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Carbon Taxes Crowd Out Climate Concern: Experimental Evidence from Sustainable Consumer Choices

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Abstract

We examine the impact of a carbon tax on consumer choices via a large-scale online randomized controlled trial. Higher taxes generally reduce the demand for high-carbon goods. Compared to an import tax, a carbon tax reduces demand when the tax is zero (i.e., announced but not levied) but shows relatively higher demand for high-carbon goods when a positive tax is introduced. This contradiction of basic price theory is entirely driven by climate-concerned consumers. Our findings suggest that carbon taxes can crowd out climate concerns, leading to important implications for policy.

Keywords: Behavioral response; Carbon pricing; Climate change; Experiment; Moral licensing.

JEL codes: Q58, C90, D03, D90, Q50, Q51.

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1. Introduction

Most economists advocate pricing carbon as a key tool to reducing the negative externalities from producing and consuming carbon-intensive products, a major contributor to global warming. Following traditional economic theory, taxing carbon increases the price of carbon-intensive products and services, which decreases demand and the associated emissions. On the production side, carbon taxes have been shown to foster more sustainable innovation (Colmer et al., 2023). However, less is known about how consumers will respond to carbon taxation (Andersson, 2019; Rivers & Schaufele, 2015). If consumers care about the externalities associated with their purchases, their concerns might modulate the response to a carbon tax, either intensifying or mitigating the price effect (Bénabou & Tirole, 2006; Kaufmann et al., 2024). Further, these effects might vary between consumer types (Taubinsky & Rees-Jones, 2018). Given the urgency for climate action and the enormous political efforts involved in introducing a price on carbon (Ewald et al., 2022; Funke et al., 2022), it is important to understand better how consumers respond to such a policy instrument.

In this paper, we study the introduction of a salient carbon tax in an incentive-compatible choice experiment using a large, representative sample (N=3,000) of consumers in an online shopping environment. We measure the willingness to pay for comparable high- vs. low-carbon goods under four scenarios with carbon tax levels set at 0%, 20%, 40%, and 60% of the product price and estimate the individual price elasticity of the high-carbon products. We randomize participants into three treatment conditions to investigate how changing the rationale of the price increase affects their choices. We present the same price increases to participants, either as a carbon tax, an import tax, or a neutral price change. These between-subject contrasts allow us to separate demand responses based on the mere price effect, any behavioral effects associated with paying taxes in general, and those unique to a Pigouvian carbon tax saliently introduced to internalize the social costs of carbon.

In line with classic economic theory, we find that introducing a carbon tax and increasing it from 20% to 60% significantly reduces demand for high-carbon goods. However, when comparing the demand curve of the carbon tax treatment with the demand curve of the import tax, we find noticeable differences despite identical prices. In the scenario where no actual tax is applied, but consumers are explicitly made aware which product would be taxed, significantly fewer consumers choose a high-carbon good in the carbon tax treatment than in the import tax treatment. However, in all scenarios with positive tax levels (20%-60%), this relationship reverses, and consumers faced with the carbon tax are relatively more likely to choose the high-carbon good. The carbon tax increases the willingness to pay for the high-carbon product compared to an import tax of the same amount by 4.4%, controlling for baseline preferences. Hence, price increases in the form of a salient carbon tax are less effective in reducing the demand for high-carbon goods

than an alternative import tax. The same pattern holds when comparing the carbon tax to the neutral price increase. Here, we find a 2.4% higher willingness to pay.

We further find that people with high climate concerns are the predominant drivers for this effect. They are more likely to choose the low-carbon product before the tax on the high-carbon product is introduced but choose the high-carbon product relatively more often when a positive tax is levied. This behavioral pattern is consistent with our hypothesis that consumers with high climate concerns feel a moral obligation to reduce their emissions from consumption when this attribute is salient during the choice. Climate-concerned consumers seem to internalize the externality of their consumption voluntarily (Kaufmann et al., 2024). However, when we introduce a positive tax, they appear to "license" themselves from this moral obligation towards the good that they hedonically prefer (Burger et al., 2022; Frey, 1992).[1] They feel they have "paid the price for the damage they are causing". A sufficiently high tax level is needed for the price effect to overcome this licensing effect for highly climate-concerned consumers. These results support that salient carbon taxes can crowd out the intrinsic motivation to reduce the demand for high-carbon consumer goods that naturally arises from climate concerns.

Our results build on and extend the small number of empirical papers on the behavioral effects associated with carbon pricing. While several studies focusing on this question conclude that the demand effect of a salient carbon tax is smaller than a mere price increase (Goeschl & Perino, 2012; Grieder et al., 2021; Hartmann et al., 2023; Lanz et al., 2018), others find limited (Houde et al., 2024) to no evidence for such behavioral responses (Woerner et al., 2023). Such differences might be attributable to the diversity in experimental paradigms where hypothetical scenarios (Hartmann et al., 2023) or the stylized nature of the task could affect the studies' external validity. For instance, Goeschl & Perino, 2012 asked participants to decide on profitable but polluting production plans in an economic game, while Woerner et al., 2023 and Grieder et al., 2021 use abstract goods with monetary consumption value. Study designs further differed, with only a few studies separately identifying the response to the informational signals of a carbon tax about differences in emission levels (Hartmann et al., 2023; Houde et al., 2024; Lanz et al., 2018). What happens to the tax revenue is also relevant for predicting the extent of behavioral responses. Grieder et al., 2021 show that crowding out is limited to carbon taxes where the revenue is explicitly earmarked for environmental purposes. Furthermore, the distribution of individual climate concerns has been shown to matter, with overall mixed findings (Hartmann et al., 2023; Houde et al., 2024).

Our contribution to the literature is fourfold. First, by contrasting the carbon tax to an import tax and neutral price increase, we can isolate any behavioral effects independent of the price change and unique to a carbon tax rather than the revenue-generating effect of taxes in general. Second, by introducing a zero percent carbon tax, we can isolate the

[1] Moral licensing has also been found to be relevant in studies investigating carbon-offsetting, which we do not directly refer to with this present work (see Günther et al., 2020; Harding & Rapson, 2019; Jacobsen et al., 2012).

demand changes linked to the information signal of the tax. Third, using four different tax levels (0%, 20%, 40%, 60%), we can estimate the shape of the demand curve, potentially identifying non-linear dynamics in price and behavioral effects. Fourth, our experimental design provides comparably high external validity. We conduct our experiment on a large, nationally representative sample of the population using real consumer products as incentives and using the collected tax revenues to reduce emission certificates (carbon tax) or as government revenue (import tax). This design avoids the external validity problem that arises from a climate-concerned student population and provides evidence on real, taxed consumption decisions.

Overall, our findings have direct implications for policymakers responsible for calibrating the right policy mix to achieve emission targets. A salient carbon tax comes with the risk of crowding out intrinsic motivation to reduce emissions, which, if the share of climate-concerned individuals in the population is large enough, could significantly dampen the effectiveness of the tax. Specifically, introducing too low prices on carbon could even increase aggregate demand if the crowding out exceeds the price effect. Furthermore, the identified behavioral response suggests that the demand effects of taxation and other non-monetary policy instruments, e.g., information campaigns or social norm nudges aiming to increase climate concern, might not be additive. Hence, the complete policy toolbox has lower mitigation potential when various instruments are applied simultaneously.

2. Experimental Design and Data

Our large-scale online randomized controlled trial (oRCT) uses a between-subject design with three treatment groups. The data was collected among a representative UK sample of 3,006 participants. After a real-effort task to earn their budget, participants made multiple incentive-compatible consumption choices at four different tax levels from which we estimate the effects of carbon taxation compared to an import tax or a neutral price increase. The experimental design and main analysis were pre-registered in https://osf.io/ts5j8 prior to data collection, which took place in March 2024.

2.1 Experimental Design

The experiment follows a simple structure: (1) introduction and consent, (2) effort task, (3) choice task including the treatment manipulation, and (4) background survey.

After obtaining informed consent, all participants engaged in a logic-effort task that, if completed, rewarded them with £20. This activity was implemented to create a sense of ownership over their budget and foster involvement and motivation throughout the experiment. Enhancing attention through such tasks has been shown to improve the quality of the collected data and increase the external validity of the findings (Abeler et al., 2011; Charness et al., 2018; Imas et al., 2017).

Participants then moved on to the choice task. We showed them two similar products

selected to differ in their carbon footprints, such as dairy and non-dairy ice cream or plastic and aluminum foil. In total, they made choices between five product pairs. Using their budget of £20, they could choose which of the two products they preferred to purchase.

The screen showed four policy scenarios for each product pair representing different tax levels in the tax treatments. Scenario A showed the two products at the same price (hereafter, *baseline price*); in scenario B we added a tax of 20% to the price of the high-carbon option (hereafter, *low tax*); in scenario C we increased the price of the high-carbon option to a tax of 40% (hereafter, *medium tax*); and in scenario D raised the price to the tax of 60% (hereafter, *high tax*). The low-carbon product remained at the base price. The Online Appendix and Appendix A1 shows the graphical layout. Participants had to choose their preferred option for each scenario - four choices per product pair. We based the tax levels on estimations from Funke et al., 2022, who reviewed empirical evidence calculating global environmental externalities and estimated appropriate carbon pricing. [2]

Participants repeated this choice for each of the *five* product pairs: flowers (roses vs. carnations), cookies (regular vs. vegan), chicken (animal vs. plant-based), ice cream (dairy vs. plant-based), and household foil (aluminum vs. plastic film). These product pairs were determined in a pre-test with 500 participants, from which we selected the pairs where the high-carbon options were most preferred. We selected the product pairs in this way to increase statistical power. The product images were AI-generated to avoid brand effects but had close counterparts in content and price in a real UK supermarket. This was done to enhance realism and incentive compatibility. After all participants had completed the survey, we randomly selected thirty to have the real equivalent of their choices delivered to their homes and the residual budget paid out. Participants were informed about the incentives at the start of the choice task. More details about the experimental consumption choices are provided in Appendix B.1.

2.2 Treatments

Before the choice task, participants were randomly assigned to one of three treatments. While we kept the tax levels in the four scenarios constant across treatments, each arm differed in the *rationale* for and *labeling* of the price differences (see Figure 1). Our main treatment attributes the price differences explicitly to a carbon tax (hereafter, *carbon tax* or *CT* treatment). To get as close as possible to a real tax and increase the external validity of our study, we use the "tax revenue" from the carbon tax treatment to buy emission allowances from the European Emissions Trading Scheme and decommission them permanently.

[2] Given that the true social costs of carbon are unknown and none of our experimental products are currently subject to a carbon tax in the UK, participants cannot base their shopping decision on the "real" tax level that might be applicable outside of the experiment, as it is the case with, for example, experimental and real discount rates for saving decisions. Which of the four policy scenarios will eventually be closest to the real world will be the result of a political process.

We compare this CT treatment to an *import tax* treatment, justifying the price differential with differences in ingredients/materials of one of the products (hereafter, *import tax* or *IT* treatment). We buy UK government bonds for the import tax and return them to the government to reduce the national debt.

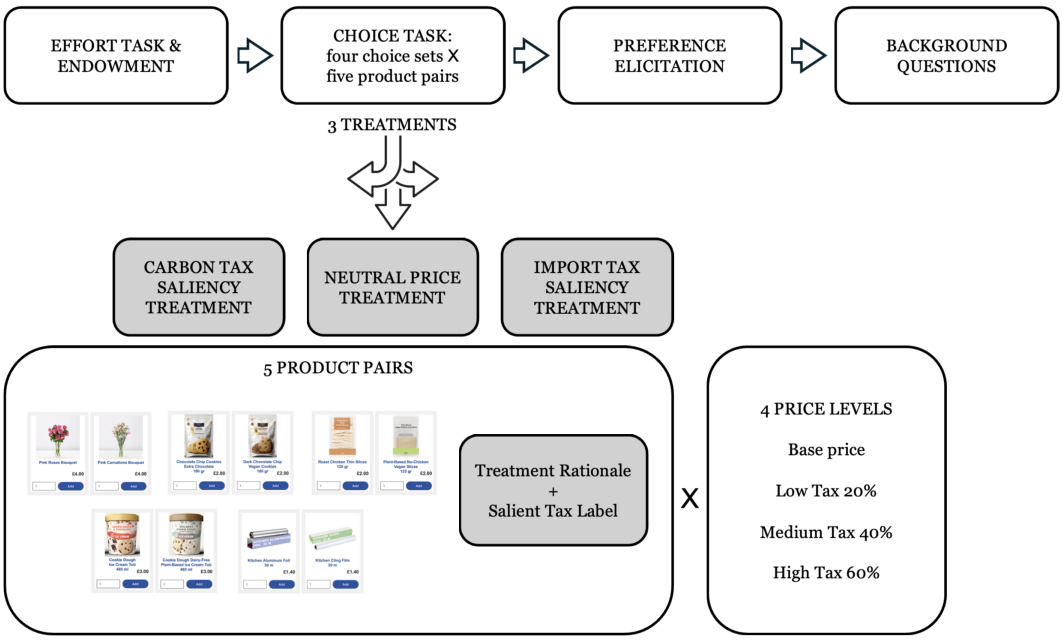
For both the carbon and import tax, we add labels below the product price showing the monetary value of the tax on the screen (see Appendix A1). In both treatments, we communicated how we used the tax revenue to the respondents in the introduction to the choice task. See the exact wording in Appendix A2. The two conditions are thus identical, except for their rationale for the leveraged tax.

We chose to contrast the carbon tax with the import tax to elicit the potential positive utility from paying a tax. The revenue of carbon taxes (or certificate auctions in cap and trade schemes) is often explicitly communicated to be either used for green innovation or redistributed to low-income households, which people could perceive as an act of "doing good" by consuming taxed high-carbon products.[3] Import taxes, however, are generally imposed to increase government revenue, protect local industries, or for political reasons and are thus less likely to stimulate consumption to derive positive utility from paying taxes.

Finally, we compare the carbon tax to a neutral pricing condition where we presented the policy scenarios and the associated price differences without explaining the purpose of the tax itself or the use of revenue. This treatment allows us to identify the pure demand curve without any tax revenue implications (hereafter, *neutral pricing* or *NP* group).

[3]Under the EU ETS, most of the auctioning revenues are used for climate, renewable energy, and energy efficiency projects. Between 2013 and 2022, 76% of the total revenue was spent on these purposes (European Environment Agency, 2024).

Figure 1: Treatment and Survey Scheme.



Note: Figure 1 shows a diagram describing the experimental flow and the treatment differences.

2.3 Preference elicitation

We force individuals to choose a product from each pair and price scenario to be able to estimate their willingness to pay. However, to avoid inflating preferences by design, we give participants the option to sell back any products they do not want at the end of the experiment. We set the sell-back price to £1 per product, which is lower than the lowest price of a low-carbon item. Only those who truly dislike a product should sell it back to us. [4]

2.4 Survey

At the end of the survey, we gathered data on socio-demographics, dietary constraints, political orientation, and trust in government. Most relevant for our analysis, we collected information on *climate concerns* (see Appendix B.2 for details).

2.5 Variables

We pre-registered willingness to pay for the high-carbon good as our main outcome variable (hereafter, WTP). We define WTP as the mid-point corresponding to the switching from the high-carbon product to the low-carbon product, as in the Multiple-Price-List literature (Andersen et al., 2006; Grieder et al., 2021; Jack et al., 2022). WTP will be

[4] A participant who wants the lowest environmental impact should always choose the cheaper low-carbon product and use their residual budget to buy emission certificates and decommission them.

counted as zero if the individual chooses the low-carbon alternative in all scenarios and equal to the maximum price if the individual chooses the high-carbon product in all scenarios. In case of multiple switching, we only consider the first switch. Sensitivity analyses cover the exclusion of multiple switchers to ensure the reliability of results (see below and Appendix E4). The main explanatory variable is a categorical indicator for our experimental treatment groups. We further explore the relevance of climate concern measured as an average score between two survey responses: *"How worried are you about climate change?"*; *"To what extent do you feel a personal responsibility to try to reduce climate change?"*. The answers were one unique option from a Likert-scale ranging from 1 to 5 and asked in the survey after the choice task.

2.6 Participants and Summary Statistics

The experiment was conducted online via Qualtrics and distributed through the Prolific platform, where we aimed to obtain a representative sample of 1000 adults per treatment matching the demographic distribution of the UK population in terms of age, sex, and ethnicity.[5]

Following data cleaning, the data analysis of consumption choices is based on 3,006 individuals. Socio-demographics across the three experimental groups are balanced (see Appendix Table E1). The differences in intervention awareness, carbon, and fiscal knowledge were expected, given that we elicited them after the treatment. See Appendix Section B.3 for details on attrition or exclusion of participants.

2.7 Analytical Approach

The main analysis can be formalized in the following regression equation 1:

$$Y_{i,c} = \beta_0 + \beta_1 X_{i,1} + \beta_2 X_{i,c,2} + \beta_k X_{i,k} + \varepsilon_{i,c} \tag{1}$$

The dependent variable $Y_{i,c}$ is the primary outcome of interest (WTP); β_0 captures the intercept; $X_{i,1}$ is an indicator of the tax treatment that varies at the treatment group level; where the dummy variable $X_{i,c,2}$ indicates the individual preference on the taxed product at the base price level. Our main analysis compares the carbon tax treatment to the import tax. The comparison to the neutral treatment generally shows similar results and is often provided as a robustness check. $X_{i,k}$ is a vector of individual-level controls. We cluster the standard errors $\varepsilon_{i,c}$ at the individual level i to account for correlation among repeated choice c by the same individual.

This analytical approach follows the pre-registered specification with one exception. The raw data revealed significant differences in demand for the high-carbon product at baseline price (Appendix Table D1). We adjust our model to account for this difference

[5] As in our pre-registered power analysis, the study was powered at 80% for a minimum detectable difference of a Cohen's d = 0.13.

by including a dummy variable $X_{i,c,2}$ indicating the individual preference for the taxed product at the base price level.

3. The effects of carbon taxation on the WTP for high-carbon products

We hypothesized, based on the related literature on carbon taxation, that the WTP for the high-carbon product is higher in the CT treatment than in the IT and NP treatments, respectively.[6]

As expected from our pre-test, most participants prefer high-carbon products. We find that, on average, the high-carbon product is chosen 76.18% of the time in the CT treatment, 81.68% in the IT treatment, and 80.44% at the base price level. When a 20% price increase is levied (low tax), that percentage becomes 63.56% for the CT treatment, 61.22% for the IT treatment, and 62.52% for the NP treatment. The differences across treatments remain comparably similar for the medium and high tax levels (see Appendix Figure D1).

To test our hypotheses, we compare the average WTP in the CT treatment with the IT and the NS treatment. Table 1 shows our main results for the WTP measure. Once we control for baseline differences in product choice, participants in the CT treatment have an 11 pence higher WTP for the high-carbon product than those in the IT treatment (column 1). We also find a difference when comparing the NP treatment, which is 6 pence (column 3). Both estimates are statistically significant and robust to including a rich set of control variables (columns 2 and 4). Appendix Table E2 lists all control variables individually. At an average product base price of £2.5, the carbon tax increases the WTP for the high-carbon product compared to an import tax of the same amount by 4.4% and by 2.4% compared to a neutral price increase. Thus, both our hypotheses are supported by our results.[7,8]

[6]Formally pre-registered as two separate hypotheses: Hypothesis H1a) "Adding a salient carbon tax to a polluting product increases the selection of this product over a less polluting alternative compared to adding a non-salient carbon tax of the same size." Hypothesis H1b) "Adding a salient carbon tax to a polluting product increases the selection of this product over a less polluting alternative compared to adding an import tax of the same size."

[7]The pre-registered regression models described in equation (1) are included in Appendix Table E3.

[8]As mentioned in Section B.3, the results are not sensitive to the exclusion of observations that correspond to multiple switches within a product set (Appendix Table E4, columns 1 and 2), observations that correspond to sold back items (Appendix Table E4, column 3 and 4), and participants that failed the attention check (Appendix Table E5 with and without controls).

Table 1: Treatment Effect Main Regression.

	(1) b(se)	(2) b(se)	(3) b(se)	(4) b(se)
CT Treatment vs IT	0.11***	0.11***		
	(0.020)	(0.020)		
CT Treatment vs NP			0.06**	0.06**
			(0.020)	(0.020)
Base product choice	3.06***	3.04***	3.09***	3.07***
	(0.036)	(0.039)	(0.034)	(0.036)
Constant	0.35***	-0.03	0.37***	-0.08
	(0.036)	(0.092)	(0.032)	(0.090)
Demographic controls	No	Yes	No	Yes
Attitude controls	No	Yes	No	Yes
N	9990	9950	10040	9965
R^2	0.479	0.481	0.481	0.484

+ < p 0.01, * p < 0.05, ** p < 0.01, *** p < 0.001.

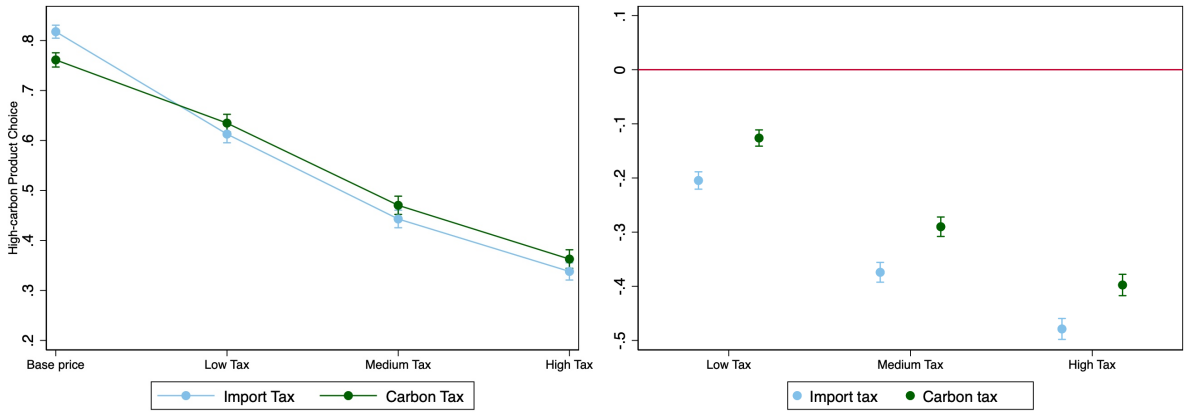
Notes: Linear regression models clustered at the individual level. The dependent variable is the willingness to pay as the mid-switching point between the high-carbon and low-carbon goods. Standard Errors clustered at the individual level in parentheses.

The average WTP, presented in Table 1, masks important differences in the baseline choices between treatments. We, therefore, show a complementary picture of participants' choice behavior by using a difference-in-difference approach that directly estimates the trajectory of choices going from scenario A (baseline price) through the tax increases in scenarios B, C, and D. We examine the probability of choosing the high-carbon product at each tax level. The dataset includes 39,960 choice observations, one for each tax level of the five products per individual for the carbon tax vs. import tax comparison (N=1,998).

We focus on the CT vs. IT comparison, but results also hold when comparing CT to NP (see Appendix Table E6 and Figure D2). For both taxes, displayed in Figure 2a, we see a downward slope of the demand curve as predicted by price theory. However, the curves cross when moving from the base price to the low-tax scenario. This crossing of the two demand curves provides evidence that the CT treatment does not simply shift the curve compared to the IT treatment. In the IT treatment, the probability of participants choosing high-carbon goods is about 80% when prices are the same for high- and low-carbon goods. In the CT treatment, the probability is significantly lower (see Figure 2a). When we introduce the low tax in scenario B, participants in the IT treatment decrease their demand for high-carbon goods. This decline compared to the base price is noticeably larger than in the CT treatment. The resulting absolute demand for high-carbon products in the CT treatment exceeds demand in the IT condition. This reversed difference persists for the medium and high tax, creating a (relative) kink in the demand curve. Figure 2b shows this relative difference in decline compared to the base price in more detail. At all tax levels, the relative decline in demand is significantly lower in the carbon tax treatment than in the import tax treatment.

Figure 2: Predictive Margins and High-carbon Demand Difference.

(a) Predicted Demand by Treatment. (b) Relative Decline by Treatment.



Note: Panel (a) plots the predictive margins of the high-carbon product proportions at each price level for the IT and CT treatments. Panel (b) shows the demand decline in the high-carbon product with respect to the base price across the two treatments, CT vs. IT. Error bars represent the 95% Confidence Intervals.

3.1 Heterogenous effects of carbon taxes by climate concerns

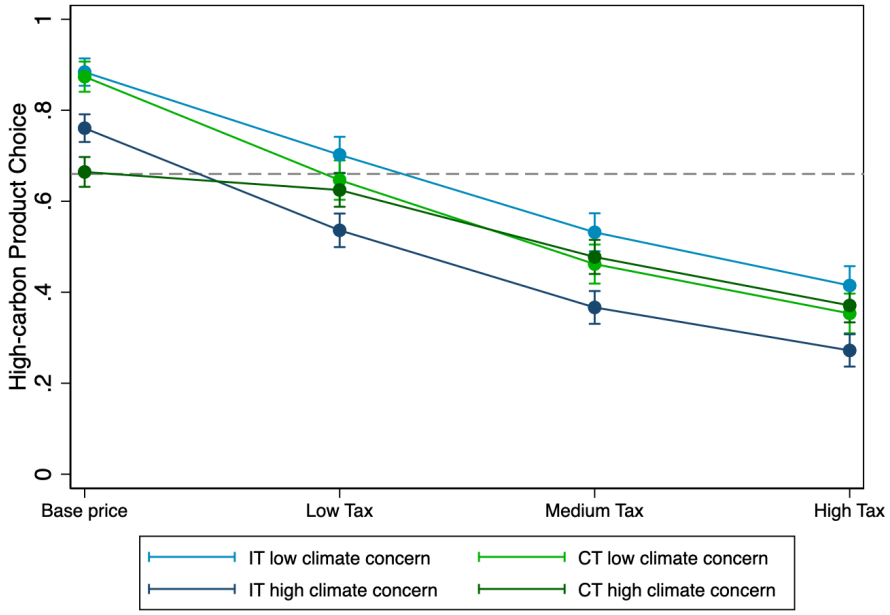
We hypothesized that moral concerns are essential for the observed differences between the treatments. Here, we provide additional analyses to support this; we see concerns for the climate as a necessary condition to feel a moral obligation in consumption choices and hence test whether the results from our diff-in-diff approach are sensitive to the self-reported climate concerns of our participants. Analytically, we estimate a triple difference (treatment x tax scenario x environmental concern) while controlling for demographics and other attitudes, similarly to Table 1. See the interaction results in Appendix Table E7.

The results presented in Figure 3 show that high climate concerns are essential for the behavioral dynamics presented in the previous section. We first look at the IT treatment. Contrasting the predictions for people with the highest and lowest climate concerns, we find a simple downward shift of the demand curve. Individuals with high climate concerns have an approximately 12 percentage points lower demand for high-carbon products, independent of the tax level: for reference, see the patterns of the light vs. dark blue lines in Figure 3.

For the CT treatment, however, we observe an even larger difference at the base price of about 21 percentage points between people with the lowest (light green) vs. the highest (dark green) climate concerns. While the demand for high-carbon goods is strikingly similar between CT and IT for individuals with low climate concerns, people in the CT treatment with high climate concerns have a significantly lower probability of choosing the high-carbon product (66%) compared to the same people in the IT treatment (76%).

When looking at the scenarios with positive tax levels, we see the initially larger difference in the CT treatment linked to climate concerns vanishes entirely. While there is a substantial decline in demand for those with low climate concerns (-17%, p<0.01), demand for those with high concerns remains close to the base price (-4%, p=0.01), even though a carbon tax of 20% was applied to the high-carbon products. This inelastic demand of people with high climate concerns (dark green line in Figure 3) erases all differences in choice associated with climate concerns. Those with the highest and those with the lowest climate concerns no longer have a significantly different demand for high-carbon goods ($\Delta = 2\%, p = 0.55$). This response produces the kink in the CT demand curve, causing it to cross the one estimated for the IT treatment, and supports our explanation of moral licensing. We see no further differences in the CT treatment due to climate concerns for the medium or high tax treatment.

Figure 3: Predictive Margins by Treatment and Climate Concern.



Note: Figure 3 plots the predicted demand for the high-carbon product proportions at each price level for the IT and CT treatments depending on participants' climate concern levels. Low and high climate concerns refer to participants with the lowest (1) and highest (5) observed values on our 5-point scale. Error bars represent the 95% Confidence Intervals.

Participants additionally conducted a post-choice classification task about the carbon impact of the products. Here, we find that while people with high climate concerns do much better than those with the lowest climate concerns (77% vs. 45% correct), there are no significant differences between the carbon tax and the import tax treatment group (78% vs. 77%) for those with high climate concerns, which suggests that they do not learn anything new from the treatments. For those with the lowest climate concerns, those in the CT treatment are significantly better at classifying which products have the higher

emissions than those in the IT treatment group (58% vs. 31%). We interpret these results as a learning effect for the low climate-concerned ones, which, however, does not seem to translate into a change in choices. The results also suggest that the CT treatment does not affect choices for the high climate-concerned individuals by increasing their factual knowledge about the relative carbon impact of products. Hence, alternative mechanisms likely explain the decline in the CT treatment at the tax level of zero.

We summarize our key findings. The good news: A tax, either in the form of a carbon tax or an import tax, reduces demand for a high-carbon product in favor of a low-carbon product, with higher tax levels leading to a more substantial reduction in demand.

The concerning news: For individuals who care the most about their climate impact, the salient carbon tax treatment strongly reduces the demand for high-carbon products when the prices are identical. This demand reduction is, however, fully crowded out once a low tax is introduced.

4. Discussion

Our analyses report on two distinct effects. In the carbon tax condition, we find reduced demand for high-carbon products when the tax rate is zero. When the tax is positive, the demand for the high-carbon product is comparably higher than in the import tax or price conditions. We document that the choices of consumers with high climate concerns drive both of these effects. Those with low climate concerns exhibit a standard demand curve in line with classic price theory.

In the previous section, we have already ruled out that individuals with high climate concerns reduce their baseline consumption because they gain new knowledge from the carbon tax. For our first finding, we, instead, argue that the introduction of the carbon tax makes the differences in carbon emissions more salient, similar to a carbon label, which has been shown to reduce consumption of high-carbon products for individuals who care about the environment (Fosgaard et al., 2024; Imai et al., 2022; Lohmann et al., 2022). In addition, the announcement of a tax could be perceived as a signal of moral or social norms (Bénabou & Tirole, 2006; Bicchieri & Dimant, 2022). Similar to "sin taxes" (on alcohol, sugar, or tobacco), the mere announcement of a potential tax could make climate-concerned consumers feel guilty for consuming a "sin good" (Pratt, 2023; Rees-Jones & Rozema, 2023)[9]. In the tax literature, this is described as the *discouragement effect* of a tax (Rees-Jones & Rozema, 2023). The import tax and the neutral frame do not carry the same "sin" connotation and, therefore, do not show such a discouragement effect.[10]

[9]Future research should investigate whether there are consumers who already act "as-if" there was a carbon pricing scheme in place, by, for example, reducing their flights outside of the EU, despite them being relatively cheaper than intra-EU flights which fall under the European Emissions Trading Scheme or by decreasing their red meat consumption at home after it was banned in public canteens.

[10]Traditionally, anticipating taxation has been found to increase short-term demand to avoid the tax. For example, Baker et al., 2021 shows that announcing an increase in a sales tax in one state leads to

Our second, more surprising finding is that the introduction of a 20% carbon tax has minimal additional effect on demand reduction for individuals with high climate concerns, putting them at the same level of demand as individuals with very low climate concerns, thus essentially, fully crowding out all intrinsic motivation to consume a low-carbon good. As hypothesized, we explain this behavior with people receiving positive utility from paying a tax, which could be a sign of *moral licensing*. Not only do the highly climate-concerned individuals in our experiment have a higher WTP for the high-carbon good, conditional on their baseline choice, but we even observed some participants reverse their choice away from the low-carbon good at baseline price towards the high-carbon good after we applied a positive tax (see Appendix Table E8). For example, when prices are identical, participants choose the lower emissions plant-based chicken over real meat and then switch to the higher emissions real chicken when the tax increases its cost by 20% and more.

The relevance of this crowding-out effect for policy making will depend on several factors. First, the share of climate-concerned consumers in the population. In our sample of UK consumers, only 7% of the participants are classified as having very high climate concerns (Score 5 on a scale from 1-5), but 32% are classified as having high concerns (Score 4 or 5). As the world shifts towards a more climate-conscious attitude (Dechezleprêtre et al., 2022), a growing number of individuals will likely be affected by the crowding out.

Second, the extent to which current demand for high-carbon goods is already discouraged by climate concerns. While we observe an overall higher demand for high-carbon goods for climate-concerned in the carbon tax treatment when a tax is in place, the overall effect is exacerbated by the demand reduction at base price, caused by merely increasing the salience about the respective climate impact. While climate concerns are likely necessary for this, attribute salience is determined by several factors, including public policies that educate consumers or mandate climate labeling schemes.

Third, it is relevant how the additional revenue is used. To gain support for carbon taxes, many governments pledge to use their revenue for green innovation or redistribution in society. Studies show that this revenue recycling strategy is indeed effective in increasing support (Woerner et al., 2023), with earmarking taxes for green spending being particularly effective (Mohammadzadeh Valencia et al., 2024). However, our results point towards an interesting dilemma. On the one hand, policymakers might be able to to gain support for carbon taxes by highlighting the "benefits of paying a tax". On the other hand, the emphasis on the "positive utility of paying a tax" could crowd out voluntary emission reductions by climate-concerned consumers. Future research should explore this

stockpiling in the short term and in the long term to out-of-state and online shopping. Rittenhouse & Zaragoza-Watkins, 2018 find that announcing new-vehicle emission standards for freight trucks created a sales spike just before the regulation was implemented and a slump immediately, leading to enormous environmental damages. And D'Haultfœuille et al., 2016 show an increase in purchases of high-emissions vehicles right before a penalty for high-emission cars was introduced.

relationship between support for taxes and crowding out.[11]

Fourth, how the tax is communicated. Our results imply that a non-salient carbon tax might reduce the demand for high-carbon goods more effectively. While such an explicit lack of transparency might raise ethical objections, it could potentially reduce crowding out and maintain the opportunity to reduce carbon-intensive consumption patterns by leveraging people's intrinsic moral concerns through informational or behavioral policy tools (Carlsson et al., 2021; Gravert & Shreedhar, 2022). Alternatively, behavioral interventions that neutralize or discourage moral licensing should be investigated to counteract the crowding out effect (Lohmann et al., 2024).

Finally, the actual level of the tax is shown to be important. The crowding-out effect is most problematic at low tax levels. We find that in our setting at medium to high tax levels (40% and 60%), the price effect will be strong enough to overcome the crowding-out effect even for the most climate-concerned consumers (Gneezy & Rustichini, 2000b, Gneezy & Rustichini, 2000a). However, given the general opposition to carbon taxes in many countries and the very low levels of implemented taxes, it might be politically challenging to implement a sufficiently high carbon tax. Even our low tax level of 20% is higher than many of the implemented carbon taxes around the world, potentially making the crowding out problem larger than what we find in our experiment.

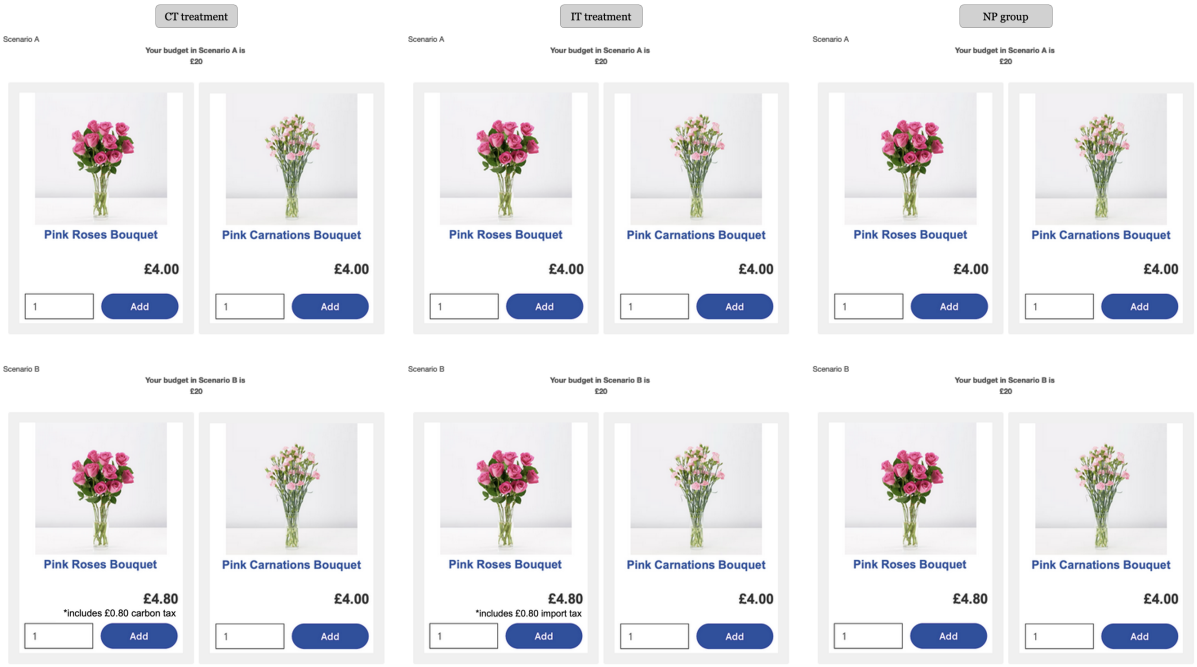
5. Conclusion

Our incentive-compatible online RCT shows the effect of a carbon tax on the demand for high-carbon, popular consumer products compared to an import tax for the same products. We find that, generally, both taxes decrease demand. However, when randomly assigned to the carbon tax, individuals concerned about the climate choose relatively fewer high-carbon products when the tax rate is zero but choose relatively more high-carbon products when the tax rate is positive, contradicting standard economic theory. Our result suggests that a carbon tax crowds out moral concerns for avoiding a high-carbon product. We attribute this crowding out to moral licensing. Our findings have important policy implications for choosing the optimal level of a consumer-facing carbon tax and the environmental policy mix.

[11] Drawing the parallel to marketing, while potentially counter-intuitive to economists, the idea of increasing sales by asking consumers to pay more is well-established in marketing. In Buy-One-Give-Money (BOGM) or Buy-One-Give-One (BYGO) campaigns, for-profit companies pledge to donate a fixed amount or a particular product to a non-profit cause for every product sold. These types of campaigns are considered to be some of the most successful marketing strategies.

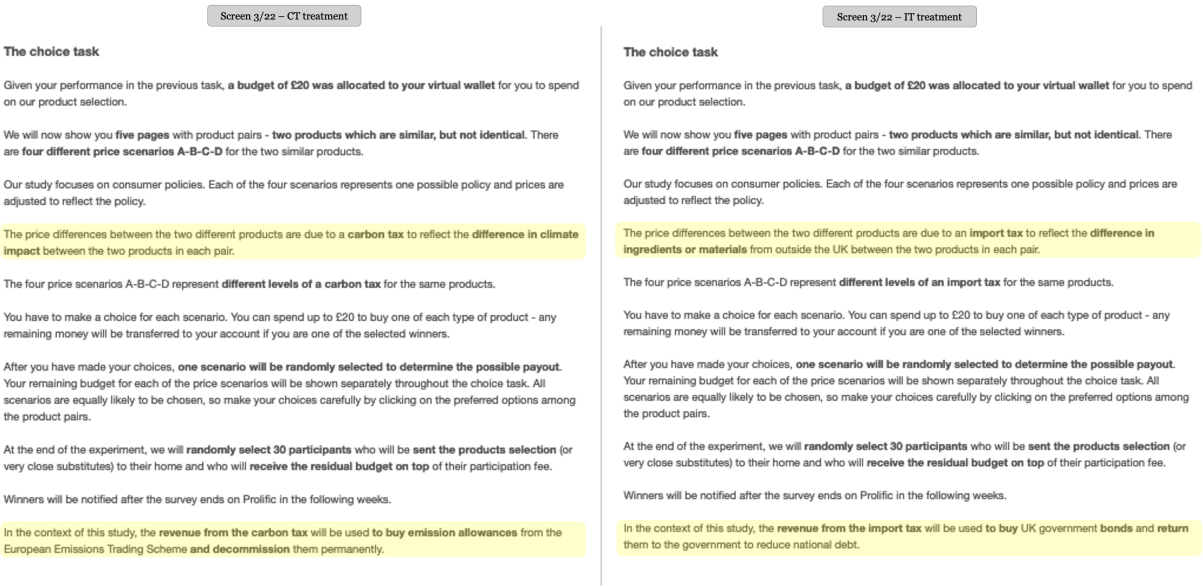
A. Appendix Survey

Figure A1: Salient Tax Label by Treatment.



Note: Figure A1 exemplifies the salient tax labels for the CT and IT treatment, when the tax is introduced, with respect to the NS group.

Figure A2: Introduction to Tax Salience by CT and IT Treatment, highlighted in yellow.



Note: Figure A2 shows the communication regarding the rationale for the leveraged tax and how the tax revenue was used in the introduction to the choice task by treatment.

B. Appendix Methods

B.1 Experimental Consumption Choices

One week prior to the experiment, 500 extra respondents were recruited on Prolific to collect data on a one-choice scenario per product X 13 product alternatives at baseline prices. The pre-test data was used as a benchmark to select the relevant five experimental product pairs, by balancing the choice sets where most respondents (i.e. more than 70%) preferred the high-carbon good, within a total £20 cost limit and with a food choice set inclusion. Prices were calibrated to ensure that any combination can be bought within the £20 budget. The choice task was designed to resemble an online shopping interface, as can be seen in Appendix A1. The order of the products was eventually randomized in the experiment. On average, the high-carbon flower alternative demand amounted at baseline at 80.67% in the experiment and 71.22% in the pre-test; the high-carbon cookie alternative demand amounted at baseline at 78.77% in the experiment and 73.84% in the pre-test; the high-carbon chicken alternative demand amounted at baseline at 78.01% in the experiment and 76.05% in the pre-test; the high-carbon ice-cream alternative demand amounted at baseline at 79.10% in the experiment and 76.86% in the pre-test; the high-carbon kitchen foil alternative demand amounted at baseline at 80.60% in the experiment and 83.29% in the pre-test. About the incentive scheme, due to privacy constraints of the data collection platform, we were unable to store their personal data and we paid out their basket as a bonus payment. This issue incurred after data collection. Thus, the incentive worked its function. No complaint has been recorded but only positive feedback from the lottery winners.

B.2 Variables and Measurement construction

The individual attitudes measured as Climate Concern, Import Attitude and Fiscal Literacy are built as follows. The *Climate Concern* is an average score of responses from the two climate concern questions "How worried are you about climate change?" and "To what extent do you feel a personal responsibility to try to reduce climate change?". The *Import Attitude* is the average score of responses from the two import attitude questions "How important do you believe it is for the UK to protect its industries and jobs from foreign competition?" and "Have you ever refrained from purchasing an imported product due to the additional cost imposed by customs and import taxes?" (reversed scoring). *Fiscal Literacy* is the ratio of right answers out of four questions (where one in four options corresponds to the right answer) about the accurate definition of a carbon tax and its revenue, and an import tax and its revenue. As for our exploratory variables, we gathered information on *Policy support*: a referendum vote question in support of import tax and carbon tax; *Carbon Licensing*: to what extent they agree with the statement "If I pay a carbon tax on a polluting product, I do not need to feel bad for consuming the

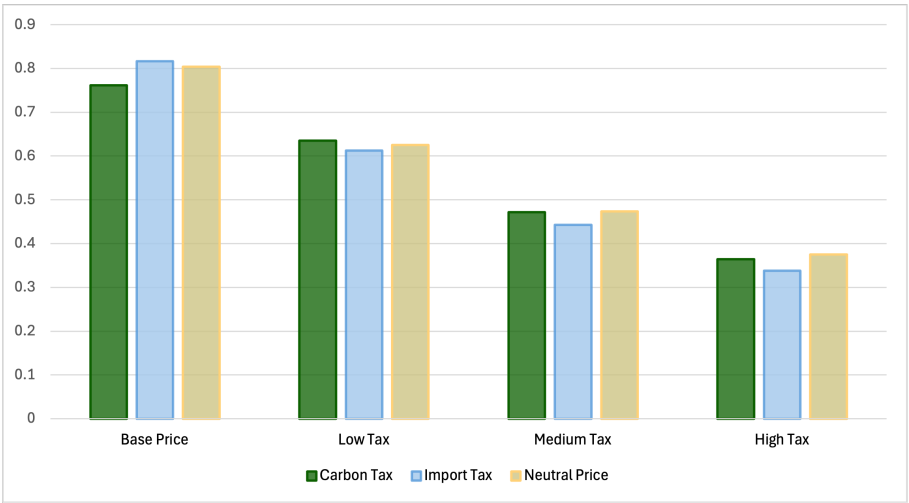
product"; *Carbon Literacy*: we ask respondents which of the two products of each choice set, if any, has the greater carbon impact, and we code it as a proportion of how many they rightfully detected out of five sets; *Compensation Coverage*: only respondents in the Carbon Tax treatment are asked which of the four price scenarios is the most adequate at addressing the product emission differential.

B.3 Excluding participants and attrition

As pre-registered, we drop the observations where more than one switch happens to test for sensitivity. As an additional sensitivity check, we drop the products/observations that respondents have decided to sell back and do not keep in their basket, as they might introduce noise and overestimate the low-carbon choices. We also test the robustness of our results by excluding participants who do not answer to our in-survey attention question correctly. No participant was excluded due to completion of the experiment abnormally fast, where by 'abnormally fast' we mean participants who are statistical outliers, i.e. 3 standard deviations below the temporal mean. We do not expect outliers to be an issue for the analysis. We planned to treat missing data by solely incorporating observations with comprehensive information. Out of the total 3,009 participants, one respondent was excluded because of a 85% survey progress status, one respondent had started the survey twice and the second try was kept, one respondent had an unknown identifier error code. Additionally, 139 potential respondents were automatically excluded by the platform during data collection because they returned the survey prior to completion and/or they timed-out the upper response time limit set automatically by the platform, based on the estimated and median completion time. Regarding attrition, we verified the absence of disparate attrition rates across various treatment arms using a Chi-squared test, which are not significant.

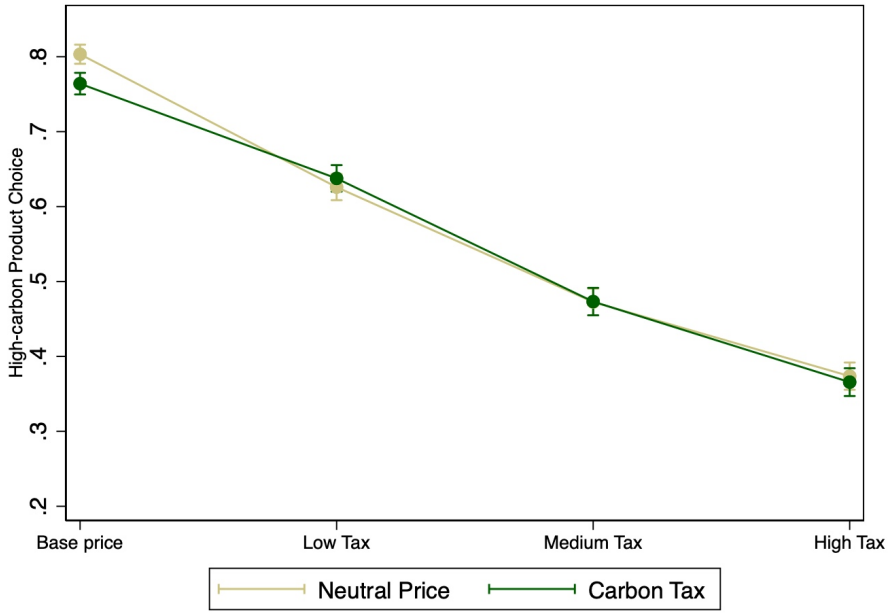
C. Appendix Figures

Figure D1: Proportion of High-carbon Goods from the Raw Data.



Note: Figure D1 shows the raw proportions of the high-carbon product at each price level for the CT, IT and NP treatment groups.

Figure D2: Predictive Margins by Treatment.



Note: Figure D2 plots the predictive margins of the high-carbon product proportions at each price level for the NP and CT treatments. Error bars represent the 95% Confidence Intervals.

D. Appendix Tables

Table E1: Descriptive Statistics by Treatment.

	NP control (N=1,008)	CT treatment (N=1,000)	IT treatment (N=998)	P-value
Age	44.76	44.82	45.51	0.493
Female	0.55	0.55	0.55	0.964
N.children	1.07	1.09	1.18	0.143
HigherEducation	0.71	0.69	0.67	0.160
BudgetConstraint	0.62	0.59	0.62	0.343
DietRestriction				
None	779 (77.3%)	734 (73.4%)	730 (73.1%)	0.680
Vegan	28 (2.8%)	31 (3.1%)	30 (3.0%)	
Vegetarian	55 (5.5%)	63 (6.3%)	69 (6.9%)	
Flexitarian	86 (8.5%)	110 (11.0%)	94 (9.4%)	
Pescatarian	29 (2.9%)	27 (2.7%)	34 (3.4%)	
Other	26 (2.6%)	30 (3.0%)	36 (3.6%)	
Dairyfree	5 (0.5%)	5 (0.5%)	5 (0.5%)	
PoliticalOrientation				
Strongly Left	146 (14.5%)	132 (13.2%)	135 (13.5%)	0.655
2	319 (31.6%)	366 (36.6%)	338 (33.9%)	
3	324 (32.1%)	301 (30.1%)	317 (31.8%)	
4	193 (19.1%)	176 (17.6%)	180 (18.0%)	
Strongly Right	26 (2.6%)	25 (2.5%)	28 (2.8%)	
GovernmentalTrust				
Disagree	207 (20.5%)	236 (23.6%)	220 (22.0%)	
2	405 (40.2%)	339 (33.9%)	379 (38.0%)	
3	302 (30.0%)	298 (29.8%)	291 (29.2%)	
4	91 (9.0%)	124 (12.4%)	104 (10.4%)	
Agree	3 (0.3%)	3 (0.3%)	4 (0.4%)	
CTsupport	0.61	0.55	0.59	0.014
ITsupport	0.52	0.56	0.57	0.059
FiscalLiteracy	0.86 (0.19)	0.89 (0.18)	0.86 (0.19)	<0.001
CarbonLiteracy	0.56 (0.33)	0.79 (0.30)	0.67 (0.34)	<0.001
ClimateConcern	3.17 (1.07)	3.15 (1.04)	3.15 (1.04)	0.836
ImportAttitude	3.12 (0.75)	3.08 (0.73)	3.07 (0.68)	0.210
CarbonLicensing				
Disagree	152 (15.1%)	102 (10.2%)	128 (12.8%)	
2	501 (49.7%)	419 (41.9%)	488 (48.9%)	
3	268 (26.6%)	351 (35.1%)	279 (28.0%)	
4	67 (6.6%)	104 (10.4%)	86 (8.6%)	
Agree	20 (2.0%)	24 (2.4%)	17 (1.7%)	

Notes: Summary statistics for individual variables. The p-value from a comparison t-test is also reported where applicable. *Higher Education* is a dummy variable created ex-post from different categorical responses. The individual attitudes measured as *Climate Concern*, *Import Attitude* and *Fiscal Literacy* are built as an average score of responses as explained in Appendix Section B.2. In that section, more details on the *Carbon Licensing*, *Carbon Literacy* and *Fiscal Literacy* can also be found. The *CT support* and *IT support* are binary variables.

Table E2: Baseline Product Regressions with Controls.

	(1) b(se)	(2) b(se)	(3) b(se)	(4) b(se)
CT Treatment vs IT	0.11***	0.11***		
	(0.020)	(0.020)		
CT Treatment vs NP			0.06**	0.06**
			(0.020)	(0.020)
Baseline choice	3.06***	3.04***	3.09***	3.07***
	(0.036)	(0.039)	(0.034)	(0.036)
Age		0.00		0.00***
		(0.001)		(0.001)
Female		0.01		0.02
		(0.021)		(0.021)
Children n.		0.03**		0.02*
		(0.009)		(0.010)
Higher Education dummy		0.04*		0.02
		(0.021)		(0.022)
Budget Constraint		0.04*		0.07**
		(0.021)		(0.021)
Diet Restrictions		-0.04		-0.08**
		(0.026)		(0.027)
Political Orientation		0.01		0.01
		(0.012)		(0.012)
Climate Concern		0.00		0.02
		(0.011)		(0.011)
Import Attitude		0.04**		0.02+
		(0.015)		(0.014)
Governmental Trust		0.03**		0.03**
		(0.011)		(0.011)
Carbon Licensing		0.02+		0.02
		(0.012)		(0.013)
Constant	0.35***	-0.03	0.37***	-0.08
	(0.036)	(0.092)	(0.032)	(0.090)
N	9990	9950	10040	9965
R^2	0.479	0.481	0.481	0.484

+ < p 0.01, * p < 0.05, ** p < 0.01, *** p < 0.001.

Notes: Linear regression models clustered at the individual level with the inclusion of control variable coefficients in column 2 and 4. The dependent variable is the willingness to pay as the mid-switching point between the high-carbon and low-carbon goods. Standard Errors clustered at the individual level in parentheses.

Table E3: Pre-registered Models with Controls.

	(1) b(se)	(2) b(se)	(3) b(se)	(4) b(se)
CT Treatment vs IT	-0.06	-0.07^{+}		
	(0.039)	(0.036)		
CT Treatment vs NP			-0.07^{+}	-0.06
			(0.040)	(0.036)
Age		-0.00		0.00
		(0.001)		(0.001)
Female		0.08*		0.11**
		(0.037)		(0.037)
Children n.		0.07***		0.07***
		(0.015)		(0.016)
Higher Education dummy		0.02		0.05
		(0.038)		(0.039)
Budget Constraint		0.02		0.06
		(0.038)		(0.038)
Diet Restrictions		-0.64***		-0.75***
		(0.047)		(0.050)
Political Orientation		0.00		0.00
		(0.020)		(0.020)
Climate Concern		-0.11***		-0.09***
		(0.020)		(0.020)
Import Attitude		0.08**		0.06*
		(0.027)		(0.026)
Governmental Trust		0.03		0.03
		(0.018)		(0.020)
Carbon Licensing		0.07**		0.07***
		(0.022)		(0.022)
Constant	2.85***	2.81***	2.85***	2.63***
	(0.026)	(0.145)	(0.028)	(0.145)
N	9990	9950	10040	9965
R^2	0.000	0.042	0.000	0.049

$+ <$ p 0.01, * p < 0.05, ** p < 0.01, *** p < 0.001.

Notes: Pre-registered linear regression models clustered at the individual level with the inclusion of control variable coefficients in column 2 and 4. The dependent variable is the willingness to pay as the mid-switching point between the high-carbon and low-carbon goods. Standard Errors clustered at the individual level in parentheses.

Table E4: Pre-registered Sensitivity Check: Multiple Switching and Sold Back Options.

	(1) b(se)	(2) b(se)	(3) b(se)	(4) b(se)
CT Treatment vs IT	0.06***		0.11**	
	(0.016)		(0.038)	
CT Treatment vs NP		0.01		0.05
		(0.016)		(0.037)
Baseline choice	3.48***	3.49***	3.09***	3.15***
	(0.012)	(0.012)	(0.065)	(0.060)
Constant	-0.08*	-0.11**	0.40***	0.31**
	(0.038)	(0.039)	(0.106)	(0.102)
Demographic controls	Yes	Yes	Yes	Yes
N	9586	9580	3982	4046
R^2	0.579	0.579	0.456	0.471

+ < p 0.01, * p < 0.05, ** p < 0.01, *** p < 0.001.

Notes: Pre-registered linear regression models clustered at the individual level, where choices related to multiple switching and sold back options are excluded. The dependent variable is the willingness to pay as the mid-switching point between the high-carbon and low-carbon goods. Standard Errors clustered at the individual level in parentheses.

Table E5: Pre-registered Robustness Check: Attention Fail.

	(1) b(se)	(2) b(se)	(3) b(se)	(4) b(se)
CT Treatment vs IT	0.10***	0.11***		
	(0.020)	(0.020)		
CT Treatment vs NP			0.06**	0.06**
			(0.020)	(0.020)
Baseline choice	3.06***	3.05***	3.10***	3.07***
	(0.036)	(0.039)	(0.034)	(0.035)
Constant	0.35***	0.18**	0.36***	0.13*
	(0.036)	(0.055)	(0.032)	(0.054)
Demographic controls	No	Yes	No	Yes
N	9810	9770	9890	9815
R^2	0.480	0.481	0.485	0.486

+ < p 0.01, * p < 0.05, ** p < 0.01, *** p < 0.001.

Notes: Pre-registered linear regression models clustered at the individual level, where individuals who failed the attention test are excluded. The dependent variable is the willingness to pay as the mid-switching point between the high-carbon and low-carbon goods. Standard Errors clustered at the individual level in parentheses.

Table E6: Diff-in-diff Regression.

	(1) b(se)	(2) b(se)	(3) b(se)	(4) b(se)
CT Treatment vs IT	-0.06***	-0.06***		
	(0.011)	(0.010)		
CT Treatment vs NP			-0.04***	-0.04***
			(0.011)	(0.010)
Base price				
Low Tax	-0.20***	-0.20***	-0.18***	-0.18***
	(0.008)	(0.008)	(0.008)	(0.008)
Medium Tax	-0.37***	-0.37***	-0.33***	-0.33***
	(0.009)	(0.009)	(0.009)	(0.009)
High Tax	-0.48***	-0.48***	-0.43***	-0.43***
	(0.010)	(0.010)	(0.010)	(0.010)
Treatment X Low Tax	0.08***	0.08***		
	(0.011)	(0.011)		
Treatment X Medium Tax	0.08***	0.08***		
	(0.013)	(0.013)		
Treatment X High Tax	0.08***	0.08***		
	(0.014)	(0.014)		
Treatment X Low Tax			0.05***	0.05***
			(0.011)	(0.011)
Treatment X Medium Tax			0.04**	0.04**
			(0.013)	(0.013)
Treatment X High Tax			0.03*	0.03*
			(0.014)	(0.014)
Age		0.00		0.00*
		(0.000)		(0.000)
Female		0.04***		0.05***
		(0.010)		(0.010)
Children n.		0.01**		0.01+
		(0.004)		(0.004)
Higher Education dummy		-0.00		0.01
		(0.011)		(0.011)
Budget Constraint		0.00		0.01
		(0.010)		(0.011)
Diet Restrictions		-0.14***		-0.17***
		(0.012)		(0.013)
Political Orientation		0.00		0.00
		(0.006)		(0.006)
Climate Concern		-0.02***		-0.01*
		(0.006)		(0.006)
Import Attitude		0.03***		0.02***
		(0.007)		(0.007)
Governmental Trust		0.01		0.00
		(0.005)		(0.006)
Carbon Licensing		0.02**		0.02**
		(0.006)		(0.006)
Constant	0.82***	0.75***	0.80***	0.67***
	(0.007)	(0.040)	(0.007)	(0.040)
N	39960	39800	40160	39860
R^2	0.113	0.143	0.101	0.136

+ < p 0.01, * p < 0.05, ** p < 0.01, *** p < 0.001.

Notes: Interacted difference-in-difference regression models clustered at the individual level. The dependent variable is the high-carbon choice dummy. Standard Errors clustered at the individual level in parentheses.

Table E7: Three-way Interaction Diff-in-diff Regression.

	(1) b(se)	(2) b(se)
CT Treatment vs IT	0.01	
	(0.030)	
CT Treatment vs NP		0.03
		(0.029)
Low Tax	-0.17***	-0.22***
	(0.026)	(0.024)
Medium Tax	-0.34***	-0.39***
	(0.029)	(0.028)
High Tax	-0.46***	-0.48***
	(0.031)	(0.030)
Treatment X Low Tax	-0.10**	
	(0.036)	
Treatment X Medium Tax	-0.13**	
	(0.040)	
Treatment X High Tax	-0.11*	
	(0.044)	
Treatment X Low Tax		-0.06
		(0.034)
Treatment X Medium Tax		-0.08*
		(0.040)
Treatment X High Tax		-0.10*
		(0.043)
Treatment X Climate Concern	-0.02*	
	(0.010)	
Climate Concern X Low Tax	-0.01	0.01+
	(0.008)	(0.007)
Climate Concern X Medium Tax	-0.01	0.02*
	(0.009)	(0.008)
Climate Concern X High Tax	-0.00	0.02+
	(0.009)	(0.009)
Treatment X Low Tax X Climate Concern	0.06***	
	(0.011)	
Treatment X Medium Tax X Climate Concern	0.07***	
	(0.012)	
Treatment X High Tax X Climate Concern	0.06***	
	(0.013)	
Treatment X Climate Concern		-0.02*
		(0.009)
Treatment X Low Tax X Climate Concern		0.03***
		(0.010)
Treatment X Medium Tax X Climate Concern		0.04**
		(0.012)
Treatment X High Tax X Climate Concern		0.04**
		(0.013)
Constant	0.77***	0.72***
	(0.041)	(0.041)
Demographic controls	Yes	Yes
Attitude controls	Yes	Yes
N	39800	39860
R^2	0.145	0.137

+ < p 0.01, * p < 0.05, ** p < 0.01, *** p < 0.001.

Notes: Interacted difference-in-difference regression models clustered at the individual level. The dependent variable is the high-carbon choice dummy. Standard Errors clustered at the individual level in parentheses.

Table E8: Diagonal Switches Regression.

	(1) b(se)	(2) b(se)	(3) b(se)	(4) b(se)
CT Treatment vs IT			0.02***	0.02***
			(0.004)	(0.004)
CT Treatment vs NP	0.02***	0.02***		
	(0.004)	(0.004)		
Age		0.00**		0.00
		(0.000)		(0.000)
Female		-0.01		-0.01*
		(0.004)		(0.005)
Children n.		0.00		0.00
		(0.002)		(0.002)
Higher Education dummy		0.00		0.01*
		(0.004)		(0.004)
Budget Constraint		0.01**		0.01*
		(0.004)		(0.004)
Diet Restrictions		0.02***		0.02**
		(0.006)		(0.006)
Political Orientation		0.01*		0.01*
		(0.002)		(0.003)
Climate Concern		0.01**		0.01*
		(0.002)		(0.002)
Import Attitude		-0.01*		-0.00
		(0.003)		(0.003)
Governmental Trust		0.01*		0.01**
		(0.002)		(0.002)
Carbon Licensing		-0.00		-0.00
		(0.002)		(0.003)
Constant	0.01***	-0.04*	0.01***	-0.05*
	(0.002)	(0.017)	(0.002)	(0.020)
N	8058	8005	8081	8051
R^2	0.005	0.017	0.005	0.017

$+ <$ p 0.01, * p < 0.05, ** p < 0.01, *** p < 0.001.

Notes: Linear regression models clustered at the individual level with the long format dataset. The dependent variable is the diagonal switching. Standard Errors clustered at the individual level in parentheses.

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