

This section reports two groups of estimation results. Table 1 presents baseline estimation checking the robustness of the results working with or without weighting variables. Furthermore, to reduce possible causality problems, 2SLS estimations are presented. The primary objective in Table 2 is to investigate the robustness of the impact of political interest on environmental values. To do so, several proxies are developed and tested sequentially. Furthermore, due to the

[17] Question: 'How proud are you to be .....? Scale from 1 to 4'.

[18] Torgler and Schneider (2006) find empirically a strong correlation between pride and tax morale.

[19] Question: To which of these geographical groups would you say you belong first of all?

[20] However, the willingness to pay higher taxes may dependent on the fiscal autonomy of the locality. A higher fiscal autonomy should enforce such an argument.

[21] Thus, regional dummies for all 17 SPANISH REGIONS called Autonomous Communities are built. Navarra and the Basque Country are defined as *foral regime communities* or *charter regions*, and the other 15 regions are defined as *common regime communities*. Although Navarra and the Basque Country have the highest financial autonomy among Spanish regions, the remaining communities have obtained additional competences and financial instruments during the last years (Monasterio and Suárez-Pandiello, in press).

[22] As an exception see also Cameron and Englin (1997).

Table 1 – Determinants of the preferences for environmental protection in Spain

Ordered probit		Unweighted ordered probit			Weighted var 1 ordered probit			Weighted var 2 ordered probit			Weighted var 1 2SLS		Weighted var2 2SLS	
		Coeff.	z-Stat.	Marg. effects	Coeff.	z-Stat.	Marg. effects	Coeff.	z-Stat.	Marg. effects	Coeff.	t-Stat.	Coeff.	t-Stat.
Independent V.		1			2			3			4		5	
Socio-demographic factors														
Age		−0.003**	−2.08	−0.001	−0.003*	−1.92	−0.001	−0.003*	−1.75	−0.001	−0.002**	−2.02	−0.002*	−1.74
Gender	Male (r.g.)													
	Female	0.049	1.30	0.010	0.085**	2.12	0.017	0.070	1.62	0.015	0.075**	2.39	0.068**	2.01
Marital status	Married	0.009	0.21	0.002	−0.005	−0.10	−0.001	0.003	0.07	0.001	0.015	0.42	0.026	0.65
	Divorced	−0.135	−0.80	−0.026	−0.172	−0.93	−0.030	−0.141	−0.74	−0.027	−0.156	−1.12	−0.117	−0.81
	Separated	0.066	0.54	0.014	0.017	0.14	0.003	0.005	0.03	0.001	0.051	0.56	0.047	0.44
	Widowed	−0.091	−1.11	−0.018	−0.111	−1.28	−0.021	−0.122	−1.34	−0.024	−0.067	−0.99	−0.073	−1.04
	Single (r.g.)													
Formal and informal education														
Education		0.007**	1.99	0.002	0.007*	1.88	0.001	0.006	1.41	0.001	0.003	0.96	0.002	0.69
Discussing politics		0.123***	4.88	0.025	0.146***	5.36	0.029	0.132***	4.36	0.028	0.099***	4.71	0.089***	3.89
Occupational status														
Employment status	Full time employed (r.g.)													
	Part time employed	−0.027	−0.36	−0.005	−0.078	−0.98	−0.015	−0.018	−0.21	−0.004	−0.111*	−1.74	−0.072	−1.04
	Self employed	0.026	0.43	0.005	0.017	0.25	0.003	0.014	0.19	0.003	0.001	0.03	−0.007	−0.13
	Unemployed	−0.019	−0.32	−0.004	−0.075	−1.18	−0.014	−0.053	−0.78	−0.011	−0.068	−1.35	−0.059	−1.09
	At home	−0.001	−0.02	0.000	−0.034	−0.62	−0.007	−0.069	−1.18	−0.014	−0.039	−0.91	−0.075	−1.63
	Student	0.090	1.31	0.019	0.063	0.84	0.013	0.009	0.11	0.002	0.055	0.95	0.022	0.35
	Retired	−0.023	−0.37	−0.005	−0.040	−0.62	−0.008	−0.066	−0.93	−0.014	−0.031	−0.63	−0.059	−1.09
	Other	−0.028	−0.16	−0.006	−0.058	−0.31	−0.011	0.014	0.07	0.003	−0.056	−0.39	−0.012	−0.08
Social capital														
Trust		0.147***	4.69	0.031	0.156***	4.64	0.031	0.142***	3.90	0.031	0.115***	4.43	0.100***	3.61
Environ. organ.	Member volunt.	0.338***	3.66	0.083	0.338***	3.56	0.079	0.317***	2.98	0.078	1.125***	3.97	0.977***	3.46
	Not a member (r.g.)													
Identification														
National pride		0.044**	2.01	0.009	0.046**	1.98	0.009	0.055**	2.18	0.012	0.046**	2.51	0.051**	2.57
Geographic group	Locality or town (r.g.)													
	State or region	0.056	1.35	0.012	0.078*	1.78	0.016	0.075	1.63	0.016	0.061*	1.79	0.058	1.64
	Country as a whole	0.059	1.53	0.012	0.063	1.55	0.013	0.027	0.61	0.006	0.051	1.60	0.024	0.68

	Continent as a whole	0.078	0.99	0.017	0.112	1.30	0.023	0.118	1.24	0.027	0.086	1.32	0.088	1.25
	World as a whole	0.126*	1.89	0.028	0.129*	1.82	0.027	0.168**	2.04	0.038	0.091*	1.67	0.106*	1.72
Other variables														
Size of town	Under 2000 (r.g.)													
	2000–5000	0.166**	2.23	0.037	0.104	1.27	0.021	0.112	1.30	0.025	0.063	0.99	0.059	0.88
Other variables														
Size of town	Under 2000 (r.g.)													
	5000–10,000	0.120*	1.73	0.026	0.102	1.31	0.021	0.154*	1.83	0.035	0.053	0.87	0.079	1.20
	10,000–20,000	0.153**	2.18	0.034	0.128*	1.68	0.027	0.220***	2.74	0.051	0.078	1.32	0.137**	2.24
	20,000–50,000	0.107	1.63	0.023	0.171**	2.34	0.036	0.170**	2.14	0.038	0.111*	1.96	0.102*	1.68
	50,000–100,000	0.299***	3.90	0.071	0.258***	3.17	0.057	0.301***	3.43	0.073	0.171***	2.72	0.195***	2.89
	100,000–500,000	0.178***	2.97	0.038	0.206***	3.13	0.043	0.248***	3.52	0.056	0.137***	2.67	0.158***	2.91
	500,000 and more	0.096	1.46	0.020	0.152**	2.13	0.032	0.206***	2.68	0.047	0.089	1.60	0.118**	1.98
Spanish region	Andalucia	−0.129**	−2.06	−0.025	−0.126*	−1.91	−0.024	−0.098	−1.26	−0.020	−0.105**	−2.07	−0.072	−1.22
	Aragon	0.191*	1.94	0.043	0.153	1.30	0.033	0.170	1.46	0.039	0.101	1.12	0.138	1.57
	Asturias	0.156	1.46	0.035	0.179	1.57	0.039	0.184	1.52	0.043	0.136	1.57	0.154*	1.67
	Baleares	−0.290***	−2.64	−0.050	−0.256**	−2.06	−0.043	−0.384***	−2.65	−0.065	−0.207**	−2.18	−0.288***	−2.69
	Cataluna	−0.257***	−4.19	−0.048	−0.332***	−5.22	−0.057	−0.172**	−2.36	−0.034	−0.248***	−5.06	−0.107*	−1.91
	Canarias	−0.167*	−1.69	−0.031	−0.169	−1.56	−0.030	−0.008	−0.07	−0.002	−0.163*	−1.93	−0.028	−0.31
	Cantabria	−0.337***	−2.66	−0.057	−0.260*	−1.87	−0.044	−0.146	−0.94	−0.028	−0.183*	−1.70	−0.085	−0.73
	Castilla-Leon	0.296***	3.94	0.070	0.228***	2.90	0.050	0.275***	3.02	0.066	0.154	2.61	0.192***	2.85
	Castilla-la Mancha	−0.225**	−2.56	−0.041	−0.184*	−1.83	−0.033	−0.022	−0.18	−0.005	−0.157**	−2.04	−0.028	−0.32
	Extremadura	0.238**	2.12	0.055	0.183	1.62	0.040	0.364***	2.93	0.092	0.111	1.33	0.238***	2.68
	Galicia	−0.237***	−2.94	−0.043	−0.278***	−3.29	−0.047	−0.097	−0.97	−0.020	−0.213***	−3.31	−0.066	−0.88
	Rioja	0.069	0.57	0.015	0.004	0.03	0.001	0.093	0.53	0.021	−0.024	−0.23	0.032	0.23
	Madrid (r.g.)													
	Murcia	0.119	1.11	0.026	0.175	1.51	0.038	0.164	1.14	0.038	0.147	1.62	0.143	1.23
	Navarra	−0.041	−0.34	−0.008	−0.140	−1.08	−0.025	−0.078	−0.57	−0.016	−0.094	−0.95	−0.029	−0.28
	Pais Vasco	−0.067	−0.76	−0.013	−0.019	−0.21	−0.004	0.018	0.18	0.004	−0.008	−0.12	0.035	0.45
	Comunidad Valenciana	−0.165**	−2.39	−0.031	−0.247***	−3.29	−0.043	−0.156*	−1.93	−0.031	−0.212***	−3.58	−0.138**	−2.17
Time	Spain 90 (r.g.)													
	Spain 95	0.258***	5.84	0.058	0.261***	5.60	0.055	0.249***	5.32	0.054	0.140***	3.42	0.140***	3.53
	Spain 1999/2000	−0.138***	−3.16	−0.028	−0.150***	−3.29	−0.029	−0.159***	−3.40	−0.032	−0.106***	−3.04	−0.112***	−3.14
(Pseudo) R^2		0.031			0.037			0.035			0.053		0.046	
Number of observations		5226			5226			5226			5226		5226	
Prob>chi^2		0.000			0.000			0.000			0.000		0.000	

Dependent variable: environmental morality on a four point scale. *,** and **** denote significance at the 10%, 5% and 1% level. Marginal effect = highest environmental value score (3). Instrument in the 2SLS for member voluntary environmental organization: not a member of a voluntary organization. Data Spain 1999/2000 covers the European Values Survey (EVS) 1999 and the World Values Survey (WVS) data 2000. A dummy variable has been added in the estimations to differentiate between EVS and WVS.

Table 2 – Further factors that shape individuals' preferences for environmental protection in Spain

Independent V.		Weighted var 1 ordered probit			Weighted var 1 ordered probit			Weighted var 1 ordered probit			Weighted var 1 ordered probit			Weighted var 1 ordered probit		
		Coeff.	z –Stat.	Marg. effects	Coeff.	z –Stat.	Marg. effects	Coeff.	z-Stat.	Marg. effects	Coeff.	z-Stat.	Marg. effects	Coeff.	z-Stat.	Marg. effects
			6			7			8			9			10	
Demographic factors																
Age		−0.003*	−1.96	−0.001	−0.003**	−2.00	−0.001	−0.002	−0.91	−3E−004	−0.003**	−2.05	−0.001	−0.003*	−1.78	−0.001
Gender	Male (r.g.)															
	Female	0.082**	2.06	0.016	0.078*	1.96	0.015	0.101**	2.23	0.021	0.059	1.32	0.013	0.063	1.37	0.014
Marital	Married	0.006	0.13	0.001	0.010	0.22	0.002	−0.008	−0.16	−0.002	−0.007	−0.13	−0.001	−0.032	−0.60	−0.007
status	Divorced	−0.145	−0.80	−0.026	−0.118	−0.65	−0.022	−0.226	−1.09	−0.041	−0.208	−0.95	−0.040	−0.217	−0.98	−0.041
	Separated	0.016	0.13	0.003	0.009	0.08	0.002	0.100	0.74	0.022	−0.043	−0.35	−0.009	−0.069	−0.54	−0.014
	Widowed	−0.102	−1.18	−0.019	−0.097	−1.11	−0.018	−0.153	−1.48	−0.029	−0.116	−1.23	−0.023	−0.120	−1.24	−0.024
	Single (r.g.)															
Formal and informal education																
Education		0.008*	1.94	0.001	0.007*	1.91	0.001	0.008**	1.79	0.002	0.004	0.96	0.001	0.001	0.31	0.0003
Discussing politics								0.131***	4.26	0.027	0.135***	4.47	0.029	0.134***	4.31	0.029
Interest in politics		0.097***	5.18	0.019												
Importance of politics				0.098***	5.08	0.019										
Idealogy																
Right political orientation							−0.030***	−2.94	−0.006							
Economic situation																
Economic	Upper class													0.045	0.43	0.010
situation	Upper middle class													0.153***	2.67	0.035
	Lower middle class													0.148***	3.25	0.033
	Working/lowest class (r.g.)															
Financial satisfaction											0.027***	2.69	0.006	0.025**	2.33	0.005
Occupational status																
Employment	Full time employed (r.g.)															
status	Part time employed	−0.080	−1.01	−0.015	−0.071	−0.90	−0.013	−0.100	−1.09	−0.019	−0.085	−0.97	−0.017	−0.095	−1.06	−0.019
	Self employed	0.023	0.35	0.005	0.028	0.43	0.006	0.018	0.25	0.004	−0.002	−0.03	0.000	0.001	0.02	0.000
	Unemployed	−0.052	−0.82	−0.010	−0.055	−0.86	−0.011	−0.065	−0.90	−0.013	−0.034	−0.47	−0.007	−0.003	−0.05	−0.001
	At home	−0.041	−0.75	−0.008	−0.042	−0.77	−0.008	0.007	0.11	0.001	−0.043	−0.70	−0.009	−0.029	−0.46	−0.006
	Student	0.056	0.75	0.011	0.059	0.79	0.012	0.066	0.78	0.014	0.000	0.00	0.000	0.021	0.24	0.005
	Retired	−0.044	−0.68	−0.008	−0.051	−0.78	−0.010	−0.039	−0.53	−0.008	−0.027	−0.37	−0.006	−0.024	−0.32	−0.005
	Other	−0.077	−0.41	−0.014	−0.076	−0.40	−0.014	−0.032	−0.14	−0.006	−0.295	−0.40	−0.053	−0.319	−0.43	−0.057
Social capital																
Trust		0.155***	4.61	0.031	0.155***	4.61	0.031	0.166***	4.46	0.035	0.164***	4.35	0.036	0.162***	4.20	0.036
Environ.	Member volunt.															
organ.	Not a member (r.g.)	0.322***	3.30	0.075	0.317***	3.24	0.073	0.423***	4.25	0.106	0.340***	3.17	0.086	0.292***	2.66	0.072

Identification																
National pride		0.047**	2.04	0.009	0.047**	2.02	0.009	0.040	1.52	0.008	0.011	0.42	0.002	0.007	0.25	0.001
Geographic	Locality or town (r.g.)															
group	State or region	0.074*	1.69	0.015	0.067	1.52	0.013	0.059	1.15	0.012	0.044	0.90	0.010	0.046	0.91	0.010
	Country as a whole	0.060	1.46	0.012	0.052	1.28	0.010	0.051	1.11	0.011	0.035	0.75	0.008	0.072	1.50	0.016
	Continent as a whole	0.121	1.39	0.025	0.123	1.42	0.026	0.106	1.20	0.023	0.043	0.50	0.009	0.032	0.35	0.007
	World as a whole	0.131*	1.87	0.027	0.125*	1.79	0.026	0.121	1.53	0.026	0.155*	1.84	0.036	0.165*	1.93	0.038
Other variables																
Size of town	Under 2000 (r.g.)															
	2000–5000	0.113	1.39	0.023	0.105	1.29	0.022	0.037	0.38	0.008	0.071	0.82	0.016	0.069	0.78	0.015
	5000–10,000	0.116	1.50	0.024	0.110	1.43	0.023	0.014	0.15	0.003	0.169**	2.05	0.039	0.155*	1.82	0.036
	10,000–20,000	0.142*	1.88	0.030	0.144*	1.90	0.030	0.056	0.63	0.012	0.167**	2.07	0.038	0.169**	2.05	0.039
	20,000–50,000	0.168**	2.33	0.035	0.165**	2.29	0.035	0.108	1.22	0.023	0.179**	2.27	0.042	0.180**	2.21	0.042
	50,000–100,000	0.256***	3.16	0.057	0.258***	3.19	0.057	0.209**	2.14	0.047	0.303***	3.49	0.074	0.262***	2.92	0.063
	100,000–500,000	0.215***	3.31	0.045	0.215***	3.31	0.045	0.114	1.44	0.024	0.279***	4.02	0.065	0.263***	3.64	0.061
	500,000 and more	0.149**	2.11	0.031	0.157**	2.22	0.033	0.090	1.07	0.019	0.184***	2.38	0.042	0.182**	2.27	0.042
Region	Andalucia	−0.131**	−1.98	−0.024	−0.133**	−2.01	−0.025	−0.153**	−2.07	−0.029	−0.118	−1.53	−0.024	−0.102	−1.28	−0.021
	Aragon	0.179	1.50	0.039	0.153	1.29	0.033	0.225	1.62	0.052	0.278*	1.93	0.068	0.313**	2.19	0.078
	Asturias	0.169	1.50	0.036	0.161	1.43	0.034	0.096	0.78	0.021	0.216	1.64	0.052	0.270**	2.00	0.066
	Baleares	−0.250**	−2.06	−0.042	−0.252**	−2.06	−0.043	−0.183	−1.32	−0.034	−0.280**	−2.21	−0.051	−0.246*	−1.89	−0.046
	Cataluna	−0.335***	−5.25	−0.057	−0.333***	−5.22	−0.057	−0.403***	−5.62	−0.070	−0.202***	−2.76	−0.040	−0.196***	−2.60	−0.039
	Canarias	−0.179*	−1.66	−0.032	−0.172	−1.60	−0.031	−0.144	−1.15	−0.027	−0.136	−1.06	−0.027	−0.078	−0.60	−0.016
	Cantabria	−0.233*	−1.69	−0.040	−0.230*	−1.67	−0.039	−0.090	−0.49	−0.017	−0.155	−1.06	−0.031	−0.128	−0.85	−0.026
	Castilla-Leon	0.212***	2.70	0.046	0.218***	2.77	0.047	0.169*	1.87	0.037	0.197**	2.25	0.046	0.214**	2.40	0.050
	Castilla-La Mancha	−0.217**	−2.12	−0.038	−0.215**	−2.09	−0.037	−0.173	−1.57	−0.032	−0.097	−0.83	−0.020	−0.107	−0.89	−0.022
	Extremadura	0.180	1.58	0.039	0.176	1.56	0.038	0.198	1.50	0.045	0.336***	2.83	0.085	0.357***	2.99	0.091
	Galicia	−0.287***	−3.40	−0.048	−0.282***	−3.34	−0.048	−0.256***	−2.78	−0.046	−0.068	−0.68	−0.014	−0.032	−0.31	−0.007
	Rioja	−0.005	−0.04	−0.001	−0.023	−0.17	−0.005	−0.071	−0.44	−0.014	−0.032	−0.21	−0.007	0.0013	0.01	0.0003
	Madrid (r.g.)															
	Murcia	0.130	1.14	0.027	0.138	1.22	0.029	0.172	1.29	0.039	0.272*	1.93	0.067	0.240	1.64	0.058
	Navarra	−0.152	−1.18	−0.027	−0.139	−1.06	−0.025	−0.154	−1.02	−0.029	−0.085	−0.65	−0.017	−0.065	−0.49	−0.014
	Pais Vasco	−0.030	−0.33	−0.006	−0.030	−0.34	−0.006	−0.048	−0.46	−0.010	−0.030	−0.29	−0.006	−0.010	−0.09	−0.002
	Comunidad Valenciana	−0.251***	−3.33	−0.043	−0.251***	−3.33	−0.044	−0.283***	−3.43	−0.051	−0.284***	−3.31	−0.053	−0.268***	−3.04	−0.051
Time	Spain 1990 (r.g)															
	Spain 1995	0.261***	5.61	0.056	0.249***	5.32	0.053	0.259***	4.78	0.058	0.257***	5.47	0.058	0.303***	5.80	0.069
	Spain 1999/2000	−0.149***	−3.29	−0.029	−0.158***	−3.47	−0.031	−0.154***	−3.02	−0.032	−0.149***	−3.27	−0.031	−0.117**	−2.36	−0.025
Wald-test: joint for econ. sit. and edu.													17.13***			
(Pseudo) R^2		0.037			0.037			0.035			0.035			0.037		
Number of observations		5232			5213			4033			4284			4086		
Prob>chi^2		0.000			0.000			0.000			0.000			0.000		

Dependent variable: environmental morality on a four point scale. *,** and *** denote significance at the 10%, 5% and 1% level. Marginal effect = highest environmental value score (3). A dummy variable has been added in the estimations to differentiate between EVS and WVS. Eqs. (9) and (10) covers only World Values Survey data. The used proxies on the economic situation were not available in the EVS 1999 data set.

relatively high number of missing values, proxies of the economic situation have also been included in Table 2 sequentially. In all cases, we show the marginal effects related to the group which has the highest preferences for environmental protection.

Tables 1 and 2 indicate that Hypothesis 2 cannot be rejected. Table 1 shows that an increase in the level of discussing politics by one unit increases the share of subjects reporting the highest willingness to contribute between 2.5 and 2.9 percentage points. In all estimations, the coefficient is statistically significant. Moreover, the coefficient of political discussion can be seen as one of the most significant and most important quantitative coefficients among all the ones used. This result is confirmed when using two further proxies (INTEREST IN POLITICS and IMPORTANCE OF POLITICS) in Table 2. Both cases yield marginal effects close the 2 percentage points. Thus, the paper shows that we have to go beyond formal education and include individuals' interest for current political matters or other proxies of political awareness. Both tables show that political interest has a much stronger impact on individuals' environmental attitudes. We also observe a positive relationship between formal education and environmental attitudes, but the coefficient loses its significance in specification 3 to 5 and 10. Thus, including the second weighting variable (specification 3), running the 2SLS regressions (4 and 5) and including the economic situation of the individual (Eq. (10)) reveal that the impact of formal education is not robust.

What about individuals' ideology? In line with our prediction, we find that people with a rightist orientation are less willing to contribute and pay higher taxes to prevent environmental damages. This statement may not be affected by different environmental attitudes only, but also by a general rejection of tax increases. However, the marginal effects are relatively low. An increase in the scale to the right reduces the probability of reporting the highest environmental attitudes by 0.6 percentage points. Furthermore, it should be noted that the ideology variable has many missing values, which makes it impossible to include the variable simultaneously in all the regressions. But due to these results we can conclude that Hypothesis 2 is supported.

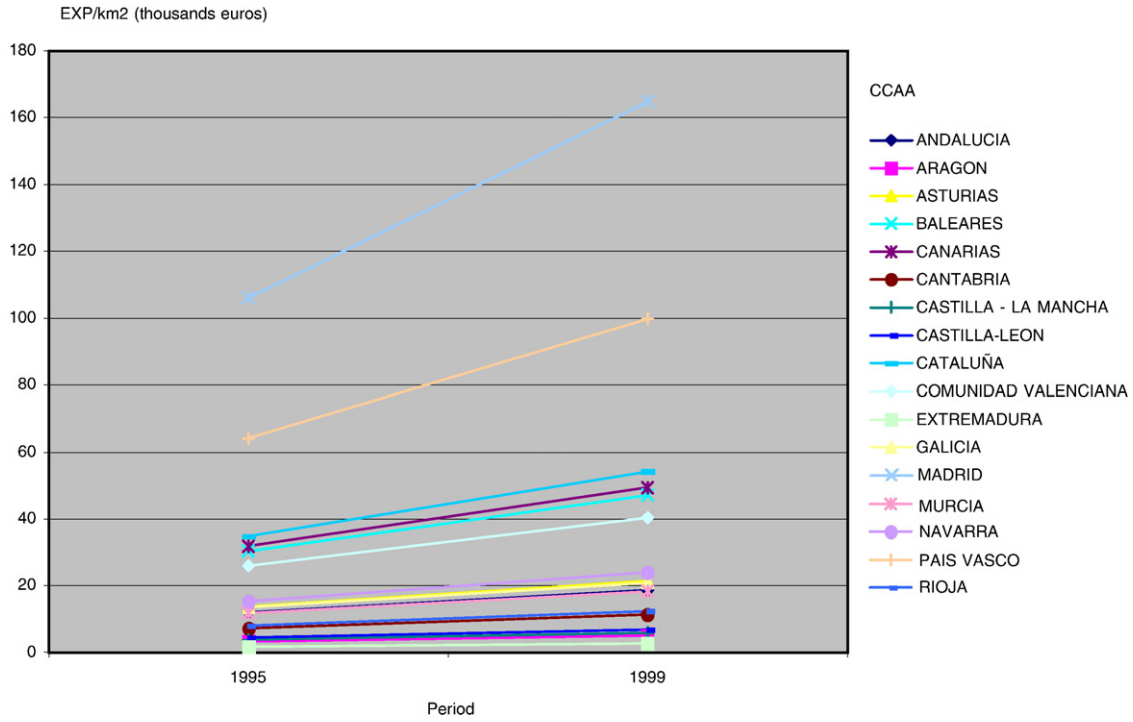
On the other hand, we find evidence that the economic situation matters. Also here we have the situation of relatively high number of missing values, which requires to include them sequentially (see last two estimations). The results indicate that a higher financial satisfaction leads to a higher preference to contribute (see estimation 9 and 10). This result remains robust after controlling for individuals' perception of their economic class status, although in both estimations. The marginal effects are not extremely, but comparable to the ones observed for political ideology. An increase in the level of financial satisfaction by one unit raises the share of individuals stating the strongest preferences for preventing environmental damages by around 0.6 percentage points. Thus, we cannot reject Hypothesis 3. Interestingly, *upper middle class* people show the highest level of environmental preferences, with marginal effects of 3.5 percentage points, followed by the *lower middle class* (3.3 percentage points) and the *upper class* (0.5 percentage, with a coefficient that is not statistically significant). Thus, there is a non-linear relationship between economic class and environmental attitudes. That fact can be seen as a confirmation of Kuznet's hypothesis at the individual level.[23] We also use a Wald-test for coefficient restrictions testing for joint significance of the economic situation and education. The results provide supportive evidence on their relevance as a group in understanding individuals' environmental attitudes.

Tables 1 and 2 also show that social capital matters. The results support Hypotheses 4 and 5. Trusting others leads to a higher preference for environmental protection. An increase in the trust scale by one unit raises the share of people reporting the highest preference between 3.1 and 3.6 percentage points. Thus, also trust is one of the most significant and important quantitative coefficients in the specifications. Not surprisingly being a member of a voluntary environmental organization leads to a higher willingness to accept a tax increase, the probability of stating the highest values increasing by more than 7.3 percentage points and showing thus the highest marginal effects among all the used variables. This might, however, be due to the higher probability of people with high values to choose the participation in a voluntary environmental organization. Thus, the causality is not clear due to a *selection bias*. This requires to apply an instrumental variable technique. A suitable instrument must be contemporaneously uncorrelated with the error term but must be highly correlated with a membership in a voluntary environmental organization. In our case, we use the dummy variable NOT A MEMBER OF A VOLUNTARY ORGANIZATION as an instrumental variable, which covers all possible voluntary organizations and not only environmental ones. The variable is not correlated with the error term ($r=-0.03$) and highly correlated with being a member of a voluntary environmental organization ($r=-0.30$). The 2SLS estimations are presented in the Eqs. (4) and (5) using the two available weighting variables. The equations indicate that the results are consistent with the ordered probit estimations. Therefore we decide to continue with ordered probit estimations to take into account the ranking information of the dependent variable.

A higher level of national pride is also correlated with higher preferences towards environmental protection, although the coefficient loses its significance in the last three estimations in Table 2. The marginal effects strongly vary (between 0.1 and 0.9 percentage points). The quantitative effects indicate that other variables such as social capital and political interest have a stronger impact on environmental attitudes. However, the lack of significance in 3 out of 10 estimations (see Eqs. (8) to (10)) seemed to be driven by a significantly lower number of observations. Nevertheless, the impact of national pride on environmental attitudes is less robust. Thus, Hypothesis 6 is not fully supported.

The GEOGRAPHIC GROUP variable shows that people in the reference group (*locality or town*) have the lowest preference to contribute (all coefficients have a positive sign). On the other hand, the group *world as a whole* shows the strongest

[23] The so-called Kuznet's curve (Selden and Song, 1994; Grossman and Krueger, 1995) reflects the relationship between pollution and economic activity. That relationship usually is shown as a not linear function, by means of an inverted U-shaped curve. Even an inverted N-shaped curve has been proposed (Holtz-Eakin and Selden, 1995; Cole et al., 1997).



Source: INE (2006).

Fig. 1 – Environmental protection expenditures 1995–1999.

difference to the reference group and the highest preference for environmental protection, being statistically significant in almost all estimations with marginal effects between 2.6 and 3.8 percentage points. The factor SIZE OF TOWN shows some interesting implications. People living in a town with less than 2000 inhabitants have the lowest value. The highest preference can be found in the town size 50,000–100,000. On the other hand, individuals living in a town with 500,000 and more inhabitants show lower values, closer to those from towns with 5–10,000 inhabitants. Thus, the relationship is not entirely linear. The high level of environmental attitudes in town sizes of 50,000–100,000 may be due to the advantage of not being big enough to induce a strong free-riding mentality in the anonymous city, but big enough to be able to implement strong and active environmental programs.[24]

Strong regional differences among Spanish regions are found. To detect a possible reason for this we calculate the environmental protection expenditures per km^2 for the years 1995 and 1999[25] (INE, 2004). Those values are shown in Fig. 1. All in all, regions with negative coefficients in the estimations have relatively higher levels of environmental protection expenditures per km^2 (except the Cantabria Region). In this case, the argument can be similar to the time-factor explanation. The higher the expenditures, the higher citizens' satisfaction with public policies in matters of environmental protection, which leads to a decrease in the preference to pay higher taxes for that "public good".

The regional income level can be an additional argument to explain the negative coefficients of some Autonomous Communities (CCAA). Communities like Baleares, Comunidad Valenciana or Cataluña are characterized by high GDP per capita levels. This might reflect a trade-off between economic activity and preferences for protecting the environment. At the same time, those regions that have higher income, show higher levels of tax burden, so that such a situation can lead to a lower willingness to accept additional tax increases. Usually, poor regions receive public grants in order to finance several public policies, and the fiscal illusion can be stronger in those Autonomous Communities.

Finally, we take a look at the evolution over time. We find a strong increase of the willingness to contribute between 1990 and 1995. On the other hand, between 1995 and 1999/2000 a very strong decrease is observable. The attitudes towards environmental protection by means of higher taxes in 1999/2000 is statistically significantly lower than in 1990, with marginal effects between 2.5 and 3.2 percentage points. It somehow surprises that we don't observe a clear and consistent trend in the 90s, taking into account that the energy-related emissions (including transport) have shown a continuous increase that led to somehow problematic situations in terms of greenhouse gas emissions, increase of the water pollution and destruction of many coast areas. This requires to take a closer look at the situation in Spain. After the Rio agreements in 1992 and the approval of the Agenda for the 21st century, the EU developed the V Environmental Program (1993–2000). In that document, several explicit strategies were designed, and members had to adapt their regulations to this

[24] In this respect, Font and Subirats (2000) showed some municipalities' experiences to implement Agenda 21 objectives in a local context.

[25] The Ceuta and Melilla Region has been excluded from the graph because it is an outlier. Only information about 1995 and 1999 is available.

Program's framework. In Spain, there was a concentration of initiatives and regulations in the second part of the 90s. During the period 1995–2000 institutions were created to improve the environment, and in special areas such as the reduction of certain emissions or the improvement of several environmental infrastructures, progresses are evident (OECD, 2004). At the same time, from 1994 on, Spain began to receive European Structural Funds to finance environmental protection investments. Such structural funds may have lead in the second half of the 90s to a higher individual satisfaction with the environmental public policy and thus to a lower willingness to increase the contribution to prevent environmental damage.

In general, if people perceive environmental damages more closely, they will be willing to pay more money in order to improve the quality of the environment. Although emissions and water pollution have increased during the last 15 years, there were some environmental problems that cause daily bothers to the population. A good example was one of the most severe drought periods in Spain from 1992–1996. To cope with this drought, some rationing measures were put into practice, such as cuts in supply or reductions in water pressure. And, usually, the scarce quantity of water was aggravated by quality problems. This kind of environmental problems affects the population directly. They become aware of the necessity to intensify public environmental initiatives, which may have led to an increasing willingness to contribute for environmental protection in Spain, especially in the first half of the 90s.

Additionally, individuals' environmental attitudes are also influenced by the current level of Spain's tax burden. By one side, the situation at the end of the 90s does not allow to speak of a real "green" tax reform in Spain. Although having good administrative conditions to implement environmental taxation, the Spanish fiscal system has not included taxes on emissions, and sometimes, environmental taxes are poorly designed and rather used to get additional revenues than to really handle existing environmental problems (Gago and Labandeira, 1999). Thus, the number and kind of environmental taxes was not significantly different in 1999/2000 compared to 1995 situation. However, the revenue from those taxes increased about 37% during the period 1995–1999 (EUROSTAT, 2006).[26]

By the other side, an income tax reform in 1998 led to a reduction of the average tax rates by 2% from a static point of view and under a partial equilibrium context (Castañer et al., 2004). Moreover, the disposable income of all taxpayers became on average 2.6% higher. Taxpayers were waiting for a taxation decrease, so perhaps this reduction in the level of direct taxation created a strong atmosphere against tax increases and therefore also a lower level of willingness to pay for the prevention of environmental damages. In fact, a national opinion survey about fiscal issues shows that the 65% of Spanish population thought that they were paying too much taxes at the end of the nineties (CIS, 2000).

[26] At this respect, EUROSTAT includes four categories of environmental taxes: energy taxes (including CO_2 taxes), transport taxes, pollution taxes and resource taxes (excluding taxes on oil and gas).

The results obtained can help to design environmental policies in Spain. The most effective degree of decentralization to achieve specific environmental objectives remains a controversial topic. On the one hand side, regional differences are a significant argument to justify a decentralization process in this context. In fact, Spanish regions have obtained more environmental competences in the last few years. However, for some environmental policies in the European Union we observe the trend towards centralization.[27] In this respect, it could be adequate to propose some kind of mixed policy, in order not to induce welfare losses in some Spanish regions, and thus to take into account regional differences. It is clear that there are differences in preferences for the level of public environmental protection expenditures among regions. So, a decentralized policy in the Spanish regions, which takes into account European objectives, could be a possible strategy.

What about some of the other control variables? In line with the previous literature, we observe a negative correlation between age and environmental attitudes. In almost all estimations the coefficient is statistically significant. Females report a higher preference to contribute than men. The coefficient is statistically not significant in the non-weighted estimations, but significant in the first weighted estimations in Tables 1 and 2. Estimation 2 indicates that being female rather than male increases the probability of a person to strongly agree to increase taxes to prevent environmental damage by 1.5 percentage points. Interestingly, the coefficient is not statistically significant anymore after controlling for the economic situations of the respondents. Moreover, there are no statistically significant differences among the marital variables and the employment situation.

5. Conclusions

Since the 1970s, the number of studies investigating environmental preferences has been growing. However, we still observe a lack of papers that analyze a country and its regions or its development over time. Furthermore, it is a promising line to search empirically for factors neglected in previous studies. This paper aims therefore to reduce such shortcomings. To assess individuals' environmental attitudes in Spain and its different regions over time we use data sets provided by the World Values Surveys (WVS) and the European Values Surveys (EVS) covering the years 1990 (WVS), 1995 (WVS) and 1999/2000 (WVS and EVS).

Compared to many previous studies, we present in this paper a richer set of independent variables to better isolate the impact of a specific variable on individuals' environmental attitudes. This allows to investigate several different

[27] For example, in the water resources field, the European Framework D2000/60/EC established a common guide for members to improve water quality and quantity aspects. The basic objective of the European regulation is to improve water quality and to achieve a rational use of water resources, in order to reduce pressure on those resources. The European Union is enforcing country members to apply this framework in the next few years. The Spanish central government will have to adapt its regulation to the European Framework.

hypotheses that are not well discussed in the literature. The results are summarized in Table A2 in the Appendix. In general, the findings indicate a strong impact of political interest and social capital on the willingness to prevent environmental damages. We also find support that ideology and financial satisfaction matter. Both have similar quantitative effects. Left orientation and a higher financial satisfaction are ceteris paribus correlated with a higher willingness to prevent environmental damages.[28] Furthermore, we find big differences between the first half (strong increase of the environmental attitudes) and the second half of the 90s (strong decrease). A possible reason for regional differences and the development over time is a higher satisfaction with the environmental policy, which may lead to the belief that paying additional taxes is not necessary to reduce environmental damages.

These results have some interesting policy implications. Increasing political awareness and the level of political discussion and political interest may help to increase individuals' willingness to contribute to the society via preventing environmental damages. Moreover, a climate with a high level of social capital and generalized trust provides a good fundament to guarantee a certain level of environmental preferences. These findings can be useful in order to create and maintain social capital to better preserve the environment. So, it is important that international agencies, governments, and other organizations accept and understand that investment in the creation of social capital pays-off. Finally, all kind of efforts made to characterize the kind of people who have higher environmental preferences help to assure those investments' success.

Regional dummy variables have been added to check for possible cross-regional variations. The results indeed indicate that there are differences between regions. Environmental preferences vary between regions and a more decentralized structure may help to deal in a better manner with such differences. Thus, our findings may justify a decentralization process in this context, allowing a certain degree of centralization to control possible external problems.

All in all, investigating citizens' environmental preferences, the paper underlines the importance of investigating a rich set of theories to fully understand what influences their willingness to contribute to the environmental protection. Understanding what shapes environmental attitudes still remains a fruitful field for further research.

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[28] It is still open how ideology affects environmental attitudes in other European countries.

Appendix A

Table A1 – Overview of some previous studies

Author/ year	Location/ period	Environmental aim	Sample size	Main factors
Whitehead (1991)	Kentucky (US), 1989	Wetlands preservation	210	Age Participation in outdoor wetlands-related recreation Membership in environmental organization Policy price
Stevens et al. (1994)	New England (US), 1989, 1992	Wildlife preservation	179	Age Income Education Policy price
Danielson et al. (1995)	Gaston County (North Carolina, US), 1990	Improving air and water pollution	370	Race Quality of information about the environmental problem Perceived level of pollution control Policy price
Bord and O'Connor (1997)	Two US surveys, 1991	Several environmental attitudes (health risks, ecological risks, seriousness of problem, voluntary action)	361–454	Age, gender, Minorities Education Quality of information about the environmental problem
Cameron and Englin (1997)	New York, Vermont, Maine and New Hampshire (US), 1989	Increasing the abundance of trouts in lakes and streams	4328	Gender Experience variables Quality of information about the environmental problem
Blomquist and Whitehead (1998)	Kentucky (US), 1990	Wetlands preservation	379	Income Education Membership in environmental organization Quality of information about the environmental problem
Engel and Pötschke (1998)	9 countries, 1993	Global environmental preservation	13,477	Age, gender Income Education Membership in environmental organization

(continued on next page)

Table A1 (*continued*)

Author/ year	Location/ period	Environmental aim	Sample size	Main factors
				Some sociopolitical attitudes Risk perception
Carlsson and Johansson-Stenman (2000)	Sweden, 1996	Air quality improvement	3107	Gender Membership in environmental organization Town/city size House ownership
Zelezny et al. (2000)	Three studies in the 90s	Environmentalism among children Environmentalism across 14 countries Survey on environmental attitudes among students	119–2160	Gender
Popp (2001)	Several states in US, 1990	Cleaning up the nation's air and water	951	Income Life expectancy Altruism about future generations
Witzke and Urfei (2001)	Germany, 1997	Global environmental preservation	1661	Age Income Some labor groups Education Green and left party voters Regional differences
Franzen (2003)	26 countries, 2000	Concern for the global conditions of the environment	26	Citizens in wealthier nations express greater concern than those in poorer countries
Dupont (2004)	Ontario (Canada), 1995	Cleaning Hamilton Harbor watershed area to implement recreational activities	713	Parenthood Environmental concerns Health risk perception
Hunter et al. (2004)	20 countries, 1993	Engagement in (private) environmental behaviors	More than 20,000	Gender
Israel and Levinson (2004)	33 countries, 1995–96	Global environmental preservation	36,375	Age, gender Income Education Town/city size
Veinsten et al. (2004)	Norwey, 1992	Endangered species protection	1019	Age Income Urbanization Engagement in preserving endangered species
Bulte et al. (2005)	Netherlands, 2001	Preservation of seal population in the Waddenzee	1309	Gender Causes of the environmental problem
Hildano et al. (2005)	Tokyo (Japan), 2000	Avoiding global warming	168–194	Age, gender Income Some environmental attitudes Quality of information about the environmental problem

Table A2 – Independent variables, predictions and summary of the results

Independent variable	Kind of variable	Categories	Expected sign	Results[a]
Socio-demographic factors (SOCDEM)				
Age (–)		Continuous	–	–
Gender	Dummy	Male (reference group)		
		Female	+	+
Marital status	Dummy	Married; Divorced; Separated; Widowed; Single (r.g.)	+	((±))
Formal and informal education (EDUC)				
Education (+)		Continuous	–	+
Discussing politics	Scaled	1=never to 3=frequently	+	+
Interest in politics	Scaled	1=not at all interested to 4=very interested	+	+
Importance of politics	Scaled	1=not at all important to 4=very important	+	+
Idealogy (IDEOLG)				
Rightist political orientation	Scaled	1=left to 10=right	–	–
Economic Situation (ECONSIT)				
Financial satisfaction	Scaled	1=dissatisfied to 10=satisfied	+	+

Table A2 (*continued*)

Independent variable	Kind of variable	Categories	Expected sign	Results[a]
Economic Situation (ECONSIT)				
Economic class	Dummy	Upper class; Upper middle class; Lower middle class; Working/lowest class (r.g.)	+	+, However, non-linear, highest for world as a whole
Occupational status (EMPLOY)				
Employment status	Dummy	Full time employed (r. g.); Part time employed; Self employed; Unemployed; At home; Student; retired; Other	±	((±))
Social capital (SCAPITAL)				
Trust	Scaled	0=can't be too careful or 1=most people can be trusted	+	+
Membership in a voluntary env. org.	Dummy	Member volunt.; Not a member (r.g.)	+	+
Identification (IDENTIFIC)				
National pride	Scaled	1=not at all proud to 4=very proud	+	(+)
Perceived geographical group	Dummy	Locality or town (r.g.); State or region; Country as a whole; Continent as a whole; World as a whole	±	(+), Non-linear, highest for world as a whole, effect decreases after incl. income
Other variables				
Size of town (*URBANI*)	Dummy	Under 2000 (r. g.); 2000–5000; 5000–10,000; 10,000–20,000; 20,000–50,000; 50,000–100,000; 100,000–500,000; 500,000 and more	±	+, Not fully linear, highest 50,000–100,000
Spanish region (*REGION*)	Dummy	17 Spanish autonomous regions: Madrid (r.g.)	±	Regional differences matter ((±))
Time (*YEAR*)	Dummy	Spain 1990 (r.g.); Spain 1995; Spain 1999/2000	±	+ between 1990 and 1995 – between 1990 and 1999/2000

Notes: [a]+, –: significant positive or negative coefficient, (+), (–), positive, respectively negative coefficient sign without being always significant, ((+/–)) positive or negative sign of the coefficient without being statistically significant.

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