

ENVIRONMENTAL FISCAL REFORM AND WILLINGNESS TO PAY FOR THE ENVIRONMENT:
AN EMPIRICAL ANALYSIS ON EUROPEAN MICRO DATA

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Environmental Fiscal Reform and willingness to pay for the environment: an empirical analysis on European micro data

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Abstract

This paper empirically investigates the determinants of marginal willingness to pay (MWTP) for the environment, employing micro data from the European Value Survey (EVS) over 2008-2010 in 27 European countries. Using ordered logit, logit and partially constrained generalized ordered logit models, we explore a wide set of individual and country level determinants. Our particular focus is on whether WTP is influenced by the Environmental Fiscal Reforms (EFR), carried out only in some countries of our sample. Our results show that MWTP for the environment is lower in countries where an EFR has been introduced. Moreover, analyses conducted on the role of information highlight that being presumably aware of the EFR does not affect positively the MWTP for the environment.

JEL codes: R220, Z130, H23

Keywords: Willingness to pay, environment, environmental fiscal reform

1. Introduction

Several studies empirically investigated the factors affecting the willingness to pay (WTP) for the environment. While this approach has several limitations (i.e. there may exist a remarkable gap between the declared WTP and actual behaviour), it shows that beyond individual socio economic characteristics, personal beliefs and political orientation, as well as features of the context of residence play a significant role in influencing attitudes revealed by the citizens.

More in detail, analyses have been conducted focusing on regional differences (Torgler and Garcia-Valiñas, 2007; Witzke and Urfei, 2001) or showing comparison between high income and

low income countries (Dorsch 2011; Franzen and Meyer 2010; Duroy 2005; Israel and Levinson 2004; Inglehart 1995).

This paper contributes to this literature by carrying out a European level analysis, focusing on the role of governments' fiscal policies in influencing individual MWTP for the environment. In particular, we empirically analyze preferences expressed by the citizens of 27 European countries and verify if they can be possibly affected by the existence of fiscal arrangements set out by a national explicit Environmental Fiscal Reform (EFR).

The EFR consists in a number of integrated interventions (i.e. taxes, subsidies, incentives) carried out in some European countries in order to discourage polluting activities and achieve, jointly, economic and employment objectives. A central point of the reform is represented by the "tax shift" from distortive taxes to environmental ones, generating the so called "double dividend".

Empirical studies have taken into account the effects of EFR on competitiveness (Barker et al. 2007, 2009), on equity (Barker and Kohler, 1998) and have studied its social acceptance (Clinch et al. 2006a, 2006b; Dresner et al. 2006), but, as far as we are currently aware, there are not studies analyzing the role of EFR in influencing MWTP for the environment. Nevertheless, for its characteristics, aims and effects it seems reasonable to suppose that individuals' MWTP for the environment might be affected by the existence of fiscal arrangements set out by an EFR. Our hypothesis is that the level of MWTP for the environment can change considering the results achieved by applying environmental policies. Being these results more consistent where an EFR has been implemented, then the willing to pay extra money for achieving extra improvement can be lower.

In order to test it, we analyze micro data provided by the 2008-2010 wave of the European Values Survey (EVS), where people are asked about their own willingness to give part of their income in order to prevent environmental pollution. Following the main literature, we control for a wide number of individual level and country level determinants of the revealed MWTP. Analyses are carried out by means of standard ordered logit model, while robustness checks include logit models and the partially constrained generalized ordered logit model.

Our results highlight a strong negative effect of EFR on individuals' MWTP for the environment and show that being aware of the existence of the implanted EFR does not impact positively on the MWTP. Summarizing, the original contribution of this paper consists of two main elements: the investigation of the EFR as a determinant of MWTP for the environment using European data and the employment of the partial generalized ordered logit model to better investigate if the effect of the independent variables vary by the level of the dependent variable, violating the parallel lines assumption.

The reminder of the paper is organised as follows. Section 2 presents an overview of the existing literature on the issue of individual WTP for the environment. Section 3 gives a detailed definition of EFR and illustrates its contents in the countries where it has been set out. Section 4 presents the data we use in our empirical analysis, while Section 5 illustrates the methodology we applied. Our results are shown in Sections 6 and 7, while Sections 8 and 9 are dedicated to discussion and final remarks.

2. Determinants of the individual WTP for the environment: the existing literature

The literature using survey data investigates the determinants of WTP for the environment at single country level, focusing on regional differences (Torgler and Garcia-Valiñas 2007; Witzke and Urfei, 2001) or shows comparison between high income and low income countries (Dorsch 2011; Franzen and Meyer 2010; Duroy 2005; Israel and Levinson, 2004; Inglehart 1995). Although its remarkable interest, this approach presents several limitations, related to the sociological issues that the well known literature on the contingent valuation has largely set out (i.e. there may exist a gap between the declared WTP and actual behaviour), but also to the aspects of the question itself, that being related to the marginal willingness to pay for the environment in general, may reduce the real concern for the environment (Witzke and Urfei 2001; Torgler and Garcia-Valiñas 2007), as there is not the perception of a concrete and tangible problem.

Generally the independent variables taken into consideration can be divided into: individual (i.e. socio-economic conditions, political and social values) and country variables.

Among the individual variables, “income” is always taken into consideration, with different results. In a cross national analysis Franzen and Meyer (2010) find the confirmation of “prosperity assumption”, stating that environmental quality increases with income and that public environmental concern, measured by an additive index including the WTP for taxes or higher price to protect the environment, depends predominately on individual characteristics, rather than macro context. Auci et al. (2006), following the Kuznetz curve hypothesis, demonstrate that the WTP increases at higher levels of income. Analyzing the specific case of low-income countries, Israel and Levinson (2004) find no strong evidence that people's WTP increases with per-capita GDP.

“Gender” and “education” also affect the WTP for the environment (Franzen and Meyer 2010; Torgler et al. 2008). Torgler and Garcia-Valiñas (2007) find that women are more willing to pay as they show a stronger preference towards the environment. In Pirani and Secondi (2010) this trend is confirmed: higher level of eco-friendly behavior is found among women, adult and elderly couples, and people with a high socio-economic status. Duroy (2005), among others, find that WTP for the environment and attitude in protecting the environment is a function of the level of education.

Variables related to politics are found to have strong impact on environmental attitude and WTP. This effect has been measured using several proxies, such as political interest – discussing politics, interest in politics and political orientation (Torgler and Garcia-Valiñas 2006, 2007); political affinity -numbers of voters of green parties- (Kollmann et al. 2012); political ideology and party identification (Konisky et al. 2008; Witzke and Urfei 2001). In all the cases they significantly affect the WTP for environmental protection.

The variable “trust” is used in order to estimate the role of social capital in affecting WTP (Torgler and Garcia-Valiñas 2007; Dorsh 2011) and in understanding attitudes about government intervention to protect the environment (Koniski et al. 2008). “Religion” is included as a significant

proxy for civic values (Greeley 1993), while among the individual values the “sense of belonging to a certain community” (global/local) is also investigated. Auci et al. (2006) find that the sense of belonging to a wider regional group, national pride and individual blame on tax evasion are strongly positively correlated with the WTP for the environment. Dorsh (2011) states that people who view themselves as world citizens have more WTP for the environment than others.

As context variables, several studies includes in their models variables related to the status of the environment (Franzen and Meyer 2010, Kollman et al. 2012). Witzke and Urfei (2001) in a regional analysis find that noise from cars and litter in the neighborhood increases individuals’ WTP; Dorsh (2011) in analyzing the WTP in developing countries finds out that the perception of global warming - loss of plant/animal biodiversity, pollution of lakes and oceans, and greenhouse effect has a positive impact on individuals’ MWTP, but not the local ones, expressed by poor water quality, poor air quality, poor sewage and sanitation.

Following the main literature on this subject, in our analysis we will employ a wide number of individual level and country level determinants of the revealed MWTP, adding some reflections in particular on the role of Environmental Fiscal Reform carried out in Europe.

3. Brief overview on the environmental fiscal reform

The Environmental Fiscal Reform (EFR)¹ encompasses a number of measures – taxes, subsidies, investments, incentives- aimed at combining the reduction of environmental degradation with political economy’ objectives (EEA 2011a, 2011b).

Since the nineties an explicit EFR has been employed by Denmark, Finland, Sweden, Germany, The Netherlands and the United Kingdom (Andersen and Ekins 2009). A crucial aspect of the reform is the tax shifting from “goods” (labour or capital) to “bads” (pollution, resource depletion) (Ashiabor et al. 2005; Bosquet 2000; EEA 2011a; Ekins et al. 2011). It consists in offsetting the introduction or the increase of environmental related taxes, by reducing other taxes and generating the so called “double dividend”² (Andersen et al. 2011; Ceriani and Franco 2011; EEA 2011a; EEA 2011b): “the cleaner environment is the first dividend while the increase in employment or GDP is the second dividend” (Clinch et al. 2006, p. 961).

Environmental taxes are mainly set up to reduce greenhouse gases emissions and to sustainably manage resources. Taxes on energy, CO₂ direct taxes and transport taxes, related to the ownership and use of vehicles are some examples, as well as taxes on NO_x and SO₂ and on the management of water (taxes on ground water) and waste (landfill tax) (Eurostat 2010)³, (fig.1). The difference between simple environmental taxes and environmental taxes as part of a fiscal reform is the revenue recycling system. Revenues can be allocated in advance to finance specific environmental programmes (e.g., environmental funds, environmental projects, R&D activities) or

¹ Environmental fiscal reform, ecological tax reform, green tax reform, green tax swap, green tax shifting, environmental tax reform are used as synonymous by a large part of the literature (Bosquet 2000).

² The double dividend hypothesis has always been highly debated (Carraro et al. 1996, Pezzey and Park 1998, Bosello et al. 2001).

³ In 2007, in most European countries for which data were available, households were the sector paying the most of total energy and transport taxes (Eurostat 2010).

can be used to compensate some of those most affected by the tax (Dresner et al. 2006). However the nature of the so called “tax shift” is conditioned by the main aim of the reform, which can differ from country to country. Examples are: the reduction of personal income taxes in Sweden; the reduction of the general tax revenues in Finland; the improvement of environmental protection and the achievement of employment’ objectives in Germany (Speck et al. 2011, in Ekins and Speck 2011). In practice then, depending on the aim of the reform, the shift will take place between environmental taxes and Personal Income tax (PIT), Social security contribution (SSC) or corporation taxes (tab. 1).

At European level three main instruments have fostered the use of market-based tools: the EU Emission Trading Scheme, the energy taxation directive (Directive 2003/96/EC) and the Eurovignette directive (Directive 1999/62/EC, revised by the Directive 2006/38/EC) (Eurostat 2010). So far, all the European Union Member States have introduced environmental taxes, but not full EFR strategies⁴ (Bassi et al. 2009). Estonia (2005) and Czech republic (2008), have recently started at implementing the shift from conventional taxes on labour to environmental ones (Speck et al. 2011, in Ekins and Speck 2011), while Denmark, Finland, Sweden, Germany, The Netherlands and the United Kingdom have implanted full EFR strategies since the nineties.

The effects of the EFR have been analyzed from different points of view. Discretionary analysis between EFR and non EFR regions has been conducted in order to verify the effects on competitiveness (Enevoldesen et al. 2009; Barker et al. 2007, 2009), while the households’ perspective has been mainly analyzed considering the distributional effects of environmental taxes and related measures (Barker and Kohler 1998; Speck 1999; Klok et al. 2006; Leicester 2006; Ekins and Speck 2011). For its characteristics, aims and effects, then, it seems reasonable to suppose that EFR might affect the individual’ preferences in terms of WTP for the environment but, as far as we are aware, no previous studies have analyzed the role of EFR in influencing WTP for the environment. By means of the ordered logit model we will try to test which is the impact of EFR on MWTP for the environment, if any. In particular, our hypothesis is based on the assumption that in countries in which an explicit EFR has been implemented for years, the marginal WTP for the environment might be lower than in countries where this system has not been introduced.

4. Data and descriptive analysis

Our empirical analysis is based on individual data drawn from the 2008-2010 wave of the European Value Survey database (EVS 2011). EVS represents “the most comprehensive research

⁴ The implementation of the reform depends on several factors, such as macroeconomic and labour market conditions (Clinch et al. 2006a). Despite “experience shows that EFR is a potential policy tool for all EU” (Speck et al. 2011, in Ekins and Speck 2011) and studies highlight the positive impacts on economic growth and innovation and on reduction of emissions (Baranzini et al. 2000, EEA 2011a), there are several difficulties of its implementation, related mainly to social and political conditions and the design of a proper revenue recycling system (Ashiabor et al 2005), as well as complementary measures for acceptance and equity (Clinch et al., 2006a, 2006b).

project on human values in Europe”⁵. It is based on interviews to representative samples of population in the European countries and collects data about the socioeconomic characteristics of the interviewees together with information about their personal beliefs, cultural tendencies and ideas about political, religious, and economic issues.

We selected data from 27 European countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom, the latter being formed by the data collected England plus the ones from Northern Ireland. As already discussed in section 3, six among them carried out an explicit EFR before 2008 (Denmark, Finland, Germany, Netherlands, Sweden, UK).

We measure the individual MWTP for the environment through the answer given to the question: “I would give part of my income if I were certain that the money would be used to prevent environmental pollution” (**ENVIRONMENTAL**). Given that the question asks about the WTP for preventing environmental damages, we may consider the answers as reflecting the individuals’ marginal willingness to pay. Answers may assume 4 values (disagree strongly, disagree, agree, strongly agree)⁶. Fig. 2 reports the frequencies registered for each answer in the whole sample, while fig.3 reports them by country.

According to the existing literature, the individual explanatory variables may be grouped in three broad categories:

- *individual socio-demographic characteristics*: age (**AGE**), age squared (**AGE2**, introduced in order to account for non linear effect), gender (**FEMALE**), parenthood status (**CHILDREN**), education (**EDUCATION**);
- *individual economic condition*: natural log of household income corrected for PPP (**INCOME**) and its squared value (**INCOME2**), introduced to take into account non linear effect;
- *personal beliefs and values*: political orientation (**RIGHT**), trust in government (**GOVER_TRUST**), trust in the others (**GEN_TRUST**), religious belonging (**RELIGION**), fear about environmental catastrophe (**ENV_CAT**), sense of belonging to the world as a whole (**WORLD_WHOLE**).

In order to explore the impact of context on individual preferences, we integrated the EVS micro data with some country level variables collected from other sources or elaborated by ourselves.

⁵ <http://www.europeanvaluesstudy.eu/>

⁶ Kollman et al. (2012) employed the same variable as a proxy for voters’ acceptance of environmental taxes. Only this paper uses a European dataset, studying the profile of people more willing to pay for the environment. Pirani and Secondi (2010) also employs a European dataset, measuring the eco-friendly attitude, but variables on willingness to pay have not been taken into account.

Two alternative strategies were followed to take the effect of context into account: first we included countries' dummies (**COUNTRY**) in order to account for unobserved cross country heterogeneity; secondly we replaced these countries' dummies with a set of variables including:

- Total taxes as percent of GDP (**TAX_GDP**);
- CO2 emission per inhabitant (thousand of tonnes x 10,000) (**CO2_PC**);
- Material recycling as percent of total waste generated (**REC_TOT**);
- a dummy taking the value of 1 for post communist countries (**EST**);
- a dummy taking the value of 1 for countries where an EFR has not been carried out (**NO_REFORM**).

Tab.2 reports codes, detailed description, presentation of the modalities and sources of all these variables, while descriptive statistics are reported in tab. 3. After list wise deletion of incomplete cases, our sample includes 21,264 observations.

As a preliminary analysis, we carried out an Analysis of Homogeneity of Variance (ANOVA) in order to understand if **NO_REFORM** affects the distribution of the answers related to **ENVIRONMENTAL**. As it is well known, the one-way ANOVA compares the means of a dependent variable between groups and determines whether those means are significantly different from each other.

The significance of the Levene statistics, whose results are reported in tab. 4, gives evidence that the basic ANOVA assumption of homogeneity of variance between the groups (**NO_REFORM**=0 and **NO_REFORM**=1) has been violated; the Brown-Forsythe test and the Welch test (tab. 5) display an alternative version of the F statistic (weighting the groups' variances by the inverse of their sample size). These results highlight the existence of significant differences in the mean values of **ENVIRONMENTAL** comparing the two groups of countries.

5. Methodology

Given the discrete and ordered nature of our dependent variable, regression analyses were carried out using a categorical dependent variable model. We assume that WTP for preventing environmental pollution of individual i is characterized by a continuous latent variable:

$$Y_i^* = X_i\beta + \varepsilon_i \quad [1]$$

where X_i is a vector of individual characteristics, ε_i is a random error term and β is the parameter to be estimated. While Y_i^* cannot be observed, we observe a variable Y_i that takes the values from 1 to 4, increasing in individual WTP for environmental interventions. More in detail, we have:

$$Y_i = j \text{ if } \kappa_{j-1} < Y_i^* < \kappa_j \text{ for } j = 1, \dots, 4 \quad [2]$$

where κ_j indicates unknown cut-points to be estimated. The full set of probabilities of the possible outcomes is the following :

$$Pr[y_i = j|x] = F(\kappa_j - X_i\beta) - F(\kappa_{j-1} - X_i\beta) \quad [3]$$

assuming that $\kappa_0 = -\infty$ and $\kappa_j = +\infty$ and where F is the cumulative distribution function for the error term. This kind of model may be estimated through maximum likelihood. When the cumulative distribution function is supposed to be a standard Normal, the ordered probit model applies while the Ordered Logit model assumes that the cumulative distribution function is logistic. In this study, we apply the ordered logit estimates that allow computing odds ratios and making the interpretation of results clearer. The model applies to data meeting the parallel lines assumption (proportional odds, Long and Freese, 2006) that the effect of the independent variables do not vary by the level of the dependent variable.

6. Results

Tab. 6 shows the odds ratios and the standard errors we obtained in three different specifications (*M1*, *M2* and *M3*). All the estimates were also carried out by means of OLS, in order to check for multicollinearity by the variance of inflator factor (VIF) test⁷. Problems of multicollinearity have not been detected: a part from squared variables (**AGE2** and **INCOME2**), which were included in the specifications in order to account for non linear effects of **AGE** and **INCOME**, no other variable registered a VIF value higher than 6.

In the first model (*M1*) only the individual variables were included as explanatory. We found that females have lower MWTP than men (see the results for the **FEMALE** dummy). Based on our results, the individual MWTP for the environment is significantly affected by the level of **EDUCATION**, as **Middle** and **Upper EDUCATION** show significant and >1 odds ratios.

Several variables capturing personal beliefs and values turned out to be significant: **RIGHT** (MWTP decreases when people are more right wing oriented but, interestingly, no significant differences were found between the extreme left and extreme right orientation), **GOVER_TRUST** (MWTP is higher when people show trust in the government), **GEN_TRUST** (people who trust in the others exhibit an higher WTP), **WORLD_WHOLE**, **ENV_CAT** (being convinced that an environmental catastrophe is going to happen, leads to significant higher MWTP for environmental preservation).

INCOME and **INCOME2** are found to be not significant: surprisingly, we did not find support for the hypothesis of a relationship between income and MWTP for the environment.

⁷ Results are omitted but available upon request.

RELIGION also turned out to be determinant: **catholic**, **protestant**, **orthodox** and the residual **other** category all show higher MWTP than non religious people. The positive effect seems to be very relevant for the **orthodox** category.

In the second model (*M2*) countries dummies were included. The aim was to account for unobserved cross country heterogeneity. The inclusion of countries' dummies does not affect significantly the results we obtained in *M1*. The only relevant change in the results concerns the **orthodox** category which is not longer significant (due to the inclusion of the dummy for Greece). Countries' dummies show that WTP for the environment is significantly higher in **Greece**, **Cyprus**, **Bulgaria** and **Slovenia** and lower in **Germany**, **Portugal** and **Finland** (the reference category here is **France**).

In the third model (*M3*) countries' dummies were replaced by the set of variables controlling for some national characteristics (**CO2_PC**, **REC_TOT**, **TAX_GDP**, **EST**, **REFORM**). As individuals within each country are, in fact, more similar to one another than individuals from another state, in *M3* the assumption that observations are independent and identically distributed is violated. For this reason, in order to obtain more reliable estimates clustered standard errors have been applied.

The results obtained for the individual variables in this third specification do not significantly differ from the ones we found in *M1* and *M2* except for the **catholic** dummy.

Furthermore, we found a significant and positive effect for **CO2_PC**, indicating that the individual MWTP for the environment is higher in countries where more pollution is registered, and a negative (even if hardly significant) impact for **REC_TOT**: the individual MWTP for the environment is lower in countries where citizens are already highly engaged in environmental friendly activities.

A negative and significant effect is also found for the **EST** dummy: this result confirms that ex communist countries are less inclined to the environment. Going back to the results of model 2, we may notice that, significantly, this is not the case of Estonia and Czech Republic where the implementation of the shift from conventional taxes on labour to environmental ones has recently started.

TAX_GDP is found to be not significant, meaning that the MWTP does not depend on the level of total taxation. At the same time, **NO_REFORM** shows a positive and significant impact: the odds of showing a high MWTP for environmental preservation are higher for respondents who live in a country where an EFR has not been set out.

Two kinds of robustness checks were carried out. Firstly, we dichotomized our dependent variable and run again the analyses by the mean of a standard logit model, using the same specifications as before. Results are omitted for the lack of space but are very similar to the ones we obtained in with the ordered logit model and our original dependent variable⁸.

⁸ Results obtained by the standard logit models are available upon request

Secondly, we replicated model 3 (M3) of tab. 6 by the means of the partial generalized ordered logit model. The generalized ordered logit model (Williams, 2006) may be applied to allow the coefficients to vary across categories of the dependent variable when the parallel lines assumption of the ordered logit is violated. Looking at the equations [1] and [2], this means that the coefficient β is allowed to differ for each of the categories j of the dependent variable.

In the partial generalized ordered logit model the parallel lines constraint is relaxed only for those variables where it is violated; variables whose effects do not significantly differ across equations have proportionality constraints imposed, so their coefficient do not vary across categories of the dependent variable. The analysis was run using the autofit option of the gologit2 module provided by Williams (2006).

Results of the partial generalized ordered logit model are shown in tab. 7. Basically, they confirm the ones we obtained in the previous models but, at the same time, they help in deepening the analysis of the impact of each explanatory variable.

Looking at tab. 7, the effect of **FEMALE** varies in both sign and magnitude across the range of MWTP attitudes. We find that women tend not to take extreme positions: compared with men, they are more likely to show an higher WTP than **ENVIRONMENTAL** = 1 but, at the same time, a lower WTP than **ENVIRONMENTAL**=3. The effect of the political orientation (**RIGHT**) also varies in magnitude across the categories of the dependent variable: right- wing orientation has a negative impact especially, but not exclusively, on **ENVIRONMENTAL**=3.

The impact of **GOVER_TRUST** significantly decreases across the categories of **ENVIRONMENTAL** while the impact of **WORLD_WHOLE** increases. The **orthodox**, **protestant** and **other** categories of **RELIGION**, all meet the parallel lines assumption: their impact does not vary categories across the categories of the dependent variable

Looking at the context variables, also **EST**, **CO2_PC** and **REC_TOT** meet the parallel lines assumption. **NO_REFORM** is found to have a significant impact on the central positions of the MWTP scale.

7. The role of knowledge in countries where the EFR has been set out

Results presented in the previous sections show that MWTP for the environment is higher in countries where an EFR has not been carried out.

According to these results, in countries where an EFR has been carried out, the individual knowledge about the reform may be crucial in explaining individual MWTP for environmental preservation: we expect people being informed about the reform to have a lower MWTP for preventing environmental pollution.

We tested this hypothesis by considering the effect of knowledge on **ENVIRONMENTAL** in countries where the EFR has been carried out and in the ones where it has not. One variable in

our dataset may be considered as a proxy for knowledge: **EDUCATION** (more educated people are supposed to be more informed).

In tab.8 we report the results of regression analyses run on two subsamples: one including all the interviews carried out in countries where the EFR has been implemented (**NO_REFORM=0**) and a second one including all the others (**NO_REFORM=1**). We use the same specification applied for model 3 (*M3*) in tab. 6⁹.

Looking at the results in tab.8, we find that **EDUCATION** has a positive effect on **ENVIRONMENTAL** in countries where an EFR has not been set out: the more people are educated, the higher is their MWTP for environmental preservation. On the contrary, in countries where an EFR has been set out, the **Middle** category of **EDUCATION** is found to have a negative and highly significant effect while **Upper** is not significant at all.

These results suggest that, in countries where an EFR has been set out, knowledge about the existence of the EFR has negative/null impact on individuals' MWTP for the environment.

8. Discussion

The main finding about the relation between the EFR and the MWTP for the environment is that the latter is higher in countries where these reforms have not been carried out.

Moreover, further investigation on the role of information, which is crucial in understanding the effects of the reform (EEA 2011a, Bassi *et al.*, 2009), leads us at stating that in countries where an EFR has been carried out, knowledge about the reform has negative/null impact on individuals' MWTP for the environment.

Among the individual variables, "income" is found not to affect the MWTP for the environment. As shown before, empirical studies do not provide a unique explanation about the relationship between income and environmental attitudes. We find support for the hypothesis of gender gap in environmental attitude, but differently from other studies (see above, par. 2), we do not find that women are more willing to pay for the environment. Results show that personal belief and values play a fundamental role in affecting the MWTP for the environment. This is higher when people trust the government, when they have the perception of belonging to the world as a whole and when they perceive the existence of an environmental risk. These results are in line with a broad sociological and economic literature on the relation between households behavior and environment (Venkataclalam 2008, Shogren and O Taylor 2008, OECD 2008): conscious of the bounded rationality, willpower and self-interest (Kallbekken and Sælen 2010) in taking choices related to the environment, they agree on the fact that what affect them, among others, are beliefs, values and perceptions. These conditions and factors influence the so called pro environmental behavior (-PEB- Clark et. Al 2003). Finally our results show that MWTP for the environment is higher in countries where an EFR has not been carried out.

This might be interpreted looking at two main factors: 1) time; 2) the perception of environmental quality. First it should be taken into account that in countries where an EFR has been carried out during the 90's, citizens have been contributing to the protection of the environment by paying

⁹ The variable EST is dropped because no ex communist countries carried out an EFR.

environmental taxes for about 20 years. This may lead at assuming that people living in EFR countries can be less willing to pay extra money for intervention related to the environment. This thought can be supported by the second mentioned circumstance for which their marginal utility in achieving additional improving of environmental quality may decrease as they perceive that an acceptable level of environmental quality has been already achieved, so they are not willing to pay extra money. This interpretation is also confirmed by the results we obtained for the variables **CO2_PC** and **REC_TOT**, employed as variables of environmental quality and environmental friendly behavior.

Another point that can be highlighted for better understand the results is the issue related to a proper and effective communication of the main effect of the reform itself. People aware of this system seem to be less willing to pay for the environment than others. This can be partially explained considering the circumstances mentioned above, but looking at the characteristic of the EFR a consideration on the communication features needs to be done. The EFR is a system that does not merely consist in introducing or increasing environmental related taxes, but in recycling revenues so to obtain several objectives jointly. By taxing “bads”, revenues can be allocated to priority spending needs through the normal budgetary process, for example for pro-poor investments as well as investments related to health, education; can be used to reduce the tax rates of other distortionary taxes such as those imposed on labour or can finance environmental investment programmes (Schlegelmich et al. 2009, p.6).

So that it would be certainly helpful to better understand the advantages that may be not immediately perceivable at an individual sphere. In fact a number of academic papers state that one of the problem related to the EFR is the perception of the shift and the mistrust that the revenues can be actually used for improving the quality of the environment (Bassi et al. 2009) or achieving effective results. On this argument, Dresner et al. (2006) explains that reactions on the effects of EFR can be skeptical, “independent of whether the interview partner already knew about the double dividend or had just been introduced to the argument” (Ibidem, 2006, p.901). Thus, in order to make it more acceptable alternative recycling methods that are currently under investigation and a better communication process might be helpful in better understand the advantages of an environmental fiscal reform.

9. Conclusion

The aim of the paper was to investigate the determinants of MWTP for the environment in Europe, focusing, in particular, on the role of EFR. The EFR encompasses a number of measures – taxes, subsidies, investments, incentives- aimed at combining the reduction of environmental degradation with positive effects on employment, innovation and economic growth. Positive results have been actually showed by the 6 European countries in which the system has been implemented since the early nineties, but social impediments in terms of acceptance of the reform have been largely underlined by empirical researches. These important highlights let us suppose that EFR might affect the individual’ preferences in terms of MWTP for the environment. In order

to test it we employed an ordered logit model and analyzed micro data provided by the 2008-2010 wave of the European Values Survey (EVS).

To understand which factors might affect the MWTP, several explicative variables have been included in the empirical analyses. In particular, they encompassed: individual socio-demographic characteristics, individual economic condition and personal beliefs and values. Moreover to explore the impact of context on individual preferences, we integrated the EVS micro data with some country level variables, including: total taxes as percent of GDP, CO2 emission per inhabitant, Material recycling as percent of total waste generated, a dummy for post communist countries and a dummy for countries where an EFR has not been carried out.

Focusing the attention on EFR, results show a negative effect of EFR on individuals' WTP for the environment, while further analysis on the role of information on WTP, highlight that a negative/null effect of individual level of information is found in countries where the EFR has been set out.

Conscious of the limit of these kind of analysis, based on value of judgments that might not reflect the real intention of the respondents as a broad literature has shown, we can only consider our results as a likely approximation of the reality. Looking at the outcomes, the understanding of the determinants of household behavior and their WTP for the environment provides useful insights to policy makers. They can be crucial in improving the decision making process concerning the implementation of the EFR, strongly promoted by the European Union¹⁰. Considering the EFR as a useful tool to improve the quality of the environment, internalizing costs of environmental damages and to obtain jointly other economics and social benefits, our results let us draw some interesting conclusions on what the policy makers need to take into account. In particular is crucial to strengthen the government trust and to influence the perceptions of environmental risks (as the MWTP is higher in more polluted countries). In order to let the people accept and support this kind of reform in the long term is the a clear statement of recycling revenues, as underlined by the main literature on EFR would be helpful in improving trust. On the other hand, the perception of the environmental risks might influence people at taking choices related to environmental policies. A better communication would certainly make people aware of the risks of a non pro environmental behavior and understand the other advantages of the reform, besides the environmental ones.

¹⁰EEA June 2012: EFR- A European Perspective: <http://storify.com/EUEnvironment/environmental-fiscal-reform-a-european-perspective>

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Tables and figures

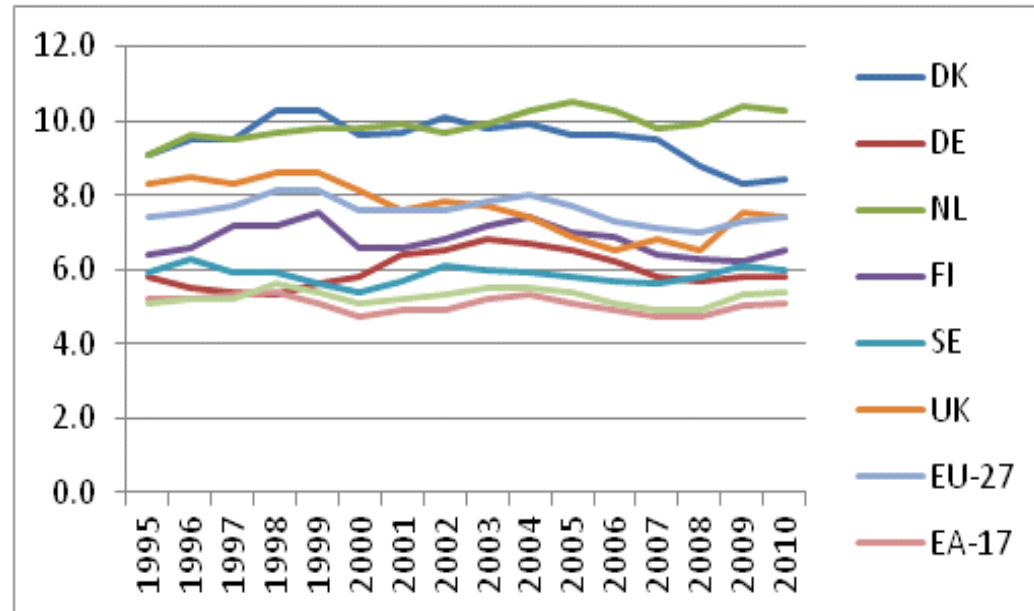


Fig. 1: Environmental taxes as % of total taxation. Source: Eurostat(2012)

Country	TAX	YEAR	EFR ¹¹
Denmark	Co2 tax	1992	Tax revenue from income, labour to pollution and scarce environmental resources.
	Energy package (increase of Co2 tax + So2 tax and energy tax on natural gas + on energy used for space heating – households-)	1996	Revenues used to reduce employers' social security contributions and investment aids for energy saving.
	Tax shifting programmes	1994-2002	A three phases programme involving households and industries. Reduction of SSC.
Finland	Co2 tax	1990	Reduction of income tax and social insurance contributions
	Landfill tax	1996	
	ETR s	1997	Reduction of labour taxes and increase of environmental taxes
	ETR s	1998	
Germany	Mineral oil taxes on transport fuels	1999-2003	Reduction of tax wedge on labour through reduced social security contributions for both employers and employees.
	Taxes on heavy fuels Electricity tax	2000-2003 1999	
	Heating fuel tax on natural gas and on heavy fuel oil	2004	
The Netherlands	Energy regulating tax	1996	Revenue returned to households in terms of reduced social security contributions
Sweden	Energy/excise taxed levied on energy products	1991	Reduction in income tax
	Co2 taxes	1991	
	So2 taxes	1991	
	Nox charge	1992	Revenues refunded to power plants covered by the charge, in proportion to the amount of energy they generate. Reduction of income taxes and increase of environmental related taxes Revision of rates and sectors
	Green tax shift	2001 -2006	
	Fiscal policy programme	2007- 2009	
UK	Transport fuel taxes	1990	Reduction of employers national insurance contributions
	Landfill tax	1996	
	Climate change Levy	2001	
	Mineral Aggregated taxes	2002	

Tab. 1: EFR(EFR) in Denmark, Finland, Germany, Netherlands, Sweden, UK.

¹¹ Contents of this table have been mainly drawn by: Ashiabor et al. (2005), Andersen and Ekins (2009), Bosquet (2000), Ekins and Speck (2011).

Code	Question/description	Modalities	Source
ENVIRONMENTAL*	I would give part of my income if I were certain that the money would be used to prevent environmental pollution	disagree strongly disagree agree strongly agree	EVS 2008 EVS 2008 EVS 2008 EVS 2008
FEMALE	Are you male or female	0=male 1=female	EVS 2008 EVS 2008
AGE	How old are you?	<i>continuous</i>	EVS 2008
AGE2	Age squared	<i>continuous</i>	EVS 2008
CHILDREN *	Have you had any children?	0=no 1=yes	EVS 2008 EVS 2008
EDUCATION	What is the highest educational level that you have attained?	Lower (reference) Middle Upper	EVS 2008 EVS 2008 EVS 2008
RIGHT	In political matters, people talk of "the left" and "the right." How would you place your views on this scale, generally speaking?	left (reference) 2 3 4 5 6 7 8 9 right	EVS 2008 EVS 2008 EVS 2008 EVS 2008 EVS 2008 EVS 2008 EVS 2008 EVS 2008 EVS 2008 EVS 2008
GOVER_TRUST *	Could you tell me how much confidence you have in the government of your country?	0= not very much / none at all 1= quite a lot/a great deal	EVS 2008 EVS 2008
GEN_TRUST *	Most people can be trusted or that you need to be very careful in dealing with people?	0=cannot be too careful 1= most people can be trusted	EVS 2008 EVS 2008
ENV_CAT *	Environment: if things continue we will experience a catastrophe	0= disagree or strongly disagree 1= strongly agree or agree	EVS 2008 EVS 2008
RELIGION *	Do you belong to a religion or religious denomination? If yes, which one?	roman catholic protestant ortodhox other (free church, buddhist, hindu, jew, etc.) not religious (reference)	EVS 2008 EVS 2008 EVS 2008 EVS 2008 EVS 2008
WORLD_WHOLE	Which of these geographical groups would you say you belong to first of all? The world as a whole	0=no 1= yes	EVS 2008 EVS 2008
INCOME	Log of Monthly household income corrected for PPP (euros)	<i>continuous</i>	EVS 2008
INCOME2	LOG_INCOME squared	<i>continuous</i>	EVS 2008
EST	Dummy =1 for ex communist countries	1= ex communist country	own elaboration
NO_REFORM	Dummy =1 for countries where EFR has not been carried out until 2005	1=EFR not carried out	own elaboration
CO2_PC	CO2 emission per inhabitant (thousand of tonnes * 10,000)	<i>continuous</i>	Eurostat
TAX_GDP	Total taxes as percent of GDP	<i>continuous</i>	Eurostat
REC_TOT	Material recycling as percent of total waste generated	<i>continuous</i>	Eurostat
COUNTRY	Countries' dummies	one dummy for each country: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France (reference), Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, United Kingdom	EVS 2008

Tab. 2: codes, detailed description, presentation of the modalities and sources of all the variables. * indicates variables which have been recoded from the original EVS database.

		Obs	Mean	Std. Dev.	Min	Max			Obs	Mean	Std. Dev.	Min	Max
FEMALE		21264	0.52	0.50	0	1	COUNTRY	Austria	21264	0.04	0.20	0	1
AGE		21264	48.94	17.25	16	108		Belgium	21264	0.06	0.23	0	1
AGE2		21264	2692.45	1754.62	256	11664		Bulgaria	21264	0.03	0.18	0	1
CHILDREN		21264	0.73	0.44	0	1		Cyprus	21264	0.02	0.15	0	1
EDUCATION	Lower	21264	0.29	0.45	0	1		Czech Republic	21264	0.04	0.20	0	1
	Middle	21264	0.46	0.50	0	1		Denmark	21264	0.04	0.21	0	1
	Upper	21264	0.26	0.44	0	1		Estonia	21264	0.04	0.20	0	1
RIGHT	left	21264	0.05	0.22	0	1		Finland	21264	0.03	0.18	0	1
	2	21264	0.04	0.20	0	1		France	21264	0.06	0.23	0	1
	3	21264	0.10	0.30	0	1		Germany	21264	0.06	0.24	0	1
	4	21264	0.10	0.30	0	1		Greece	21264	0.05	0.21	0	1
	5	21264	0.31	0.46	0	1		Hungary	21264	0.05	0.23	0	1
	6	21264	0.13	0.34	0	1		Ireland	21264	0.01	0.12	0	1
	7	21264	0.10	0.30	0	1		Italy	21264	0.03	0.17	0	1
	8	21264	0.09	0.29	0	1		Latvia	21264	0.04	0.19	0	1
	9	21264	0.03	0.17	0	1		Lithuania	21264	0.02	0.15	0	1
	right	21264	0.05	0.21	0	1		Luxemburg	21264	0.04	0.20	0	1
GOVER_TRUST		21264	0.35	0.48	0	1		Malta	21264	0.02	0.14	0	1
GEN_TRUST		21264	0.36	0.48	1	2		Netherlands	21264	0.05	0.22	0	1
ENV_CAT		21264	0.81	0.39	0	1		Poland	21264	0.03	0.18	0	1
RELIGION	roman catholic	21264	0.37	0.48	0	1		Portugal	21264	0.02	0.14	0	1
	protestant	21264	0.15	0.36	0	1		Romania	21264	0.02	0.16	0	1
	ortodhox	21264	0.13	0.34	0	1		Slovak Republic	21264	0.03	0.18	0	1
	not religious	21264	0.31	0.46	0	1		Slovenia	21264	0.03	0.17	0	1
	other	21264	0.04	0.19	0	1		Spain	21264	0.03	0.18	0	1
WORLD_WHOLE		21264	0.05	0.22	0	1		Sweden	21264	0.03	0.17	0	1
INCOME		21264	7.07	0.86	3.92	9.60		UK	21264	0.04	0.20	0	1
INCOME2		21264	50.75	11.88	15.34	231							
EST		21264	0.32	0.47	0	1							
NO_REFORM		21264	.74	.44	0	1							
CO2_PC		21264	95.99	36.25	42.1	197.6							
TAX_GDP		21264	37.50	5.50	28	47.8							
WASTE_REC		21264	.20	.13	0	.47							

Tab. 3: Descriptive statistics

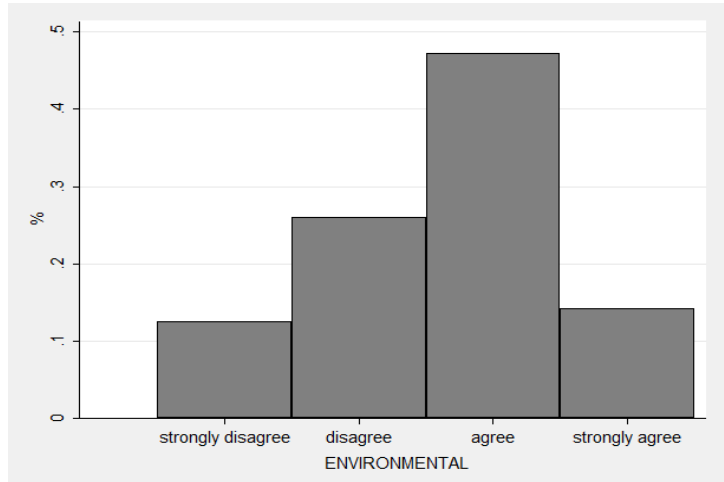


Fig. 2: Willingness to pay for environmental preservation (ENVIRONMENTAL). Whole sample. Source: Own elaboration on EVS data after listwise deletion of incomplete cases.

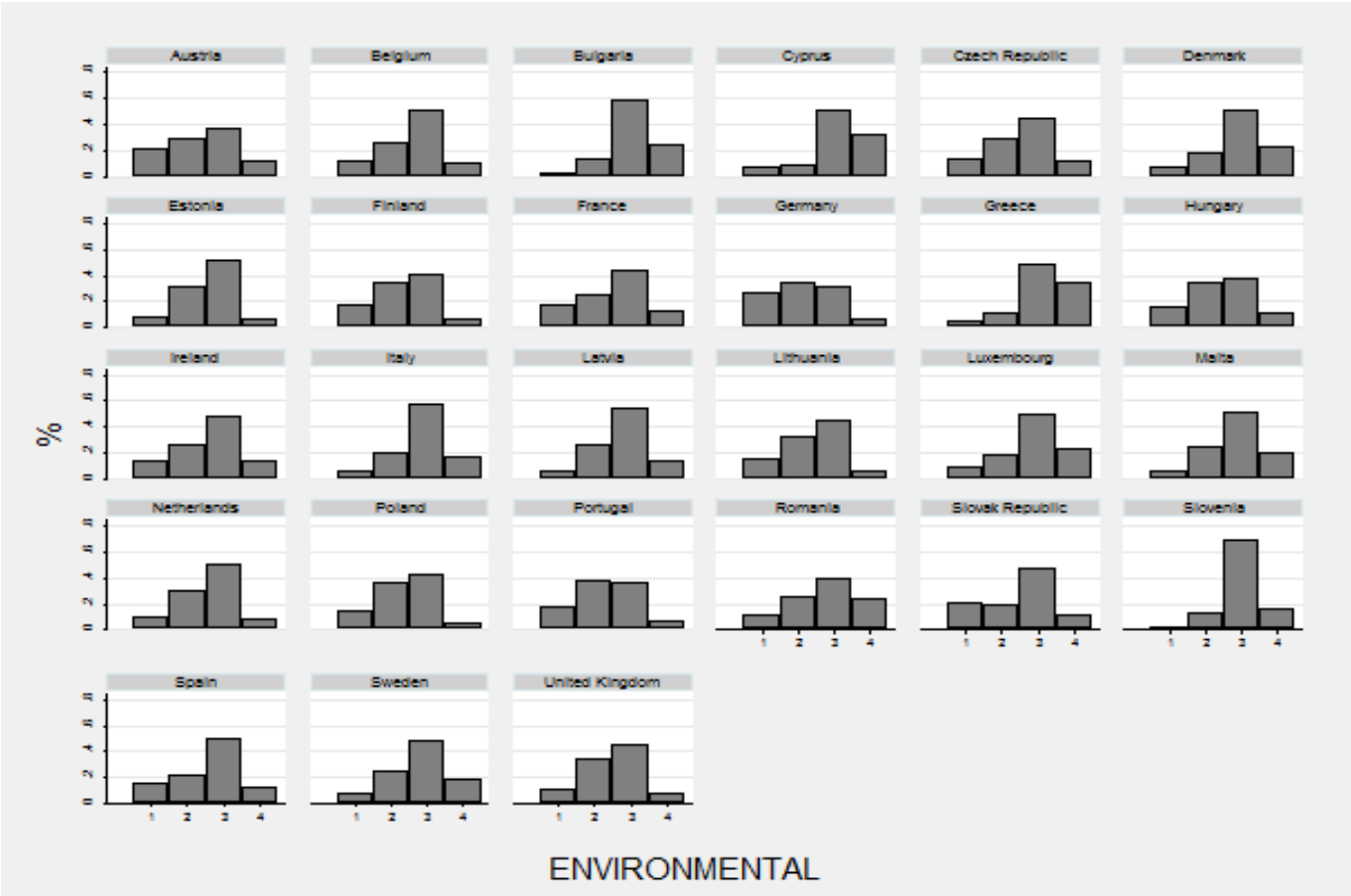


Fig. 3: Willingness to pay for environmental preservation (ENVIRONMENTAL) by country. Source: Own elaboration on EVS data after listwise deletion of incomplete cases.

Levene Statistic	df1	df2	Sig.
14.323	1	21262	.000

Tab. 4: Test of homogeneity of variances. The dependent variable is ENVIRONMENTAL while the factor is REFORM.

	Statistic	df1	df2	Sig.
Welch	109.674	1	9690.082	.000
Brown-Forsythe	109.674	1	9690.082	.000

Tab. 5: Robust test of equality of means. The dependent variable is ENVIRONMENTAL while the factor is REFORM.

		M1		M2		M3a	
FEMALE		0.938**	(0.02)	0.938**	(0.02)	0.931**	(0.03)
AGE		0.997	(0.00)	1,002	(0.00)	1,001	(0.01)
AGE2		1,000	(0.00)	1,000	(0.00)	1,000	(0.00)
CHILDREN		1,012	(0.04)	0.991	(0.04)	1,026	(0.05)
EDUCATION	Middle	1.074**	(0.03)	1.211***	(0.04)	1.176***	(0.07)
	Upper	1.504***	(0.06)	1.720***	(0.07)	1.640***	(0.13)
RIGHT	2	0.972	(0.08)	1,087	(0.10)	1,022	(0.11)
	3	0.882*	(0.06)	0.987	(0.07)	0.931	(0.09)
	4	0.781***	(0.06)	0.894	(0.07)	0.838	(0.10)
	5	0.749***	(0.05)	0.826***	(0.05)	0.794**	(0.07)
	6	0.738***	(0.05)	0.843**	(0.06)	0.796*	(0.10)
	7	0.763***	(0.06)	0.839**	(0.06)	0.826*	(0.09)
	8	0.733***	(0.05)	0.796***	(0.06)	0.779**	(0.10)
	9	0.758***	(0.07)	0.827**	(0.08)	0.807	(0.13)
	right	0.967	(0.08)	1,009	(0.09)	1,010	(0.15)
GEN_TRUST		1.271***	(0.04)	1.291***	(0.04)	1.315***	(0.06)
RELIGION	roman catholic	1.122***	(0.04)	1.095**	(0.04)	1,007	(0.08)
	protestant	1.130***	(0.05)	1.199***	(0.06)	1.306**	(0.18)
	ortodox	2.781***	(0.12)	0.962	(0.07)	2.186***	(0.27)
	other	1.325***	(0.09)	1.206**	(0.09)	1.275**	(0.15)
ENV_CAT		1.987***	(0.07)	1.974***	(0.07)	1.962***	(0.13)
GOVER_TRUST		1.360***	(0.04)	1.248***	(0.04)	1.286***	(0.08)
WORLD_WHOLE		1.631***	(0.10)	1.646***	(0.10)	1.583***	(0.08)
INCOME		0.988	(0.16)	1,049	(0.18)	1,056	(0.33)
INCOME2		1,006	(0.01)	1,001	(0.01)	0.998	(0.02)
COUNTRY	Austria			0.883	(0.08)		
	Belgium			1.267***	(0.10)		
	Bulgaria			4.370***	(0.47)		
	Cyprus			4.843***	(0.62)		
	Czech Republic			1.372***	(0.12)		
	Denmark			2.203***	(0.21)		
	Estonia			1.337***	(0.11)		
	Finland			0.518***	(0.05)		
	Germany			0.489***	(0.04)		
	Greece			5.525***	(0.61)		
	Hungary			0.991	(0.08)		
	Ireland			1.323**	(0.16)		
	Italy			2.265***	(0.21)		
	Latvia			1.876***	(0.17)		
	Lithuania			0.865	(0.09)		
	Luxemburg			2.075***	(0.18)		
	Malta			2.362***	(0.26)		
	Netherlands			1.262***	(0.10)		
	Poland			0.923	(0.08)		
	Portugal			0.800**	(0.09)		
	Romania			2.683***	(0.34)		
	Slovak Republic			1,155	(0.11)		
	Slovenia			3.003***	(0.28)		
	Spain			1.298***	(0.12)		
	Sweden			1.350***	(0.13)		
	UK			1,079	(0.09)		
EST						0.640***	(0.11)
NO_REFORM						1.557**	(0.30)
CO2_PC						1.006***	(0.00)
TAX_GDP						0.999	(0.02)
REC_TOT						0.135*	(0.16)
Oss.		21264		21264		21264	
log likelihood		-25604.71		-24969.23		-25408.14	
Pseudo R2		0.03		0.05		0.04	
LR chi2		1620.93		2891.89		.	
PR>chi2		0.00		0.00		.	
BIC		51488.44		50476.56		51075.37	

Tab. 6: Ordered logit estimates. The dependent variable is ENVIRONMENTAL. Odds ratios and standard errors (in parentheses). *, **, *** mean significantly different from zero at the 0.10, 0.05, 0.01 significance level. a= clustered standard errors applied

		ENVIRONMENTAL=1	ENVIRONMENTAL=2	ENVIRONMENTAL=3
FEMALE		1.119*** (0.05)	0.929** (0.03)	0.838*** (0.03)
AGE		1.002 (0.01)	1.002 (0.01)	1.002 (0.01)
AGE2		1.000 (0.00)	1.000 (0.00)	1.000 (0.00)
CHILDREN		1.024 (0.05)	1.024 (0.05)	1.024 (0.05)
EDUCATION	Middle	1.174*** (0.07)	1.174*** (0.07)	1.174*** (0.07)
	Upper	1.767*** (0.20)	1.771*** (0.15)	1.416*** (0.11)
RIGHT	2	1.026 (0.11)	1.026 (0.11)	1.026 (0.11)
	3	0.940 (0.09)	0.940 (0.09)	0.940 (0.09)
	4	0.923 (0.11)	0.891 (0.10)	0.716** (0.09)
	5	0.952 (0.10)	0.774*** (0.07)	0.779*** (0.07)
	6	1.047 (0.14)	0.796* (0.10)	0.689*** (0.09)
	7	0.999 (0.15)	0.859 (0.10)	0.696*** (0.07)
	8	0.786** (0.09)	0.786** (0.09)	0.786** (0.09)
	9	0.810 (0.14)	0.754* (0.12)	0.972 (0.16)
	right	0.778 (0.13)	0.932 (0.13)	1.251 (0.18)
GEN_TRUST		1.461*** (0.09)	1.327*** (0.07)	1.220*** (0.07)
RELIGION	roman catholic	1.007 (0.08)	1.007 (0.08)	1.007 (0.08)
	protestant	1.305** (0.17)	1.305** (0.17)	1.305** (0.17)
	ortodox	2.146*** (0.26)	2.146*** (0.26)	2.146*** (0.26)
	other	1.270** (0.15)	1.270** (0.15)	1.270** (0.15)
ENV_CAT		1.979*** (0.13)	1.979*** (0.13)	1.979*** (0.13)
GOVER_TRUST		1.436*** (0.13)	1.375*** (0.09)	1.066 (0.06)
WORLD_WHOLE		1.148** (0.08)	1.587*** (0.13)	1.700*** (0.13)
INCOME		1.032 (0.33)	1.032 (0.33)	1.032 (0.33)
INCOME2		1.000 (0.02)	1.000 (0.02)	1.000 (0.02)
EST		0.643*** (0.11)	0.643*** (0.11)	0.643*** (0.11)
NO_REFORM		1.448 (0.37)	1.646** (0.33)	1.477** (0.29)
CO2_pc		1.006*** (0.00)	1.006*** (0.00)	1.006*** (0.00)
TAX_GDP		1.000 (0.02)	1.000 (0.02)	1.000 (0.02)
REC_TOT		0.135* (0.16)	0.135* (0.16)	0.135* (0.16)
Oss.			21264	
log likelihood			-25299.69	
Pseudo R2			0.04	
LR chi2			1385.57	
PR>chi2			0.00	
BIC			50858.46	

Tab. 7: Generalized ordered logit (GOLOGIT) estimates with the parallel lines constraint relaxed only for those variables where it is violated (partial proportional odds model). The dependent variable is ENVIRONMENTAL. Odds ratios and standard errors corrected for clustering at country level in parentheses. *, **, * mean significantly different from zero at the 0.10, 0.05, 0.01 significance level.**

		EFR NOT CARRIED OUT		EFR CARRIED OUT	
FEMALE		0.916**	(0.04)	0.976	(0.07)
AGE		1.006	(0.01)	0.985	(0.01)
AGE2		1.000	(0.00)	1.000	(0.00)
CHILDREN		1.001	(0.06)	1.053	(0.06)
EDUCATION	Middle	1.305***	(0.07)	0.851**	(0.06)
	Upper	1.794***	(0.16)	1.224	(0.18)
RIGHT	2	0.940	(0.11)	1.068	(0.26)
	3	0.922	(0.09)	0.809	(0.24)
	4	0.816	(0.11)	0.744	(0.19)
	5	0.806**	(0.08)	0.673	(0.20)
	6	0.810	(0.11)	0.639	(0.19)
	7	0.858	(0.10)	0.586*	(0.17)
	8	0.845	(0.11)	0.487***	(0.10)
	9	0.938	(0.15)	0.373***	(0.11)
	right	1.145	(0.17)	0.437***	(0.11)
GEN_TRUST		1.187***	(0.07)	1.490***	(0.14)
RELIGION	roman catholic	0.951	(0.08)	1.467**	(0.25)
	protestant	1.385**	(0.21)	1.078	(0.22)
	orthodox	2.057***	(0.24)	0.476*	(0.19)
	other	1.231	(0.23)	1.375**	(0.20)
ENV_CAT		2.033***	(0.15)	1.835***	(0.26)
GOVER_TRUST		1.232***	(0.08)	1.399***	(0.16)
WORLD_WHOLE		1.604***	(0.10)	1.550***	(0.14)
INCOME		1.262	(0.45)	0.505**	(0.15)
INCOME2		0.983	(0.03)	1.059***	(0.02)
EST		0.595***	(0.11)	-	-
CO2_PC		1.004*	(0.00)	1.003	(0.00)
TAX_GDP		0.977	(0.02)	1.092***	(0.03)
REC_TOT		0.385	(0.67)	0.103**	(0.12)
Oss.		15732		5532	
log likelihood		-18747.89		-6510.50	
Pseudo R2		0.04		0.06	
LR chi2		.		.	
PR>chi2		.		.	
BIC		37689.05		13064.09	

Tab. 8: Ordered logit estimates. The dependent variable is ENVIRONMENTAL. Odds ratios and standard errors adjusted for clustering at country level (in parentheses). *, **, * mean significantly different from zero at the 0.10, 0.05, 0.01 significance level.**