Attitudes to carbon taxes across Europe: The role of perceived uncertainty and self-interest*

Resul Umit† Lena Schaffer‡

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Abstract

While using carbon taxes to reduce greenhouse gas emissions may well be effective, this has recently proved too unpopular to put in practice in a number of countries. Yet, at a time when governments across the world are preparing their nationally determined contributions to the Paris Agreement, our knowledge of whether and why people oppose these taxes originates from a single or small number of cases. Drawing on the European Social Survey (n = 44,387), this article provides evidence on public attitudes towards increasing taxes on fossil fuels to reduce climate change from 23 countries, most of which have never featured in the literature before. The results point to a widespread aversion to carbon taxes. On the one hand, this worsens with the perceived costs of taxes, such as the case among consumers who depend highly on energy or live in rural areas. On the other, it improves with political trust and efficacy—factors that help ease the uncertainty around policy proposals. Our estimations suggest that the effect of changes in these factors alone would be large enough to reverse the public resistance to carbon taxes in some countries.

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†University of Lucerne (resul.umit@unilu.ch).

‡University of Lucerne (lena.schaffer@unilu.ch).

1 Introduction

Carbon taxes offer an effective choice of instrument for climate change policy (N. Stern & Stiglitz, 2017; Goulder & Parry, 2008). By increasing the cost of activities detrimental to the environment, taxes can lead to changes in the behaviour of masses for the better—towards innovative and greener alternatives that reduce pollution (Aldy & Stavins, 2012). When the French government proposed to increase the taxes on fossil fuels in 2019, for example, the plan was to help reduce carbon emissions dramatically and facilitate the transition to electric cars. Moreover, the revenues raised from these taxes offer further opportunities for governments, such as the ability to finance specific environmental purposes (Kallbekken & Aasen, 2010) or to reduce other taxes for a stronger and fairer economy (Ballard & Medema, 1993). Hence there are good reasons why governments may consider using taxes to reduce greenhouse gas emissions while preparing their nationally determined contributions to the Paris Agreement.

Yet taxes are not a popular choice—at least, not as much as their effectiveness would suggest. For example, carbon taxes are implemented currently in as few as 22 countries worldwide (World Bank, 2018). Many see the public resistance to taxes as the main reason behind the reluctance of governments to use this policy instrument (Carattini, Carvalho, & Fankhauser, 2018),[1] pointing to the numerous occasions where tax proposals were rejected in popular votes, such as in Switzerland (Thalmann, 2004; Carattini, Baranzini, Thalmann, Varone, & Vöhringer, 2017) or Washington State. The proposal to increase

[1]Negative attitudes are also common among the industry (Clinch & Dunne, 2006; Dresner, Jackson, & Gilbert, 2006; Klok, Larsen, Dahl, & Hansen, 2006), which contributes to the resistance to taxes (Farrell, 2016).

the taxes was abandoned in France as well, amid the violent 'yellow vest' protests against the policy.

As a result, governments committed to the environment face a difficult decision between effectiveness and popularity in climate change policy, and—as public opinion shapes policy (Shapiro, 2011)—the benefits of carbon taxes might remain outweighed in the near future. Understanding the resistance to carbon taxes could offer other ways out of this problem, and there is an urgency to know the determinants of individual attitudes to carbon taxes. This urgency has led to many studies on the public attitudes to climate change policy in the last decade or so,[2] but the existing evidence comes from a limited number of countries and/or from studies that do not seek nationally representative samples—such as interviews, focus groups, and laboratory experiments. In this study, we heed the call to cover more cases (Fairbrother, 2017a, p. 6), and contribute to this influential literature with evidence from 23 countries, most of which are yet to feature in the literature.

The main results are three-fold. First, there is a widespread aversion to carbon taxes in Europe. If governments are to introduce new taxes, as things stand they will face public resistance almost everywhere—although the unpopularity of taxes vary between individuals and countries. Second, we find the support for taxes improves significantly with individuals' political trust and efficacy. Third, however, it worsens among people who depend highly on energy or live in rural areas. These results suggest that perceived uncertainty and self-interest determine the support for taxes as instruments in climate change policy. Substantively, their potential effects on the public attitudes to carbon taxes are large enough to be decisive at least in some countries.

[2]For recent reviews of this literature, see Drews and Van den Bergh (2016) and Carattini, Carvalho, and Fankhauser (2018).

The remainder of the article proceeds as follows. The following section reviews the related literature, showing that concerns for the environmental and economic consequences of taxes drive the public resistance. Section 3 then details five hypotheses based on a rational-choice perspective. We briefly introduce the data, main variables, and the methods in Section 4, leaving the fine details to Supporting Information S1. The subsequent section presents the descriptive analysis and multivariate tests of the hypotheses. Finally, the paper concludes with remarks on why the results of these tests might be politically significant.

2 Literature Review

There is a growing interest—scholarly or otherwise—on the public attitudes to energy-related climate change policies, which reflects the importance of social acceptance for these policies to be successfully implemented. However, what we already know points to a challenge for decision makers looking to implement carbon taxes to reduce climate change: against the overwhelming evidence of their effectiveness (Weitzman, 2017; Baranzini & Carattini, 2017; Aldy & Stavins, 2012; Mankiw, 2009; Metcalf, 2009; Goulder & Parry, 2008; Ballard & Medema, 1993; Baumol & Oates, 1971), the public support for carbon taxes remain low (Carattini et al., 2017; Jagers & Hammar, 2009; Dietz, Dan, & Shwom, 2007)—lower than the level of support for less efficient instruments such as subsidies (Heres, Kallbekken, & Galarraga, 2017; Cherry, Kallbekken, & Kroll, 2012; De Groot & Schuitema, 2012; Kallbekken & Aasen, 2010; Steg, Dreijerink, & Abrahamse, 2006).[3]

[3]The evidence from the research on environmental *regulations* is less clear. While some (Clinch & Dunne, 2006; Deroubaix & François, 2006) find that the level of support for taxes is lower than the level

Studies on the causes of this resistance suggest that environmental and economic consequences of taxes, as perceived by the people, are to blame.

To begin with, people do not seem to agree with the scientific evidence that taxes can be a solution to environmental problems. In part, this is a question of effectiveness, and many believe that increasing the cost of polluting would be ineffective to address the problems at hand (Baranzini & Carattini, 2017; Carattini et al., 2017; Kallbekken & Aasen, 2010; Gaunt, Rye, & Allen, 2007; Clinch & Dunne, 2006; Dresner et al., 2006; Steg et al., 2006). Interviews and focus groups show that participants expect people would 'pay to pollute' even if governments introduce or increase taxes (Kallbekken & Aasen, 2010; Gaunt et al., 2007; Clinch & Dunne, 2006)—in other words, there is a widespread belief that the price elasticity of polluting activities is too low for taxes to change the behaviour of consumers. However, the level of support for carbon taxes increases if people experience—for example, in trials (Carattini, Baranzini, & Lalive, 2018; Tiezzi & Xiao, 2016; Cherry, Kallbekken, & Kroll, 2014; Schuitema, Steg, & Forward, 2010)—or simply believe (Hammar & Jagers, 2006) that these taxes work.

In part, it is a question of trust. Increasing the cost of polluting may well be an effective deterrent, but people are then suspicious that this is why governments are keen to introduce carbon taxes (Clinch & Dunne, 2006; Hammar & Jagers, 2006). Instead, they worry that governments use environmental problems 'as a cover for obtaining new revenues' (Klok et al., 2006, p. 913), which may not be spent for the environment or redistributed back to the people (Hsu, Walters, & Purgas, 2008; Clinch & Dunne, 2006; Dresner et al., 2006). Putting the two parts together, in short, there is an uncertainty that

of support for regulations as well, others (Cherry et al., 2012; Halbheer, Niggli, & Schmutzler, 2006) report the opposite finding.

taxes could or would possibly be used to address environmental problems. This is why, as many studies show, earmarking helps (Carattini, Kallbekken, & Orlov, 2019; Baranzini & Carattini, 2017; Carattini et al., 2017; Gevrek & Uyduranoglu, 2015; Kallbekken & Aasen, 2010; Deroubaix & François, 2006; Dresner et al., 2006; Steg et al., 2006): if governments designate the revenues, the level of support for taxes increases significantly as this practice provides some certainty that taxes can and will be used to address certain environmental problems.

Another group of reasons behind the public resistance relates to the perceived economic consequences of taxes. First and foremost, people are worried that carbon taxes will increase their personal costs (Brännlund & Persson, 2012; Jagers & Hammar, 2009; Clinch & Dunne, 2006). Studies repeatedly show that, for example, the opposition to taxes is significantly higher among car owners (Hsu et al., 2008; Gaunt et al., 2007; Hammar & Jagers, 2006; Thalmann, 2004), who are more likely to see their costs increase as a result of carbon taxes. Similarly, there is a negative relationship between tax rates and public support (Baranzini & Carattini, 2017; Gevrek & Uyduranoglu, 2015; Cherry et al., 2012; Kallbekken & Sælen, 2011; Thalmann, 2004) as people prefer taxes that would cost them as little as possible. However, calculating the personal costs of a tax is not always an easy task, and people seem to overestimate the personal costs associated with taxes (Schuitema et al., 2010)—unlike the environmental benefits of these taxes which, as discussed above, are often underestimated.

Then again, the worry about the economic consequences of taxes might go beyond self-interest, and to a certain extent it is also based on the consideration for 'others', such as low-income groups (Carattini et al., 2017; Kallbekken & Sælen, 2011). For example,

Carattini et al. (2017) show that the vote against the non-renewable energy tax in the 2015 Swiss referendum can be explained largely by its perceived repercussions on low-income households and businesses. In general, the acceptability of carbon taxes decreases as they lead to regressive distributions (Gevrek & Uyduranoglu, 2015; Brännlund & Persson, 2012), posing a higher share of burden to low-income than high-income earners.

3 Theory and Hypotheses

We view the attitudes towards climate change policies from a rational-choice perspective, where individuals support policy instruments that are likely to minimise their costs and/or maximise their benefits (P. C. Stern, Dietz, & Kalof, 1993). However, these cost and benefit calculations take place amid uncertainty. So much so that, at least in perceptions, the uncertainty around climate policy—i.e. the solutions—might be larger than the uncertainty around climate change itself—i.e. the problem (Patt & Weber, 2014). Indeed, the literature above makes it clear that there is a lot of perceived uncertainty about (a) whether carbon taxes could solve the problem, (b) how these taxes would be used, and (c) how much they would cost to individuals. We therefore argue that uncertainty and self-interest associated with policy instruments are among the key determinants of personal support for climate change policies.

Against this background, in the following subsections we develop two further sets of hypotheses based on factors that (1) decrease the uncertainty around carbon taxes and that (2) make the cost of taxes clearer for consumers.

3.1 Political trust and efficacy

A first set of theoretical expectations is related to the uncertainty around carbon taxes. As reviewed above, there is mounting evidence that people are uncertain about whether taxes could or would be used to address environmental problems, and this uncertainty hinders the support for carbon taxes. If this is true, factors that decrease this uncertainty should at the same time contribute to the support. In fact, certainty likely improves the acceptance of any policy instrument, but as a result of the direct and coercive nature of taxes (Heres et al., 2017; Steg et al., 2006), we expect the improvement to be particularly prevalent for taxes. In this article, we consider two such factors—political trust and efficacy.

Political trust is a crucial element of social capital for governments as 'institutional trust will matter for the support or rejection of *any* government activity' (Paxton & Knack, 2012, p. 174). Consequently, it has become a concept that features often in studies over public attitudes—including environmental attitudes (Fairbrother, 2017a), which are associated with political trust in a large body of research (Baranzini & Carattini, 2017; Fairbrother, 2017b; Dietz et al., 2007; Gaunt et al., 2007; Beuermann & Santarius, 2006; Hammar & Jagers, 2006). When a government proposes to address as complex an issue as climate change with taxes, those who have higher levels of political trust should be more likely to believe that the government proposal could and would work, and therefore have a higher probability to support the proposal. This is why we expect political trust to correlate positively with the level of support for carbon taxes.

Hypothesis 1: *The level of support for carbon taxes is higher among people with high political trust.*

What is yet to establish itself in the literature on the acceptability of climate change policies is political efficacy—specifically, *external* political efficacy, which refers to beliefs about government responsiveness to citizen demands (Craig, Niemi, & Silver, 1990). Irrespective of the political trust that governments have, their climate change policy might turn out to be a failure in the eyes of the citizens. Under high external efficacy—i.e. where people (are perceived to) have a say in what their governments do—the citizens can at least then expect these policies to be reformed or dropped altogether in line with their demands. However, where governments are not responsive to citizen demands, policies are more likely to remain untouched once enacted even if they prove unpopular in time. Hence we hypothesise the support for carbon taxes to increase with external efficacy.

Hypothesis 2: *The level of support for carbon taxes is higher among people with high external political efficacy.*

3.2 Self-interest

A second set of expectations is related to the personal cost of carbon taxes. As already suggested above, one of the main reasons behind the public resistance to carbon taxes is their perceived economic consequences to people, who purposefully try to minimise their costs. For this assertion to hold, the resistance should be stronger among people who are

more likely to be paying a higher cost of the taxes. Here we develop hypotheses based on two such groups: those who depend on energy and those who live in rural areas.

As carbon taxes often aim at limiting the energy consumption behaviour, heavy consumers of energy share a higher burden of these taxes—a principle that has widespread support among the public (Jagers & Hammar, 2009; Hammar & Jagers, 2006)—unless they reduce their consumption levels. However, the elasticity of energy consumption is not the same for everyone, and consumers are more likely to lose if they could not use less energy despite a new or increased carbon tax. Therefore, we expect to find a negative relationship between energy dependency of individuals and their support for taxes.

> **Hypothesis 3:** *The level of support for carbon taxes is lower among people with high energy dependency.*

One special case of energy dependency emerges in rural areas, where people rely more heavily on energy for mobility (due to relative lack of public transport amid larger distances) and heating (due to characteristically less energy-efficient housing) than people living in urban areas (Kallbekken & Sælen, 2011; Broz & Maliniak, 2010; Ewing & Rong, 2008). As a result, carbon taxes are likely to have more repercussions on rural areas. This effect is not limited to those rural habitants who personally depend on energy. If carbon taxes mean less money (and eventually fewer people) to remain in local economy, all residents would have to shoulder the burden of these taxes disproportionately. This leads us to hypothesise the support for carbon taxes to be lower in rural than in urban areas.

Hypothesis 4: *The level of support for carbon taxes is lower among people living in rural areas.*

4 Data and Design

Our analysis draws on data from the European Social Survey (ESS). Including for the first time a module on energy attitudes, Round 8 of the ESS (2016) provides a unique opportunity to test the hypotheses above across 23 countries (n = 44,387). The majority of these countries are in the European Union (EU) or European Free Trade Association (EFTA)—Austria, Belgium, Czech Republic, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom—while the survey includes also Israel and the Russian Federation. This allows us to provide cross-national evidence for individual preferences for carbon taxes in a range of countries larger than it has ever been possible before.

The data for our dependent variable comes from the following survey question: 'To what extent are you in favour or against ... increasing taxes on fossil fuels, such as oil, gas, and coal ... in [country] to reduce climate change?' The response options were 1 = 'strongly in favour', 2 = 'somewhat in favour', 3 = 'neither in favour nor against', 4 = 'somewhat against', and 5 = 'strongly against'. We have reversed the original scale so that higher values indicate increasing favour. To provide easily interpretable results, we treat this dependent variable as continuous in the main body of the article although the measure is ordinal. This allows us to model the data with multilevel (where respondents

are nested in countries) linear regression models. In the Supporting Information S4, however, we provide a robustness test on this modelling choice by re-estimating the coefficients with multilevel ordered logistic regressions. The results remain substantively the same.

For the independent variables of interest, we use data from the survey items measuring (a) how much on average the respondents trust their country's parliament, political parties, and politicians (*Political Trust*), (b) how much they believe the political system in their country allows people like them to have a say in what the government does (*Political Efficacy*), (c) how confident they are that they could use less energy than they do now (*Energy Dependence*), and finally (d) how rural is the area they live in (*Rural Area*).

To show that our substantive results are not driven by inclusion or exclusion of covariates, we report models with and without control variables.[4] At the individual level, these variables include the respondents' age, gender, left-right orientation, climate change worries, and energy cost worries. In addition, whether there is already a carbon tax in place, average party position on green energy, and gross domestic product are the country-level controls. For more details on the data and variables, see Supporting Information S1.

5 Results

To begin with analysis, Figure 1 plots the mean levels of public support for increasing taxes on fossil fuels to reduce climate change, in countries with and without existing

[4]Note that this also allows us to provide evidence from all 23 countries at least in some models, as the number of countries decrease to 18 with the country-level control variables due to missing data.

carbon taxes. Overall, it shows that people are rather negative about increasing these taxes, with the average preference (2.72, standard error = 0.01) under the neutral mid-point of the scale—'neither in favour nor against'. This is indeed the situation in most countries; the public attitude towards this policy is on average negative in 17 out of 23 cases. The support turns only slightly positive in no more than five countries in the survey. In Germany, the public seems divided almost equally between being against and in favour of increasing taxes on fossil fuels.

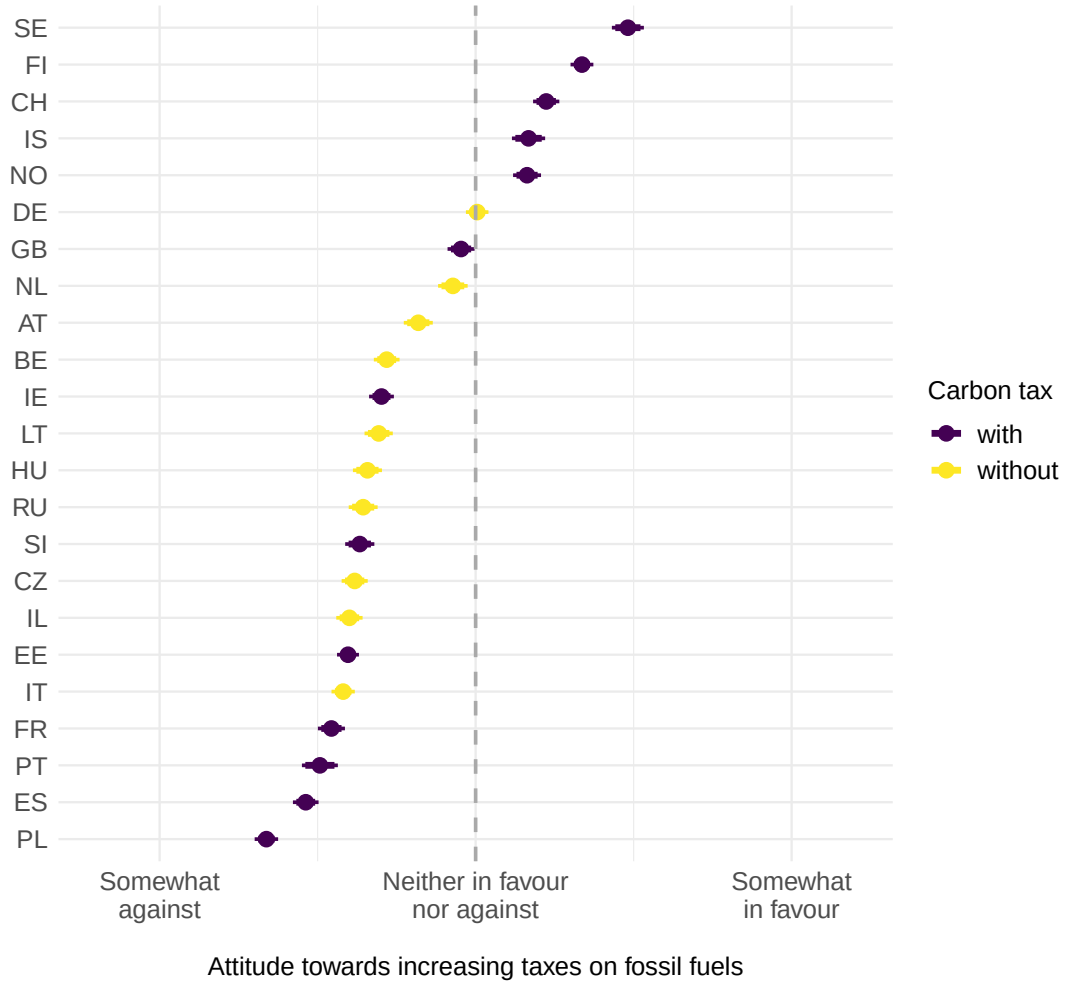

Figure 1: Mean levels of public support for increasing taxes on fossil fuels to reduce climate change. *Notes:* The values are based on the ESS Round 8 (ESS, 2016), weighted to account for sampling error, non-response bias, and differences in inclusion probabilities. Horizontal bars indicate standard errors.See Table S2 in the Supporting Information for the underlying values in table format.

At the time of data collection, carbon taxes existed in 13 of the 23 countries in the survey. Figure 1 shows that most of these countries are clustered at either ends of the level of support for increasing taxes on fossil fuels. On the one hand, we see that in all five countries where the attitude towards increasing taxes are positive, carbon taxes are already in place. Notice also that, with the exception of Switzerland, these are all Nordic countries (Sweden, Finland, Iceland, and Norway). On the other hand, carbon taxes exist in Poland, Estonia, Portugal, and France as well, but the public support for increasing taxes on fossil fuels are at its lowest level in this set of countries. This suggests that, at least at the country level, there is no linear relationship between having carbon taxes already in place and the public attitude towards increasing these taxes.

In the remainder of this section, we provide explanations as to the determinants of such variations at the individual level with evidence from multivariate analyses. Table 1 presents a summary of two multilevel linear regression models, where the dependent variable is the support for increasing taxes on fossil fuels to reduce climate change. Figure 2 then complements the main results with predictions stemming from the estimations in the forth model, which includes the individual- and country-level control variables.

For the factors related to uncertainty, we find statistically significant, positive relationships between both *Political Trust* and *Political Efficacy* on the one hand, and the support for taxes on the other. Substantively, as Figure 2 shows, *Political Trust* is associated with a larger effect size than it is the case for any other variable of interest in our models. In its absence ($Political\ Trust = 0$), we estimate the average support for increasing taxes to be 2.50—similar to the situation in Portugal, the country with third lowest score in the dataset. At the other end of the spectrum ($Political\ Trust = 10$), the

Table 1: Multilevel linear regression models—summary results.

	Basic Model	Individual Controls	Country Controls	All Controls
Political Trust	0.068***	0.064***	0.074***	0.069***
	(0.003)	(0.004)	(0.003)	(0.004)
Political Efficacy	0.110***	0.079***	0.116***	0.080***
	(0.007)	(0.008)	(0.008)	(0.009)
Energy Dependence	–0.047***	–0.029***	–0.050***	–0.030***
	(0.002)	(0.003)	(0.003)	(0.003)
Rural Areas	–0.074***	–0.053***	–0.074***	–0.052***
	(0.005)	(0.006)	(0.005)	(0.006)
Individual-level Controls	✗	✓	✗	✓
Country-level Controls	✗	✗	✓	✓
Constant	2.669***	2.377***	2.304***	2.054***
	(0.050)	(0.064)	(0.156)	(0.160)
N—Observations	40972	30216	33079	24613
N—Groups	23	23	18	18
Log likelihood	–64732.776	–46734.868	–52229.111	–38034.364
Wald χ^2	2121.56	3567.89	1971.66	3032.08

Notes: These results are from multilevel linear regressions, where individuals are nested in countries, with standard errors in parentheses. The dependent variable is the support for increasing taxes on fossil fuels to reduce climate change. Individual–level controls include age, gender, left–right orientation, climate change worries, and energy cost worries. Country–level controls include whether there is already a carbon tax in place, average party position on green energy, and GDP. See Table S3 for complete results. *** $p < 0.001$.

cross-country result (mean = 3.19) looks very much like in Iceland, the country with the forth highest score. With regard to *Political Efficacy*, while the average support is 2.68 among those who believe that people like them have no say in what their government does, we predict this average to be 3.00 ('neither in favour nor against' increasing the taxes) for those who believe the complete opposite—that they have a great deal of say. These results confirm our Hypotheses 1 and 2.

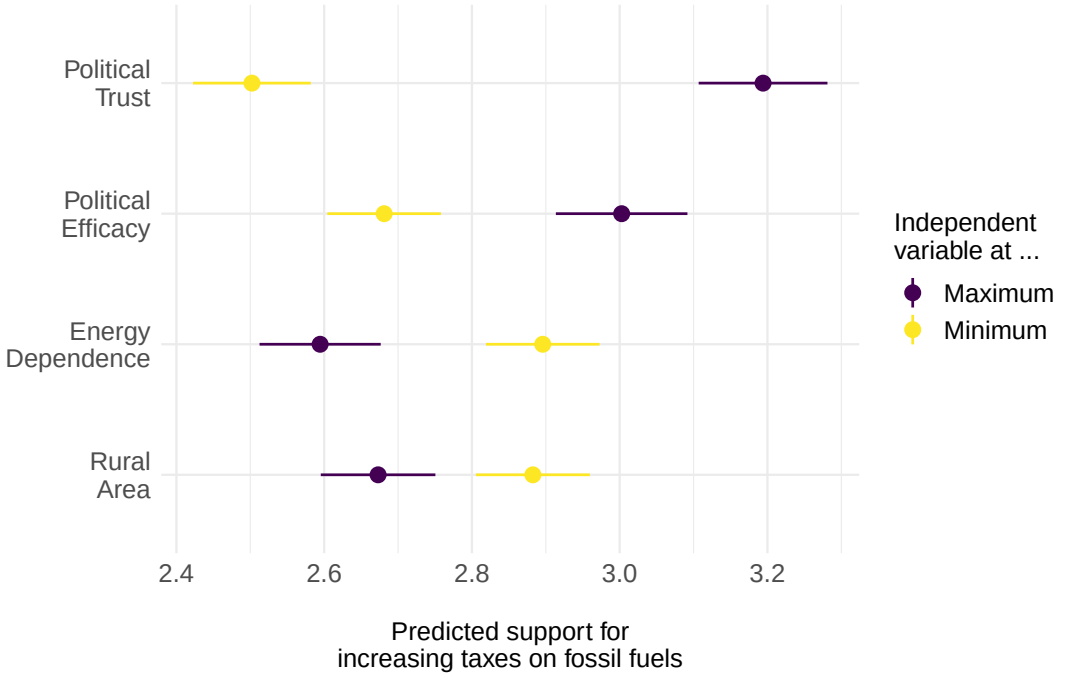

Figure 2: Predicted support for increasing taxes on fossil fuels to reduce climate change. *Notes*: Predictions are based the forth model in Table 1. The dependent variable is the respondents' support for increasing taxes for fossil fuels to reduce climate change. Horizontal bars represent 95% confidence intervals. Other variables are set to observed values.

For the factors related to self-interest, we again find statistically significant but this time negative relationships, confirming our respective Hypotheses 3 and 4. As we expected, first, the support for taxes decreases with respondents' dependency on energy. All else being equal, a switch from maximum to minimum confidence that the respondents could use less energy is associated with a 0.30 decrease on a five-point support scale for taxes. Second, there is a likewise decrease in support on the urban-rural divide. Here the effect size is smaller in comparison—about a quarter of a point on a five-point scale—where the support for increasing taxes on fossil fuels decreases significantly as the area that the respondents live in become more rural.

6 Conclusion

In search for policy instruments to reduce climate change, many governments face a hard choice between effectiveness and popularity. One would think carbon taxes are the *go-to* instrument since they are known for their effectiveness in changing behaviour in favour of the environment. What is more, these taxes also generate additional revenues for governments to improve the lives of their citizens—environmentally or otherwise. Yet they are unpopular with the public. This article extends the empirical evince on their unpopularity with representative data from more than two dozen countries, most of which are to appear in the literature with this article. We find that there is no overall support for carbon taxes in most of the 23 countries in the dataset.

Multivariate analyses provide insights into the reasons behind the unpopularity of carbon taxes. On the one hand, the results show that the attitudes towards taxes improve significantly with higher political trust and efficacy. We argue that this is because the level of support for taxes are particularly prone to uncertainty, which decreases with trust and efficacy. On the other hand, the level of support for carbon taxes is significantly lower among people who depend highly on energy or live in rural areas, for whom the economic cost of energy-based taxes is likely to be higher. We see this as evidence that the self-interest is one of the determining factors behind the attitudes to carbon taxes.

These results can be considered as good as well as bad news for the future of carbon taxes. These are bad news because, as things stand, people are on average against carbon taxes in many countries. If there are any governments looking into introducing taxes into their climate change policy any time soon, they are likely to meet public resistance like

in France. However, our results can also be considered as good news at least in countries where the average support for taxes is only slightly negative. If the governments in these countries take steps to decrease the uncertainty around taxes, they can shift the attitudes towards positive. This article shows that increasing political trust and efficacy of the citizens could be a step in this direction.

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SUPPORTING INFORMATION

'Attitudes to environmental taxes across Europe: The role of perceived uncertainty and self-interest'

Resul Umit

University of Lucerne

resul.umit@unilu.ch

Lena Schaffer

University of Lucerne

lena.schaffer@unilu.ch

Contents

S1 Codebook of Variables

As explained in the main text, our main data source is the European Social Survey (ESS), and except for the country-level controls, all our variables originate from the Round 8 of this survey (ESS, 2016). The ESS is an academically driven project based on face-to-face interviews with cross-sectional samples. It is conducted every two years since 2002, with rotating sections complementing the core survey in different rounds. In Round 8, one of these rotating sections was for the first time a module on public perceptions of climate change and energy security.

Table S1: Descriptive statistics.

	N	Mean	Median	SD	Min	Max
Dependent variable						
Support for Taxes	42401	2.77	3.00	1.23	1.00	5.00
Key independent variables						
Political Trust	44051	3.96	4.00	2.27	0.00	10.00
Political Efficacy	43429	2.20	2.00	0.94	1.00	5.00
Energy Dependence	43435	3.96	4.00	2.63	0.00	10.00
Rural Areas	44337	2.87	3.00	1.24	1.00	5.00
Individual-level controls						
Age	44232	49.14	49.00	18.61	15.00	100.00
Education	44170	4.01	4.00	1.85	1.00	7.00
Female	44378	0.53	1.00	0.50	0.00	1.00
Household Income	36445	3.76	3.05	2.67	0.32	17.43
Left-Right Orientation	38583	5.16	5.00	2.24	0.00	10.00
Climate Worries	42654	3.01	3.00	0.93	1.00	5.00
Cost Worries	43955	3.10	3.00	1.04	1.00	5.00
Country-level controls						
Carbon Tax	44387	0.51	1.00	0.50	0.00	1.00
Party Position	35450	0.21	0.31	0.28	–0.35	0.60
GDP	44387	4.21	4.14	1.25	2.49	7.25

Table S1 provides the descriptive statistics for all variables used in the analysis before we proceed to define each of them in detail below.

S1.1 Dependent variable

The dependent variable come from a battery of questions measuring how much the respondents are in favour or against different instruments to reduce climate change:

Support for Taxes. Increasing taxes on fossil fuels, such as oil, gas and coal.

The answers are (reverse) coded as 5 = 'strongly in favour', 4 = 'somewhat in favour', 3 = 'neither in favour nor against', 2 = 'somewhat against', and 1 = 'strongly against' to code the first two dependent variables above. In addition, we created a third, index dependent variable out of two items.

S1.2 Independent variables

Political Trust. We created this variable out of a battery of questions measuring respondents' trust towards a list of actors and institutions. The wording of the overall instruction was as follows: 'please tell me on a score of 0-10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust'. We then calculated this individual-level variable as the mean value of trust towards the country's parliament, political parties, and politicians.[i]

Political Efficacy. Respondents' answer to the survey question, 'How much would you say the political system in [country] allows people like you to have a say in what the

[i]The other actors and institutions in the battery, which we did not include in the calculation of this variable, were the country's legal system and police as well as the European Parliament and the United Nations.

government does?', with response options as 1 = 'not at all', 2 = 'very little', 3 = 'some', 4 = 'a lot', 5 = 'a great deal'.

Energy Dependence. Respondents' answer to the survey question, 'Overall, how confident are you that you could use less energy than you do now?', with response options (reverse coded) from 0 = 'completely confident' to 10 = 'not at all confident'.

Rural Area. A variable based on respondents' deception of the area where they live, coded as 1 = 'a big city', 2 = 'the suburbs or outskirts of a big city', 3 = 'a town or a small city', 4 = 'a country village', 5 = 'a farm or home in the countryside'.

Individual-level controls

Age. A continuous variable based on the age of respondents. The acceptance of environmental taxes likely decreases with age (Thalmann, 2004).

Education. An ordinal variable indicating the highest level of education that the respondents successfully completed: 1 'less than lower secondary' = 1, 'lower secondary' = 2, 'lower tier upper secondary' = 3, 'upper tier upper secondary' = 4, 'advanced vocational, sub-degree' = 5, 'lower tertiary education, BA level' = 6, or 'higher tertiary education, MA level or above' = 7. The acceptance of environmental taxes likely increases with education (Alberini, Ščasný, & Bigano, 2018; Hsu, Walters, & Purgas, 2008; Thalmann, 2004).

Female. A binary variable based on gender, coded as 1 for females and 0 for males.

Household Income. As the ESS measures income with pre-defined deciles of the national household income distribution, the cross-country comparability of the resulting variable is limited. To address this issue, we re-estimated the original variable in the dataset, in line with a solution offered by Donnelly and Pop-Eleches (2018).

For example, for a survey respondent in Austria, for whom the original income variable is coded as 3, our re-estimation was as follows. First, as the third decile ranges from €19,800 to €24,200 in this country, we take (19800 + 24800) / 2 = 22000 as the midpoint. We then divide this value by the purchasing power parity for Austria in 2016—that is, 22000 / 0.841 = 26159.33—in the second step. Notice that, to provide meaningful regression coefficients, we code this variable in $10,000, and therefore this respondent is assigned 2.62 as *Household Income*. We control for this variable because the acceptance of environmental taxes likely increases with income (Gevrek & Uyduranoglu, 2015; Hsu et al., 2008; Kotchen, Turk, & Leiserowitz, 2017).

Left-Right Orientation. An ordinal variable measuring where the respondents would place themselves on a left-right scale, where 0 indicates the left and 10 indicates the right. The acceptance of environmental taxes is likely higher among the people on the left of the political spectrum (Hammar & Jagers, 2006; Thalmann, 2004).

Climate Worries. An ordinal variable measuring whether the respondents are are 'not at all worried' = 1, 'not very worried' = 2, 'somewhat worried' = 3, 'very worried' = 4, or 'extremely worried' about climate change. The acceptance of environmental taxes likely increases with the redistributional concerns for the environment (Alberini et al., 2018; Carattini, Baranzini, Thalmann, Varone, & Vöhringer, 2017; Gevrek & Uyduranoglu, 2015; Kotchen et al., 2017).

Cost Worries. An ordinal variable measuring whether the respondents are 'not at all worried' = 1, 'not very worried' = 2, 'somewhat worried' = 3, 'very worried' = 4, or 'extremely worried' that energy may be too expensive for many people in their country. The acceptance of environmental taxes likely decreases with the redistributional concerns for others (Brännlund & Persson, 2012; Carattini et al., 2017; Thalmann, 2004; Kallbekken & Sælen, 2011).

Country-level controls

Carbon Tax. A binary variable, coded as 1 for countries with carbon pricing initiatives, or otherwise as 0 (World Bank, 2018). The acceptance of environmental taxes is likely related to current tax situation in a country (Jagers & Hammar, 2009).

Party Position. The average position of political parties—in the European Union countries in 2014—with regard to the following statement: 'Renewable sources of energy (e.g. solar or wind energy) should be supported even if this means higher energy costs', with response categories as –1 = 'completely disagree', –0.5 = 'tend to disagree', 0 = 'neutral', 0.5 = 'tend to agree', and 1 = 'completely agree'. The data for this variable comes from an expert survey in the *euandi* project (Garzia, Trechsel, & De Sio, 2017).

GDP. Gross domestic product, calculated as 10,000 US Dollars per capita in 2016 (OECD, 2018).

S2 Mean Levels of Support: Source Data

Figure 1 in the main text plots the mean levels of public support for increasing taxes to reduce climate change in each country. In this section, we provide the source data in Table S2.

Table S2: Mean values of public support for increasing taxes on fossil fuels.

	Country	Sample	Mean	SE
AT	Austria	2010	2.82	0.04
BE	Belgium	1766	2.72	0.03
CH	Switzerland	1525	3.22	0.03
CZ	Czech Republic	2269	2.62	0.03
DE	Germany	2852	3.00	0.02
EE	Estonia	2019	2.60	0.02
ES	Spain	1958	2.46	0.03
FI	Finland	1925	3.34	0.03
FR	France	2070	2.54	0.03
GB	United Kingdom	1959	2.95	0.03
HU	Hungary	1614	2.66	0.04
IE	Ireland	2757	2.70	0.03
IL	Israel	2557	2.60	0.03
IS	Iceland	880	3.17	0.04
IT	Italy	2626	2.58	0.03
LT	Lithuania	2122	2.69	0.03
NL	Netherlands	1681	2.93	0.04
NO	Norway	1545	3.16	0.03
PL	Poland	1694	2.34	0.03
PT	Portugal	1270	2.51	0.05
RU	Russian Federation	2430	2.64	0.03
SE	Sweden	1551	3.48	0.04
SI	Slovenia	1307	2.63	0.04
Total		44387	2.72	0.01

Notes: This table reports the means and standard errors (SE) of public support for increasing taxes on fossil fuels to reduce climate change, as plotted in Figure 1. All values are based on ESS Round 8 ESS (2016), weighted to account for sampling error, non-response bias, and differences in inclusion probabilities. The total values are calculated with additional weights to account for the different population sizes of the countries in the dataset.

S3 Complete Table

For reasons of brevity and space, the regression table in the main text report only a summary of the results. This section provides the complete version of Table 1.

Table S3: Multilevel linear regression models—complete results for Table 1.

	Basic Model	Individual Controls	Country Controls	All Controls
Political Trust	0.068***	0.064***	0.074***	0.069***
	(0.003)	(0.004)	(0.003)	(0.004)
Political Efficacy	0.110***	0.079***	0.116***	0.080***
	(0.007)	(0.008)	(0.008)	(0.009)
Energy Dependence	–0.047***	–0.029***	–0.050***	–0.030***
	(0.002)	(0.003)	(0.003)	(0.003)
Rural Areas	–0.074***	–0.053***	–0.074***	–0.052***
	(0.005)	(0.006)	(0.005)	(0.006)
Age		–0.000		–0.001
		(0.000)		(0.000)
Education		0.046***		0.045***
		(0.004)		(0.004)
Female		0.052***		0.046**
		(0.013)		(0.015)
Household Income		0.014***		0.023***
		(0.003)		(0.004)
Left-Right Orientation		–0.049***		–0.038***
		(0.003)		(0.003)
Climate Worries		0.230***		0.231***
		(0.008)		(0.009)
Cost Worries		–0.140***		–0.143***
		(0.007)		(0.008)
Carbon Tax			–0.003	0.033
			(0.077)	(0.075)
Party Position			0.448**	0.359**
			(0.141)	(0.136)
GDP			0.053	0.030
			(0.034)	(0.033)
Constant	2.669***	2.377***	2.304***	2.054***
	(0.050)	(0.064)	(0.156)	(0.160)
N—Observations	40972	30216	33079	24613
N—Groups	23	23	18	18
Log likelihood	–64732.776	–46734.868	–52229.111	–38034.364
Wald χ^2	2121.56	3567.89	1971.66	3032.08

Notes: These results are from multilevel linear regressions, where individuals are nested in countries, with standard errors in parentheses. The dependent variable is the support for increasing taxes on fossil fuels to reduce climate change. ** $p < 0.01$, *** $p < 0.001$.

S4 Ordered Logistic Regression Models

In the main text, we treated various variables—most importantly, the dependent variables—as continuous although they are ordinal. In this section, we show that our substantive findings remain substantively the same if we treat them as ordinal instead. Table S4 presents the results re-estimated in multilevel ordered logistic regression models.

Table S4: Multilevel ordinary logistic regression models—Robustness check for Table 1.

	Basic Model		Individual Controls		Country Controls		All Controls	
	Coef.	Std.Error	Coef.	Std.Error	Coef.	Std.Error	Coef.	Std.Error
Political Trust	0.109***	0.005	0.104***	0.006	0.117***	0.005	0.112***	0.006
Political Efficacy	0.176***	0.011	0.129***	0.013	0.187***	0.013	0.132***	0.015
Energy Dependence	–0.074***	0.004	–0.048***	0.004	–0.078***	0.004	–0.049***	0.005
Rural Areas	–0.112***	0.008	–0.082***	0.009	–0.111***	0.008	–0.081***	0.010
Age			–0.001	0.001			–0.001	0.001
Education			0.075***	0.006			0.073***	0.007
Female			0.077***	0.021			0.071**	0.023
Household Income			0.023***	0.005			0.036***	0.006
Left-Right Orientation			–0.082***	0.005			–0.063***	0.006
Climate Worries			0.390***	0.013			0.391***	0.014
Cost Worries			–0.243***	0.012			–0.249***	0.013
Carbon Tax					0.002	0.118	0.074	0.120
Party Position					0.678**	0.216	0.552*	0.219
GDP					0.071	0.053	0.043	0.053
Cut-point 1	–1.362***	0.077	–1.001***	0.103	–0.831***	0.240	–0.490	0.258
Cut-point 2	–0.055	0.077	0.416***	0.103	0.472*	0.240	0.925***	0.258
Cut-point 3	0.957***	0.077	1.436***	0.103	1.475***	0.240	1.942***	0.258
Cut-point 4	2.809***	0.078	3.385***	0.105	3.349***	0.241	3.910***	0.260
N—Observations	40972		30216		33079		24613	
N—Groups	23		23		18		18	
Log likelihood	–61262.237		–44138.65		–49298.939		–35868.007	
Wald χ^2	2103.80		3385.99		1937.49		2843.20	

Notes: These results are from multilevel ordered logistic regressions, where individual respondents are nested in countries, with standard errors in adjoining columns. The dependent variable is the support for increasing taxes on fossil fuels to reduce climate change. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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