The Acceptance of Environmental Taxes: An Empirical Public Choice Investigation (Draft)

Friedrich Schneider[1], Andrea Kollmann[2], Johannes Reichl[2]

[1] Institute of Economics, Johannes Kepler University, Linz, Austria, friedrich.schneider@jku.at

[2] Energy Institute at the Johannes Kepler University, Linz, Austria, kollmann@energieinstitut-linz.at and reichl@energieinstitut-linz.at

Preamble. We have started to research the socio-economic and demographic factors which influence the acceptance of environmental and energy-related policies in the European Union back in 2010 when we published a paper titled 'Why does Environmental Policy in Representative Democracies Tend to be Inadequate? A Preliminary Public Choice Analysis'[1] Over the next years, we revisited these issues in two empirical analyses which both took a closer look at individual characteristics of voters in representative democracies and how these characteristics influence acceptance of policy instruments and the willingness to pay for environmental protection.[2] Currently, our focus is on researching how our results can be used to inform the shaping of instruments needed to successfully fulfill three major European Policy Strategies currently under discussion: firstly, the 2050 Energy Strategy[3] asks for emissions to be cut by 80% below 1990 levels in 2050, with two intermediate steps (40% emissions cuts by 2030 and 60% by 2040) as well as a development of all sectors to this transition to a low-carbon economy. Secondly, the third phase of the European Emission Trading System which started in 2013 and runs until 2020 and in which fundamental changes to the system (compared to the two previous phases) have been implemented and finally, the implementation of an Energy Union which aims for a fully-integrated internal energy market. Furthermore, these European Plans shall be in line with the ambitious global emissions reduction goals set out in the Paris Agreement in late 2015.

The following draft was prepared on the basis of the research articles outlined above and is supposed to be used as a companion to the presentation given by Friedrich Schneider. We are thankful for critical comments and suggestions about our on-going work which we aim to publish later this year.

Abstract. In our paper we aim to identify which individual characteristics form environmental policy attitudes and use data gathered in the European Value Survey in 2008 to empirically test our findings. Knowing voters' motivation provides valuable insights into how to establish more efficient environmental policies. Furthermore, based upon the results of our literature analysis, we take a deeper look into the importance of trust in political institutions on the willingness to accept environmental taxes using data compiled by the International Social Survey Programme in 2010.

[1] Kollmann, A. and Schneider, F. (2010) Why does Environmental Policy in Representative Democracies Tend to be Inadequate? A Preliminary Public Choice Analysis. Sustainability 2010, 2(12), 3710-3734.
[2] Kollmann, A. Reichl, J. and Schneider, F. (2012) Who is Willing to Pay for the Environment in the EU - An Empirical Analysis. EuroEconomica; 5: 15–27. and Kollmann, A. and Reichl, J. (2015) How Trust in Governments influences the Acceptance of Environmental Taxes, in Kollmann, A., Schneider, F. and Reichl, J. (Eds.), Political Economy and Instruments of Environmental Politics. The MIT Press, 2015.
[3] More details: https://ec.europa.eu/energy/en/topics/energy-strategy/2050-energy-strategy

1 Introduction

How to choose the most appropriate economic instruments in environmental policy has been widely discussed in the past two decades.[4] While market based instruments are considered to be theoretically superior to command and control measures, the latter are still the dominant tools in environmental policy and the former a source of discussion about their distributional effects and influences on competitiveness. [5] The EU has decided to base parts of its environmental policy on the use of market-based instruments, though a recent study of the European Environmental Agency about environmental tax reforms concluded that 'the discussion on market-based instruments should be intensified.'[6] However, the adoption of Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003, establishing a scheme for greenhouse gas emission allowance trading (EU-ETS) within the Community, has affirmed that there is a shift in the way environmental policy is implemented and publicly perceived.

In our paper we assume - in accordance with Public Choice theory - that any outcome in negations about the shape of environmental policy instruments is subject to the interdependences of the economic actors involved: (1) voters, (2) politicians, (3) administration and (4) interest groups. We focus our paper on taking a deeper look into what characteristics of voters influence their willingness to contribute monetarily to environmental protection as fighting climate change but also protecting the environment in a more regional perspective will need to be supported by voters; with voters unwilling to accept a more stringent environment policy, political strategies are probably doomed. From the literature we reviewed, we additionally singled-out one specific aspect in the discussion: how trust in political institutions influences the acceptance of environmental taxes. Furthermore, we examined how competing interests and individual characteristics of voters influence their position towards market-based instruments. We discuss literature findings on altruistic, pro-social and pro-environmental attitudes to find explanations for voters' individual willingness to contribute monetarily to environmental protection. Furthermore, we are interested in what influences voters' acceptance of an environmental policy instrument and in the individual characteristics that influence the willingness to contribute if a market-based instrument is chosen. But even though we find that voters attach value to the state of the environment, we also show that in terms of everyday life, in which one's job, income and security situation have more weight than less tangible aspects, like CO_2- emissions, people's environmental morale or intrinsic motivation may not be high enough for them to actively vote for the environment. While altruistic behavior can surely be assumed for a part of society, it may be less prevalent for environmental policy measures in society as a whole. We finally test our literature findings and hypotheses using data gathered in the European Value Study (EVS) in 2008 as well as the International Social Survey Programme (ISSP) in 2010.

Our paper is organized as follows: Section 2 presents a literature review, Section 3 shows the empirical analysis and Section 4 gives a summary.

2 Literature

Findings in Happiness research show that environmental pollution negatively affects individual wellbeing, therewith supporting the notion that the general public is motivated to act in an environmentally friendly way.[7] Halla et al. (2008) analyze the relationship between citizens' satisfaction with the quality and performance of the economic and political system they live in and environmental quality. They find that '[…] both a focus on environmental policy and higher environmental quality […] increase satisfaction with democracy in statistically

[4] See for example OECD (2010), EEA (2012) or European Commission (2014).

[5] See OECD (2006) and OECD (2010).

[6] EEA (2012).

[7] Compare Welsch (2006 and 2009).

and economically important ways'.[8] But they also report that a rise in public environmental expenditure tends to decrease average satisfaction, which they interpret as a confirmation of the public good characteristics of environmental policy and environmental quality. Layton and Levine (2003) furthermore show empirically that the public's willingness to pay to prevent small negative impacts on the ecosystem is insignificantly different from zero but significantly positive with larger impacts.

A lack of information about market-based instruments in environmental policy is considered a major obstacle in European environmental policy.[9] One explanation is that this lack of information on the voters' side is too costly to overcome. Understanding the complexity of environmental issues requires higher education, interest and time to learn, therefore acquiring information is subject to high opportunity costs.[10] Klok et al. (2006) report that participants in a Danish survey about market-based instruments in environmental policy argued that 'they could not accept something they did not understand'.[11] The importance of education and knowledge about the environment for explaining individual environmental concern is also found by Franzen and Meyer (2010) who analyze environmental attitudes in a cross-national dataset of 26 countries. However, Owens and Driffil (2008) argue that information about '[…] the need for, or characteristics of, controversial developments has not notably delivered acquiescence on the part of local communities. On the contrary, it can fuel distrust […]'.[12] If only information can raise acceptance for new instruments but varied information also triggers distrust, the key issue is seeking trust, as voters may simply not trust their governments. Miller (1974) defines political trust as '[…] the belief that the government is operating according to one's normative expectations of how government should function'. He argues that '[p]resumably, the behaviour and decisions of trusted authorities are more likely to be accepted as legitimate and worthy of support than are of those of distrusted leaders.' According to Dunn (2012) Miller's definition of political trust also suggests 'a self-interested bias in individual trust in representative political institutions […]' as well as '[…] a broader view of individual causes of trust in representative institutions.' The trust levels reported in the dataset we use in Section 3 shows that in an international comparison, Switzerland has the highest level of trust among European countries, a fact argued to be strongly correlated to the direct democratic processes in Switzerland by Alm and Torgler (2006): '[t]he relatively high tax morale in the United States and in Switzerland, two countries with a strong direct democratic tradition, provides further policy implications. […] If taxpayers perceive that their preferences are adequately represented and they are supplied with public goods, their identification with the state increases, and thus the willingness to pay taxes rises.' Political trust was identified as a main criteria for finding public acceptance for market based instruments in environmental policy in the PETRAS (Policies for Ecological Tax Reform: Assessment of Social Responses) project. PETRAS looked at the attitudes of business and the general public towards environmental policies in Denmark, France, Germany, Ireland and the UK and came to homogenous results. Clinch and Dunne (2006) who analysed the impediments to an environmental tax reform in Ireland, find that there is a general suspiciousness as well as distrustful attitude towards the government when it comes to tax policy. They also report that those interviewed in their project state that they already feel overtaxed. The reason for this reluctance to accept environmental taxes can be found in recent political events in Ireland where a promised tax recycling regime was not installed. In the French survey conducted by Deroubaix and Leveque (2004), a similar finding was reported; those interviewed suggested 'that politicians always thwart the allocation of taxes'[13] and that there was doubt whether environmental taxes would be used for the specified purposes. Harring and Jagers (2013) conclude in their study of the public acceptance of a carbon dioxide tax in Sweden that trust has a significant and independent effect on policy support. In a study for the United States, Konisky et al. (2008) who analysed attitudes for various environmental policy types found that 'an individual's trust in government is a significant predictor only for global issues; respondents with higher levels of confidence in government are more likely to support government action to address issues such as climate

[8] Halla et al. (2008), p. 17

[9] For France see Deroubaix and Leveque (2004), for Ireland see Clinch and Dunne (2006), for Germany see Beuermann and Santarius (2006).

[10] Compare also Anthoff and Hahn (2010).

[11] Klok et al.(2006), p. 913.

[12] Owens and Driffil (2008), p. 4414.

[13] Deroubaix and Leveque (2004), p. 947.

change, ozone depletion, and the protection of biodiversity.' Tjernström and Tietenberg (2007) who analysed the ISSP 2000 dataset show that 'in countries in which citizens have a higher level of trust in information supplied by their government, reductions of greenhouse gas emissions are larger. It is not only the amount of information that is supplied that matters, but also its credibility.'

Kirchgässner and Schneider (2010) argue that selfish voting is an obstacle to any kind of environmental policy. A data set that allows the analysis of individual characteristics of voting behavior was collected in Switzerland in the year 2000, when 4.7 million Swiss citizens had the possibility to vote on three proposals for taxes on fossil energy. Thalmann (2004) analyzed the data and found that political affinity and education played a role in voter behavior. Both citizens with an affinity to green and left-of-center parties and citizens with higher education had higher rates of participation in the referenda and also higher rates of approval of the proposals, whereas income – ceteris paribus - did not significantly influence voting behavior. In another analysis of the votes on the three Swiss environmental proposals, Bornstein and Lanz (2008) found that socially accepted norms and ideology do play a role in the referendum outcome and that price and/or income effects are not the main factors taken into account by voters. The Swiss voting data are unique as they reflect real-world behavior of voters combined with their individual characteristics. Such data cannot – to the authors' knowledge - be found for other European countries. But there is an interesting body of literature especially with a sociological and psychological background about how characteristics of individuals influence their environmental concern for environmental policy gathered in large national or cross-national surveys.

We will look at the characteristics analyzed in the Swiss proposal in turn and compare them with findings form other survey analysis. The first factor is whether political affinity actually influences willingness to contribute monetarily to environmental protection. We find support for this notion in Neumayer (2004) who analyzed a large cross national data sample of 45 countries and concludes that left-wing oriented individuals are willing to pay higher prices and taxes to protect the environment. Dietz et al. (1998) conclude from their analysis of the US General Social Survey 1993 that political liberalism increases awareness of consequences and choice of the environment over economic progress. The influence of education on environmental concern is straightforward. The Swiss proposal showed that higher education also led to higher rates of approval for the environmental tax proposals. Support for the effect of education on environmental concern, willingness to pay and pro-environmental behavior can be found in Neumayer (2004); Franzen and Meyer (2010) and Dietz et al. (1998).

Among the most interesting outcomes of the Swiss proposal data is that income did not play an essential role in the election outcome. This outcome is not supported by survey analysis: Franzen and Meyer (2010) conclude from their analysis of the International Social Survey Programme (ISSP) 1993 and 2000 that household with a comparatively better income situation also report a higher concern for the environment. They also report that in-country differences are much larger than cross-country differences in relative income but nevertheless report that richer nations have higher levels of environmental concern. Gelissen (2007) comes to the opposite conclusion: richer nations are less willing to pay for environmental protection. He argues that this result of his multi-level analysis of 50 nations may be explainable with the already relatively high share of income given up for environmental protection or with the exploitation hypothesis which states 'that publics of countries, which have acquired wealth by high levels of environmental exploitation, are not willing to pay the external costs related to exploitation'. For individual income he finds the expected positive relation with support for environmental protection. This result is also supported by Haller and Troy (2003) who analyzed the ISSP 2000 data. They confirm the results of Franzen and Meyer (2010) concerning the cross-country differences stating that relatively richer nations have a higher willingness to sacrifice for environmental protection.

The influence of gender, marital status and age were analyzed by Gelissen (2007), Dietz et al. (1998) as well as Franzen and Meyer (2010). Gelissen (2007) found a significant influence of age on individual support for environmental protection with the younger having a higher support. He finds no significant influence of gender. Dietz and al. (1998) report that women have stronger environmental beliefs but that they are less willing to make any sacrifices for environmental protection. They find no consistent relationship between age and pro-environmentalism. In contrast, Franzen and Mayer (2010) find a significant influence of gender as well as age,

whereas women and the younger have a higher environmental concern. Thalmann (2004) reports no significant gender or age differences in the votes for the three Swiss tax proposals. We found no studies looking at the effect of the marital status. Furthermore, Halla et al. (2008) find that parents worry significantly more about CO2 emissions than citizens without children, which may be an argument in favor of a low but non-zero inter-temporal discount rate.

The empirical results about the influence of income on the acceptance of environmental taxation are inconclusive in literature. In contrast to the results of the Swiss dataset presented above, Franzen and Meyer (2010) analyse the factors influencing public concern for the environment using the International Social Survey Programme (ISSP) 1993 and 2000. They find an income effect on environmental attitudes and report that households with a better income situation also have a higher concern for the environment. Furthermore, the results of their empirical analysis suggest that in-country differences are larger than cross-country differences in relative income. Still, they deduce that on average richer countries have higher levels of environmental concern (see also Haller and Troy (2003)).

Using data from the World Values Survey and the European Values Study, Gelissen (2007) presents results from a multi-level analysis of 50 countries, which suggest that richer nations are less willing to pay for environmental protection. He explains this result with a comparatively high share of income given up for environmental protection in richer countries with the exploitation hypothesis: 'publics of countries, which have acquired wealth by high levels of environmental exploitation, are not willing to pay the external costs related to exploitation'.[14] Yet, on an individual level, he finds a positive relation between support for environmental protection and income.[15]

Literature also points at the influence of religious affiliation on trust, tax morale as well as on environmental concern. Owen and Videras (2007) argue that '[b]ecause religious values are part of an individual's system of values and norms, we can then expect that religiosity and religious beliefs influence efforts to contribute to public goods'.[16] They analyse a sample of about 13,000 individuals in 14 OECD countries to investigate how religiosity influences contributions to a public good. They find that 'Individuals who are active in church groups are more likely to recycle, to attend meetings, and to be willing to pay higher prices'[17]. Alm and Torgler (2006) also support this finding in their study of the determinants of an individual's intrinsic willingness to pay taxes for which they use data from the World Values Survey and conclude that higher rates of church attendance result in a greater willingness to pay taxes.

How party affiliation influences the willingness to pay for environmental protection is not straight forward. Dupont and Batemann (2012) deduce from a survey analysis undertaken in East Anglia that party affiliation and the way (public) environmental goods are provided by the government interact with and have a significant influence on willingness to pay. Neumayer (2004) states more definitely that *'Left-wing-oriented individuals are more willing to give priority to environmental protection over economic growth, have greater confidence in the Green/Ecology movement and are more likely to selfreport pro-environmental political behavior'*.

None of the studies cited in this paragraph took a look at the influence of political trust on the public acceptance of environmental taxes. To our knowledge the only paper that specifically focuses on the effect of political trust in environmental policy is Harring and Jagers (2013), who empirically analysed public support for environmental taxes in Sweden.

[14] Gelissen (2007), p. 411.

[15] This discussion partly draws from a more extensive literature survey on the factors influencing environmental concern in Kollmann et al. (2012).

[16] Owen and Videras, p. 163.

[17] Owen and Videras (2007), p. 174.

3 Hypothesis

As described in the introduction, we present results on two related aspects of the influence of individual characteristics on the acceptance of and willingness to pay for environmental policy instruments. Based upon our literature analysis in Section 2 we derive the following hypotheses:

Hypothesis 1 - Individuals whose political orientation is green have a higher willingness to contribute monetarily to environmental protection than individuals without a green affinity. The literature review showed evidence that individuals with a green political affinity are more willing to give up on their income than people with other political orientations. In the EVS 2008 individuals were asked which party they would vote for. We analyzed the answers and identified those parties who are green parties in the individual countries. Furthermore we use two other variables to depict the overall point of view of the respondent. The answers to the question "If things continue we will experience an environmental catastrophe" are used to assess the perception of the respondent concerning the need and urgency of a stricter environmental policy. To also be able to differ between the individual's political point of view and his willingness to act we use the answers to the question „Do you belong to an environmental organization". This is analysed in Model 1.

Hypothesis 2 - Individual willingness to contribute is subject to the individual characteristics that influence the individual life situation. For model 2, we choose the individual characteristics yearly household income, having children, gender, marital status, age as well as the individual's employment situation as explanatory variables. All of this data was collected in the EVS 2008.

Hypothesis 3 - Individual education influences willingness to contribute monetarily to environmental protection. The influence of individual education is not completely conclusive. It would have been interesting to differ between individual education and state-of-knowledge about environmental issues in the model. As no such data is available in the EVS2008 we use the variable individual education as a proxy for how well individuals are apt to understand the complexity and importance of environmental protection.

Hypothesis 4 - Individual willingness to contribute is subject to a country's energy price level. Here, we draw from the findings of Gelissen (2007) who argues that relatively wealthier nations are less willing to pay for environmental protection, which can be explained with the already high share of income devoted to environmental protection. We use the average of the gasoline price in the six months prior to the survey as an indicator for individuals' self-perceived existing burden.

And finally, **Hypothesis 5** – Citizens who trust their respective governments, have a higher willingness to pay environmental taxes. This hypothesis is tested using data compiled in the International Social Survey Programme. Unfortunately, the ESV 2008 did not include any question on this issue. As we have to use a different dataset our analysis also focuses on different countries and is presented separately in the following section.

4 Empirical analysis

4.1 Data

The used data was gathered in the European Value Survey in 2008 to assess the willingness to contribute monetarily to environmental improvements and provides data for 39 countries and over 56,000 citizens. The subsequent analysis of factors driving the levels of acceptance towards environmental taxes exploits data gathered in the International Social Survey Programme: Environment III - ISSP 2010, where overall some 45,000 individuals in 32 countries were surveyed concerning questions about their attitudes to the environment, environmental protection, their environmental behaviour and preferences regarding governmental measures on environmental protection. For the sake of our analysis we only used respondents from one of the EU-27 member countries, Switzerland and Norway.

4.2 Model specification

The aim of the econometric estimation is to test whether there is an effect of different individual characteristics or trust in government on the probability that respondents accept environmental taxes. The survey data, as described above, measures the respondents' answers about their willingness to accept such taxes on the Likert scale. The Likert-item used in this survey has five points, where the most left expresses "very willing", followed by "fairly willing", then "neither willing nor unwilling", where the last two points are "fairly unwilling" and "very unwilling".

Table 4.1: Dependent variable Willingness to pay for environmental protection, answers in ISSP Env. III survey 2010

	Frequency	in %	Cumulative
Very willing	532	2.3	-
Fairly willing	3,946	17.3	19.8
Neither willing nor unwilling	5,227	23.1	42.9
Fairly unwilling	6,449	28.5	71.3
Very unwilling	6,487	28.7	100.0
Total	22,641	100.0	

To explain respondent i's choice y_i among the five alternatives she has, we refer to the disutility of the environmental tax by D_i, and to the environmental benefit respondent i expects from that tax by B_i. As it is well known for utility models, B_i and C_i are not identified in terms of their levels, but only in terms of their difference ∂i = B_i - C_i. Bringing the Likert-item into the model, we may assume that the bigger this difference is for respondent i, the more left on the Likert-scale her choice is made, i.e. the higher the surplus from the environmental tax is to respondent i, the more likely she will accept it.

We estimate the willingness to pay or accept environmental taxes by regressing the latent ∂i on a set of control variables x_i including the respective constructs of interest, such as trust in government; hence the equation for ∂i is given by

$$\partial_i = x_i\beta + \alpha_t + \varepsilon_i,$$

where vector β refers to the coefficients of x_i, α_t is a country fixed effect, and $\varepsilon_i$is the error. Since a clear order of the choice options with respect to the unobserved ∂_i, can be given, an ordered regression model is applied. The decision rule is then given by

$$y_i = \begin{cases} 1 \ if \ \partial_i \leq \mu_1 \\ 2 \ if \ \mu_1 < \partial_i \leq \mu_2 \\ 3 \ if \ \mu_2 < \partial_i \leq \mu_3 \\ 4 \ if \ \mu_3 < \partial_i \leq \mu_4 \\ 5 \ if \ \mu_4 < \partial_i \end{cases}$$

where μ_k refers to the respective threshold where respondent *i* is indifferent between alternatives k and k+1. As link functions logit and probit are chosen. Since no significant difference between the two link functions is found in the regression results, only the logit results are presented, because the choice probabilities can be calculated easier with an underlying logistic distribution.

4.3 Results – acceptance environmental taxes

First we addressed the question *"I would give part of my income if I were certain that the money would be used to prevent environmental pollution"* that is contained in the EVS data. Even though this question does not directly target the use of environmental taxes and makes the condition that the money is used to prevent environmental pollution, we consider the answers to this question a proxy for voters' acceptance of environmental taxes. The aim of our analysis is to identify the factors influencing the individual answers to this question.

Table 4.2: "I would give part of my income if I were certain that the money would be used to prevent environmental pollution"

		No. of valid answers
1	agree strongly	5,405
2	agree	18,019
3	disagree	10,478
4	disagree strongly	5,726
	Total	39,628

In the survey respondents also had the possibility to not answer this question. In the following models only those cases in which one of the answers in Table 3.1 was given are considered.

In Model 1 we include variables that capture the individuals green affinity, their 'philosophical' point of view on the urgency of environmental protection as well as their engagement in an environmental group in addition to a set of demographics. The model furthermore comprises dummies for each country (EU-27, Norway and Switzerland) to correct for an unobservable heterogeneity in country specific attitudes towards environmental protection.

Respondents who declared that they would vote a green party are more willing to pay for environmental protection than those who vote for other parties. The same is true for respondents who belong to environmental groups. Respondents who have a pessimistic point of view on the environmental situation also have a higher tendency to agree with giving part of their income for environmental protection. The results for this variable are ambiguous. On the one hand we have to note that the coefficients for all of the categories of this variable have a negative sign, whereas we expected at least for the category *disagree* a positive sign. But on the other hand the magnitude of the coefficients strongly declines from *agree strongly* to *disagree*. Our interpretation of this result is that even though having an optimistic point of view still goes along with a positive willingness to pay, it also represents a weaker acceptance of giving up on income than for the categories *strongly agree* and *agree*.

The demographic variables largely show significant coefficients, while the coefficients for the categorical variable *age* are insignificant. Unmarried respondents have a lower willingness to contribute monetarily to environmental protection. Respondents who have children, a paid employment and are male have a higher willingness to contribute than respondents without children, without paid employment and are female.

Considering our discussion in Section 2 about the various results concerning the influence of income on willingness to contribute, our results support the hypothesis that higher income goes along with a higher willingness to contribute for environmental protection. This is not surprising in comparison to the literature review given in chapter 2 that partly tends to confirm the notion that younger people have a higher willingness to contribute to environmental protection but is not fully conclusive.

The coefficient for the *employment status* is insignificant. The coefficients for the *educational status* are highly significant except for the category „*First stage of tertiary education*". But we see that the tendency to be willing to contribute monetarily rises with better education. That the coefficient for „*First stage of tertiary education*" is insignificant may be interpreted as showing that there is an upper bound to how educated someone has to be to understand the importance of environmental protection.

Table 4.3: Results of the ordinal regression, Model 1

	Model 1			
c_1		-1,266	(0,127)	***
c_2		0,193	(0,127)	
c_3		1,088	(0,127)	***
Austria		0,177	(0,093)	*
Belgium		-0,105	(0,092)	
Bulgaria		-0,737	(0,096)	***
Cyprus		-0,777	(0,098)	***
Northern Cyprus		-0,815	(0,105)	***
Czech Republic		-0,155	(0,094)	*
Denmark		-0,567	(0,094)	***
Estonia		-0,112	(0,093)	
Finland		0,323	(0,096)	***
France		-0,009	(0,092)	
West Germany		0,293	(0,095)	***
East Germany		0,600	(0,096)	***
Greece		-0,801	(0,093)	***
Hungary		0,010	(0,093)	
Ireland		-0,112	(0,115)	
Italy		-0,505	(0,095)	***
Latvia		-0,263	(0,094)	***
Lithuania		0,133	(0,096)	
Luxembourg		-0,366	(0,094)	***
Malta		-0,500	(0,097)	***
Netherlands		-0,088	(0,093)	
Norway		-0,255	(0,094)	***
Poland		0,032	(0,095)	
Portugal		0,077	(0,099)	
Romania		-0,476	(0,096)	***
Slovak Republic		-0,054	(0,096)	
Slovenia		-0,636	(0,096)	***
Spain		-0,226	(0,096)	**
Sweden		-0,265	(0,096)	***
Switzerland		-0,250	(0,095)	***
Great Britain		0,000	(0,095)	
Individual Level variables				
No Voter of Green Party		0,444	(0,033)	***
Belongs to environmental group		-0,355	(0,028)	***
If things continue we will experience catastrophe: strongly agree		-0,726	(0,042)	***
If things continue we will experience catastrophe: agree		-0,511	(0,041)	***
If things continue we will experience catastrophe: disagree		-0,266	(0,043)	***
Not Married		0,036	(0,016)	**
younger than 29 years		-0,006	(0,025)	
between 30 and 39 years		0,04	(0,024)	*
between 40 and 49 years		0,016	(0,023)	
between 50 and 59 years		-0,021	(0,022)	
No children		-0,015	(0,019)	
Male		-0,03	(0,013)	**
Paid Employment		0,01	(0,017)	
Yearly household income in 1.000€		-0,001	(0,004)	**
Pre- primary education or none education		0,486	(0,083)	***
Primary education or first stage of basic education		0,456	(0,074)	***
Lower secondary or second stage of basic education		0,386	(0,072)	***
(Upper) secondary education		0,283	(0,071)	***
Post- secondary non- tertiary education		0,219	(0,076)	***
First stage of tertiary education		0,071	(0,071)	
N	39.628	27.991		
Model fit (-2Log-Likelihood)	1,542.702	58,305.067		

Method: ordered probit model; Numbers in parentheses are standard errors, statistical significance level is shown with *** representing a 1% significance, ** a 5% significance and * a 10% significance level. Significance of model fit tested with chi-test (*** representing a 1% significance). Interpretation of coefficients: The endogenous variable is categorical with four answer possibilities (1) agree strongly, (2) agree, (3) disagree and (4) disagree strongly. A negative coefficient represents a shift to the left, in this case a shift towards (1) agree strongly. A positive coefficient represents a shift to the right; in this case towards (4) disagree strongly.

Table 4.4: Results of the ordinal regression, Model 2

Model 2			
c_1	-1,447	(0,094)	***
c_2	-0,047	(0,094)	
c_3	0,829	(0,094)	***
Yearly household income in 1.000 €	0,001	(0,000)	***
Belongs to environmental group	-0,426	(0,028)	***
Male	-0,047	(0,014)	***
Not Married	0,066	(0,016)	***
No Voter of Green Party	0,410	(0,034)	***
If things continue we will experience catastrophe: strongly agree	-0,723	(0,043)	***
If things continue we will experience catastrophe: agree	-0,492	(0,042)	***
If things continue we will experience catastrophe: disagree	-0,261	(0,045)	***
No children	-0,032	(0,020)	
Paid Employment	-0,002	(0,017)	
younger than 29 years	-0,042	(0,025)	*
between 30 and 39 years	0,018	(0,024)	
between 40 and 49 years	0,009	(0,023)	
between 50 and 59 years	-0,027	(0,022)	
Pre- primary education or none education	0,261	(0,086)	***
Primary education or first stage of basic education	0,213	(0,078)	***
Lower secondary or second stage of basic education	0,274	(0,077)	***
(Upper) secondary education	0,194	(0,076)	***
Post- secondary non- tertiary education	0,205	(0,080)	**
First stage of tertiary education	-0,001	(0,076)	
Petrol Price between 0 and 1,061 €/liter	-0,435	(0,022)	***
Petrol Price between 1,061 and 1,199 €/liter	-0,457	(0,022)	***
Petrol Price between 1,199 and 1,252 €/liter	-0,179	(0,023)	***
Petrol Price between 1,252 and 1,419 €/liter	-0,250	(0,020)	***
N	26.270		
Model fit (-2Log-Likelihood)	55,739.237***		

Method: ordered probit model; Numbers in parentheses are standard errors, statistical significance level is shown with *** representing a 1% significance, ** a 5% significance and * a 10% significance level. Significance of model fit tested with chi-test (*** representing a 1% significance). Interpretation of coefficients: The endogenous variable is categorical with four answer possibilities (1) agree strongly, (2) agree, (3) disagree and (4) disagree strongly. A negative coefficient represents a shift to the left, in this case a shift towards (1) agree strongly. A positive coefficient represents a shift to the right; in this case towards (4) disagree strongly.

We have already argued that the dummies for the individual countries capture a matrix of unknown cross-country differences. To see how the coefficients of all other variables changes we formulated Model 2 in which no *country dummies* are used. Furthermore we use Model 2 to test another assumption we found in the literature review: that the individual willingness to contribute monetarily to environmental protection is subject to how high the given and self-perceived burden through existing environmental dues is. For this we include a variable depicting the average *petrol price* in the individual countries in the six months prior to the survey. The variable *petrol price* is used as categorical variable. Table 3.3 shows the regression outcome. Firstly, we see that the signs of the significant variables are the same as in the already presented Model 1. Insignificant coefficients are reported for the variables *having no children*, having a *paid employment* and for three of the four *age* categories (and this fourth category is barely significant). The newly incorporated variable *petrol price* shows significant and negative coefficients for all categories. The sign of the coefficients is surprising but its magnitude for the four categories shown tends to undermine the assumption that respondents from countries with a higher share of environmental dues on income have a lower willingness to contribute than respondents from countries with lower petrol prices. We are very well aware of the fact that this variable is only a proxy for the underlying relationship between the willingness to contribute monetarily to environmental protection and each countries (or each respondents) initial position with environmental dues. Nevertheless, our preliminary analysis shows that a deeper look into this matter may be worthwhile.

4.4 Results – trust in government

In this analysis, the dependent variable in the model is 'How willing would you be to pay much higher taxes in order to protect the environment?' The answers to this question are measured on a Likert scale that ranges from 1 (Very willing) to 5 (Very unwilling) again. We estimate the dependent variable employing four categories of variables.

Trust in Government and Environmental Concern: The key explanatory variable in our model is trust in government. In the survey the question 'To what extent do you agree or disagree with the following statement: Most of the time we can trust people in government to do what is right' was posed. Answers are measured on a Likert scale from 1 (Agree strongly) to 5 (Disagree strongly). The second variable we use depicts the overall environmental concern of the survey participants which is shown by the answers to the question 'Generally speaking, how concerned are you about environmental issues?'. Again, this variable is measured on a Likert scale from 1 (Not at all concerned) to 5 (Very concerned). We assume that individuals who have a very high concern for the environment also have a higher willingness to pay environmental taxes and therefore control for this influence.

Religion and Party affiliation: The second set of variables in the model comprises the following two: 'Apart from such special occasions as weddings, funerals, etc., how often do you attend religious services?' as well as 'Political party affiliation: left/ right placement' which is a variable based on and derived from the question 'Do you usually think of yourself as close to any particular political party and, if yes, which party is that?'[18] Again, both variables are measured on a scale: attendance of religious services ranges from 1 (several times a week or more often) to 8 (never) and party affiliation from 1 (Far left), 5 (far right) to 7 (no party affiliation). They are included in the model according to the literature findings discussed in Section 2 which show that religious people have a higher willingness to pay for environmental issues and to account for the potential influence of party affiliation on environmental issues.

Individual Level controls: We included a set of individual control variables in estimating the relationship between willingness to pay and trust in government: sex, age, education as well as the marital status of the respondent. We assume that especially education correlates with willingness to pay as well as with the trust level. Coefficients estimates are given in the following table. Following the model specification in the preceding chapter, a positive coefficient means that this variable increases the likelihood of accepting an additional environmental tax and the higher the coefficient is, the stronger is the effect.

First of all, we see that there are significant differences regarding peoples' attitudes towards environmental taxes between countries. Here, Great Britain serves as baseline and coefficients need to be interpreted with respect to them. The variable country accommodates a number of country specific effects, like the current level of environmental taxes, the level of current environmental quality, or even the income level of the respective country. Since all country specific effects are captured by the country fixed effect, these unobserved structural differences cannot bias the outcome regarding trust effects, but make the interpretation of the country variable somewhat inconclusive.

Other control variables can be interpreted with more certainty. Most naturally, our assumption that a higher concern for the environment is associated with a higher willingness to pay is supported by the model outcomes. Furthermore, the level of education a person has alters her acceptance likelihood, too. Interestingly, the extent of religiousness has some explanatory power in our model, where we use the frequency of attending religious services as a proxy for the extent of individual religiousness. A result that further undermines the studies we reviewed in Section 2: we also find that people who frequently attend religious services (several times a week or more) are significantly more willing to pay environmental taxes, while we cannot find a significant effect for less religious people.

[18] The variable Party affiliation was constructed by the ISSP team, not by the authors.

Table 6.5 Results of the ordered regression analysis

Dependent variable: Willingness to pay environmental taxes		Estimate		95% Confidence Interval	
				Lower Bound	Upper Bound
Threshold	μ_1	-3,318	***	-3,565	-3,070
	μ_2	-,788	***	-1,019	-,557
	μ_3	,445	***	,215	,676
	μ_4	1,859	***	1,627	2,091
Age		,002	**	,000	,005
Sex = (Male)		,035		-,022	,093
TRUST Ref = Disagree Strongly	Agree Strongly	-1,119	***	-1,336	-,903
	Agree	-,978	***	-1,076	-,879
	Neither Agree nor Disagree	-,813	***	-,906	-,720
	Disagree	-,478	***	-,565	-,391
CONCERN Ref = Very Concerned	Not at all concerned	1,791	***	1,626	1,956
	Not concerned	1,324	***	1,214	1,433
	Indifferent	,886	***	,805	,968
	Concerned	,407	***	,330	,484
Ref = University degree completed	No formal qualification	,914	***	,735	1,093
	Lowest formal qualification	,820	***	,714	,926
	Intermediate secondary completed	,749	***	,660	,837
	Higher secondary completed	,523	***	,437	,609
	University degree incomplete	,360	***	,261	,460
REL ATTENDANCE Ref = Never	Several times a week or more often	-,163		-,369	,044
	Once a week	-,143	**	-,260	-,027
	2 or 3 times a month	-,134	*	-,272	,004
	Once a month	-,071		-,205	,062
	Several times a year	-,112	**	-,197	-,027
	Once a year	-,071		-,165	,024
	Less frequently than once a year	-,025		-,111	,062
MARITAL STATUS Ref = never been married	Married	,077	*	-,003	,158
	Civil partnership	,024		-,159	,206
	Separated from spouse/ civil partner	,263	**	,029	,496
	Divorced from spouse/ legally separated from civil partner	,161	**	,040	,283
	Widowed/ my civil partner died	,299	***	,159	,438
PARTY PREF Ref = No party affiliation	Far left	-,547	***	-,714	-,380
	Left, center left	-,395	***	-,479	-,311
	Center, liberal	-,326	***	-,443	-,210
	Right, conservative	,033		-,056	,121
	Far right	,086		-,092	,265
	Other, no specification	-,268	**	-,449	-,088
Country fixed effects	Austria	,175		-,036	,386
	Bulgaria	1,031	***	,808	1,254
	Croatia	,425	***	,220	,630
	CZ	,251	**	,045	,457
	Denmark	-,597	***	-,798	-,396
	Finland	,280	**	,089	,470
	France	,478	***	,299	,657
	West Germany	-,285	**	-,491	-,079
	East Germany	-,046		-,305	,213
	Latvia	,961	***	,742	1,180
	Lithuania	,235	**	,025	,445
	Norway	,303	**	,113	,493
	Slovak Republic	,005		-,196	,205
	Slovenia	,260	**	,062	,457
	Spain	,127		-,052	,306
	Sweden	,112		-,082	,307
	Switzerland	-,554	***	-,746	-,362

Comparably, politically left-wing and central oriented people tend to have a higher probability to accepting higher environmental taxes, while we cannot make a statement about people of the political right. This finding is consistent with results from Konisky et al. (2008) who showed that 'ideologically conservative individuals and Republicans expressed considerably less enthusiasm for further government action on the environment'19 The marital status of respondents shows significant lower probability of accepting environmental taxes when people are separated from their spouse or civil partner, divorced or widowed. This effect could be subject to the negative effect on household income such a separation has. We find that age and the probability to agree are positively correlated but find no significant effect of the marital status of the respondents. The variable of main interest in our analysis, trust in government, is highly significant at all levels. Distrust in the government of a respondent's own country clearly hampers the acceptance of higher environmental taxes.

Quantifying the "trust effect": In the following we give evidence on the extent of the impact that this relation might have on the implementation of such new regimes. For this purpose we shrink the 5 point Likert scale to only 3 points. Therefore, we combine the answers "very willing" and "willing" and consider these answers to reflect acceptance of new environmental taxes. Accordingly, we combine the alternatives "very unwilling" and "somehow unwilling". The middle category is interpreted as reflecting indifference towards this question.

To assess the overall impact that an increase in trust in government could have we perform a sensitivity analysis. As a first example of our sensitivity analysis we define the average survey participant and investigate the probability of accepting new taxes under different levels of trust in government. By 'average survey participant' we refer to a setting where each explanatory variable (except the trust variables) is set to its mean value. Thus, this theoretical individual has individual characteristics, attitudes and concerns that are the average of all survey participants. Additionally, we set levels of trust in government to those we find in the survey, i.e. on average each participant agreed strongly that people in government are to be trusted at 1.9%, he or she agreed to 21.8%, was indifferent at 26.0%, disagreed at 33.2% and strongly disagreed at 17.1%. In this baseline setting the predicted probability of accepting new environmental taxes is 17.7%, the probability for such an average participant to be indifferent is expected at 21.1%, and 61.2% of persons with average characteristics would not accept new environmental taxes at all.

The country with the highest trust level in our sample is Switzerland where 50% trust their government. Assuming, that the average survey participant had the Swiss trust levels, we observe a shift in acceptance from 17.7% to 21%, while the expected probability for not accepting decreases from 61.2% to 57.0%. In order to further illustrate our results, we also calculated the change in the predicted probabilities of Austrian and German citizens if they had Swiss trust levels, ceteris paribus. As the results in Table 4.6 show, we observe a significant shift.

Table 4.6: Results of the ordered regression analysis

	Austrian Participant		**German Participant**	
Predicted probability of	with Austrian Trust Level	with Swiss Trust Levels	with German Trust Level	with Swiss Trust Levels
accept new environmental taxes	16.5%	20.0%	26.4%	31.0%
being indifferent is expected at	20.3%	23.0%	25.0%	26.0%
not accept new environmental taxes	63.2%	57.0%	48.5%	43.0%

Considering that all other variables are held constant, the gain in acceptance by an increase in trust in government is significant.

[19] Konisky et al. (2008), p. 1082.

5 Conclusion

We focused our analysis on taking a deeper look into what characteristics of voters influence their willingness to contribute monetarily to environmental protection as fighting climate change but also protecting the environment in a more regional perspective will need to be supported by voters. With voters unwilling to accept to a more stringent environment policy, political strategies are probably doomed. The general public, the voters, obviously attach some importance to environmental quality: an empirical fact repeatedly verified in the studies we reviewed.

The factors influencing public support and acceptance of environmental policies have been a target of intense research in the past. Our paper makes a contribution in showing empirically that political trust has a significant effect on people's willingness to pay environmental taxes and in quantifying this effect. We analysed data collected in the ISSP Environment III survey, and formulated an ordered regression model to analyse the effect political trust has on willingness to pay for environmental taxes. Our model controlled for individual characteristics (sex, age, marital status, and education), individual attitudes (party affiliation, religion, environmental concern) as well as country fixed effects.

The growing body of literature about what influences happiness also shows the high positive correlation between individual happiness and environmental quality. In addition, the more tangible willingness-to-pay studies confirm these findings. But even though the value that voters place on the environment surely is high, we also showed that in terms of everyday life, in which one's job, income and security situation have more weight than less tangible aspects, like CO_2 emissions, people's environmental morale or intrinsic motivation may not be high enough for them to actively vote for the environment. Furthermore, the costs of fighting climate change are imposed on today's voters immediately, while it is future generations that will benefit from this effort. While, as argued above, altruistic behavior can surely be assumed for a part of society, it may be less prevalent for environmental policy measures in society as a whole.

The ordered probit models we developed show that firstly there are cross-country differences within the European Union, Norway and Switzerland. Secondly, among the individual characteristics we used as exogenous variables political affinity, overall environmental attitude, gender, education and the yearly household income are those variables which significantly influence the willingness to contribute monetarily to environmental protection. We found no influence of age or having children.

What we can deduce from our analysis is that a further strengthening of educational and informational campaigns can positively influence the individual willingness to contribute. We may deduce that there are countries in the European Union in which such campaigns may be more necessary than in other countries. In our literature review we also showed that there is a persisting information asymmetry that remains a major obstacle in environmental policy. Ongoing efforts made especially on the European level, such as 'green labels' for food and non-food products, may help voters to better understand the external effects of their actions on the environment and may therewith positively influence their willingness to contribute.

Also, the Swiss environmental tax proposal presented in the literature review may serve as an example of how increasing the influence of voters on environmental policy is a way to accelerate environmental policy. This could be done by pushing the idea of giving voters more rights, such as the introduction of a referendum or the right to an initiative, so that voters can express their preferences on environmental issues more directly. We discussed in chapter that respondents in large surveys impose high importance on environmental issues when no other issues (especially economic ones) are in the focus. Considering referenda on single environmental issues, in which no other aspects of daily life are at stake, may therefore be a way to strengthen environmental policy.

Furthermore, our analysis using the International Social Survey data affirms results about the influence of individual level characteristics which is an issue that has been intensely discussed in literature. Comparably older individuals have a higher probability to accept environmental taxes than younger people, and the higher an

individual's concern about the environment is, the higher is her willingness to accept environmental taxes. The level of education alters the acceptance likelihood in a positive way, too. Interestingly, we find that people who regularly attend religious services are significantly more willing to pay environmental taxes, but we cannot find a significant effect for less religious people. Politically left-wing and central oriented people also have a higher probability to accept environmental taxes, while we cannot draw a statistically significant conclusion for people of the political right. Finally, the marital status of respondents shows a significantly lower probability of accepting environmental taxes when people are separated from their spouse or civil partner, divorced or widowed. We interpret this result as an effect that could be due to the negative consequence on household income that such a separation has.

Furthermore our analysis showed that all trust levels show a significant effect on the willingness to pay environmental taxes. In the baseline setting of our model and assuming an individual with average characteristics, the predicted probability of accepting new environmental taxes is 17.7%, the probability to be indifferent is expected at 21.1%, and the probability of not accepting environmental taxes is 61.2%. We show that if the average survey participant theoretically had the Swiss trust levels (Switzerland being the country with the highest political trust in our sample), acceptance would increase from 17.7% to 21.0%, while the expected probability for not accepting would decrease from 61.2% to 57.0%.

Summing up our analysis we find an influence of trust on the willingness to pay environmental taxes. Considering that all other variables are held constant, the gain in acceptance by an increase in trust in government is significant. We furthermore quantified the effect this increase in trust would have on the probability to agree to environmental taxes and showed that if Swiss trust levels could be adopted in other countries; this probability would increase by 4-5% points. In the light of the study of the Swiss referenda on fossil fuel taxation, one of which was rejected by only 3.4%, such an increase could well make an impact on environmental policy making.

The available dataset does not allow further investigation into these issues. It would be especially interesting to look at the effect trust has over time and on other non-environmental taxes to show whether people make a difference them and other taxes.

6 Literature

Alm, J. and Torgler, B. (2006) Culture differences and tax morale in the United States and in Europe. Journal of Economic Psychology 27, pp. 224–246.

Anthoff, D. and R. Hahn (2010). *Government failure and market failure: on the inefficiency of environmental and energy policy*. Oxford Review of Economic Policy 26, 197–224.

Beuermann, C. and T. Santarius (2006). *Ecological tax reform in Germany: handling two hot potatoes at the same time*. Energy Policy 34, 917–929.

Bornstein, N. and B. Lanz (2008). *Voting on the environment: Price or ideology? Evidence from Swiss referendums*. Ecological Economics 67, 430–440.

Clinch, J. and L. Dunne (2006). *Environmental tax reform: an assessment of social responses in Ireland*. Energy Policy 34, 950–959.

Deroubaix, J.-F. and F. Leveque (2004). *The rise and fall of French Ecological Tax Reform: social acceptability versus political feasibility in the energy tax implementation process*. Energy Policy 34, 940–949.

Dietz, T., Stern, P. and G. Guagnano (1998). *Social Structural and Social Psychological Bases of Environmental Concern*. Environment and Behavior 30, 450-471.

Dunn, K. (2012) Voice and trust in parliamentary representation. Electoral Studies 31, pp. 393-405.

Dupont, D. and Bateman, I. (2012) Political affiliation and willingness to pay: An examination of the nature of benefits and means of provision. Ecological Economics 75, pp. 43–51.

European Commission (2014) Enhancing comparability of data on estimated budgetary support and tax expenditures for fossil fuels - final report. http://ec.europa.eu/environment/enveco/taxation/pdf/201412ffs_final_report.pdf

Franzen, A. and R. Meyer (2010). *Environmental Attitudes in Cross-National Perspective: A Multilevel Analysis of the ISSP 1993 and 2000*. European Sociological Review 26, 219-234.

Gelissen, J. (2007). *Explaining Popular Support for Environmental Protection: A Multilevel Analysis of 50 nations*. Environment and Behavior 39, 392-415.

Halla, M., F. Schneider, and A. Wagner (2008). *Satisfaction with Democracy and Collective Action Problems: The Case of the Environment.* Working Paper No. 0808, Department of Economics at the Johannes Kepler University: Linz, Austria.

Haller, M. und C. Troy (2003). *Umwelteinstellungen und Umweltverhalten im internationalen Vergleich*. SWS-Rundschau 43, 81-105. (German only).

Harring, N. and Jagers, S. (2013) Should We Trust in Values? Explaining Public Support for Pro-Environmental Taxes. Sustainability 5, pp. 210-227.

Kirchgässner, G. and F. Schneider (2003). *On the Political Economy of Environmental Policy*. Public Choice 115, 369–396.

Klok, J., A. Larsen, A. Dahl, and K. Hansen (2006). *Ecological Tax Reform in Denmark: history and social acceptability*. Energy Policy 34, 905–916.

Konisky, D., Milyo, J., Richardson, L. (2009) Environmental Policy Attitudes: Issues, Geographical scale, and Political Trust. Social Science Quarterly 89, pp.1066-1085.

Layton, D. F. and R. Levine (2003). *How Much does the Far Future Matter? A Hierarchical Bayesian Analysis of the Public's Willingness to Mitigate Ecological Impacts of* Climate Change. *J. Am. Stat. Assoc. 98*, 533–544.

Miller, A. (1974) Rejoinder to 'Comment' by Jack Citrin: Political Discontent or Ritualism?" American Political Science Review 68, pp. 989-1001.

Neymayer, E. (2004). The *environment, left-wing political orientation and ecological economics.* Ecological Economics 51, 167-175.

Owens, S. and L. Driffill (2008). *How to change attitudes and behaviours in the context of energy*. Energy Policy 36, 4412–4418.

Owen, A. and Videras, J. (2007) Culture and public goods: The case of religion and the voluntary provision of environmental quality. Journal of Environmental Economics and Management 54, pp. 162–180.

Thalmann, P. (2004). *The public acceptance of green taxes: 2 million voters express their opinion.* Public Choice *119*, 179–217.

Tjernström, E. and Tietenberg, T. (2008) Do differences in attitudes explain differences in national climate change policies? Ecological Economics 65, pp. 315-324

Welsch, H. (2006) *Environment and happiness: Valuation of air pollution using life satisfaction data*. Ecological Economics, 58, 801-813.

Welsch, H. (2009) *Implications of happiness research for environmental economics*. Ecological Economics, 68, 2735-2742.