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Does climate change concern alter tax morale preferences? Evidence from an Italian survey

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Abstract

Given the increasing relevance of sustainability debates, this paper investigates the relationship between the climate change concern and the willingness to pay an environmental tax, considering the interplay with the general level of individual tax morale. By employing a survey among Italian economics students, we show that the climate change concern affects the attitude towards paying an environmental tax both directly and indirectly, via a change in the preferences between the general and the specific tax morale. We find that also tax immoral subjects are significantly willing to pay an environmental tax as their awareness of climate change increases. Given the goal to increase the public acceptance of an environmental tax, we provide three main policy implications: i) carry on campaigns to increase the general level of tax morale, following the guidelines given by the OECD (2019); ii) raise the climate change awareness among people, for instance through investments in sensibilization campaigns on environmental-related topics; iii) increase awareness about climate change in particular among individuals who show lower attitude towards paying taxes. The evidence about an inconsistent tax preference made us recommend a policy addressed to a specific target group rather than to individuals and based on non-monetary incentives, such as nudging and moral suasion tools.

JEL code: Q50, Q40, H23
Key Words: Energy survey; Carbon tax; Climate change; Tax evasion and avoidance; Environmental Taxes and Subsidies

1. Introduction

Nowadays, political agendas across governments are converging on several global-common concerns. Among others, there is the need on one hand to globally reduce CO2 emissions and on the other to increase tax compliance across both individuals and businesses. For both these two topics, insights from behavioral economics could be included and used as a tool to strengthen the policy-making process's effectiveness. Starting from tax compliance, several experimental and empirical studies found that it can be increased through policies focused on stimulating individual tax morale (OECD, 2017). Tax morale refers to the intrinsic motivations of people in paying taxes (Alm and Torgler, 2006), which in turn can significantly increase overall tax compliance in a society given the evidence of a causal link between tax morale and tax compliance behavior (Cummings et al., 2009; Li, 2010; Halla, 2012). Several authors empirically showed that the tax morale varies according to the socio-demographic information at the individual level (age, gender, income, employment, religiosity) as well as their economic and social preferences, such as trust in institutions, confidence in government, and agreement with redistributive policies (Torgler, 2005; Alm and Torgler, 2006; Lago-Peñas and Lago-Peñas, 2010). However, different sorts of taxes can be differently perceived by taxpayers, thus tax morale can vary according to the kind of tax considered within a country (Lutthmer and Singhal, 2014), and this can be the case with environmental taxes (Park and Yoon, 2017). This intuition leads us to contribute to the literature about the environmental tax morale, namely the individual willingness to accept an environmental tax on non-renewable energy resources, such as fossil fuels.[1] An environmental tax can be intended as the tax rate imposed on the negative externalities coming from polluting productions (i.e. the Government could set a tax in terms of euros per ton of CO2 emissions or a tax on the percentage of carbon present in non-renewable energy resources, such as oil, gas, and coal). Despite the theoretical and empirical foundations about the efficiency and effectiveness of an environmental tax, international organizations are pushing governments to impose it (UN, 2015; OECD, 2021) since it can lead to a behavioral change in both citizens and firms in the use of greener or renewable energy resources (Aldy and Stavins, 2012), in line with the UN's sustainable development goals, in particular SDG 7 (Affordable and clean energy) and SDG 13 (Climate Action). However, to get a visible economic and environmental impact of an environmental tax, the latter must be supported and accepted by the public. For this reason, it is paramount to understand which factors determine the individuals' level of environmental tax morale. Muhammad et al. (2021) reviewed the topic, analyzing the determinants of public acceptance of

[1] With the term "environmental tax" we specifically refer to an increase in taxes on fossil fuels, such as oil, gas and coal, while it can be also intended as "carbon tax" or "Pigouvian tax".

environmental taxes, arguing that most of the studies in this field were conducted through surveys and with experimental approaches. The most tested variables are the use of revenue, environmental attitude, political ideology, trust in the government, and perceived policy effectiveness, as well as demographic traits (income, age, education, gender) obtaining mixed results. In general, it seems that people appear more willing to support a carbon tax when they (i) are aware of its efficacy and the policy content, (ii) believe that the government is trustworthy, (iii) have a positive attitude toward environmental protection, (iv) perceive the policy is fair in terms of costs distribution and social sharing, and (v) are concern about climate change issues.

This paper focuses on the latter reason, thus on the role that the individual concern about climate change plays on the environmental tax morale, considering the interplay with the general level of tax morale. By employing an online survey among Italian economics students, this paper contributes to the literature by analyzing the role that the individual climate change concern has on the willingness to accept an environmental tax both directly and indirectly, trying to grasp how the individual general tax preferences can differ respect to the specific (environmental) tax. Indeed, we aim to demonstrate whether and how climate change concern alters individual attitudes toward paying taxes, by investigating its effect on the willingness to accept an environmental tax among both tax morale and tax immoral subject groups. Insights from this paper may help to understand how policymakers should design policies according to (i) the group of individuals targeted based on their general level of tax morale; (ii) the behavioral preferences of the new generations about energy use and taxation.

To significantly increase the public acceptance of an environmental tax, we show that tax policies should be designed to increase the general level of tax morale and to raise climate change awareness among people. The latter should be particularly focused on a specific target group (individuals who show a lower attitude towards paying taxes) and carried out through non-monetary tools, which have been shown to be effective in positively influencing both individuals' energy behaviors and tax attitudes.

The paper is structured as follows: Section 2 describes data and research hypotheses; Section 3 deals with the description of the empirical strategy; Section 4 describes the results; finally, section 5 concludes with some tax policy implications.

2. Data and research hypotheses

We surveyed 514 Italian university students in economics, which is the commonly used subject pool in experimental economics studies, all around the country. We administered the questionnaire via Google Forms, spreading it through the Instagram profile "Economia del Suicidio", the largest social community of economics students in Italy. The sample is composed of 54,7% males and 45,3% females, with an average of 23 years old. We collected information at the individual level about their energy use, their perception of environmental issues, their political orientation, their economic preferences as well as their socio-demographic information. The structure of the questions that we used in the questionnaire was inspired by the European Social Survey regarding energy use and environmental preferences (Public Attitudes to Climate Change, 2016), and by the European Values Study for the individual willingness to pay taxes.

Our dependent variable is "Environmental tax morale" (ETM_i), proxied by the individual answer to the question "*To what extent are you in favor or against the following policies in Italy to reduce climate change? Increasing taxes on fossil fuels, such as oil, gas and coal*" on a 5-point Likert scale from "strongly against" to "strongly in favor".

The main independent variable is the climate change concern (CCC_i), which we measured with the question "*How worried are you about climate change?*" on a 5-point Likert scale from "not at all worried" to "extremely worried".

The other main independent variable of interest is the general level of tax morale (TM_i), proxied by the question "*Please tell me whether you think it can always be justified, never be justified, or something in between: Cheating on taxes if you have the chance*". Answers range from 1 (always justified) to 10 (never justified).

According to the literature, we accounted for several control variables (see Hordonic, 2018; Muhammad et al., 2021): trust in government, trust in politicians and political parties, political orientation (left-right), if he/she voted in the last elections, personal responsibility in combating climate change, social network activity, religiosity, age, gender. The summary of all the variables employed with their relative survey questions and descriptive statistics is reported in table 1.

Table 1: Variables description

Variable	Description	Mean	Std. Dev.	Min	Max	Observations
Environmental tax morale	"To what extent are you in favor or against the following policies in Italy to reduce climate change? Increasing taxes on fossil fuels, such as oil, gas and coal" (1=strongly against; 5= strongly in favor)	3.712	1.086	1	5	514
Climate change concern	"How worried are you about climate change?" (1=not at all worried; 5=extremely worried)	4.023	.83	1	5	514
Tax morale	Cheating on taxes if you have the chance" (1=always justified; 10=never justified)	8.85	1.792	1	10	514
Trust in government	Please tell me on a score of 1-10 how much you personally trust each of the institutions. 0 means you do not trust an institution at all, and 10 means you have complete trust: Government.	4.99	2.337	1	10	514
Political trust	Please tell me on a score of 1-10 how much you personally trust each of the institutions. 0 means you do not trust an institution at all, and 10 means you have complete trust: Political parties and politicians.	3.222	2.026	1	9	514
Political orientation	In politics people sometimes talk of 'left' and 'right'. Where would you place yourself on this scale, where 1 means the left and 10 means the right?	6.185	2.468	1	10	514
Social network activity	Have you posted or shared anything about online politics, for example on a blog, via email or on social media like Facebook or Twitter?	.36	.48	0	1	514
Voted in last elections	Did you vote in the last national election? (1=yes; 0=no)	.671	.47	0	1	514
Climate responsibility	To what extent do you feel a personal responsibility to try to reduce climate change? (1=not at all; 10= a great deal)	6.206	3.053	1	10	514
Religiosity	Dummy =1 if respondent declare to be "not religious at all"; 0 otherwise.	.354	.479	0	1	514
Gender	Dummy = 1 for males.	.547	.498	0	1	514
Age	Age	22.82	6.19	1	32	514

Building on the proposed literature and data, we formalize the following research hypotheses:

Hypothesis 1: There exists a direct and positive relationship between environmental tax morale and climate change concern.

According to the literature, we expect that the more people are concerned with climate change the more they are willing to pay an environmental tax.

Hypothesis 2: The environmental tax morale positively depends on the level of individual tax morale.

The expected result is that the people who are more willing to pay taxes, in general, will be also more willing to pay a specific (environmental) tax.

> *Hypothesis 3: For individuals with high tax morale, an increase in climate change concern increases the environmental tax morale. For individuals with low tax morale, the relationship between environmental tax morale and climate change concern should vanish.*

We expect that an increase in climate change concern should positively affect the willingness to pay an environmental tax only for those showing a higher level of general tax morale. They correctly evaluate the positive externalities generated by the tax payment. Thus, with an increasing interest in a particular topic (concern about climate change), it is logical to expect that the estimated value of the positive externality generated by the tax payment on that specific topic would be positive. On the contrary, an increase in climate change concern should not affect the willingness to pay an environmental tax for those who are tax immoral. In fact, given that they show low general tax morale, they should not evaluate the importance of paying either a specific tax. The theoretical prediction is that, given that they do not recognize the economic value of the positive externality generated by the tax payment, they would not be willing to accept an environmental tax even though they are concerned with climate change. Evidence against this hypothesis can be intended as incoherence between general and specific tax preferences (Lutthmer and Singhal, 2014), which can demonstrate whether and how climate change concern alters individual tax morale preferences.

3. Empirical strategy

Given the ordinal distribution of our respondent variable, we estimate an ordered logit model.[2] We start by estimating the baseline (restricted) model represented by the following equation (1):

$$Pr(ETM_i) = \phi(\beta_0 + \beta_1 CCC_i + X_i' \gamma) \qquad Equation\ (1)$$

where $\phi(\cdot)$ is the standard normal cumulative distribution function, CCC_i refer to the climate change concern variable and X_{ic}' is a vector including the control variables previously described. According to the first hypothesis (*H1*), we expect a positive sign of the CCC's coefficient.

To test our second hypothesis (*H2*) we extend the previous model by including as regressor the individual level of general tax morale expecting a positive sign of the respective coefficient.

[2] For the sake of robustness, we run the entire analysis applying OLS instead of ordered logit obtaining the same statistical relevance of results. Estimates are reported in the supplementary material attached (table A2).

Finally, to understand the role played by the general tax morale on the relationship between CCC and ETM by testing the hypothesis 3, we employ a category-based approach. We used the tax morale (TM_i) as contextual variable to split the subject pool into two categories: High tax morale (HTM) and Low tax morale (LTM). According to several studies about tax morale, to get the respective variable, it is common to construct a dummy equal to one if the respondent declared that cheating on taxes is "never justified", while it is zero for all the other cases (see, for instance, Torgler and Valev, 2010). This is done because, with a dichotomous measure, it is possible to distinguish the group of individuals who do not justify tax evasion under any circumstances from the others (Andriani 2016, Cambridge Journal of Economics). Following this methodology, we insert in the High tax morale group (HTM) only respondents who answered "never justified" to the tax morale question, clustering the remaining ones in the Low tax morale group (LTM). Hence, we run the baseline model separated for both groups, HTM and LTM respectively. According to hypothesis 3, we expect the coefficient to be positive and statistically significant in the HTM group only, while its effect should be not statistically significant in the LTM group.

4. Results

This section describes the results and discusses the significance of the results. Table 2 reports the estimated coefficients and marginal effects of the restricted (column 1), extended (column 2), and category-based approach (columns 3 and 4) models employing as dependent variable the environmental tax morale (ETM_i).

Table 2: Ordered logit estimates (dependent variable: ETM_i)

	(1)		(2)		(3)		(4)	
	Restricted		Extended		Category-based approach (HTM)		Category-based approach (LTM)	
	Estimated coefficient	Marginal effect	Estimated coefficient	Marginal effect	Estimated coefficient	Marginal effect	Estimated coefficient	Marginal effect
Climate change concern	0.731*** (0.106)	0.125***	0.724*** (0.106)	0.124***	0.767*** (0.143)	0.142***	0.692*** (0.164)	0.0997***
Tax morale			0.105*** (0.0288)	0.0179***				
Political orientation	-0.0886** (0.0351)	-0.0152**	-0.0811** (0.0353)	-0.0139**	-0.0828* (0.0454)	-0.0153*	-0.114** (0.0568)	-0.0164**
Political trust	0.0605 (0.0601)	0.0104	0.0674 (0.0602)	0.0115	0.0906 (0.0785)	0.0168	0.0359 (0.0956)	0.00517
Trust in government	0.205*** (0.0526)	0.0351***	0.204*** (0.0526)	0.0348***	0.184** (0.0714)	0.0341***	0.245*** (0.0804)	0.0353***
Social network activity	-0.0609 (0.174)	-0.0105	-0.0414 (0.175)	-0.00708	0.0549 (0.233)	0.0102	-0.170 (0.268)	-0.0244
Voted in last elections	-0.0987 (0.187)	-0.0169	-0.0647 (0.188)	-0.0111	-0.346 (0.248)	-0.0641	0.226 (0.297)	0.0326
Climate responsibility	-0.0168 (0.0281)	-0.00288	-0.0158 (0.0281)	-0.00270	0.0281 (0.0368)	0.00520	-0.0612 (0.0461)	-0.00883
Religiosity	0.0974 (0.175)	0.0167	0.100 (0.175)	0.0171	0.0245 (0.234)	0.00455	0.0933 (0.271)	0.0134
Gender	0.252 (0.170)	0.0433	0.308* (0.172)	0.0526*	0.451** (0.227)	0.0835**	0.211 (0.270)	0.0304
Age	0.0182 (0.0153)	0.00312	0.0157 (0.0154)	0.00269	0.0315 (0.0209)	0.00583	0.00434 (0.0233)	0.000625
Observations	514	514	514	514	302	302	212	212
Pseudo R^2	0.061		0.065		0.062		0.071	

Standard errors in parentheses.
Marginal effects are computed at the highest ETM level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Starting from the first column, the coefficient of climate change concern is positive and statistically significant at a 1% level. This confirms the first hypothesis ($H1$), as already evidenced in Italy from the empirical work of Rotaris and Danielis (2019). The individual political ideology matters: people from the right-wing seem to be less willing to accept an environmental tax, and this result is in line with the conclusions of Lozza et al. (2013) who argue that left-wing taxpayers generally show higher levels of voluntary cooperation and seem to be more prone to consider tax compliance a civic duty rather than right-wing subjects. Another interesting result is that the more people trust the government the more they are willing to accept an environmental tax, and this is in line with the existing evidence (Harring and Jagers, 2013; Savin et al. 2020; Umit and Schaffer, 2020). The effect of other control

variables is overall statistically negligible. Looking at the second column, the positive and statistically significant (at 1% level) coefficient of tax morale variable confirms the second hypothesis ($H2$). Surprisingly, focusing on columns 3 and 4, one can see that the coefficient of climate change concern is positive and statistically significant at 1% level in both HTM and LTM groups, a result that is partially against our expectation from the third hypothesis. Although an increase in climate change concern positively affects the willingness to pay an environmental tax for those showing a higher level of general tax morale (HTM group), we did not expect a positive and significant coefficient also among tax immoral subjects (LTM group). This deviation from the expectation made us formalize the third hypothesis. The opposite evidence coming from these results can be interpreted as a behavioral bias that leads people to show preferences that are not coherent across kinds of taxes (general vs particular). This means that even though there exists a group of people who are less willing to pay taxes in general (i.e., tax immoral) this does not imply that they would not be willing to pay a specific tax. Rather, they would increase their willingness to pay the specific tax if they were stimulated and made aware of the tax-specific topic. The magnitude of the climate change concern coefficient in the LTM group is still positive and statistically significant, implying that there is a margin to increase the environmental tax morale also among the tax immoral subjects.

To conclude, according to our research hypotheses, we summarize the following results:

R1: The climate change concern positively influences the environmental tax morale.
R2: The general level of tax morale positively affects the specific (environmental) tax morale.
R3: An increase in climate change concern increases the willingness to pay an environmental tax either for moral or tax immoral subjects, independently of their level of general tax morale.

5. Conclusions and Policy Implications

This work attempted to grasp evidence on how to stimulate the willingness to pay an environmental tax considering the level of individual climate change concern and the general level of tax morale, employing a survey among 514 Italian economics students. Our results provide innovative insights from a tax policy point of view, which we point out as follows.

i) First, in line with previous studies, our results remark the importance of increasing climate change awareness among people to let them be more willing to pay the environmental tax, for instance through investments in sensibilization campaigns on the importance of energy source usage and climate-related topic.

ii) Second, we demonstrated that an increase in the general tax morale leads to an increase in the specific (environmental) tax morale. Our evidence showed that people with high tax

morale logically recognize the positive impact of paying an environmental tax when the climate change concern increases, since the more the theme becomes important, the larger the willingness to pay the specific tax. For this reason, policymakers should carry on campaigns to increase the general level of tax morale to increase the overall tax compliance level and the relative tax revenues, following the guidelines given by the OECD (2019) to support taxpayer education programs, such as including tax morale research and analysis into education programs, improving the ease of paying taxes or strengthening revenue-expenditure links to build the social contract (Feld and Frey, 2007).

iii) Last but not least, we evidenced that also people with low tax morale turned out to be willing to pay an environmental tax if aware of the environmental issues. Hence, the climate change concern affects the environmental tax morale in two ways: its effect is transmitted directly on the dependent variable and indirectly by altering the general-specific tax morale preferences of subjects. The latter inconsistent preference implies that a key point in designing an effective tax policy is not to convince those who are already willing to pay taxes, which is a relatively easier task, but it is to increase the specific-tax morale also among those who are generally less willing to pay taxes. It should be paramount to increase awareness about environmental topics among people in general, and among those who are relatively tax immoral. Following the arguments of Caferra et al. (2021), our results remark the importance of targeting energy and environmental tax policies to groups rather than to individuals. According to this evidence, we support the use of non-monetary tools proposed by Colasante et al. (2021) to nudge people in the environmental transition by changing their behavior in energy use, for instance through the taxation on fuel and other non-renewable energy resources. Several studies showed that it could be effective to influence individuals' energy use preferences through social and moral nudging, namely a soft power policy to discourage negative consumption behaviors (Thaler, 2009), which can influence individual behavior (Schultz et al., 2007; Nolan et al., 2008; Allcott, 2011; Alcott and Rogers, 2014; Gilbert and Zivin, 2014; Brandon et al., 2019; Andor et al., 2020; Colasante et al., 2021). Also from the side of tax compliance attitude and behavior, the literature showed the effectiveness of these policy tools, such as social nudging and moral suasion (Blaumenthal et al. 2001; Torgler, 2004; Castro and Scartascini 2013; Bott et al. 2014; Del Carpio, 2014). Finally, given the goal to increase the public acceptance of an environmental tax, we suggest a policy based on non-monetary tools targeted at a group rather than at an individual level.

Even if this study's evidence reinforces the usefulness of behavioral studies in the context of social sciences and energy-related topics, we want to point out that there are several limitations: although we used a common methodology in this strand of research, we are aware that in an online survey individuals can be influenced by the self-reporting and hypothetical choice bias (see Swamy et al., 2001), that in turn can characterize their reported preferences. Moreover, even if economics university students are commonly used as a subject pool in experimental economics settings, and although several studies showed that the behavioral responses of students are largely the same as those of nonstudents in identical experiments (for a discussion see Alm et al., 2012; Choo et al., 2016), we are aware that in this case, they are not taxpayers yet (Barabas and Jerit, 2010). Even though this can be seen as a limitation for the external validity of results, it can be also seen as an opportunity since they represent the class of future taxpayers, and hence the relevance of results remains still important.

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Supplementary material

We replicated the entire analysis by applying the OLS, obtaining the same statistical relevance of the results. Estimates are reported in the following table A2.

Table A2: Ordinary least squares (dependent variable: ETM_i)

	(1)	(2)	(3)	(4)
	Restricted	**Extended**	**Category-based approach (HTM)**	**Category-based approach (LTM)**
Climate change concern	0.391***	0.386***	0.427***	0.340***
	(0.0553)	(0.0552)	(0.0747)	(0.0852)
Tax morale		0.0507***		
		(0.0157)		
Political orientation	-0.0498***	-0.0446**	-0.0444*	-0.0595**
	(0.0189)	(0.0190)	(0.0246)	(0.0301)
Political trust	0.0254	0.0260	0.0430	0.00708
	(0.0312)	(0.0311)	(0.0409)	(0.0491)
Trust in government	0.104***	0.0996***	0.0927**	0.118***
	(0.0269)	(0.0269)	(0.0368)	(0.0405)
Social network activity	-0.0554	-0.0477	-0.0103	-0.121
	(0.0947)	(0.0945)	(0.124)	(0.149)
Voted in last elections	-0.0924	-0.0783	-0.227*	0.0808
	(0.104)	(0.104)	(0.135)	(0.167)
Climate responsibility	0.000868	0.00126	0.0239	-0.0198
	(0.0150)	(0.0149)	(0.0197)	(0.0242)
Religiosity	0.0251	0.0234	-0.0280	0.0511
	(0.0942)	(0.0939)	(0.124)	(0.148)
Gender	0.103	0.133	0.195	0.107
	(0.0929)	(0.0939)	(0.122)	(0.152)
Age	0.00921	0.00804	0.0175	-0.000307
	(0.00831)	(0.00830)	(0.0111)	(0.0127)
Constant	1.827***	1.341***	1.571***	1.980***
	(0.353)	(0.429)	(0.480)	(0.528)
Observations	514	514	302	212
R^2	0.157	0.164	0.160	0.173

Standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$