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The Impact of Information Provision on Public Acceptance of Carbon Tax Revenue Recycling: A Randomized Experiment in Germany

Jana Eßer[1], Daniela Flörchinger[1], Manuel Frondel[1,2], Viola Helmers[1], Colin Torkowski[1]

Abstract

Economists advocate for lump-sum repayments of carbon tax revenues to mitigate the regressivity of carbon taxes and increase their acceptance among the population. However, past research has shown that the public generally prefers earmarking revenues for green investments rather than receiving lump-sum repayments. This preference is puzzling from an economic perspective and suggests a limited understanding of the carbon price mechanism. This study uses a randomized controlled trial with a sample of the general population in Germany (N = 4,040) to investigate whether providing information about the underlying mechanism can increase support for lump-sum repayments and other revenue recycling schemes besides green spending. Contrary to our hypothesis, we find that the treatment increased support for and the expected effectiveness of green spending but not of other revenue recycling schemes. One possible explanation is that the more respondents think about the carbon tax, the more they care about its environmental impact. This result highlights the importance of framing for successful information interventions.

Keywords: Carbon pricing, Revenue Recycling, Policy Acceptance, Experiment

JEL Codes: C93, Q58

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1. Introduction

Carbon pricing instruments form an important part of the European Union's ambitious climate action framework. By making carbon-intensive goods and activities more expensive, carbon pricing mechanisms are designed to encourage the transition to cleaner energy sources and more efficient technologies, ultimately reducing greenhouse gas emissions. Germany has taken a leading role by implementing a national emissions trading system covering the transport and buildings sector in 2021, complementing the EU Emissions Trading System, which has been operational since 2005.

Despite its economic efficiency, carbon pricing often encounters strong public resistance, limiting its political feasibility and long-term impact (Carattini et al., 2018). Opposition stems largely from concerns about fairness, trust in government, and perceived effectiveness. Many view carbon pricing as regressive, disproportionately burdening low-income households (Klenert et al., 2018), and skepticism grows when there is little trust that revenues will be used transparently or beneficially (Drews et al., 2022). Misconceptions – such as the overestimation of individual financial consequences (Eßer et al., 2024) – may further erode support.

To prevent regressivity and to increase acceptance among the population, economists have advocated for a lump-sum redistribution of the revenues to all citizens (Akerlof et al., 2019). Surprisingly, empirical studies have found little public support for lump-sum repayments. By contrast, most studies find that earmarking the revenues for green spending constitutes the most preferred revenue recycling scheme (Bristow et al., 2010; Dütschke et al., 2023; Ewald et al., 2022; Gevrek and Uyduranoglu, 2015; Hammerle et al., 2021; Kotchen et al., 2017; Sommer et al., 2022). One exception is Woerner et al. (2024). This preference reflects a desire for visible climate benefits and is strengthened by framing and labeling, such as using “climate fund” rather than “carbon tax” (Baranzini & Carattini, 2017). Other mechanisms – like lump-sum rebates or low-income support – are more accepted when their fairness benefits are clearly communicated, but then still rank below green spending (Kallbekken & Aasen, 2010; Sommer et al., 2022).

The literature has identified a lack of trust in government and doubts about the effectiveness of carbon pricing if its revenue is not used for green spending as the main reasons for the preference for green spending (Carattini et al., 2018; Dütschke et al., 2023; Ewald et al., 2022). In other words, many people do not understand that a relative price increase of carbon-intensive products can stir demand towards more environmentally friendly products. Eßer et al. (2024) also show that many Germans remain poorly informed about the CO_2 price introduced in 2021,

with significant misconceptions about its goals and use. This lack of understanding highlights the need for better communication and transparent revenue use to ensure policy legitimacy.

This study addresses this issue by using an RCT-based information treatment to assess whether clear explanations of carbon pricing mechanisms and revenue allocation strategies a) increase approval and/or expected effectiveness for revenue recycling options other than green spending, and b) whether the treatment effect depends on respondents' perceived price elasticity of driving behavior with respect to fuel prices.

The remainder of this paper is structured as follows: Section 2 details the research design, including the experimental setup, sample characteristics, and statistical methods. Section 3 reports empirical findings, analyzing the effects of the information treatment on revenue recycling preferences, Section 4 concludes.

2. Data and Methodology

A randomized controlled trial was conducted among a general population sample of individuals in Germany from September 25 to October 15, 2024. The experiment was embedded in a larger online survey on the preferences and effects of policies in the context of the German energy, heating and mobility transition. The survey was conducted in cooperation with the professional survey institute *forsa*, which maintains an online panel of more than 150,000 individuals that is representative of German-speaking Internet users over the age of 14 – the *forsa.omninet* panel. Participants in the *forsa.omninet* panel are recruited actively, randomly and offline, which reduces self-selection.

The data was collected online using a state-of-the-art online survey tool, and participants were able to interrupt and resume the survey at any time. For the survey, *forsa* selected 4,040 participants from the *forsa.omninet* panel. The full questionnaire, originally developed in German and translated into English for documentation purposes, is included in Appendix A.

To capture preferences for carbon tax revenue usage, participants were presented with six potential uses of the revenues, displayed in random order to mitigate order effects:

- Green spending (Expanding renewable energy or climate-friendly transportation systems),
- Lump-sum repayment (Providing annual lump-sum repayments to all citizens),
- Reimburse low-income (Supporting low-income households),

- Grid charge (Reducing electricity prices by lowering grid charges),
- Budget (Integrating revenues into the overall government budget), and
- Debt reduction (Reducing government debt).

Both agreement and perceived effectiveness were measured using five-point Likert scales, ranging from 1 ("do not agree at all") to 5 ("fully agree").

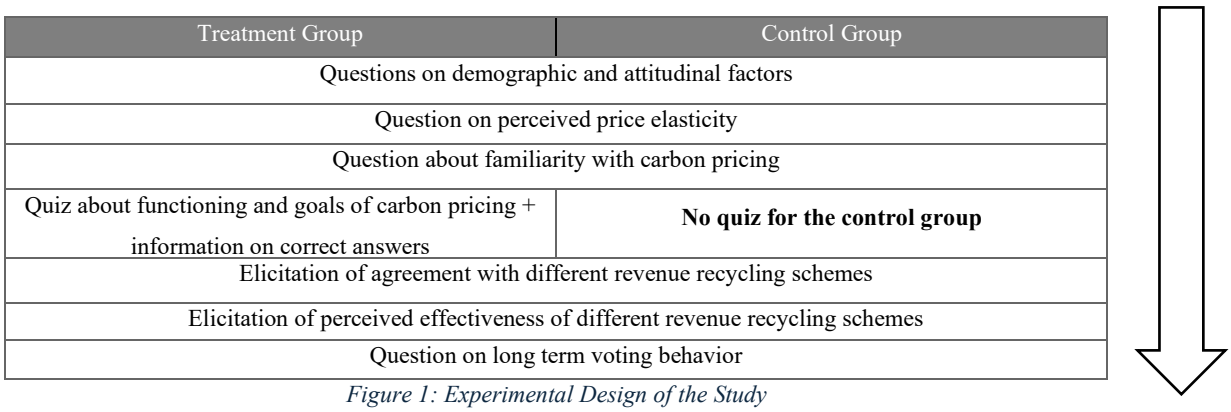


Figure 1: Experimental Design of the Study

To determine the causal effect of information provision, participants were randomly assigned to a control group (N = 2,025) and a treatment group (N = 2,015). Before the preference elicitation, the treatment group received an interactive information intervention consisting of a quiz featuring multiple-choice questions, each followed by a corrective explanation. This approach aimed to increase respondents' understanding of carbon pricing mechanisms and highlight its effectiveness, irrespective of revenue use. In contrast, the control group proceeded with the survey without receiving the information treatment. The quiz addressed three key topics about carbon pricing: its climate protection goals, the current use of revenue in Germany, and its ability to reduce CO_2 emissions by incentivizing shifts to climate-friendly alternatives: After the first question, respondents were informed that the goal of carbon pricing is to protect the climate by increasing the price of carbon-intensive products. After the second question, they received information about how the revenue collected through carbon pricing is currently used in Germany, namely, to relieve the financial burden on households by reducing levies on the electricity price and to finance climate protection measures, such as renewable energy or sustainable infrastructure, but not for direct compensation of CO2-emissions. The information provided after the third and last treatment question explained that carbon pricing reduces CO2-emissions by increasing the price of carbon-intensive products, such that consumers switch to more climate-friendly alternatives. This means that carbon pricing is effective irrespective of the use of its revenues.

Figure 1 summarizes the experimental sequence and contrasts the conditions between the treatment and control groups.

Table 1: Descriptive Statistics of Survey Sample

Variable		Mean or % in sample	(Std.D.)
Age	Age	61.5	(14.31)
Household size	People in the same household	2.06	(0.98)
Male (d)	Gender (1 if male)	0.58	-
Higher Education (d)	Education (1 if university degree or higher)	0.54	-
Income Groups			
Low-Income	Income < 1700 €	9.2 %	-
Middle-Income	Income 1700 - 3700 €	38.4 %	-
High-Income	Income > 3700 €	41.8 %	-
Missing	No income information provided/prefer not so say	10.6 %	-
Election	Long-term party preference		
CDU / CSU		23.8 %	-
SPD		19.2 %	-
AfD		6.3 %	-
FDP		4.1 %	-
Die Linke		2.8 %	-
Die Grünen		19.8 %	-
BSW		5.0 %	-
Different party	Party not included in the list	2.9 %	-
No party		11.7 %	-
Missing	No preference stated	4.4 %	-
Climate as Problem (d)	1 if climate change seen as one of the two most pressing problems	34.1 %	-
Climate Concern (d)	1 if concern about climate change for grand-/children is “rather high” or “very high”	69.2 %	-
Governmental trust (d)	1 if trust in the German government is “rather high” or “very high”	33.9 %	-
CO2 Pricing Knowledge	Self-reported knowledge: rather well (4) or very well informed (5)	15.4 %	-
Expected Price Elasticity	Estimated change in car usage in % if fuel prices rise	22.7	(19.49)
N		4,040	

Note: (d) stands for dichotomous variable. Income grouping is based on estimations by the DIW Berlin (Bönke et al., 2023, p. 288). Group thresholds were derived by rounding the estimated income distribution boundaries to the nearest predefined response category.

The survey design included a comprehensive set of questions on respondents’ socioeconomic and psychological characteristics, political attitudes, environmentally conscious behavior, and climate beliefs. In addition to the treatment indicator, these variables were incorporated as controls in the regression analysis to account for factors that may influence agreement and perceived effectiveness ratings. Demographic controls include age (modeled both linearly and quadratically to capture potential non-linear effects), male (1 if male; 0 if female), and

household size. Educational attainment is included as a binary variable, coded 1 for respondents with a university degree or higher. Monthly net household income is categorized into low, medium, and high groups, with a separate "Missing" category for non-disclosure to minimize sample loss. Political preferences are measured via self-reported long-term voting behavior (again with a separate "Missing" category), while trust in the federal government is included to capture institutional attitudes. Two climate-related belief variables are also included: whether respondents perceive climate change as a problem and whether they express concern for its impact on future generations. Participants were further asked to self-assess their familiarity with Germany's carbon pricing system, introduced in 2021. Finally, to capture perceived behavioral responsiveness, all respondents were asked to estimate how much their car usage would decrease in response to higher fuel prices. This serves as a proxy for perceived price elasticity of demand, a potential determinant of attitudes toward carbon pricing.

Table 1 presents descriptive statistics for the study sample and Table B. 1. in the Appendix compares the control group (N = 1,814) and the treatment group (N = 1,782). The balance table shows that randomization of the groups was successful. Any differences in outcomes can therefore be plausibly attributed to the information treatment rather than to pre-existing differences.

The average estimated reduction in car usage due to rising fuel prices was about 22.7%. Trust in the German government is relatively low, with 34% reporting "rather high" or "very high" trust. Climate concern is widespread: 69% expressed strong concern for the effects of climate change on future generations.

2.1 Methodology

The analysis focuses on six distinct revenue use options, measuring both agreement and perceived effectiveness using five-point Likert scales. While the dependent variables are ordinal in nature, the main analysis uses Ordinary Least Squares (OLS), controlling for a number of demographic, economic, and attitudinal covariates for ease of interpretation.

The baseline regression models are specified as follows:

$$Diff_Agree_{ik} = \gamma_{0k} + \gamma_{1k} Treated_i + \gamma_{2k} X_i + \epsilon_{ik} \quad (1)$$

$$Diff_Effect_{ik} = \delta_{0k} + \delta_{1k} Treated_i + \delta_{2k} X_i + \epsilon_{ik} \quad (2)$$

where $Diff_Agree_{ik}$ is the difference in agreement between the revenue recycling option "Green spending" and another revenue recycling option *k* for individual *i*, and $Diff_Effect_{ik}$ is the difference in expected effectiveness between the revenue recycling option "Green spending" and another revenue recycling option *k*:

$$Diff_Agree_{ik} = Agree_{Green,i} - Agree_{ik} \quad (3)$$

$$Diff_Effect_{ik} = Effect_{Green,i} - Effect_{ik} \quad (4)$$

$Treated_i$ is a binary indicator equal to 1 if the respondent received the quiz-based information treatment, and X_i is a vector of control variables. As control variables we include age, age squared, gender, whether a participant has a bachelor's degree or higher, income, household size, whether climate change is a major concern, climate and environmental concern, how knowledgeable a person is about CO2 pricing, trust in government, political party sympathies, and expected price elasticity of driving behavior stated by the participants. The error term is denoted as ϵ_{ik}. Equations (1) and (2) are estimated five times each, once for each difference between "Green spending" and any other option *k*.

These differences used as dependent variables in equations (1) and (2) capture participants' relative preferences, allowing for a deeper exploration of how green spending is prioritized compared to lump-sum repayment, reimbursing low-income households, grid charge reduction, government budget integration, and debt reduction.

Robustness checks are conducted using ordered logit models to account for the ordinal nature of the dependent variables. These models allow comparison of coefficient direction and significance across specifications. Additionally, since the price elasticity variable is only available for car owners, an alternative specification excluding this variable is estimated to test for selection bias. These additional tests reinforce the validity and reliability of the study's findings. All regressions were conducted in Stata 18.5 using robust standard errors to correct for heteroskedasticity.

3. Results

3.1 Descriptive Results

Table 2 summarizes acceptance rates for all six revenue recycling options. For this table, acceptance was coded as binary (1 if "Fully approve" or "Somewhat approve", 0 otherwise)

Table 2: Acceptance Rates for Revenue Recycling Options

	Control Group Agreement Rate		Treatment Group Agreement Rate		Difference
Revenue Use	Mean	(St.D.)	Mean	(St.D.)	
Green Spending	0.76	(0.425)	0.79	(0.406)	0.03*
Lump-sum	0.41	(0.492)	0.40	(0.489)	0.01
Reimburse Low-Income	0.41	(0.492)	0.41	(0.492)	-0.00
Grid Charge	0.69	(0.461)	0.71	(0.453)	0.02
Budget	0.12	(0.324)	0.09	(0.281)	-0.03**
Debt	0.16	(0.363)	0.09	(0.290)	-0.06**

** p<0.01, * p<0.05

and shows means across the groups. Green spending receives the highest baseline support with 76% acceptance, followed by usage for grid charge reduction at 69%. Support for lump-sum repayments and reimbursing low-income households falls in the mid-range, both have acceptance rates of 41%. Budget integration and debt reduction are rated lowest at 12% and 16%, showing a stark contrast to green spending and grid charge reduction. Similar patterns are found when looking at the expected effectiveness ratings for the six recycling options (Table B. 2). Agreement for a revenue recycling scheme and its expected effectiveness are strongly correlated (see Appendix Table B. 4). Looking at correlations across different revenue recycling schemes, there are a few pairs of revenue recycling schemes for which either agreement or perceived effectiveness are moderately strongly correlated (i.e. above 0.3). Agreement for the options "Lump-sum" and "Grid charge", as well as the options "Budget" and "Debt reduction" are positively correlated, while agreement for "Green spending" is negatively correlated with agreement for "Lump-sum". Regarding perceived effectiveness, there are positive correlations between the options "Lump-sum" and "Reimburse low-income" and between "Lump-sum" and "Grid Charge".

Comparing acceptance rates descriptively between treatment groups shows that contrary to our expectations, the treatment increased acceptance only for the green spending recycling option and decreased it for the other recycling options.

3.2 Treatment Effect Relative to Support for and Perceived Effectiveness of "Green spending"

To investigate the effect of the treatment on the support and perceived effectiveness of the recycling options relative to "Green spending", Table 3 reports the results of the regressions based on Equations (1) and (2), Table B. 5 and Table B. 6 in the Appendix show the full results. Table 3 summarizes how the information treatment affects the differences in A) agreement and

B) perceived effectiveness between different revenue recycling options, for a total of 10 models. The dependent variable in all models is the support for (or perceived effectiveness of) green spending subtracted from the support for (or perceived effectiveness of) each of the other five recycling options. Negative constants indicate that at baseline, a recycling options garners less acceptance than green spending. Any negative coefficient therefore increases this difference, and any positive coefficient mediates it.

The Table shows that, contrary to our hypotheses, support for and perceived effectiveness of all other recycling options were reduced by the information treatment, compared to the option "Green Spending", in line with the descriptive results in Table 2.

Table 3: Abridged Regression Results with Differences from Green Spending as Dep. Variable, Equations (1) and (2)

			(A) Difference in Agreement for Revenue Use		(B) Difference in Perceived Effectiveness of Revenue Use	
Model	Revenue Use minus Green Spending		Coeff.	(St.E.)	Coeff.	(St.E.)
(1)	Lump-sum – Green Spending	Treatment Effect	**-0.190****	(0.063)	-0.118	(0.062)
		Constant	-0.322	(0.511)	-0.714	(0.512)
		N	3,746		3,716	
(2)	Reimburse Low-Income – Green Spending	Treatment Effect	**-0.167****	(0.052)	-0.091	(0.053)
		Constant	-1.268**	(0.405)	-1.299**	(0.417)
		N	3,757		3,733	
(3)	Grid Charge – Green Spending	Treatment Effect	-0.065	(0.047)	0.020	(0.051)
		Constant	0.158	(0.381)	0.403	(0.428)
		N	3,767		3,740	
(4)	Budget – Green Spending	Treatment Effect	**-0.313****	(0.047)	**-0.239****	(0.045)
		Constant	-0.382	(0.385)	-0.988**	(0.375)
		N	3,773		3,735	
(5)	Debt reduction – Green Spending	Treatment Effect	**-0.394****	(0.050)	**-0.308****	(0.046)
		Constant	-0.533	(0.390)	-0.943*	(0.394)
		N	3,783		3,736	

Note: ** p<0.01, * p<0.05

Support for the other revenue recycling options were already lower in the control group. Due to the info treatment, the differences in support were amplified by between 8.4%[3] (Reimburse Low-income, β = -0.167) and 20.2% (Debt reduction, β = -0.394). The differences are statistically significant for all revenue recycling options except Grid Charge. The difference between expected effectiveness of the other revenue recycling options and Green Spending was likewise further increased by the treatment, the differences are statistically significant for the options Budget, with 10.8% (β = -0.239), and Debt Reduction, with 13.9% (β = -0.308).

3.3 Treatment Effect Interaction with Explanatory Variables of Interest

To capture potential moderating effects, interaction terms are introduced into the regression model. We investigate potential moderating effects on the treatment of first and foremost the expected fuel price elasticity, but also of education, income, and self-perceived CO_2 pricing knowledge. The regression equation for this analysis is specified as follows:

$$Diff_Agree_{ij} = \beta_{0j} + \beta_{1j} Treated_i + \beta_{2j} X_i + \beta_{3j} (Treated_i \times Het_i) + \epsilon_{ij}. \qquad (4)$$

where $Diff_Agree_{ij}$ is the difference in agreement between revenue recycling option j and revenue option Green Spending. The interaction term $Treated_i \times Het_i$ captures whether the effect of the information treatment varies across different subgroups of the variables included in Het_i, i.e. expected fuel price elasticity, education, income, and CO_2 pricing knowledge.

The expected price elasticity may interact with the treatment in different ways. Those with a higher expected elasticity may already place less importance on revenue use because they expect the price-based instrument to be effective, and therefore there may not be a strong impact of our treatment on their preference for revenue recycling. Those with low expected elasticity may therefore be more susceptible to the treatment. On the other hand, those with a high price elasticity may be able to better understand the price-based instrument, and therefore have an easier time understanding the treatment information. In this case, the treatment would instead correlate with high price elasticity rather than a low one.

Interacting price elasticity with the treatment in our models yields the results presented in Table 4 using the difference in agreement to the green spending option as dependent variable. We split the expected elasticity variable into four roughly equally sized groups based on quartiles and included them as dummies in the regression, with the group "Price elasticity between 10%

[3] The percentage change is calculated as follows: $\% = \left(\frac{\beta_{1j}}{Mean\ Outcome\ of\ Controlgroup_j}\right) \times 100$

and 20%" as the reference category. We created groups instead of using the continuous variable to decrease the influence of outliers, and so non-linear effects of the variable would be more visible.

Table 4: Interacting Price Elasticity with Treatment (Effect on Differences in Agreement)

VARIABLES	(1) Lumpsum – Green Spanding	(2) Low-Income – Green Spending	(3 Grid Charge – Green Spending	(4) Budget – Green Spending	(5) Debt – Green Spending
Treatment effect (on reference group)	**-0.272****	**-0.173***	-0.040	**-0.299****	**-0.391****
	(0.097)	(0.081)	(0.071)	(0.070)	(0.073)
Price elasticity					
… below 10%	**-0.399****	**-0.328****	**-0.301****	**-0.232***	**-0.333****
	(0.135)	(0.123)	(0.098)	(0.105)	(0.113)
.. betw. 10% and 20 %			(reference group)		
	-	-	-	-	
… betw. 20% and 30%	-0.085	-0.039	0.067	-0.032	-0.124
	(0.172)	(0.151)	(0.120)	(0.137)	(0.148)
.. above 30%	**-0.399****	**-0.328****	**-0.301****	**-0.232***	**-0.333****
	(0.135)	(0.123)	(0.098)	(0.105)	(0.113)
Additional treatment effect for those with expected elasticity…					
… below 10%	**0.259***	0.048	-0.015	0.046	0.065
	(0.113)	(0.095)	(0.087)	(0.080)	(0.084)
.. betw´. 10% and 20 %			(reference group)		
	-	-	-	-	
… betw. 20% and 30%	-0.087	-0.151	-0.196	-0.209	-0.085
	(0.187)	(0.154)	(0.127)	(0.142)	(0.151)
.. above 30%	0.019	0.051	0.038	-0.001	-0.069
	(0.165)	(0.139)	(0.120)	(0.125)	(0.131)
Constant	-0.782	-1.599**	-0.113	-0.746	-0.991*
	(0.519)	(0.408)	(0.386)	(0.386)	(0.387)
Observations	3,746	3,757	3,767	3,773	3,783
Adjusted R-squared	0.177	0.078	0.250	0.116	0.176

** p<0.01, * p<0.05

For people who stated a very low and a very high expected elasticity, their support for other recycling options is even lower than that for the option of green spending, as can be deduced

from statistically significant coefficients in Table 4. The information treatment, however, seems to have had almost no significant interaction with expected price elasticity when looking at both agreement and perceived effectiveness results. One exception is that the treatment reduced the difference between agreement for Lump Sum Payments and Green Spending, for those who expect an elasticity of 10% or lower.

Running these regression with differences in perceived effectiveness as dependent variable leads to results with similar patterns (see Appendix, see Appendix Table B. 7).

Results for interacting the treatment dummy with self-reported CO_2 pricing knowledge, income level, and educational attainment are presented in the Appendix (

Table B. 8 - Table B. 13). While in the main models CO2 pricing knowledge is used as a binary dummy, here we look at it in more granular categories, with the reference category being “not informed at all”. Reference category for income is “middle income”. We found no interaction effects, neither with acceptance nor with perceived effectiveness as dependent variable.

3.4 Robustness Tests

To assess the reliability of the main results, a series of robustness checks were conducted. These checks address three central concerns: the appropriateness of the estimation strategy for ordinal outcome variables, the potential selection bias introduced by a control variable available only for a subsample, and concerns about whether participants read and processed the information treatment.

First, while the primary models employ OLS regression, which is commonly used in applied social science research involving Likert-scale outcomes (Norman, 2010; Skrondal & Rabe-Hesketh, 2004), ordered logit models were estimated as a robustness check to account for the ordinal nature of the dependent variables. The results of the ordered logit models, presented in

Table B. 14 in the Appendix, confirm the direction and statistical significance of the treatment effects across both agreement and perceived effectiveness measures. These findings indicate that the core results are not sensitive to the choice of estimation method.

Second, to test whether the inclusion of a control variable available only for a subset of the sample affects the results, the models were re-estimated without the variable capturing perceived price elasticity of car usage (see Appendix, Table B. 15). Because this variable is only observed for car owners, its inclusion may introduce selection bias. However, the exclusion of this variable does not alter the main findings, suggesting that the treatment effects are robust to this aspect of sample composition.

Third, since the information treatment did not have the hypothesized effects, we also looked at how long participants spent on the survey page where the true quiz results were presented. This is the spot where they were informed that it did not matter much how the tax revenue was used for the tax to unfold its intended effects. We therefore ran regressions only with the subset of participants who spent more than 4 seconds on this page, which is enough to glean this most important part of the information. We again used the difference between support for or perceived effectiveness of "Green spending" and each other recycling option as dependent variables. The results indicate even stronger treatment effects in the same direction (see Appendix, Table B. 16). This means that, for those participants for which it can be reasonably assumed that they absorbed the critical information, the "Green spending" option gained even more strongly in popularity.

4. Discussion and Conclusion

This study examined how information provision affects public support for different carbon tax revenue recycling options in Germany. Using a randomized controlled trial embedded in a survey of a general population sample, it tested whether an interactive quiz about carbon pricing could shift attitudes regarding six specific revenue uses. Despite providing a treatment that informed participants that carbon pricing mechanisms work regardless of how revenues are used, contrary to our hypothesis, support for and perceived effectiveness of the "Green spending" recycling option increased significantly in relation to most other recycling schemes. This effect adds to the findings already established in the literature, that "green" revenue recycling tends to be most popular with the public. On the other hand, the treatment reduced

support for less transparent fiscal applications such as general budget integration and debt reduction.

The specific language used in the treatment focused on the climate change mitigation aspects of carbon taxes, which may partly explain why “Green spending” revenue recycling options received even more support as this called additional attention to these issues. When we test our results with a subset of participants who we can reasonably assume read the quiz solution – that carbon pricing is effective regardless of revenue recycling – we get the same results. It may well be that the more people are encouraged to think about the carbon tax and its purpose, the more they will care about its environmental impact. This explanation is in line with Woerner et al. (2024). In their experiment, participants decided whether to buy carbon-intensive products first at a low and then at a high product price without knowing that the high price included a carbon price. Participants were then informed about the carbon price and various revenue recycling schemes and voted separately for each scheme on whether the situation should be implemented with or without the carbon price. In this scenario, the "climate premium" – a fixed per capita repayment – received the most support. By contrast, when ranking the different recycling schemes, green spending was the most popular among the same respondents. This may be because individuals were implicitly primed in their purchase decisions to think about the monetary value they would receive from each decision, and thus preferred recycling schemes that gave them more monetary value (see Stajkovic et al., 2022 and Vohs, 2015 on the effects of money priming). In contrast, the ranking of different recycling schemes gives more weight to environmental concerns, such that the "double dividend" option is preferred. Because respondents in our experiment evaluated all revenue recycling options on the same screen, our experiment is more similar to the ranking task in Woerner et al. (2024).

As carbon taxation remains a central pillar of climate policy, understanding how to build broad and enduring public support remains both a theoretical challenge and a practical priority. This study shows that while information matters, so does the way it is framed – and the audience it is designed to reach.

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Appendix A – Wording of the Survey

Political Trust and Climate Attitudes

Question PK1: How much do you trust the German government?

- Not at all
- A little
- Quite a bit
- Very much
- Don't know
- No response

Question PK2:

It worries me when I think about the environmental conditions our children and grandchildren will probably have to live in.

- Do not agree at all
- Rather disagree
- Neither agree nor disagree
- Tend to agree
- Agree completely
- Don't know
- No response

Question Climate3:

In your opinion, what are the two most important problems currently facing Germany?

- Economic situation
- Immigration
- Health
- Environment and climate change
- Unemployment
- Rising prices/inflation/cost of living
- Terrorism
- Crime
- Pensions

- Taxes
- Energy supply
- International security situation
- Other
- Don't know
- No response

Knowledge and Price Elasticity

Question C3:

The CO_2 price was introduced in Germany on 1 January 2021. How well informed do you feel about this?

- Not informed at all
- Rather poorly informed
- Neither well nor poorly informed
- Rather well informed
- Very well informed
- Don't know
- No response

Questions CP0:

Prices for diesel and petrol are subject to strong fluctuations in some cases. For example, prices have risen sharply as a result of Russia's attack on Ukraine: from an average of EUR 1.52 for a litre of Super E10 in 2021 to EUR 1.86 in 2022. Please use the slider to indicate the percentage by which you estimate the average reduction in car use by drivers as a result of such a price increase.

- Slider from "no reduction in car use (0 %)" to "halving of car use (reduction by 50 %)" to "no car use (reduction by 100 %)", 5 % increments
- No specification

Information intervention and questions on agreement and perceived effectiveness

Question C4:

In your opinion, which of the following statements apply to the CO2 price? You can select one or more answers.

- The CO2 price makes some activities that emit CO2 more expensive.
- One aim of the CO2 price is to protect the climate.
- One aim of the CO2 price is to solve environmental problems such as the pollution of the oceans by plastic waste or the extinction of species.
- One aim of the CO2 Prize is to reduce traffic jams and improve air quality in cities.
- One aim of the carbon price is to generate higher tax revenues.
- Don't know
- No response

Correct Answer:

The aim of the CO2 price is to protect the climate. To this end, the carbon price makes products whose production or use emits CO2 more expensive. For example, petrol, diesel and LPG, and therefore driving, become more expensive, while the use of climate-friendly means of transport does not become more expensive.

Question C4_1:

In your opinion, which of the following statements apply to the CO2 price? You can select one or more answers.

- The CO2 price offsets the CO2 emissions emitted, i.e. CO2 emissions of the same amount are saved elsewhere.
- The revenue generated by the CO2 price is used to finance climate protection measures.
- The revenue generated by the CO2 price is used to relieve the financial burden on consumers.
- Don't know
- No response

Correct Answer:

The revenue generated by the carbon price is used, among other things, to relieve the financial burden on citizens, for example by reducing the price of electricity (abolition of the EEG levy).

They are also used to finance climate protection measures, such as the expansion of renewable energies or investments in sustainable transport infrastructure. There is no direct compensation for CO2 emissions.

Question C4_2:

In your opinion, which of the following statements apply to the CO2 price? You can select one or more answers.

- For the carbon price to be effective, the revenue must be used for climate protection measures.
- The CO2 price works by making CO2-intensive products more expensive and therefore less purchased.
- The carbon price makes products that cause low CO2 emissions more favourable compared to products with high CO2 emissions.
- The CO2 price is intended to ensure that less CO2 is emitted.
- Don't know
- No response

Correct Answer:

The CO2 price can have a favourable effect simply by increasing the price of climate-damaging products. It does not matter what the revenue is used for.

The carbon price makes climate-friendly activities and products more favourable compared to climate-damaging alternatives. This is intended to steer people's behaviour away from climate-damaging and towards climate-friendly behaviour, thereby reducing CO2-emissions are reduced. For example, the aim is to encourage more frequent use of climate-friendly modes of transport such as buses, trains and bicycles instead of cars.

Question C2:

We have now compiled a series of proposals on how the additional revenue generated by the German government through carbon pricing could be used. Please indicate the extent to which you agree with the following measures.

Scale:

- Do not agree at all (1)
- Rather disagree (2)
- Neither (3)
- Tend to agree (4)
- Agree completely (5)
- Don't know
- No response

Items:

The revenue from CO2 pricing should ...

1. ... be used for the expansion of renewable energies (e.g. wind, solar and hydropower) or climate-friendly transport systems (e.g. cycle paths and local public transport).
2. ... be used for an annual repayment to all citizens in the same amount.
3. ... be used to support low-income households.
4. ... be used to reduce electricity prices by lowering grid fees.
5. ... flow into the national budget.
6. ... be used to reduce national debt.

Question CP1:

Below you can see once again the proposals just mentioned as to what the revenue from carbon pricing could be used for. Please tick the extent to which you agree that a carbon price in combination with the respective use of the revenue would help to reduce the consumption of fossil fuels and the emission of greenhouse gases.

Scale:

- Do not agree at all (1)
- Rather disagree (2)
- Neither (3)
- Tend to agree (4)
- Agree completely (5)
- Don't know
- No response

Items:

1. Investment of the revenue in the expansion of renewable energies or climate-friendly transport systems
2. Utilisation for an annual repayment to all citizens in the same amount
3. Use the revenue to support low-income households
4. Use of the revenue to reduce electricity prices
5. Use of the revenue for the national budget
6. Use of revenue to reduce public debt

Appendix B – Tables

Table B. 1: Balance Table Control vs. Treatment Group

	Control Group (N = 1,814)				Treatment Group (N = 1,782)				
Variable	Mean	Std.D.	Min	Max	Mean	Std.D.	Min	Max	P-Value
Age	61.2	14.27	22	91	61.2	14.11	22	90	0.996
Household size	2.08	0.98	1	7	2.1	1.02	1	8	0.677
Price Elasticity (%)	22.7	19.48	0	100	22.6	19.35	0	100	0.915
Male (d)	0.60	-	0	1	0.58	-	0	1	0.292
Higher Education (d)	0.55	-	0	1	0.56	-	0	1	0.464
Candidate Problem (d)	0.34	-	0	1	0.35	-	0	1	0.914
Governmental trust (d)	0.36	-	0	1	0.33	-	0	1	0.107
Climate Concern (d)	0.70	-	0	1	0.69	-	0	1	0.519
CO2 Pricing Knowledge	2.54	0.90	1	5	2.54	0.90	1	5	0.901
Income Groups									0.961
Low-Income	7.8 %	-	-	-	9.2 %	-	-	-	
Middle-Income	39.5 %	-	-	-	37.3 %	-	-	-	
High-Income	43.7 %	-	-	-	43.9 %	-	-	-	
Missing	9.0 %	-	-	-	9.7 %	-	-	-	
Election									0.592
CDU / CSU	23.4 %	-	-	-	25.2 %	-	-	-	
SPD	19.3 %	-	-	-	19.5 %	-	-	-	
AfD	6.4 %	-	-	-	5.9 %	-	-	-	
FDP	4.4 %	-	-	-	4.0 %	-	-	-	
Die Linke	3.3 %	-	-	-	2.5 %	-	-	-	
Die Grünen	20.4 %	-	-	-	19.9 %	-	-	-	
BSW	5.2%	-	-	-	4.9 %	-	-	-	
Different party	3.1%	-	-	-	3.0 %	-	-	-	
No party	11.6 %	-	-	-	11.5 %	-	-	-	
Missing	3.1 %	-	-	-	3.6 %	-	-	-	

Note: (d) stands for dichotomous variable

Table B. 2: Distribution of Agreement and Perceived Effectiveness Outcome Variables

	Control Group (N = 1,988)		Treatment Group (N = 1,961)		Diff.	
Variable	Mean	Std.D.	Mean	Std.D.	T-values, sign.	Information
Agreement for…						
Green spending	3.960	(1.244)	4.086	(1.139)	-3.317**	Expanding renewable energy or climate-friendly transportation systems
Lump-sum repayment	2.989	(1.428)	2.956	(1.435)	0.709	Providing annual lump-sum repayments to all citizens
Reimburse Low-income	2.970	(1.343)	2.941	(1.360)	0.662	Supporting low-income households
Grid charge	3.740	(1.174)	3.825	(1.134)	-2.304*	Reducing electricity prices by lowering grid charges
Budget	1.905	(1.092)	1.740	(0.995)	4.936**	Integrating revenues into the overall government budget
Debt reduction	2.004	(1.204)	1.754	(1.061)	6.915**	Reducing government debt
Perceived Effectiveness of…						
Green spending	3.968	(1.190)	4.086	(1.090)	-3.243**	Expanding renewable energy or climate-friendly transportation systems
Lump-sum repayment	2.710	(1.443)	2.727	(1.430)	-0.365	Providing annual lump-sum repayments to all citizens
Reimburse Low-income	2.600	(1.329)	2.642	(1.360)	-0.968	Supporting low-income households
Grid charge	3.320	(1.333)	3.468	(1.306)	-3.492**	Reducing electricity prices by lowering grid charges
Budget	1.745	(1.012)	1.635	(0.952)	3.487**	Integrating revenues into the overall government budget
Debt reduction	1.752	(1.080)	1.577	(0.940)	5.391**	Reducing government debt

** p<0.01, * p<0.05

Table B. 3: Distribution of Difference to Green Spending Outcome Variables

	Control Group		Treatment Group		Difference t-test
Variable	Mean	Std.D.	Mean	Std.D.	t-value, sign.
Relative Agreement to Green Spending:					
Lump-sum repayment	-0.967	(2.143)	-1.140	(2.081)	2.556*
Reimburse Low-income	-1.986	(1.648)	-1.150	(1.663)	3.0882**
Grid charge	-0.221	(1.680)	-0.260	(1.636)	0.724
Budget	-2.044	(1.563)	-2.346	(1.466)	6.232**
Debt reduction	-1.951	(1.740)	-2.333	(1.575)	7.2045**
Relative Effectiveness to Green Spending:					
Lump-sum repayment	-1.259	(2.883)	-1.364	(2.016)	1.588
Reimburse Low-income	-1.370	(1.701)	-1.451	(1.690)	1.469
Grid charge	-0.652	(1.833)	-0.622	(1.765)	-0.517
Budget	-2.221	(1.485)	-2.452	(1.430)	4.908**
Debt reduction	-2.217	(1.611)	-2.512	(1.461)	5.978**

** p<0.01, * p<0.05

Table B. 4: Spearman Correlation Matrix

Variables		Agreement						Perceived Effectiveness					
		Green Spending	Lump-sum	Low-income	Grid Charge	Budget	Debt	Green Spending	Lump-sum	Low-income	Grid Charge	Budget	Debt
Agreement	Green Spending	1											
	Lump-sum	**-0.31***	1										
	Low-income	**0.12***	**0.14***	1									
	Grid Charge	-0.03	**0.24***	**0.07***	1								
	Budget	**0.05***	**-0.04***	**0.12***	**-0.06***	1							
	Debt	**-0.04***	0.02	**0.07***	0.02	**0.56***	1						
Perceived	Green Spending	**0.71***	**-0.29***	**0.12***	**-0.06***	**0.06***	**-0.04***	1					
	Lump-sum	**-0.28***	**0.76***	**0.16***	**0.20***	**0.03***	**0.05***	**-0.28***	1				
	Low-income	0.03	**0.20***	**0.74***	**0.20***	**0.14***	**0.09***	0.03	**0.35***	1			
	Grid Charge	**-0.09***	**0.25***	**0.09***	**0.60***	-0.02	0.03	**-0.10***	**0.39***	**0.28***	1		
	Budget	0.01	0.02	**0.11***	-0.03	**0.68***	**0.52***	-0.01	**0.14***	**0.23***	**0.07***	1	
	Debt	**-0.06***	**0.07***	**0.08***	0.02	**0.52***	**0.67***	**-0.09***	**0.19***	**0.22***	**0.13***	**0.71***	1

Note: Stars indicate a significance level at 5%.

Table B. 5: Full Results Agreement Differences from Green Spending

VARIABLES	(1) Lump-sum Diff	(2) Low-Income Diff	(3) Grid Charge Diff	(4) Budget Diff	(5) Debt Diff
Treatment Effect	-0.190**	-0.167**	-0.065	-0.313**	-0.394**
	(0.063)	(0.052)	(0.047)	(0.047)	(0.050)
Age	0.010	0.016	0.014	-0.032*	-0.017
	(0.017)	(0.013)	(0.012)	(0.013)	(0.013)
Age_squared	-0.000	-0.000	-0.000	0.000*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male (d)	0.324**	0.321**	0.071	-0.002	0.027
	(0.065)	(0.055)	(0.048)	(0.048)	(0.051)
Higher	-0.277**	-0.078	-0.171**	-0.026	-0.105
Education (d)	(0.070)	(0.058)	(0.052)	(0.052)	(0.055)
Income Groups					
Low-Income	-0.122	-0.519**	-0.154	-0.102	-0.081
	(0.110)	(0.097)	(0.082)	(0.085)	(0.089)
High-Income	-0.269*	-0.695**	-0.272**	0.028	0.017
	(0.121)	(0.105)	(0.089)	(0.092)	(0.095)
Missing	0.053	-0.602**	-0.127	0.073	0.111
	(0.149)	(0.129)	(0.111)	(0.112)	(0.120)
Household size	0.016	0.018	0.047	0.000	0.024
	(0.039)	(0.033)	(0.029)	(0.028)	(0.029)
Climate	-0.364**	-0.003	-0.488**	-0.248**	-0.358**
concern (d)	(0.071)	(0.062)	(0.054)	(0.054)	(0.055)
Environmental	-0.679**	-0.245**	-0.590**	-0.569**	-0.662**
concern (d)	(0.080)	(0.066)	(0.059)	(0.059)	(0.064)
CO2 Pricing Knowledge (d)	0.167	0.092	0.064	0.017	0.029
	(0.090)	(0.072)	(0.067)	(0.068)	(0.071)
Trust in government (d)	-0.532**	-0.194**	-0.480**	-0.056	-0.201**
	(0.073)	(0.059)	(0.055)	(0.056)	(0.057)
Election					
SPD	-0.077	0.257**	-0.120	-0.083	-0.229**
	(0.101)	(0.084)	(0.074)	(0.076)	(0.079)
AfD	1.345**	0.902**	0.993**	0.795**	0.931**
	(0.162)	(0.139)	(0.126)	(0.128)	(0.144)
FDP	0.150	-0.022	0.199	0.197	0.361*
	(0.182)	(0.145)	(0.136)	(0.147)	(0.167)
Die Linke	-0.054	0.521**	-0.155	-0.313*	-0.447**
	(0.178)	(0.168)	(0.135)	(0.131)	(0.130)
Die Grünen	-0.268*	0.302**	-0.476**	-0.234**	-0.396**
	(0.105)	(0.088)	(0.078)	(0.079)	(0.080)
BSW	0.676**	0.624**	0.216	0.094	-0.052
	(0.169)	(0.145)	(0.123)	(0.117)	(0.130)
Different Party	0.023	0.485**	-0.112	-0.059	-0.186
	(0.207)	(0.167)	(0.153)	(0.150)	(0.152)
No Party	0.277*	0.330**	0.004	0.031	-0.046
	(0.123)	(0.099)	(0.089)	(0.087)	(0.093)
Missing	0.250	0.387**	0.092	0.280*	0.223
	(0.179)	(0.150)	(0.133)	(0.142)	(0.159)
Price elasticity					
… between 0% and 10%	-0.326*	-0.314**	-0.304**	-0.218*	-0.315**
	(0.132)	(0.121)	(0.095)	(0.103)	(0.111)
… betw. 20% and 30%	0.022	-0.021	-0.045	0.041	-0.038
	(0.140)	(0.127)	(0.100)	(0.110)	(0.118)
.. above 30%	-0.326*	-0.314**	-0.304**	-0.218*	-0.315**
	(0.132)	(0.121)	(0.095)	(0.103)	(0.111)
Constant	-0.322	-1.268**	0.158	-0.382	-0.533
	(0.511)	(0.405)	(0.381)	(0.385)	(0.390)
Observations	3,746	3,757	3,767	3,773	3,783
Adj. R-squared	0.175	0.077	0.249	0.110	0.170

** p<0.01, * p<0.05

Table B. 6: Full Perceived Effectiveness Differences from Green Spending by Revenue Use

VARIABLES	(1) Lump-sum Diff	(2) Low-Income Diff	(3) Grid Charge Diff	(4) Budget Diff	(5) Debt Diff
Treatment Effect	-0.118	-0.091	0.020	-0.239**	-0.308**
	(0.062)	(0.053)	(0.051)	(0.045)	(0.046)
Age	0.012	0.006	-0.009	-0.017	-0.019
	(0.016)	(0.014)	(0.014)	(0.012)	(0.013)
Age_squared	-0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male (d)	0.176**	0.216**	-0.052	-0.075	-0.024
	(0.064)	(0.056)	(0.054)	(0.046)	(0.048)
Higher	-0.292**	-0.207**	-0.330**	-0.075	-0.151**
Education (d)	(0.068)	(0.058)	(0.056)	(0.049)	(0.050)
Income Groups					
Low-Income	0.023	-0.252*	0.069	-0.050	0.012
	(0.111)	(0.099)	(0.092)	(0.086)	(0.084)
High-Income	-0.199	-0.507**	-0.151	-0.037	-0.006
	(0.120)	(0.107)	(0.100)	(0.091)	(0.089)
Missing	0.161	-0.341**	0.062	0.187	0.198
	(0.146)	(0.129)	(0.119)	(0.111)	(0.112)
Household size	0.026	-0.001	0.040	-0.002	0.024
	(0.039)	(0.033)	(0.033)	(0.027)	(0.028)
Climate	-0.362**	-0.143*	-0.578**	-0.244**	-0.304**
concern (d)	(0.071)	(0.063)	(0.062)	(0.052)	(0.053)
Environmental	-0.617**	-0.202**	-0.473**	-0.493**	-0.508**
concern (d)	(0.077)	(0.065)	(0.063)	(0.056)	(0.058)
CO2 Pricing Knowledge (d)	0.121	0.036	-0.044	-0.062	-0.058
	(0.089)	(0.074)	(0.074)	(0.064)	(0.066)
Trust in government (d)	-0.464**	-0.249**	-0.475**	-0.129*	-0.227**
	(0.071)	(0.062)	(0.062)	(0.053)	(0.054)
Election					
SPD	-0.059	0.225**	-0.032	-0.067	-0.179*
	(0.096)	(0.085)	(0.081)	(0.072)	(0.073)
AfD	1.380**	0.995**	1.105**	1.009**	1.063**
	(0.157)	(0.134)	(0.135)	(0.119)	(0.128)
FDP	-0.006	-0.152	0.072	0.155	0.200
	(0.175)	(0.141)	(0.135)	(0.147)	(0.153)
Die Linke	-0.055	0.489**	-0.011	-0.308*	-0.379**
	(0.195)	(0.183)	(0.159)	(0.129)	(0.127)
Die Grünen	-0.159	0.199*	-0.400**	-0.200**	-0.293**
	(0.102)	(0.089)	(0.088)	(0.073)	(0.075)
BSW	0.628**	0.455**	0.251	0.101	0.112
	(0.174)	(0.142)	(0.140)	(0.124)	(0.130)
Different Party	-0.078	0.223	-0.169	-0.083	-0.231
	(0.201)	(0.181)	(0.166)	(0.148)	(0.145)
No Party	0.344**	0.301**	0.059	0.044	0.006
	(0.117)	(0.098)	(0.093)	(0.081)	(0.085)
Missing	0.417*	0.464**	0.254	0.092	0.165
	(0.176)	(0.148)	(0.137)	(0.128)	(0.137)
Price elasticity					
… between 0% and 10%	-0.646**	-0.437**	-0.626**	-0.324**	-0.377**
	(0.135)	(0.121)	(0.105)	(0.100)	(0.108)
… betw. 20% and 30%	-0.444**	-0.270*	-0.308**	-0.320**	-0.313**
	(0.149)	(0.131)	(0.115)	(0.109)	(0.119)
.. above 30%	-0.173	0.073	-0.104	-0.009	-0.056
	(0.143)	(0.127)	(0.110)	(0.107)	(0.115)
Constant	-0.714	-1.299**	0.403	-0.988**	-0.943*
	(0.512)	(0.417)	(0.428)	(0.375)	(0.394)
Observations	3,716	3,733	3,740	3,735	3,736
Adj. R-squared	0.173	0.105	0.248	0.128	0.167

** p<0.01, * p<0.05

Table B. 7: Interacting Price Elasticity with Treatment (Effect on Perceived Effectiveness)

VARIABLES	(1) Lumpsum – Green Spanding	(2) Low-Income – Green Spending	(3 Grid Charge – Green Spending	(4) Budget – Green Spending	(5) Debt – Green Spending
Treatment effect (on reference group)	-0.052	-0.050	0.117	-0.178**	-0.237**
	(0.096)	(0.084)	(0.081)	(0.069)	(0.069)
Price elasticity					
… between 0% and 10%	-0.659**	-0.428**	-0.599**	-0.318**	-0.383**
	(0.139)	(0.124)	(0.108)	(0.102)	(0.110)
… betw. 10% and 20%			(reference group)		
… betw. 20% and 30%	-0.317	-0.202	-0.168	-0.265*	-0.180
	(0.174)	(0.149)	(0.139)	(0.126)	(0.141)
.. above 30%	-0.074	0.089	-0.057	0.078	0.034
	(0.165)	(0.144)	(0.129)	(0.122)	(0.133)
	0.710**	0.572**	0.567**	0.452**	0.460**
	(0.121)	(0.105)	(0.102)	(0.092)	(0.097)
Treated X expected elasticity…					
… between 0% and 10%	0.036	-0.039	-0.107	-0.027	0.014
	(0.109)	(0.096)	(0.094)	(0.078)	(0.078)
… betw. 10% and 20%			(reference group)		
… betw. 20% and 30%	-0.263	-0.142	-0.289*	-0.115	-0.274*
	(0.181)	(0.152)	(0.146)	(0.130)	(0.136)
.. above 30%	0.036	-0.039	-0.107	-0.027	0.014
	(0.109)	(0.096)	(0.094)	(0.078)	(0.078)
Constant	-0.753	-1.321**	0.350	-1.022**	-0.986*
	(0.512)	(0.417)	(0.428)	(0.375)	(0.394)
Observations	3,716	3,733	3,740	3,735	3,736
Adjusted R-squared	0.173	0.104	0.248	0.128	0.168

** p<0.01, * p<0.05

Table B. 8: Heterogeneity - results when interacting treatment with categories of knowledge about CO2 pricing, dep. var is diff. in agreement to green spending

AGREEMENT	(1)		(2)		(3)		(4)		(5)	
VARIABLES	Lumpsum – Green Spanding		Low-Income – Green Spending		Grid Charge – Green Spending		Budget – Green Spending		Debt – Green Spending	
Treatment effect	-0.392	(0.238)	-0.156	(0.202)	-0.255	(0.180)	-0.417*	(0.164)	-0.470*	(0.185)
CO2 pricing knowledge										
… rather poor	-0.481*	(0.191)	-0.259	(0.154)	-0.304*	(0.138)	0.008	(0.133)	-0.026	(0.152)
… neither poor nor good	-0.571**	(0.195)	-0.253	(0.158)	-0.447**	(0.142)	-0.010	(0.137)	-0.035	(0.156)
… rather well informed	-0.485*	(0.216)	-0.265	(0.172)	-0.371*	(0.157)	-0.125	(0.152)	-0.136	(0.172)
.. very well informed	-0.016	(0.424)	0.432	(0.404)	-0.174	(0.247)	0.171	(0.387)	0.283	(0.355)
CO2 knowledge X treated										
… rather poor	0.159	(0.255)	-0.093	(0.216)	0.186	(0.192)	0.040	(0.178)	0.011	(0.198)
… neither poor nor good	0.199	(0.261)	0.047	(0.221)	0.176	(0.198)	0.129	(0.184)	0.096	(0.205)
… rather well informed	0.412	(0.291)	0.120	(0.241)	0.330	(0.221)	0.323	(0.208)	0.266	(0.229)
.. very well informed	0.700	(0.597)	-0.263	(0.499)	0.492	(0.397)	0.156	(0.504)	-0.016	(0.485)
Constant	0.109	(0.531)	-1.089*	(0.428)	0.447	(0.399)	-0.384	(0.400)	-0.516	(0.408)
Covariates	Yes		Yes		Yes		Yes		Yes	
Observations	3,728		3,739		3,748		3,757		3,765	
Adjusted R-squared	0.179		0.080		0.252		0.109		0.171	

** p<0.01, * p<0.05

Table B. 9: Heterogeneity - results when interacting treatment with categories of knowledge about CO2 pricing, dep. var is diff. in expected effectiveness to green spending

EFFECTIVENESS	(1)		(2)		(3)		(4)		(5)	
VARIABLES	Lumpsum – Green Spanding		Low-Income – Green Spending		Grid Charge – Green Spending		Budget – Green Spending		Debt – Green Spending	
Treatment Effect	-0.322	(0.235)	-0.121	(0.198)	0.036	(0.188)	-0.186	(0.160)	-0.338*	(0.159)
CO2 pricing knowledge										
… rather poor	-0.561**	(0.183)	-0.296	(0.155)	-0.251	(0.148)	-0.046	(0.121)	-0.151	(0.130)
… neither poor nor good	-0.594**	(0.188)	-0.252	(0.161)	-0.335*	(0.153)	-0.050	(0.126)	-0.067	(0.135)
… rather well informed	-0.557**	(0.209)	-0.326	(0.175)	-0.429*	(0.171)	-0.229	(0.138)	-0.305*	(0.149)
.. very well informed	0.020	(0.397)	0.545	(0.388)	0.024	(0.320)	0.120	(0.365)	0.194	(0.343)
CO2 knowledge X treated										
… rather poor	0.157	(0.251)	-0.036	(0.212)	-0.022	(0.202)	-0.139	(0.173)	-0.025	(0.173)
… neither poor nor good	0.237	(0.258)	0.112	(0.220)	-0.095	(0.210)	-0.026	(0.179)	0.036	(0.180)
… rather well informed	0.345	(0.287)	0.146	(0.242)	0.144	(0.234)	0.093	(0.200)	0.201	(0.201)
.. very well informed	0.701	(0.620)	-0.564	(0.500)	-0.005	(0.484)	0.217	(0.476)	0.120	(0.448)
Constant	-0.251	(0.537)	-1.075*	(0.438)	0.630	(0.444)	-0.992*	(0.387)	-0.851*	(0.408)
Covariates	Yes		Yes		Yes		Yes		Yes	
Observations	3,699		3,713		3,720		3,716		3,719	
Adjusted R-squared	0.177		0.107		0.248		0.128		0.167	

** p<0.01, * p<0.05

Table B. 10: Heterogeneity - results when interacting treatment with income categories, dep. var is diff. in agreement to green spending

AGREEMENT	(1)		(2)		(3)		(4)		(5)	
VARIABLES	Lumpsum – Green Spanding		Low-Income – Green Spending		Grid Charge – Green Spending		Budget – Green Spending		Debt – Green Spending	
Treatment Effect	0.039	(0.194)	-0.280	(0.173)	-0.229	(0.145)	-0.196	(0.151)	-0.396*	(0.159)
Income level:										
Middle Income	0.065	(0.161)	-0.610**	(0.142)	-0.266*	(0.119)	-0.003	(0.124)	-0.060	(0.136)
High Income	-0.152	(0.170)	-0.727**	(0.146)	-0.346**	(0.123)	0.076	(0.129)	0.005	(0.139)
Income info missing	0.033	(0.216)	-0.737**	(0.182)	-0.271	(0.160)	0.100	(0.162)	0.056	(0.178)
Income level X treated:										
Middle Income	-0.362	(0.217)	0.173	(0.192)	0.212	(0.162)	-0.192	(0.168)	-0.045	(0.178)
High Income	-0.219	(0.217)	0.051	(0.189)	0.131	(0.162)	-0.088	(0.168)	0.022	(0.176)
Income info missing	0.050	(0.285)	0.257	(0.244)	0.270	(0.214)	-0.047	(0.217)	0.108	(0.233)
Constant	-0.468	(0.523)	-1.179**	(0.418)	0.271	(0.390)	-0.463	(0.392)	-0.538	(0.401)
Covariates	Yes		Yes		Yes		Yes		Yes	
Observations	3,746		3,757		3,767		3,773		3,783	
Adjusted R-squared	0.176		0.077		0.249		0.110		0.169	

** p<0.01, * p<0.05

Table B. 11: Heterogeneity - results when interacting treatment with income categories, dep. var is diff. in expected effectiveness to green spending

EFFECTIVENESS	(1)		(2)		(3)		(4)		(5)	
VARIABLES	Lumpsum – Green Spanding		Low-Income – Green Spending		Grid Charge – Green Spending		Budget – Green Spending		Debt – Green Spending	
Treatment Effect	0.034	(0.196)	-0.184	(0.178)	-0.159	(0.164)	-0.161	(0.156)	-0.284	(0.151)
Income level:										
Middle Income	0.185	(0.167)	-0.327*	(0.153)	-0.041	(0.137)	0.033	(0.126)	0.053	(0.129)
High Income	-0.129	(0.175)	-0.530**	(0.157)	-0.244	(0.141)	-0.019	(0.130)	-0.012	(0.134)
Income info missing	-0.007	(0.211)	-0.466*	(0.185)	-0.085	(0.167)	0.196	(0.157)	0.188	(0.166)
Income level X treated:										
Middle Income	-0.324	(0.219)	0.142	(0.198)	0.205	(0.183)	-0.164	(0.172)	-0.084	(0.167)
High Income	-0.139	(0.217)	0.035	(0.195)	0.170	(0.182)	-0.030	(0.170)	0.014	(0.166)
Income info missing	0.339	(0.279)	0.240	(0.246)	0.277	(0.230)	-0.013	(0.216)	0.021	(0.219)
Constant	-0.800	(0.527)	-1.221**	(0.430)	0.519	(0.439)	-1.049**	(0.387)	-0.969*	(0.407)
Covariates	Yes		Yes		Yes		Yes		Yes	
Observations	3,716		3,733		3,740		3,735		3,736	
Adjusted R-squared	0.174		0.104		0.247		0.128		0.166	

** p<0.01, * p<0.05

Table B. 12: Heterogeneity - results when interacting treatment with education, dep. var is diff. in agreement to green spending

AGREEMENT	(1)		(2)		(3)		(4)		(5)	
VARIABLES	Lumpsum – Green Spanding		Low-Income – Green Spending		Grid Charge – Green Spending		Budget – Green Spending		Debt – Green Spending	
Treatment Effect	-0.306**	(0.094)	-0.161*	(0.079)	-0.023	(0.071)	-0.333**	(0.070)	-0.435**	(0.076)
Higher education	-0.382**	(0.095)	-0.073	(0.077)	-0.133	(0.069)	-0.044	(0.072)	-0.142	(0.076)
Higher education X treated	0.211	(0.126)	-0.010	(0.105)	-0.077	(0.094)	0.038	(0.094)	0.076	(0.100)
Constant	-0.297	(0.511)	-1.270**	(0.405)	0.148	(0.382)	-0.377	(0.385)	-0.523	(0.390)
Covariates	Yes		Yes		Yes		Yes		Yes	
Observations	3746		3757		3767		3773		3783	
Adjusted R-squared	0.176		0.077		0.249		0.110		0.170	

** p<0.01, * p<0.05

Table B. 13: Heterogeneity - results when interacting treatment with education, dep. var is diff. in expected effectiveness to green spending

EFFECTIVENESS	(1)		(2)		(3)		(4)		(5)	
VARIABLES	Lumpsum – Green Spanding		Low-Income – Green Spending		Grid Charge – Green Spending		Budget – Green Spending		Debt – Green Spending	
Treatment Effect	-0.188*	(0.092)	-0.101	(0.080)	0.028	(0.076)	-0.311**	(0.067)	-0.374**	(0.070)
Higher education	-0.354**	(0.093)	-0.216**	(0.079)	-0.322**	(0.078)	-0.139*	(0.068)	-0.210**	(0.072)
Higher education X treated	0.127	(0.123)	0.019	(0.107)	-0.015	(0.103)	0.130	(0.090)	0.119	(0.093)
Constant	-0.696	(0.513)	-1.296**	(0.417)	0.400	(0.429)	-0.970**	(0.375)	-0.927*	(0.393)
Covariates	Yes		Yes		Yes		Yes		Yes	
Observations	3716		3733		3740		3735		3736	
Adjusted R-squared	0.173		0.104		0.247		0.128		0.167	

** p<0.01, * p<0.05

Table B. 14: Results of ordered logit estimations, marginal effects of treatment dummies

Mod			(A) Difference in Agreement for Revenue Use Coeff.	(St.E.)	(B) Difference in Perceived Effectiveness of Revenue Use Coeff.	(St.E.)
(1)	Lump-sum – Green Spending	Treatment Effect	-0.153**	(0.058)	-0.088	(0.058)
		N	3,746		3,716	
(2)	Reimburse Low-Income – Green Spending	Treatment Effect	-0.173**	(0.058)	-0.080	(0.058)
		N	3,757		3,733	
(3)	Grid Charge – Green Spending	Treatment Effect	-0.096	(0.059)	0.010	(0.059)
		N	3,767		3,740	
(4)	Budget – Green Spending	Treatment Effect	-0.380**	(0.059)	-0.325**	(0.059)
		N	3,773		3,735	
(5)	Debt reduction – Green Spending	Treatment Effect	-0.456**	(0.059)	-0.378**	(0.060)
		N	3,783		3,736	

Note: ** p<0.01, * p<0.05

Table B. 15: OLS Results when excluding expected elasticity

Mod			(A) Difference in Agreement for Revenue Use Coeff.	(St.E.)	(B) Difference in Perceived Effectiveness of Revenue Use Coeff.	(St.E.)
(1)	Lump-sum – Green Spending	Treatment Effect	-0.192**	(0.063)	-0.123*	(0.062)
		Constant	-0.393	(0.509)	-0.958	(0.513)
		N	3,746		3,716	
(2)	Reimburse Low-Income – Green Spending	Treatment effect	-0.169**	(0.052)	-0.094	(0.053)
		Constant	-1.346**	(0.402)	-1.415**	(0.418)
		N	3,757		3,733	
(3)	Grid Charge – Green Spending	Treatment Effect	-0.067	(0.047)	0.014	(0.052)
		Constant	0.073	(0.382)	0.186	(0.433)
		N	3,767		3,740	
(4)	Budget – Green Spending	Treatment Effect	-0.314**	(0.047)	-0.241**	(0.045)
		Constant	-0.430	(0.384)	-1.097**	(0.371)
		N	3,773		3,735	
(5)	Debt reduction – Green Spending	Treatment Effect			-0.311**	(0.046)
		Constant	-0.395**	(0.050)	-1.079**	(0.391)
		N	-0.623	(0.387)	3,736	

Note: ** p<0.01, * p<0.05

Table B. 16: OLS results when only using those participants who looked at treatment screen for more than 4 seconds

Mod			(A) Difference in Agreement for Revenue Use Coeff.	(St.E.)	(B) Difference in Perceived Effectiveness of Revenue Use Coeff.	(St.E.)
(1)	Lump-sum – Green Spending	Treatment Effect	-0.309**	(0.067)	-0.229**	(0.066)
		Constant	-0.589	(0.539)	-0.997	(0.540)
		N	3247		3221	
(2)	Reimburse Low-Income – Green Spending	Treatment Effect	-0.210**	(0.056)	-0.163**	(0.058)
		Constant	-1.266**	(0.438)	-1.314**	(0.454)
		N	3255		3235	
(3)	Grid Charge – Green Spending	Treatment Effect	-0.121*	(0.050)	-0.060	(0.055)
		Constant	-0.392	(0.393)	0.032	(0.452)
		N	3267		3240	
(4)	Budget – Green Spending	Treatment Effect	-0.395**	(0.050)	-0.317**	(0.048)
		Constant	-0.495	(0.419)	-0.977*	(0.409)
		N	3268		3233	
(5)	Debt reduction – Green Spending	Treatment Effect	-0.512**	(0.052)	-0.405**	(0.049)
		Constant	-0.721	(0.419)	-1.079*	(0.423)
		N	3276		3236	

Note: ** p<0.01, * p<0.05