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Differences in Preferences Towards the Environment: The Impact of a Gender, Age and Parental Effect

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Abstract: The paper investigates empirically the differences in preferences towards protection of the environment. Using seven different dependent variables to focus on the impact of age, gender and children we use a large micro data set covering data from 33 Western and Eastern European countries. The results indicate that women have both a stronger preference towards the environment and a stronger willingness to contribute. Moreover, we observe the tendency of a negative correlation between age and environmental preferences. However, a positive effect is visible once we focus on the impact of age on social norms (environmental morale). Finally, we were not able to observe that having children is positively correlated with a stronger preference towards the environment.

JEL classification: H260, H730, D640

Keywords: environmental preferences, environmental morale, gender, age, children

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I. INTRODUCTION

In recent times, a growing number of studies have been devoted to examining individual environmental preferences. Initial interest in environmental attitudes goes back to the early 1970s (Bord and O'Connor, 1997). An increasing number of economists have been involved in evaluating whether an individual's environmental morale or attitudes could help to reduce environmental degradation or the problems of free riding associated with public goods (Frey and Stutzer, 2006). Consider this illustrative case: during holiday periods, the bins at beaches and parks are full (or overflowing) with rubbish. The majority of campers/holidaymakers carefully collect and wrap their refuse before purposely driving to the bin and disposing of it. This action incurs a personal cost that could have been avoided by simply leaving the rubbish behind. What would induce people to incur such a cost (without the threat of omnipresent police officers)? It has been argued that this voluntary compliance is primarily being driven by social norms or preferences for environmental protection. Voluntary compliance eliminates free-rider behavior and provides the foundation of cooperation and public good provision. Such a willingness to contribute to the environment is especially useful in situations where it is extraordinarily expensive to arrange an enforcement regime. As a consequence, voluntary compliance lowers the cost of the government's operations. Slemrod (2002) points out:

> "It is as if there is a stock of goodwill, or social capital, the return to which is the more efficient operation of government. This social capital stock may be reduced by a policy change that decreases the incentive to be a law-abiding citizen" (p. 13).

Recent studies in the area of ecological economics have shown that social capital influences transaction costs and the effectiveness of public environmental policies. So, "environmental conflicts can be resolved by making collective choices that are implemented by establishing changing or reaffirming governance institutions" (Paavola and Adger, 2005, p. 364). It has furthermore been shown that social capital is important for dealing with new environmental scenarios, such as the threat of climate change, or for coping with the impact of environmental disasters, such as droughts or floods. The capability of societies to adapt is strongly linked to their capability to act collectively (Adger, 2003).

One of our key aims is to present (compared to previous studies) a richer set of dependent variables using a large micro data set that covers European 33 countries. Within this data set, we can explore different channels through which individuals express their environmental preferences. People are willing to contribute to environmental protection by paying money, working voluntarily or by means of pro-environmental daily behaviors. The strength of the paper lies in the use of seven different dependent variables that measure environmental preferences such as the willingness to pay, the social norm of compliance, voluntary participation in environmental organizations and perception of environmental compliance. Moreover, we will control for variables that have not been investigated in detail in the literature (e.g., political awareness).

Section 2 of the paper first discusses the gender, age and parental effect, including a survey of the previous literature. Next, Section 3 introduces the way in which individuals' environmental preferences are defined, provides information about the data

set, (namely the latest available *European Values Survey* 1999-2001), and about the variables used in the estimations. Empirical findings are presented in Section 4 and concluding remarks are offered in Section 5.

II. THEORETICAL CONSIDERATIONS

1. Gender Effect

Experimental and empirical studies in have established gender differences in areas such as charitable giving, tax morale, corruption, bargaining or household decision making (Brown-Kruse and Hummels, 1993; Nowell and Tinkler, 1994; Andreoni and Vesterlund, 2001; Eckel and Grossman, 2001; Torgler, 2007, Torgler and Valev 2007). The correlation between gender and crime or delinquent behavior has been investigated extensively in the criminology literature. The following sweeping statement by Mears et al. (2000) summarizes the general finding that women are less likely to be involved in such activities compared to men:

> "at every age, within all racial or ethnic groups examined to date, and for all but a handful of offense types that are peculiarly female… sex differences in delinquency are independently corroborated by self-report, victimization, and police data, and they appear to hold cross-culturally as well as historically" (p. 143).

It is often argued that traditional gender socialization which occurs through such channels as overt and covert encouragements to be cooperative and feel compassion, cultural

norms and the role of women as caregivers and nurturers all lead to a higher concern for the maintenance of life and environment. In addition, the "traditional" domain of working at home induces a greater likelihood to engage privately in behaviors aimed at the preservation of the environment (for an overview see Hunter et al., 2004).

There are two major theories explaining gender differences in the compliance literature. According to one theory, gender differences can be attributed to different biological, psychological, and experiential realities that lead to different approaches to issues and problems. In contrast, the opportunity argument lies closer to traditional economics, suggesting that men and women do not necessarily have different motivations. Instead, gender differences can be explained by the different external constraints and opportunities faced by men and women. Although the evidence on the two theories is limited, the available evidence seems to provide little support for the opportunities argument (see Gottfredson and Hirschi, 1990). Similarly, Torgler and Valev (2007) investigate whether gender matters in the conduct of illegal activities. Despite a decrease of gender differences over the past 20 years, leading to a greater equality of status and simultaneously increased opportunity to conduct white collar crimes such as corruption and tax evasion, the authors find evidence for strong gender differences. Women are significantly less likely to agree that corruption and cheating on taxes can be justified. The results remain robust after investigating different time periods and extending the specification with several opportunity factors such as education, employment status or income.

Henderson (1996) offers an explanation for the predominance of women in social roles by suggesting that women spend their available leisure time on deeply socialized

roles emphasizing the ethic of care (p. 147), ensuring that women conform to the "traditional feminine identities of nurturing, caring, passivity, gentleness…" (p. 148). These characteristics predispose women to spending their leisure time on activities that are 'other focused' and as a consequence are nurturing for society and the environment.

Can we observe a gender difference with regard to environmental preferences? Zelezny et al. (2000) find strong evidence that environmentalism does not begin in adulthood, which contradicts the idea that gender differences are due to a desire for child protection arising from the onset of motherhood. Women show at every age more concern for the environment than men. Finally, the literature has found that women volunteer more than men (Bekkers, 2005), although political volunteers are more likely to be male (Bussell and Forbes, 2003). However, literature reviews in the 80s report that the relationship between environmental attitudes or preferences and gender is meager and inconsistent (Van Liere and Dunlap, 1980; Hines et al., 1986-1987; Mohai 1992). The meta-review by Zelezny et al. (2000) covering the years 1988 to 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) or Hunter et al. (2004) found women hold higher environmental values, while Kealy et al. (1990), Swallow et al. (1994) and Cameron and Englin (1997) found the opposite result. Finally, Brown and Taylor (2000) did not find any gender difference.

2. Age Effect

Several studies have stressed that age is negatively correlated with the willingness to contribute to 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 people. However, there are two different age effects operating: 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 refers to the difference in 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) show a strong relationship between age and environmental concern.

Focusing on social norms we observe that social position is a key explanation of an age effect. Tittle (1980) explains that aged persons have acquired greater social stakes such as material goods, status and a stronger dependency on the reactions from others. This avoidance of exclusion as a motivation for pro-environmental behavior represents both compliance with social norms and a recognition of socially appropriate behavior (Bamberg and Möser 2007). Thus, the potential costs of non-compliance are increased and we observe that compliance increases with age. The literature on tax morale, for example, provides support for this age effect (see Torgler 2007). The criminology literature has extensively explored the impact of age and crime. One of the predominant theories in this regard is the The desistance theory which asserts that the decline in crime occurs because factors associated with age reduce or change the actors' criminality. A

study conducted in a controlled environment (prison) by Gottfredson and Hirschi (1990) shows that the age effect in such a setting is comparable to the age effect outside prison. These consistent results indicate that status changes such as marriage, parenthood or employment are not sufficiently responsible for the observed decreases in criminality associated with age (Hirschi and Gottfredson 2000). The age theory asserts that the decline cannot be explained by a change in the persons' status or the exposure to restrictions. The theory is based on the idea that the aging of the organism itself has an impact on individuals' behavior. Looking at criminal activities, Gottfredson and Hirschi (1990) are in favor of the aging theory stressing that differences in individuals' criminal tendencies remain relatively stable over the life course.

Torgler and Valev (2006) try to capture and isolate the influence of age on values since the age effect may interfere with a cohort effect. Thus, they investigate the attitudes of the same cohorts over time (age effect) as well as the same age groups in different time periods (cohort effect). A consistent age effect is observed, yet on the other hand, a cohort effect is less obvious.

Instead of using age as a continuous variable, we have formed several classes: AGE<30, AGE 30-39, AGE 40-49, AGE 50-59, AGE 60-69, AGE 70+, with AGE<30 as reference group, to better investigate the impact of age.

3. Parental Effect

Furthermore, a parental effect might influence environmental attitudes. Parents may be more concerned with local environmental problems than singles as the "parental effect"

motivates these individuals to ensure the welfare of their children (Dupont, 2004). The arrival of children makes the future "a far more tangible concept", and causes individuals to reconsider present behavior in light of future consequences (Dresner et al., 2007). Since parents act both for themselves and their children when engaging in pro-environmental behaviour, we can thus expect that the state of parenthood would heighten commitment to environmental issues when compared to non-parents (Teal and Loomis, 2000). The parental effect can also be expected to influence the gender effect – even though men generally exhibit less tendency towards protecting the environment, concern over the wellbeing of their offspring will alter their perceptions of natural resource value (Wilson et al., 1996). Moreover, parents might be 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). We will use a dummy variable to indicate whether someone has a child or not.

III. EMPIRICAL APPROACH

1. Data Set

This paper uses survey data provided by the European Values Survey (EVS) 1999/2000, which is a European-wide investigation of socio-cultural and political change. The survey collects data on the basic values and beliefs of people throughout Europe. The EVS was first carried out from 1981 to 1983, then in 1990 to 1991 and again in 1999 through 2001,

with an increasing number of countries participating over time. The methodological approach is explained in detail in the European Values Survey (1999) source book, which provides information on response rates, the stages of sampling procedures, the translation of the questionnaire, and field work, along with measures of coding consistency, reliability of data, and data checks. All country surveys are conducted by experienced professional survey organizations, with the exception of Greece. Interviews are face-to-face and those interviewed are adult citizens aged 18 years and older. Tilburg University coordinates the project and provides the guidelines to guarantee the use of standardized information in the surveys and the national representativeness of the data. To avoid framing biases, the questions are asked in a prescribed order. The response rates vary from country to country with an average response rate of around 60 percent.

Because EVS poses an identical set of questions to individuals in various European countries, the survey provides a unique opportunity to examine empirically our hypotheses. We are able to employ a large data set considering 30 representative national samples of at least 1,000 individuals in each country. The survey permits us to work with a representative set of individuals, covering a large set of countries. EVS has been designed as a wide-ranging survey, thereby reducing the danger of framing effects when compared with many other surveys that focus entirely on environmental questions. A further advantage of using this extensive data set is the ability to explore a large number of dependent variables.

Economists are increasingly using survey data in such areas of research as those dealing with social capital, corruption, happiness and tax compliance. These literatures

explore the causes of attitudes (see, e.g., Frey and Stutzer 2002; Brewer and Steenbergen, 2002; Uslaner, 2004; Brewer et al., 2004; and Chang and Chu, 2006 and Torgler, 2008).

2. Dependent Variables

To check the robustness of results, we use several dependent variables that measure different aspects of pro-environmental values.

The first two variables measure environmental preferences in the following way:

I would give part of my income if I were certain that the money would be used to prevent environmental pollution (0=strongly disagree, 3=strongly agree)

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

Although we are not conducting a contingent valuation study (CV), these two questions offer the chance to investigate environmental preferences. However, the question is not free of problems. The statement is relatively vague: "environmental pollution" is not clearly specified, and neither is the level of improvement. Similarly, the degree of income to be spent and the tax increase are not clarified. Therefore the respondents are not aware of how much they would hypothetically have to contribute[1]. The consequences of taxation are not mentioned and no information is provided regarding the extent to which income tax, value added tax or other taxes are supposed to increase. Thus, it is not clear

[1] 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).

who will bear the highest tax burden. Such unspecified payment schemes questions will increase the variance in responses, but on the other hand, may influence the willingness to contribute (Witzke and Urfei, 2001). Nevertheless, 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 question do not have to be thoroughly explained to be sure that respondents understand and respond with the appropriate willingness to spend income and accept an increase in taxes[2].

In a next step we will explore a variable that measures environmental preferences, but takes into account the possibility that people may have an incentive to free-ride (profit without incurring costs). We would predict that such a variable would lead to contradictory results (compared to the previous two variables):

The Government has to reduce environmental pollution but it should not cost me any money (0=strongly disagree, 3=strongly agree)

Civil engagement in voluntary organizations is gaining increased attention from researchers; nonetheless the causes of environmental participation are still fairly unknown. The advantage of participation in voluntary activities is the creation of social output that would per se require paid resources (Freeman, 1997). Pretty and Ward (2001)

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

showed that the creation of active pro-environmental groups was significant for solving certain local environmental problems[3]. Our study will not only explore the gender, age and parental effect, but will also show who is likely to participate and whose priorities and values are best promoted by voluntary work in environmental organizations. However, to date only a few studies have analyzed the factors impacting on the participation in environmental organizations (Mohai, 1992; Thompson and Barton, 1994). The advantage of focusing on direct participation in environmental organizations is that individuals' behavior can be measured. Moreover, it builds a bridge between the social capital literature that focuses on volunteering and the environmental literature on pro-environmental preferences.

What is the meaning of 'pro-environmental behavior'? Kollmuss and Agyeman (2002) define it as actions taken by an individual in consciously seeking to minimize the negative impact of human activities on the environment and Jensen (2002) refers to those personal actions that are directly related to environmental improvements. Some daily activities, such as minimizing resource and energy consumption, reducing and recycling waste, or using public transport are private actions which contribute to the improvement of the preservation of nature. In the same way, participation in environmental organizations can be seen as a kind of pro-environmental behavior and is highly relevant in ensuring the efficacy of environmental policies which require behavioral changes. When considered from an economic perspective, this behavior "exemplifies an individual's voluntary effort to provide an environmental public good" (Clark et al. 2003, p. 238). Why do people take actions which result in collective benefits? While the

[3] Those authors analyzed some environmental organizations in rural communities. They found an evolution from reactive-dependence groups (static and created exclusively in reaction to a threat or a crisis), towards awareness-interdependence groups (more dynamic and interactive).

traditional theoretical predictions find a free-rider effect in the private provision of public goods, in practice the observed levels of provision are higher than anticipated (Andreoni, 1988; Piliavin and Charng, 1990).

We use two variables that measure involvement in a voluntary environmental organization, namely membership and doing unpaid work:

> *Please look carefully at the following list of voluntary organizations and activities and say which, if any, are you currently doing unpaid voluntary work for: conservation, the environment, ecology, animal rights (1=yes).*

> *Please look carefully at the following list of voluntary organizations and activities and say which, if any, do you belong: conservation, the environment, ecology, animal rights (1=mentioned, 0= not mentioned).*

An additional dependent variable measures social norms or environmental morale focusing on individual's willingness to keep public places free from litter. To assess the level of environmental morale, we use the following question:

> *Please tell me for each of the following statements whether you think it is always justified, never justified, or somewhere in between: … Throwing away litter in a public place.*

The question leads to a ten-scale index of tax morale with the two extreme points "never justified" and "always justified". The scale has been recoded into a four-point scale (0, 1, 2, 3), with the value 3 standing for "never justifiable"; that is, a higher numeric score indicates a higher intrinsic motivation not to litter and so a higher environmental morale. The points 4 to 10 in the original scale have been combined in the value 0 due to a lack of variance.

Finally, we are also going to explore the determinants of individuals' perceptions about littering.

> *"According to you, how many of your compatriots do the following: Throwing away litter in a public place?" (4=almost all, 1=almost none)*

It is difficult to obtain objective measurements when collecting data on illegal activities, thus it is common practice to instead measure perceptions of such activities. For example, the literature on corruption has extensively used such indirect ways of measurement (see Tanzi 2002) and Treisman (2000, pp. 410-411) strongly argues for the validity of data based on perceptions and makes a clear case for why it should be taken seriously.

Our multivariate analysis includes a vector of control variables. Previous research in environmental economics and social norms demonstrates the relevance of considering such socio-demographic factors as the level of church attendance, formal and informal education and participation in an environmental organization (see Torgler and Garcia-Valiñas, 2007; Torgler, 2007). We differentiate between the two regions of Europe (i.e. Western and Eastern Europe) to account for effects of the reform process in the transition countries. The rapid collapse of institutional structures in Eastern European countries

produced a vacuum in many, if not all, of these countries. This led to large social costs, especially in terms of worsening income inequalities, increasing poverty and poor institutional conditions resulting from uncertainty and high transaction costs. Torgler (2003) and Alm et al. (2006) show that such circumstances have an impact on social norms.

III. EMPIRICAL RESULTS

In general, a probit estimation is appropriate when working with information such as our two dependent variables measuring participation in environmental organizations. Otherwise an ordered probit model is used to take into account the ranking information of the scaled dependent variables. We calculate the marginal effects to measure the quantitative effect of a variable, because the equation is nonlinear. Marginal effects indicate the change in the probability of individuals having a specific level of environmental preferences when the independent variable increases by one unit. For simplicity, the marginal effects in all the estimations are presented for the highest value only. Weighted estimates are conducted to make the samples correspond to the national distribution.[4] Furthermore, answers such as 'don't know' and missing values are eliminated in all estimations.

Table 1 and *2* present the findings. We first focus on a potential gender effect and find that the coefficient is statistically significant in all seven regressions. Specification (1) and (2) indicate that being a woman rather than a man increases the probability of

[4] The weighting variable is provided by the EVS.

reporting the highest willingness to pay for environmental protection (via giving income or paying additional taxes to prevent environmental pollution) by between 0.8 and 1.5 percentage points. In both cases the coefficient is statistically significant. Regression (3) on the other hand reports a negative correlation with a marginal effect of 1.1 percentage points. This indicates that women are less willing to reduce environmental pollution without incurring costs. Thus, they are less likely to be interested in free-riding. Equation (4) also shows that women are more likely to be a member of a voluntary environmental organization. Specification (5) in *Table 2* shows that women are less likely to justify littering. Being a woman increases the probability of stating that littering is never justifiable by 3.7 percentage points. This is quite a substantial effect. Interestingly, the fifth regression shows that women perceive the level of littering to be higher than men. This may also explain why they have a higher incentive to contribute. On the other hand, the last specification shows that women are less likely to do unpaid voluntary work on conservation, environment, ecology, and animal rights. One can argue that these results contradict the previous findings showing that women are more concerned with environmental issues and also contradict the opportunity cost argument as women on average have a lower simple *cost* of time. However, it can be argued that women might be more active in community-based and neighborhood organizations which address local environmental issues, while men are more likely to participate in formal environmental organizations. Our survey question captures more of the latter type of participation than the former – therefore, our results may not conflict with previous findings to the contrary. Moreover, it should be noted that women have higher restrictions on participation in voluntary organizations, particularly young women involved in time intensive household

activities. It has been shown that the gender effect does not depend on whether the woman is a mother or not, indicating that in general the values and priorities of women differ from men. Arguments for the reason behind this difference do not detract from a possible policy implication of this finding, namely that due to the consistent disparity between women and men, there is a strong case for better representation of women on boards, committees and in positions of power requiring input and collaboration for decision making. Utilizing those heavily socialized values in this way creates a positive outcome from the contextualized conformity to social roles that are suggested by Henderson (1995) as a reason behind this gender effect and can go some way towards making this difference in mindset empowering for women.

In a next step we are going to explore the age effect. Specification (1) clearly shows the tendency of a negative age effect. The reference group (AGE below 30 years) has the strongest environmental preferences and the marginal effects increase consistently for higher age groups. For example, being in the category AGE70+ rather than in the reference group reduces the probability of reporting the highest willingness to give income by 3.4 percentage points. Yet the age effect is less visible in the willingness to pay higher taxes. Only the coefficient AGE 70+ is statistically significant at the 10% level with a marginal effect of 1 percentage point. Similarly, age is positively correlated with the willingness to free ride. The strongest effect is visible for the age category AGE 60-69 reporting a marginal effect of 5.2 percentage points; the smallest one for the group AGE 40-49 (positive, but not statistically significant). Nevertheless, elderly people are more likely to be a member of a voluntary organization (most visible for the group AGE50-59). Similarly, the results obtained in specification (5) are in line with the social

norm literature. Age is positively correlated with values that do not justify littering. The marginal effects increase when moving to an older age group (till category AGE 60-69). The category AGE 70+, on the other hand, shows a decrease in the marginal effects, yet at 8.4 percentage points still reports high marginal effects. Regression (6) also reports a negative correlation between age and the perceived level of littering. Elderly people seem to have a higher level of trust in other citizens. Also here we observe that the marginal effects increase with age. Finally, we observe a positive correlation between age and participation in voluntary work. However, the coefficient is only statistically significant for the group AGE 50-59. It may be that restrictions driven by the biological age (e.g., health conditions) could reduce the possibility of engaging in voluntary work. Nevertheless, the reference group (AGE below 30) negates this argument as it has the lowest active participation rate.

In a next step we check whether we observe a positive parental effect, the results indicate that interestingly, a parental effect is not that visible. We observe only that having a child leads to a lower willingness to free-ride. On the other hand, specification (1) and (2) suggests that we are not able to observe a parental effect on environmental preferences. Such findings are also confirmed in *Table 2*. The coefficient is not statistically significant in regression (5). Interestingly, specifications (4) and (7) show that individuals with children are less likely to be a member of a voluntary organization or to spend unpaid time volunteering. Such a finding could be explained by the time constraints experienced by parents who may consider volunteering a leisure activity and thus are subject to the barriers to engaging in leisure as suggested by Cleave and Doherty (2005). It has been found that both men and women experience a loss of leisure time

during the parenting years (see Henderson 1995).. Finally, we also observe a positive correlation between having children and the perceived level of littering.

Looking at the other variables, namely, CHURCH ATTENDANCE[5] we observe in specifications (1), (2), (5) and (7) that churches can act as enforcers of social norms (see Torgler 2006). Involvement with the church can also tend to reduce free-rider attitudes. However, in this case the coefficient is not statistically significant (see regression (3)). Interestingly, we observe that church attendance is positively correlated with voluntary work in environmental organizations but negatively correlated with membership. We also observe that religiosity is positively correlated with the belief that compatriots are more likely to litter.

Regarding the effect of education, the literature shows that formal education[6] has a significant positive influence on willingness to contribute to environmental quality (Blomquist and Whitehead, 1998; Engel and Pötschke, 1998; Witzke and Urfei, 2001; Veisten et al., 2004). On the other hand, informal education is also important and is represented in this analysis by a self-reported tendency to discuss political matters (Whitehead, 1991; Blomquist and Whitehead, 1998; Carlsson and Johansson-Stenman, 2000; Hidano et al., 2005). Well-informed citizens are more aware of environmental issues and problems and have stronger environmental attitudes, because they are more knowledgeable about the possible damage (Danielson et al., 1995; Torgler and Garcia-Valiñas, 2007). The strength of the influence of formal and informal education is visible

[5] Apart from weddings, funerals and christenings, how often do you attend religious services these days? More than once a week, once a week, once a month, only on special holy days, once a year, less often, practically never or never (8= more than once a week to 1=practically never or never).

[6] Formal education is usually expressed as the level of education or degrees a person has obtained. It can alternatively be expressed as the number of years spent in education (Blomquist and Whitehead, 1998).

in *Tables 1* and *2*[7]. All respective coefficients are statistically significant and show considerable quantitative effects. Finally, we also observe marital and employment status differences. For example, married people have an overall higher willingness to contribute than other individuals. Regarding employment status, retired people show low preferences for environment, except in the case of free-rider attitudes.

[7] Formal education: At what age did you complete or will you complete your full time education, either at school or at an institution of higher education? Please exclude apprenticeships. Informal education/political discussion: When you get together with friends, would you say you discuss political matters frequently, occasionally or never (3=frequently, 2=occasionally, 1=never)?

Table 1: Determinants of Environmental Preferences and Environmental Participation

	WEIGHTED ORDERED PROBIT									WEIGHTED PROBIT		
DEPENDENT VARIABLES	*GIVE INCOME TO PREVENT ENVIRONMENTAL POLLUTION*			*AGREE TO INCREASE TAXES TO PREVENT ENVIRONMENTAL POLLUTION*			*GOVERNMENT HAS TO REDUCE ENVIRONMENTAL POLLUTION WITHOUT OWN COSTS (FREE RIDING)*			*MEMBER VOLUNTARY ORGANIZATION ON CONSERVATION, ENVIRONMENT, ECOLOGY, ANIMAL RIGHTS*		
	(1)			*(2)*			*(3)*			*(4)*		
	Coeff.	*z-Stat.*	*Marg.*	*Coeff.*	*z-Stat.*	*Marg.*	*Coeff.*	*z-Stat.*	*Marg.*	*Coeff.*	*z-Stat.*	*Marg.*
GENDER EFFECT												
FEMALE	0.067***	4.89	0.015	0.052***	3.82	0.008	-0.031**	-2.23	-0.011	0.077***	2.88	0.007
AGE EFFECT												
AGE 30-39	-0.024	-1.08	-0.005	-0.013	-0.60	-0.002	0.046**	2.02	0.017	0.062	1.42	0.005
AGE 40-49	-0.053**	-2.28	-0.011	0.001	0.03	0.000	0.023	0.96	0.008	0.103**	2.20	0.009
AGE 50-59	-0.062**	-2.46	-0.013	-0.022	-0.88	-0.004	0.071***	2.74	0.026	0.234***	4.78	0.023
AGE 60-69	-0.057*	-1.80	-0.012	-0.031	-0.98	-0.005	0.140***	4.43	0.052	0.194***	3.13	0.019
AGE 70+	-0.167***	-4.57	-0.034	-0.064*	-1.76	-0.010	0.118***	3.21	0.044	0.214***	3.00	0.021
PARENTIAL EFFECT												
CHILD	-0.018	-0.71	-0.004	0.007	0.28	0.001	-0.075***	-3.12	-0.027	-0.104*	-1.96	-0.008
Formal and Informal Educ.												
EDUCATION	0.024***	18.61	0.005	0.024***	18.09	0.004	-0.022***	-17.04	-0.008	0.028***	14.30	0.002
POLITICAL DISCUSSION	0.178***	17.23	0.039	0.160***	15.61	0.026	-0.169***	-16.45	-0.062	0.184***	9.40	0.016
Marital Status												
WIDOWED	-0.115***	-4.50	-0.024	-0.087***	-3.37	-0.013	0.055**	2.15	0.020	-0.146**	-2.52	-0.011
DIVORCED	-0.075***	-2.90	-0.016	-0.082***	-3.21	-0.013	0.073***	2.88	0.027	-0.101**	-2.07	-0.008
SEPARATED	-0.004	-0.07	-0.001	-0.032	-0.64	-0.005	0.116**	2.29	0.043	-0.018	-0.19	-0.002
NEVER MARRIED	-0.017	-0.86	-0.004	-0.035*	-1.80	-0.006	0.019	0.93	0.007	0.128***	3.50	0.011
Employment Status												
PART TIME EMPLOYEE	0.057**	2.21	0.013	0.042	1.64	0.007	-0.022	-0.83	-0.008	0.152***	3.43	0.014
SELFEMPLOYED	0.057**	2.10	0.013	0.020	0.73	0.003	-0.060**	-2.14	-0.022	0.084	1.62	0.008
UNEMPLOYED	-0.083***	-3.18	-0.017	-0.077	-2.98	-0.012	0.109***	4.25	0.040	-0.109**	-2.22	-0.009

AT HOME	0.001	0.05	0.000	-0.041	-1.63	-0.006	0.122***	4.85	0.046	-0.106**	-2.13	-0.008
STUDENT	0.117***	3.67	0.027	0.057*	1.84	0.010	-0.125***	-3.97	-0.045	0.000	0.00	0.000
RETIRED	-0.117***	-4.34	-0.024	-0.114***	-4.51	-0.017	0.202***	7.82	0.076	-0.258***	-4.22	-0.018
OTHER	-0.012	-0.23	-0.003	0.022	0.44	0.004	-0.062	-1.23	-0.023	0.158*	1.76	0.015
Religiosity												
CHURCH ATTENDANCE	0.021***	7.89	0.005	0.015***	5.95	0.002	-0.003	-0.98	-0.001	-0.021***	-4.09	-0.002
REGIONS	YES			YES			YES			YES		
Pseudo R2	0.021			0.014			0.024			0.071		
Number of observations	35823			35790			35963			37728		
Prob > chi2	0.000			0.000			0.000			0.000		

Notes: The reference group consists of MAN, AGE<30, NOT HAVE CHILDREN, MARRIED, FULL-TIME EMPLOYEE, EASTERN EUROPE. The symbols *, **, *** represent statistical significance at the 10%, 5% and 1% levels, respectively. Robust standard errors.

Table 2: Further Estimations

	WEIGHTED ORDERED PROBIT						WEIGHTED PROBIT		
DEPENDENT VARIABLES	*JUSTIFIABILITY OF LITTERING*			*PERCEIVED LEVEL OF LITTERING*			*VOLUNTARY WORK ON CONSERVATION, ENVIRONMENT, ECOLOGY, ANIMAL RIGHTS*		
		(5)			*(6)*			*(7)*	
	Coeff.	*z-Stat.*	*Marg.*	*Coeff.*	*z-Stat.*	*Marg.*	*Coeff.*	*z-Stat.*	*Marg.*
GENDER EFFECT									
FEMALE	0.105***	6.75	0.037	0.031**	2.15	0.005	-0.095***	-2.69	-0.004
AGE EFFECT									
AGE 30-39	0.113***	4.68	0.040	-0.148***	-6.38	-0.026	0.030	0.54	0.001
AGE 40-49	0.165***	6.31	0.057	-0.180***	-7.39	-0.032	0.081	1.40	0.004
AGE 50-59	0.229***	8.02	0.078	-0.204***	-7.74	-0.037	0.139**	2.24	0.006
AGE 60-69	0.285***	8.06	0.096	-0.289***	-8.95	-0.055	0.108	1.35	0.005
AGE 70+	0.248***	5.94	0.084	-0.330***	-8.92	-0.066	0.057	0.53	0.002
PARENTIAL EFFECT									
CHILD	0.006	0.20	0.002	0.097***	3.90	0.014	-0.128	-1.51	-0.005
Formal and Informal Educ.									
EDUCATION	0.001	0.48	0.000	0.002	1.52	0.000	0.023***	8.78	0.001
POLITICAL DISCUSSION	-0.002	-0.21	-0.001	-0.026**	-2.48	-0.004	0.143***	5.34	0.006
Marital Status									
WIDOWED	-0.042	-1.45	-0.015	-0.009	-0.37	-0.001	-0.050	-0.62	-0.002
DIVORCED	-0.090***	-3.17	-0.032	0.014	0.55	0.002	-0.085	-1.31	-0.003
SEPARATED	-0.146***	-2.65	-0.054	0.018	0.34	0.003	0.151	1.19	0.007
NEVER MARRIED	-0.132***	-6.07	-0.048	0.047**	2.27	0.007	0.144***	3.13	0.006
Employment Status									
PART TIME EMPLOYEE	-0.091***	-3.22	-0.033	0.010	0.39	0.002	0.065	1.04	0.003
SELFEMPLOYED	0.053*	1.66	0.019	0.036	1.32	0.006	-0.042	-0.58	-0.002
UNEMPLOYED	0.115***	3.83	0.040	0.062**	2.37	0.009	-0.126*	-1.81	-0.005
AT HOME	0.140***	4.70	0.048	0.034	1.32	0.005	-0.166**	-2.22	-0.006

STUDENT	-0.124***	-3.58	-0.045	0.062*	1.72	0.009	0.099	1.42	0.004
RETIRED	-0.010	-0.35	-0.004	-0.070**	-2.58	-0.012	-0.331***	-4.14	-0.010
OTHER	0.077	1.44	0.027	-0.065	-1.29	-0.011	0.127	1.07	0.006
Religiosity									
CHURCH ATTENDANCE	0.011***	3.80	0.004	0.009***	3.36	0.001	0.014**	2.03	0.001
REGIONS	YES			YES			YES		
Pseudo R2	0.014			0.012			0.035		
Number of observations	37356			34490			37728		
Prob > chi2	0.000			0.000			0.000		

Notes: The reference group consists of MAN, AGE<30, NOT HAVE CHILDREN, MARRIED, FULL-TIME EMPLOYEE, EASTERN EUROPE. The symbols *, **, *** represent statistical significance at the 10%, 5% and 1% levels, respectively. Robust standard errors.

V. CONCLUSIONS

This paper investigates whether we observe a gender, age and parental effect in the expression of environmental preferences. One strength of the paper is in the use of seven different dependent variables examining the issue from diverse angles to better see how these effects work. We have explored both the willingness to give income and to agree pay higher taxes. These effects were also examined regarding the influence of individuals' willingness to free-ride and to participate in voluntary environmental organization (membership or voluntary work). Furthermore, we investigated the social norms of compliance or environmental morale focusing on the justifiability of littering. Finally, we have also analyzed the perceived level of littering. A second strength is the use of a large micro-data set covering not less than 33 different countries. The results indicate that women have a stronger preference towards the environment and a stronger willingness to contribute. Moreover, we observe the tendency of a negative correlation between age and environmental preferences. However, age exerts a positive effect on social norms (environmental morale) indicating a discernable difference between social norms of compliance and environmental willingness to pay higher tax or to give income. Moreover, we were not able to observe that having children is positively correlated with a stronger preference towards the environment. Upon examining the control variables we find that it is important to control also for informal education and religiosity.

These findings can be usefully employed in policies to create and maintain social capital to better preserve the environment. To this end, it is important that international agencies, governments, and other organizations accept and understand that investment in

the creation of social capital pays off. Finally, any efforts made to identify the characteristics of those people holding higher environmental preferences help to ensure the success of those investments. The findings obtained in this analysis can also be used to bring about positive environmental outcomes in other areas as the truly interesting and attractive feature of this behavior is its voluntary nature. Such behavior is not only cost effective but can be more successfully activated in areas where law enforcement and market incentives fail. The results of this study have implications for both developed and developing countries. For example, developing countries experience a major problem with litter in public places and the clean up is quite expensive for the city councils. Heavy fines and strict law enforcement have been trialed in unsuccessful attempts to discourage littering. Hence, the results of this study should be useful for decision-makers as well.

Further investigation is required to gain an understanding what shapes environmental preferences and environmental morale.. A good understanding of the interactions between environmental morale and preferences and perceived environmental cooperation, along with the factors strengthening these relationships, has the potential to bring about better environmental outcomes.

APPENDIX

Table A1: Countries in the Sample

Western European Countries	**Eastern European Countries**
Germany	Belarus
Austria	Bulgaria
Belgium	Croatia
Great Britain	Czech Republic
Denmark	Estonia
Finland	Greece
France	Hungary
Iceland	Latvia
Ireland	Lithuania
Italy	Poland
Luxembourg	Romania
Malta	Russia
Netherlands	Slovak Republic
North Ireland	Slovenia
Portugal	Turkey
Spain	Ukraine
Sweden	

Notes: Estimations with the highest number of observations cover all these countries

Table A: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Dependent variables					
ENVIRONMENTAL PREFERENCES (INCOME)	1.620	0.885	1.620	0.885	1.620
ENVIRONMENTAL PREFERENCES (TAXES)	1.412	0.877	1.412	0.877	1.412
ENVIRONMENTAL FREE-RIDING	1.996	0.894	1.996	0.894	1.996
MEMBER VOLUNTARY ENVIRONMENTAL ORGANIZATION	0.049	0.216	0.049	0.216	0.049
WORKING VOLUNTARY ENVIRONMENTAL ORGANIZATION	0.020	0.140	0.020	0.140	0.020
JUSTIFIABILITY OF LITTERING	2.350	1.071	2.350	1.071	2.350
PERCEIVED LITTERING	2.710	0.777	2.710	0.777	2.710
Independent Variables					
AGE 30-39	40963	0.197	0.398	0	1
AGE 40-49	40963	0.191	0.393	0	1
AGE 50-59	40963	0.15	0.357	0	1
AGE 60-69	40963	0.135	0.342	0	1
AGE 70+	40963	0.102	0.302	0	1
WOMAN	41114	0.54	0.498	0	1
CHILDREN	41125	0.077	0.266	0	1
EDUCATION	39840	18.712	5.125	5	74
POLITICAL DISCUSSION	40713	1.886	0.654	1	3
UPPER CLASS	21335	0.136	0.343	0	1
MIDDLE CLASS	21335	0.338	0.473	0	1
WIDOWED	39861	0.097	0.295	0	1
DIVORCED	39861	0.07	0.256	0	1
SEPARATED	39861	0.016	0.124	0	1
NEVER MARRIED	39861	0.228	0.42	0	1
PART TIME EMPLOYEe	40919	0.068	0.252	0	1
SELFEMPLOYED	40919	0.052	0.222	0	1
UNEMPLOYED	40919	0.229	0.42	0	1
AT HOME	40919	0.095	0.293	0	1
STUDENT	40919	0.061	0.24	0	1
RETIRED	40919	0.073	0.261	0	1
OTHER	40919	0.018	0.131	0	1
CHURCH ATTENDANCE	40762	3.871	2.456	1	8

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