

# Changing consumption behavior with carbon labels

## Causal evidence on behavioral channels and effectiveness

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# Why carbon labels on food items?

- Food system causes 26% - 34% of global greenhouse gas emissions (Poore and Nemecek (2018), Crippa et al (2021))
- Emissions from global food system alone make it difficult to realize the 2° target (Clark et al. (2020))
- BUT: Carbon taxes on agricultural goods uncommon and unpopular (Dechezleprêtre et al. (2022))

⇒ Carbon labels increasingly gaining attention

# Findings in a nutshell

## How effective are carbon labels?

- **Lab-in-the-field experiment:** Effectiveness comparable to that of a carbon tax of €120 / Ton
- **Field experiment:** Effective over six-week label period and in three-week post-label observation period

## What are the channels?

- **Lab-in-the-field experiment:** Correction of misperceptions plays a role, but the direction of attention is at least as important

## Do labels impose psychological costs on consumers?

- **Lab-in-the-field experiment:** Positive or neutral effect on consumer surplus
- **Field experiment:** Survey participants in favor of labels

▶ Role of food carbon emissions in global warming

# How effective are carbon labels?

Behavioral interventions on food consumption:

- Student restaurant context  
Lohmann et al (2022), Brunner et al (2018), Visschers and Siegrist (2015)
- Mixed evidence for one-shot lab setting and hypothetical studies  
Camilleri et al (2019), Imai et al (2022), Osman and Thornton (2019)
- Other contexts: grocery shopping, snacks  
e.g. Bilén (2022), Panzone et al (2021), Vlaeminck et al (2014)
- Other interventions in the restaurant context  
e.g. Jalil et al (2020), Cawley et al (2020), Bazoche et al (2021)

Challenge: reduced-form effect sizes strongly depend on restaurant offer and prices

⇒ Difficult to compare effects across contexts and policy instruments.

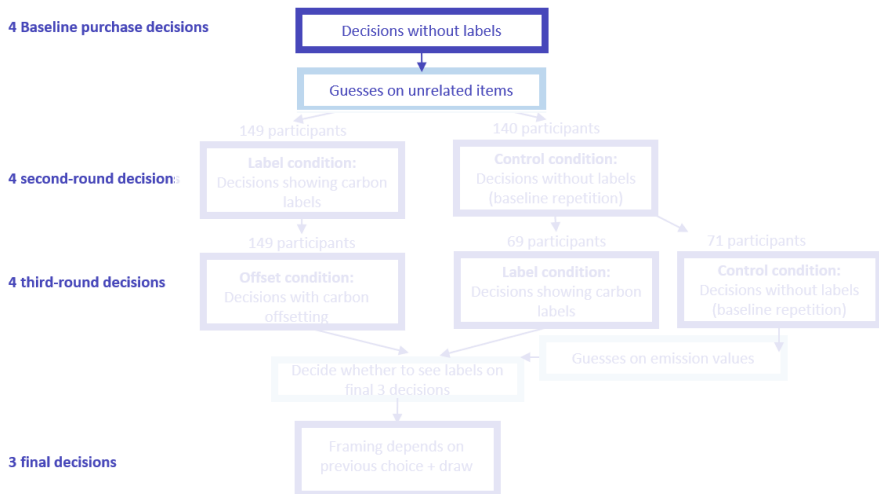
## Quantifying impact

For a more precise estimate of the impact of carbon labels, it would be optimal to:

- Observe demand for the same meal, under the same conditions, of the same individual, without and with carbon labels.
- Observe change in demand as change in willingness-to-pay rather than just quantities.

⇒ Increase control in a lab-in-the-field experiment!

# Set-up experiment 1



## Example meal decision

Which meal do you prefer? Click on one of the two buttons.



<p>Sliced beef with potatoes</p>  Beef	or	<p>Cheese sandwich</p>  Vegetarian
<input type="button" value="Sliced beef with potatoes"/>		<input type="button" value="Cheese sandwich"/>

Figure: Meal purchase decision example: Step 1 of the purchasing decision

# Decisions lab-in-the-field experiment

Sliced beef with potatoes

Cheese sandwich

In case you are allocated to receive the cheese sandwich: How much of your payment would you **at most** forego to exchange it for Sliced beef with potatoes?

*(Click on the gray bar to make the slider visible.)*



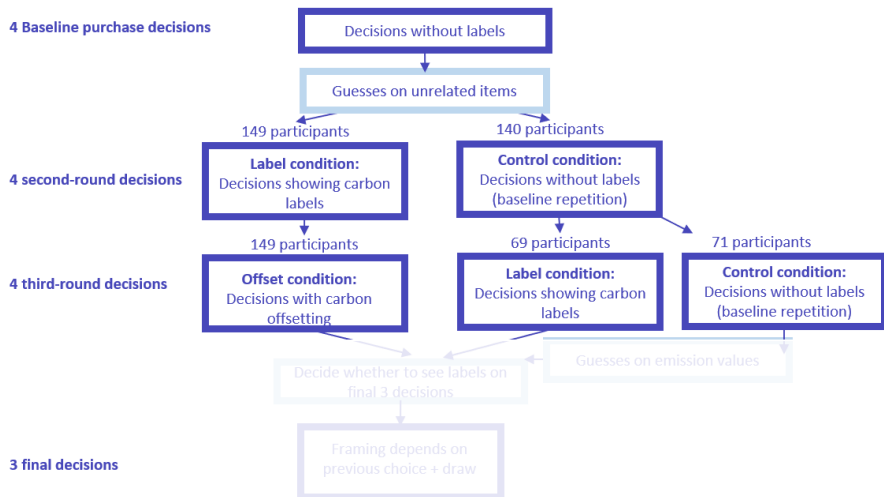
You want to forego at most **1,25 €** of your payment to receive **Sliced beef with potatoes** instead of the cheese sandwich.

Next

Figure: Meal purchase decision example: Step 2 of the purchasing decision




# Set-up experiment 1



# Decisions with label

Which meal do you prefer? Click on one of the two buttons.

Sliced beef  
with potatoes

**CO<sub>2</sub>**  Causes 3,4 kg CO<sub>2</sub>  
≈ 17,0 km car drive



Sliced beef with potatoes

or

Cheese sandwich

**CO<sub>2</sub>**  Causes 0,7 kg CO<sub>2</sub>  
≈ 3,5 km car drive



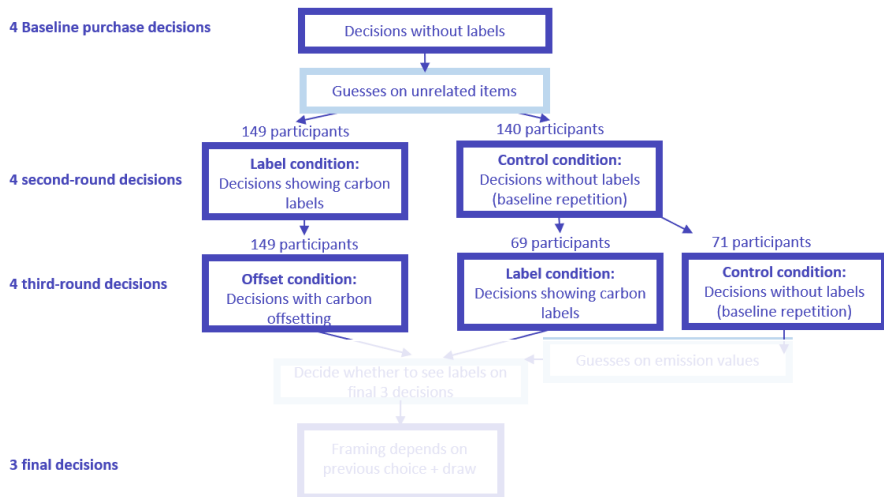
Cheese sandwich

# Payout lab-in-the-field experiment

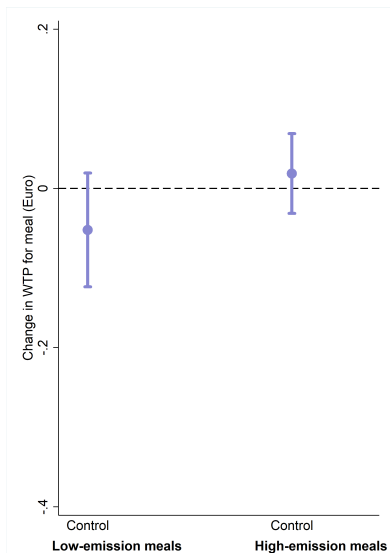


» Incentives

# Set-up experiment 1

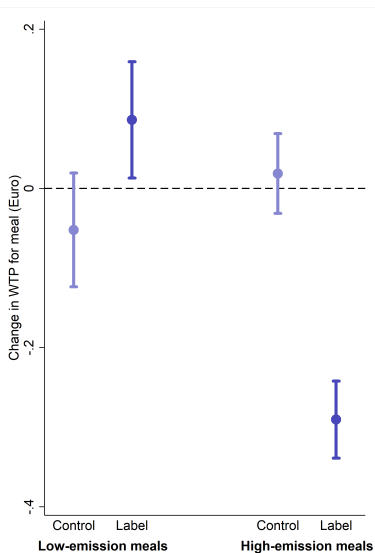


## Change in WTP without and with labels



- Effect of simply asking for WTP twice is not significant and direction opposite to expected treatment effect.

## Change in WTP without and with labels



- Effect of simply asking for WTP twice is not significant and direction opposite to expected treatment effect.
- The label decreases WTP for high-emission meals by 0.31 Euro ( $p < 0.01$ ).
- On average, WTP decreases by 0.12 Euro for every additional kg of emissions relative to the cheese sandwich ( $p < 0.01$ ).
- Based on 1,716 observations from 140 control and 218 treated participants.

▶▶ Baseline WTP

▶▶ Regression

## What are the channels?

# What are the channels?

No causal evidence yet on channels

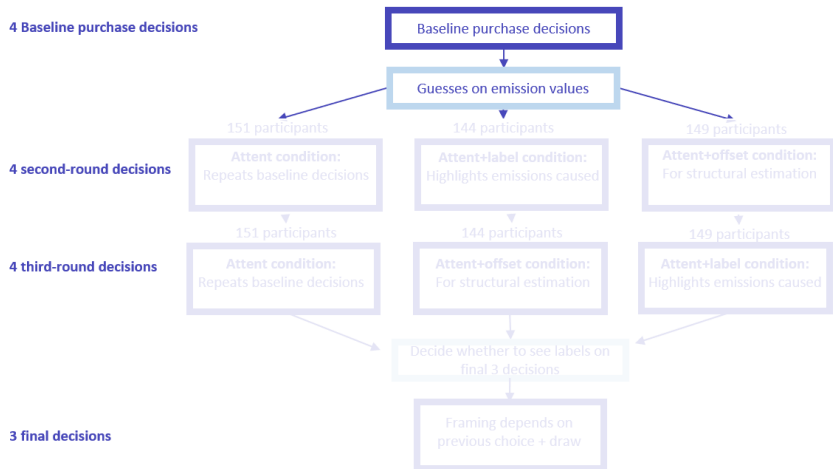
- General assumption: Correction of misperceptions  
e.g. Shewmake et al. (2015), Camilleri et al. (2019), Imai et al. (2022)
- Evidence from other contexts: Importance of attentional biases  
e.g. Tiefenbeck et al. (2018), Allcott and Taubinsky (2015), Taubinsky and Rees-Jones (2018)

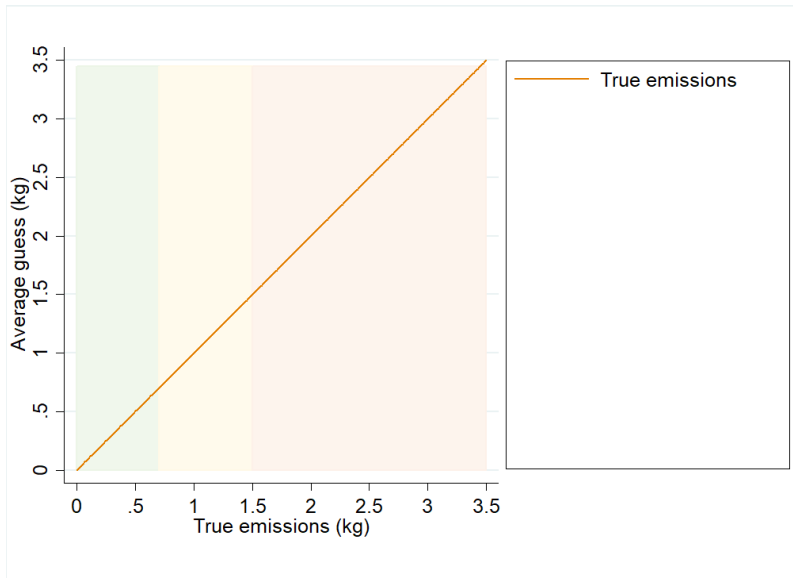
Challenge: Want an experiment design that allows to attribute part of the effect size to different channels.

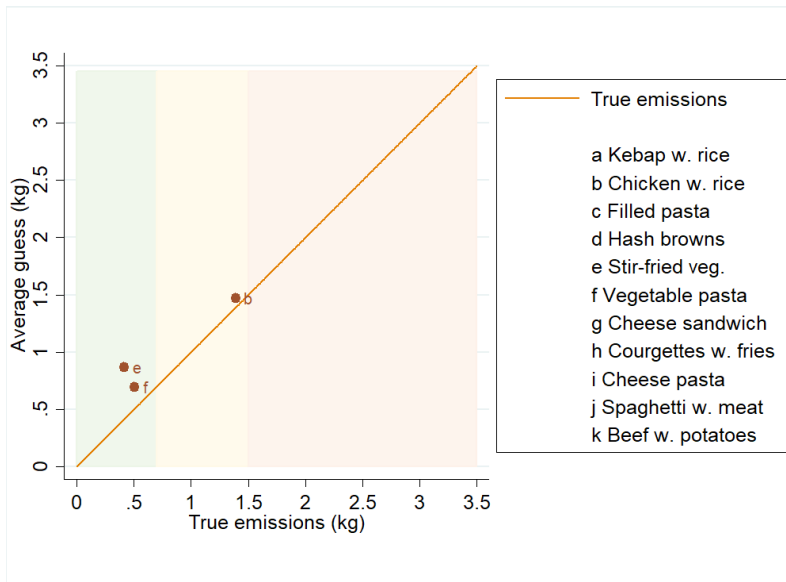
⇒ Second lab-in-the-field experiment



# Set-up experiment 2



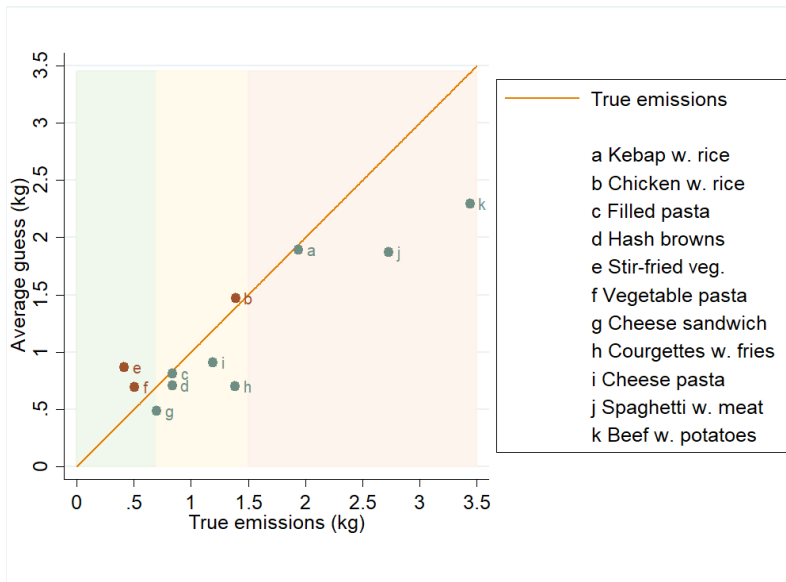




Plot based on 5,000 emission guesses of 502 participants.

▶▶ Regression

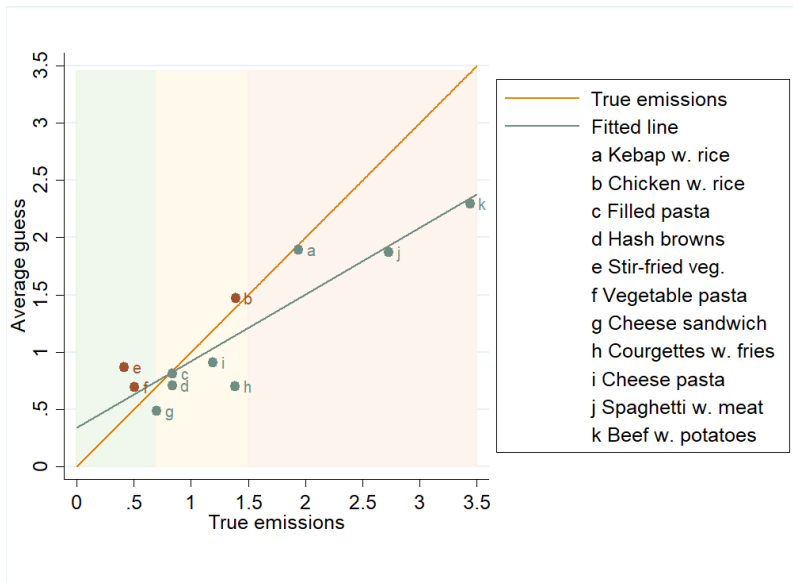
▶▶ Guess screen



Plot based on 5,000 emission guesses of 502 participants.

▶▶ Regression

▶▶ Guess screen



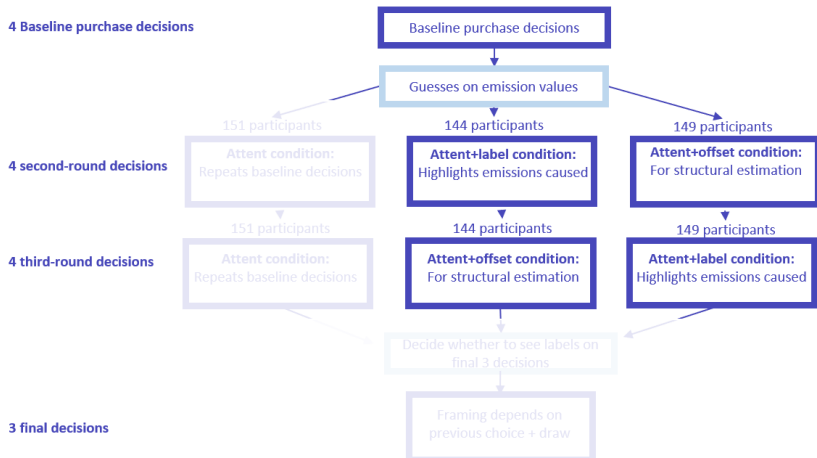
Plot based on 5,000 emission guesses of 502 participants.

▶ Regression

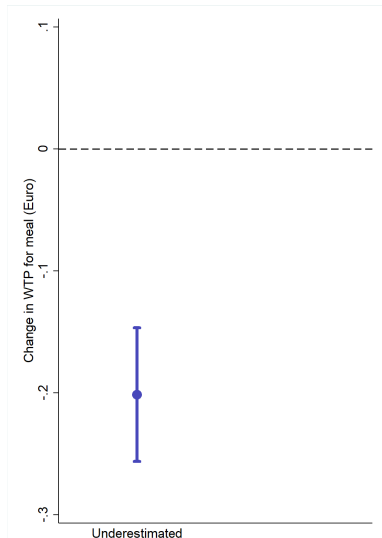
▶ Magnitude initial guesses

▶ Guess screen

# Set-up experiment 2

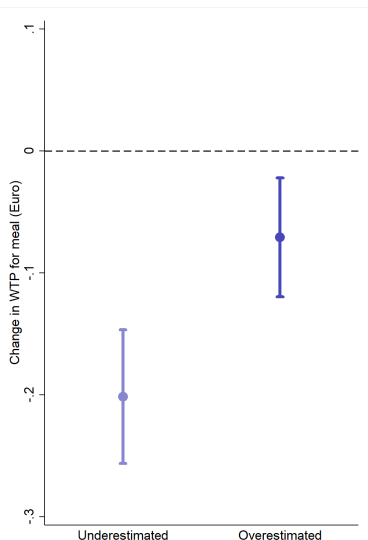


# Correction of misperceptions as the driver?



- If emissions were underestimated (528 cases):
  - WTP decreases by 0.23 Euro ( $p < 0.01$ ).

# Correction of misperceptions as the driver?



- If emissions were underestimated (555 cases):
  - WTP decreases by 0.23 Euro ( $p < 0.01$ ).
- If emissions were overestimated (562 cases):
  - WTP decreases by 0.10 Euro (difference significant at  $p < 1\%$ ).
- Based on observations from 293 participants who guessed emissions and were then shown the label.

» Regression

» By prev. knowledge



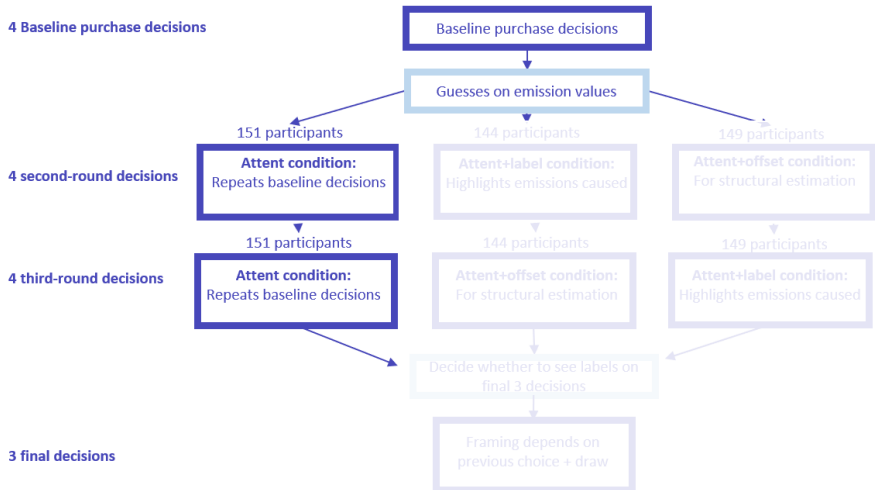
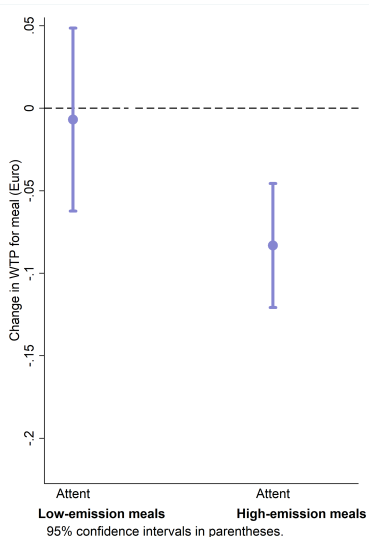


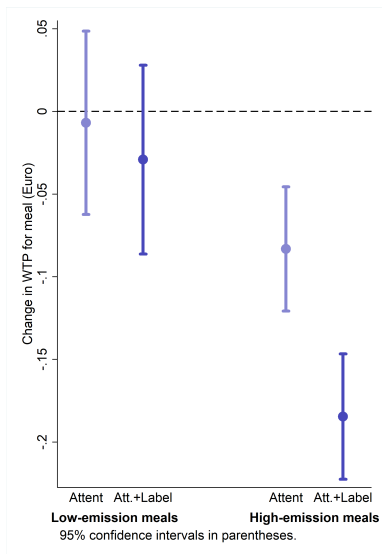
Figure: Experiment schedule and treatment groups

# Role of attention



- With only an increase in attention:
  - WTP decreases by 0.10 Euro ( $p < 0.01$ ) for high emission meals.

# Role of attention

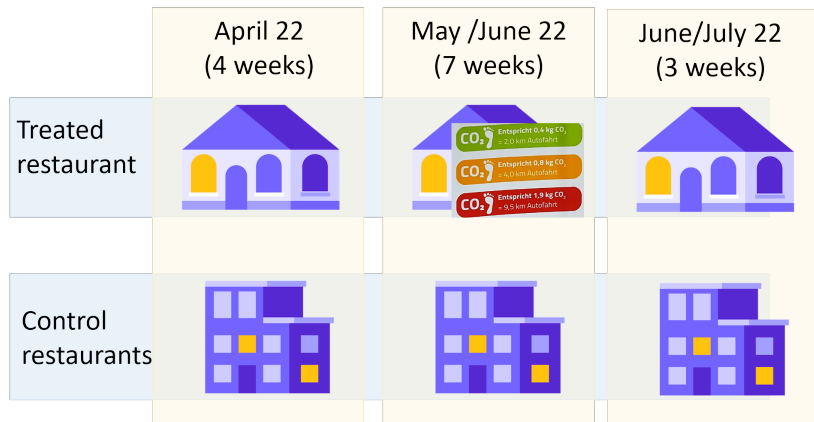


- With only an increase in attention:
  - WTP decreases by 0.10 Euro ( $p < 0.01$ ) for high emission meals.
- If additionally labels are provided: :
  - WTP decreases by an additional 0.10 Euro ( $p < 0.01$ ) for high emission meals.
- Based on observations from 151 participants with increased attention and 293 participants additionally shown the labels.

» Regression

# Are carbon labels effective outside of a one-shot setting?

## Field experiment set-up




Data on consumption choices: guest's ID, meal choice, date and time.

▶ Field study contribution

# Emission labels in treated restaurant (7 weeks)

**Lentille vegetable dish**




	Stud. 1,35 €
	Emp. 2,60 €
	Guest 4,00 €

Allergenic's & Additives

**0.2 kg CO<sub>2</sub>**

**Sausage in mustard sauce**



	Stud. 1,85 €
	Emp. 2,70 €
	Guest 4,00 €

Allergenic's & Additives

**0.9 kg CO<sub>2</sub>**

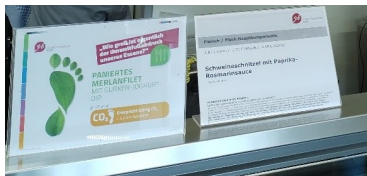


Figure: Display online (left) and in the student restaurant(right).

## Field experiment results

Difference-in-difference analysis identifies:

- 2 percentage point reduction in meat consumption ( $\approx$  5 percent decrease)
- Decrease in meat consumption persists in 3-week post-intervention period
- Estimates similar when estimating intent-to-treat effects (classifying individuals as CONTROL or TREATED based on their restaurant patterns pre-intervention)

▶▶ Regression equation

▶▶ Results table

▶▶ Restaurant switching

▶▶ Visitor numbers

▶▶ Weekly trends

▶▶ Effect on emissions

▶▶ Heterogenous effects

# Psychological costs?



# Do carbon labels impose psychological costs on consumers?

- Importance of considering possible psychological costs  
Allcott and Kessler (2019), Butera et al (2020), Thunstrom (2019)

**Here:** First study to evaluate the impact of carbon labels on consumer surplus. Designed final stage of lab-in-the-field experiments to elicit consumer surplus:

- Directly elicit participants' willingness to pay to see or avoid carbon labels
- Elicit a variety of individual characteristics for suggestive heterogeneity analysis

# Lab-in-the-field experiment quantifies effect on consumer surplus

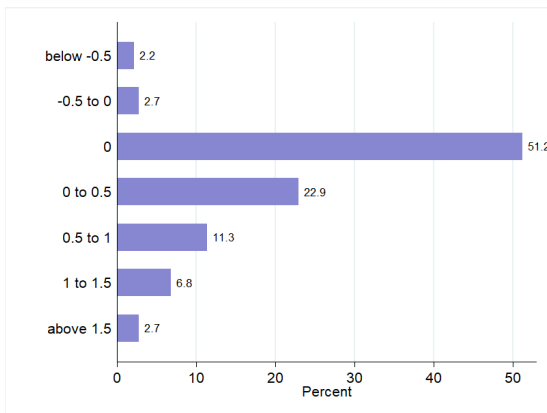


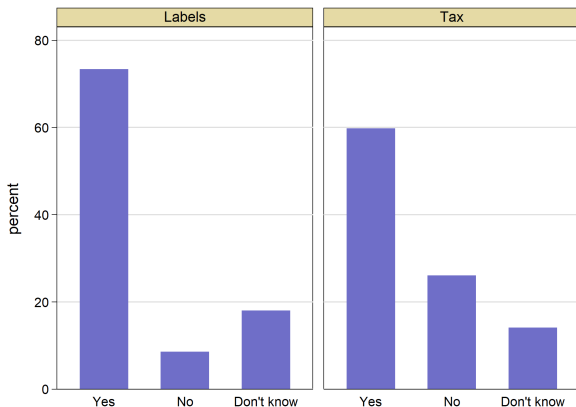
Figure: Average willingness to pay to see labels, 731 participants.

▶▶ By treatment

▶▶ By characteristics

## Survey results from field experiment

Students in favor of a permanent implementation of carbon labels vs. carbon tax



Based on 234 survey responses [▶ Opinion by impact](#)

# Findings in a nutshell

## How effective are carbon labels?

- **Lab-in-the-field experiment:** Effectiveness comparable to that of a carbon tax of €120 / Ton
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## What are the channels?

- **Lab-in-the-field experiment:** Correction of misperceptions plays a role, but the direction of attention is at least as important

## Do labels impose psychological costs on consumers?

- **Lab-in-the-field experiment:** Positive or neutral effect on consumer surplus
- **Field experiment:** Survey participants in favor of labels

# Attention vs. Label

	(1)
High emission meal x Shown label	-0.10*** (0.04)
Low emission meal x Shown label	-0.02 (0.04)
High emission meal	-0.10*** (0.03)
Low emission meal	-0.02 (0.03)
Control for third round	0.03 (0.02)
Participants attent	151
Participants label	293
Observations	2,380

Standard errors in parentheses

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

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# Label effects by misperception

	(1)	(2)
Underestimated emissions	-0.13*** (0.04)	
Underestimation (in kg)		-0.07*** (0.02)
Control for third round	0.05 (0.05)	0.07 (0.05)
Constant	-0.10*** (0.04)	-0.16*** (0.03)
Participants	293	270
Obs. underestimate	555	515
Obs. overestimate	562	494
Observations	1,117	1,009

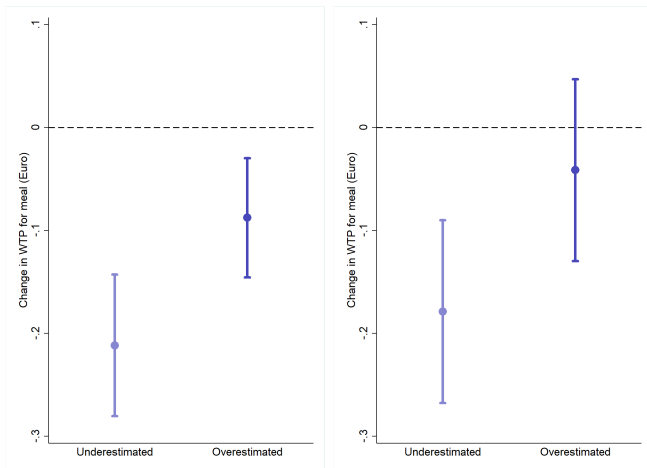
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▶ Back

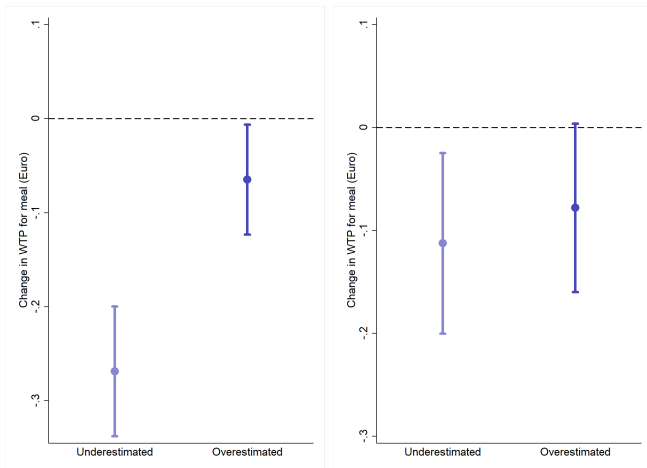
## Good knowledge vs. bad knowledge

At least three ranks correct (194 participants) vs. at most two ranks correct (90 participants) [▶▶ Back](#)



## Good knowledge vs. bad knowledge

At least three correctly guessed magnitudes (171 participants) vs. at most two magnitudes correct (129 participants) [» Back](#)





Meal	Relative emissions	No. underestimated	No. overestimated	No. correct	Total
Vegetable pasta	-0.2 kg	31	249	13	293
Chicken w. rice	0.7 kg	47	163	17	227
Courgettes w. fries	0.7 kg	249	33	11	293
Cheese pasta	0.5 kg	31	24	11	66
Beef w. potatoes	2.7 kg	193	32	2	227
Stir-fried veg.	-0.3 kg	4	61	1	66
<b>Total</b>	<b>654</b>	<b>459</b>	<b>59</b>	<b>55</b>	<b>1.172</b>

No. of correctly ranked meals	No. participants
0	11
2	88
3	188
4	6
Total	289

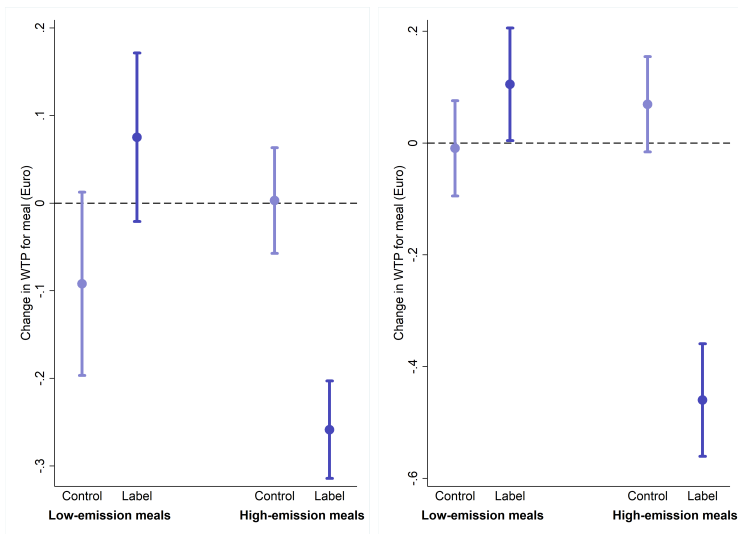
	(1)	(2)
High emission meal x Shown label	-0.31*** (0.05)	
Low emission meal x Shown label	0.14*** (0.04)	
High emission meal	0.01 (0.02)	
Low emission meal	-0.06* (0.03)	
Emissions(kg) x Shown label		-0.12*** (0.03)
Emissions(kg)		0.02 (0.01)
Shown label		-0.08** (0.03)
Control for third round	0.01 (0.03)	0.02 (0.03)
Constant		-0.02 (0.02)
Participants control	140	140
Participants treated	218	218
Observations	1,716	1,716

Standard errors in parentheses

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

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# Non-vegetarians vs. vegetarians



# Effectiveness of carbon labels in the field

## Evidence for carbon labels being effective in the student restaurant context

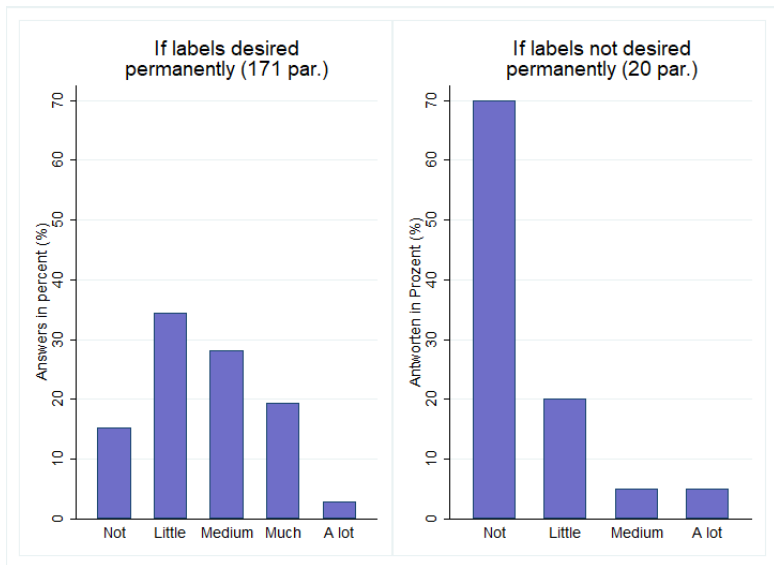
- Correlational evidence  
e.g. Brunner et al (2018), Vlaeminck et al (2014), Spaargaren et al (2013), Visschers and Siegrist (2015)
- Difference-in-difference evidence (causal interpretation)  
Lohmann et al (2022)

Here:

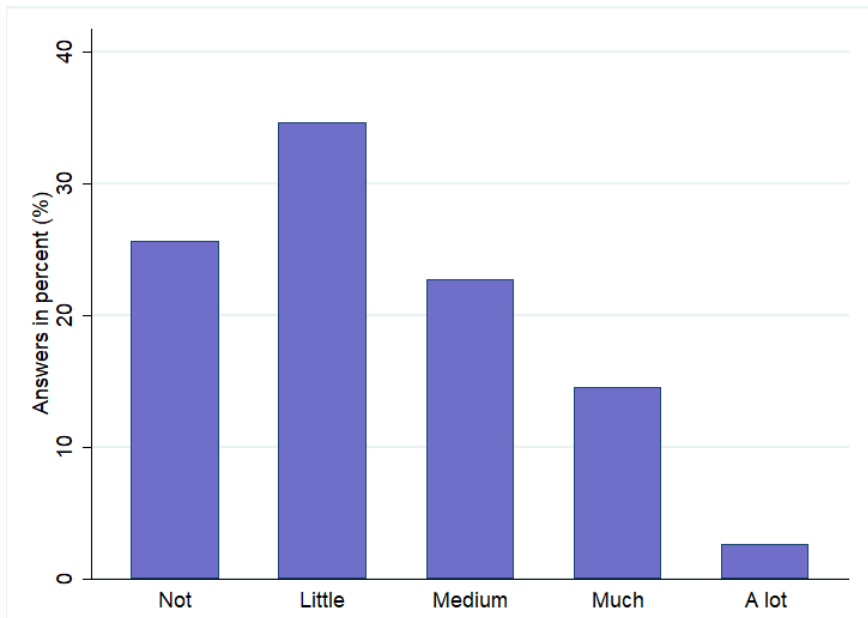
- First evidence on post-intervention effects
- Control and treated restaurants offer same meals
- Accompanying surveys

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## In how far did you include the labels in your decisions?



## In how far did you include the labels in your decisions?



# Spillovers?

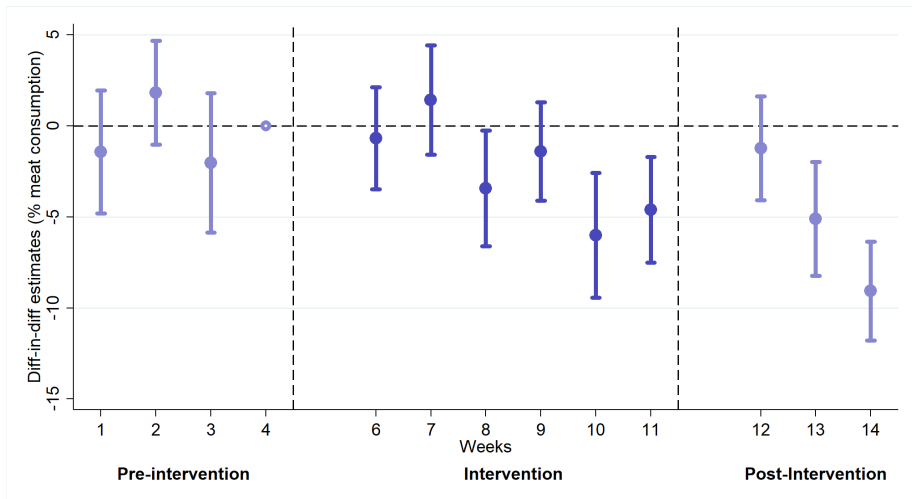
Of survey responders:

- 11% of control guests report having seen the labels at some point
- 76% of treated guests report having seen the labels. Of those who did not, 28% did not visit restaurant during treatment period.

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# Diff-in-diff estimates

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# Heterogenous effects in the field

	(1) All	(2) Employees	(3) Non-busy time	(4) Card payment	(5) Frequent
Treatment restaurant x Label period	-2.07*** (0.75)	-5.43** (2.76)	-2.37** (0.98)	-3.09*** (0.94)	-2.88** (1.15)
Treatment restaurant x Post period	-5.27*** (0.86)	-10.84*** (3.18)	-3.42*** (1.14)	-7.40*** (1.12)	-6.50*** (1.36)
Treatment restaurant	-13.44*** (0.76)	-2.43 (2.40)	-15.09*** (1.02)	-7.71*** (1.03)	-7.69*** (1.24)
Second veg. main	-3.59*** (0.51)	-1.87 (1.39)	-3.12*** (0.69)	-4.86*** (0.68)	-4.52*** (0.81)
Price difference	-5.17*** (1.90)	-4.86 (5.54)	-6.68*** (2.52)	-5.59** (2.43)	-5.78** (2.93)
Number of meal options	-1.47*** (0.26)	-0.38 (0.63)	-2.26*** (0.35)	-0.77** (0.34)	-0.62 (0.41)
Total daily sales	-0.91*** (0.06)	-0.25** (0.12)	-1.04*** (0.08)	-0.10 (0.08)	-0.25*** (0.09)
Date effects	Yes	Yes	Yes	Yes	Yes
Fixed effects	No	No	No	No	No
Guests control	6,935	883	3,808	6,927	2,246
Guests treated	2,822	266	1,684	2,817	864
Observations	121,071	21,052	68,215	82,745	58,264

Standard errors in parentheses

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

# Heterogenous effects in the field

	(1) All	(2) Survey	(3) Male	(4) Above 23	(5) Env. important
Treatment restaurant x Label period	-3.09*** (0.94)	-4.54** (1.86)	-3.94 (2.78)	0.98 (3.31)	-3.79 (2.32)
Treatment restaurant x Post period	-7.40*** (1.12)	-8.72*** (2.27)	-9.60*** (3.50)	-7.36* (4.11)	-7.03** (2.82)
Treatment restaurant	-7.71*** (1.03)	8.96*** (2.38)	3.40 (4.24)	5.40 (4.18)	2.92 (2.96)
Second veg. main	-4.86*** (0.68)	-5.41*** (1.49)	-8.96*** (2.45)	-6.66** (2.74)	-2.84 (1.76)
Price difference	-5.59** (2.43)	-0.39 (4.99)	0.31 (7.65)	-3.65 (9.09)	-6.32 (6.31)
Number of meal options	-0.77** (0.34)	1.09 (0.80)	1.34 (1.30)	0.37 (1.42)	0.40 (0.99)
Total daily sales	-0.10 (0.08)	1.77*** (0.22)	1.32*** (0.47)	1.89*** (0.40)	1.20*** (0.25)
Date effects	Yes	Yes	Yes	Yes	Yes
Fixed effects	No	No	No	No	No
Guests control	6,927	907	362	301	472
Guests treated	2,817	560	247	191	249
Observations	82,745	16,439	8,091	5,326	7,704

Standard errors in parentheses

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

# Regression equation

$$\begin{aligned} \text{Meat}_{it} = & \alpha + \beta \text{Treat}_{it} + \gamma \text{LabelPeriod}_t \\ & + \delta(\text{Treat}_{it} * \text{LabelPeriod}_t) + X_{it} + \epsilon_{it} \quad (1) \end{aligned}$$

where:

- $\text{Meat}_{it}$ : equals 1 if individual  $i$  consumed meat on date  $t$ , equals 0 if consumed vegetarian
- $\text{Treat}_{it}$  is an indicator whether  $i$  eats in treated restaurant on date  $t$
- $\text{LabelPeriod}_t$  is an indicator whether date  $t$  is in the labeling phase

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	(1)	(2)	(3)	(4)
	Meat meal	Meat meal	Meat meal	Meat meal
Treatment restaurant x Label period	-2.09*** (0.74)	-2.07*** (0.74)	-2.07*** (0.75)	-1.53* (0.92)
Treatment restaurant x Post period	-6.89*** (0.82)	-6.82*** (0.82)	-5.27*** (0.86)	-3.15*** (1.17)
Treatment restaurant	-10.09*** (0.59)	-9.98*** (0.59)	-13.44*** (0.76)	
Label period	0.55 (0.42)			
Post period	0.83* (0.47)			
Second veg. main			-3.59*** (0.51)	-3.14*** (0.64)
Price difference			-5.17*** (1.90)	-5.89** (2.44)
Number of meal options			-1.47*** (0.26)	0.99*** (0.32)
Total daily sales			-0.91*** (0.06)	
Date effects	No	Yes	Yes	Yes
Fixed effects	No	No	No	Yes
Guests control	6,936	6,936	6,936	1,949
Guests treated	2,821	2,821	2,821	680
Observations	121,071	121,071	121,071	49,921

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ [▶ Restaurant switching](#)[▶ Visitor numbers](#)[▶ Weekly trends](#)[▶ Effect on emissions](#)[▶ Heterogenous effects](#)[▶ Back](#)

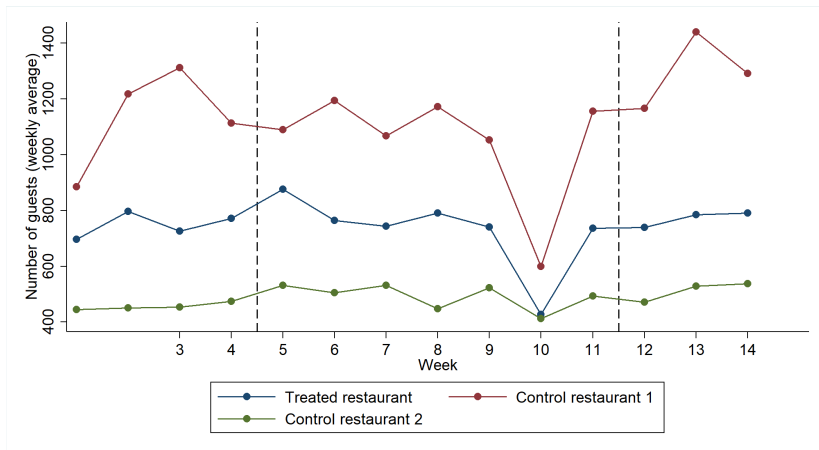
## Effect on greenhouse gas emissions in the field

	(1)	(2)	(3)	(4)
	GHGE (g)	GHGE (g)	GHGE (g)	GHGE (g)
Treatment restaurant x Label period	-16.18 (11.21)	-24.78** (10.22)	-23.52** (10.19)	-51.40 (37.28)
Treatment restaurant	-50.41*** (7.40)	-45.32*** (6.70)	-49.39*** (8.23)	
Label period	4.72 (6.25)			
Number of meal options			2.93 (3.37)	27.53** (13.25)
Total daily sales			-6.83*** (1.14)	
Date effects	No	Yes	Yes	Yes
Fixed effects	No	No	No	Yes
Guests control	5,076	5,076	5,076	166
Guests treated	1,998	1,998	1,998	39
Observations	33,711	33,711	33,711	2,365

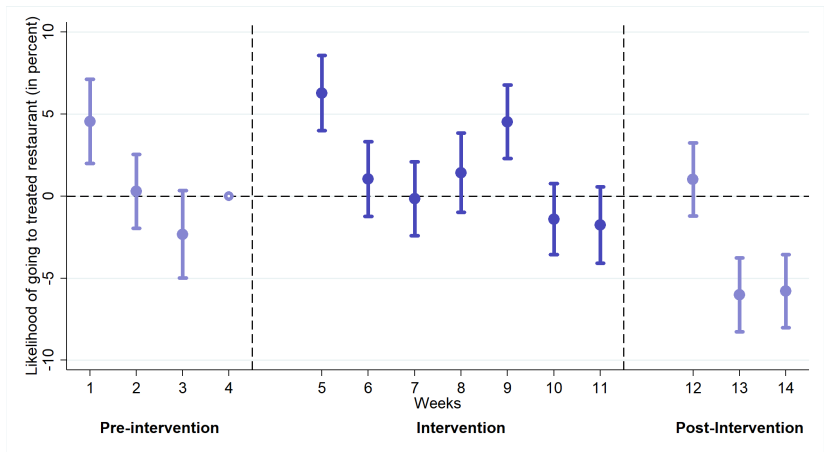
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# Average number of daily guests


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# Likelihood of visiting treated restaurant

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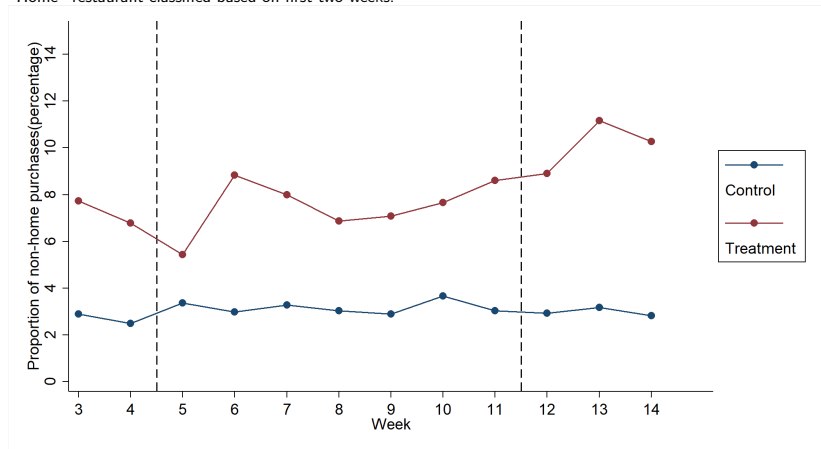


# Restaurant switchers

Sample:

- Payment with individual card, at least 10 visits during 12 week period, at least one visit in first two weeks
- Individual ate at same restaurant on 80% of visits in first two weeks (93% of remaining sample)

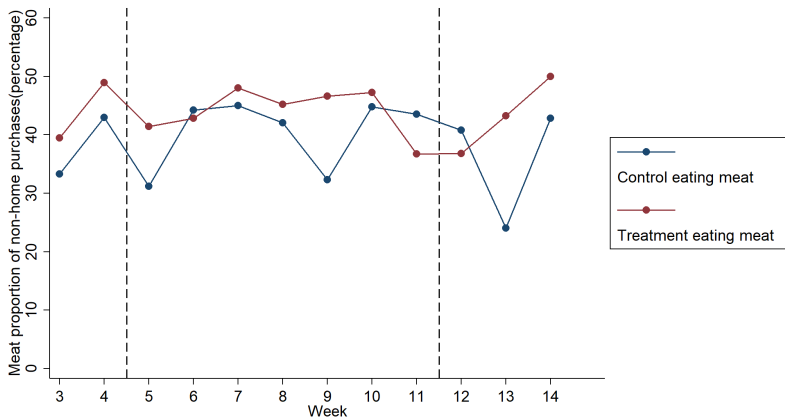
"Home" restaurant classified based on first two weeks:



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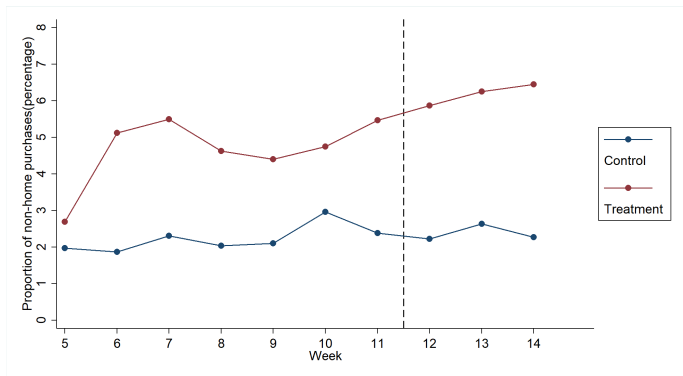
# Restaurant switchers

Of the switchers: How many ate meat at the "non-home" restaurant?



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# Restaurant switchers based on entire pre-intervention

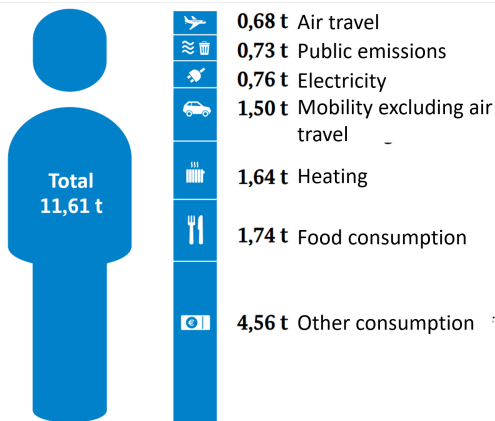
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# Food consumption plays a relevant part in global warming

- Potential for reduction through behavioral change:
  - Typical food consumption emits 1.7 tons of  $CO_2$  annually
  - Vegetarian consumption reduces amount to 1.1 tons
  - Vegan consumption reduces it to 0.64 tons (Potsdam Institute for Climate Research)
- As a comparison: Annual  $CO_2$  budget of every person if we take UN goals seriously: 1.5 tons
- Another comparison: Return flight from Berlin to London emits around 0.5 tons of  $CO_2$

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# Greenhouse gas emissions of an average German citizen



**Figure:** Greenhouse gas emissions in  $CO_2$  equivalents. Source: Federal environment agency, 2020

## How choices affect pay-out

Participants make a total of 15 choices. **One choice** is implemented:

- 50% probability that participants get their preferred meal without additional cost.
- In other 50% of cases: random draw of exchange price. Then if  $WTP \geq Price$ : Meals exchanged, exchange price deducted from payment.
- Participants pick up meal together with payment.



# Meals

12 of the 15 choices revolve around **the same four meals**.

For non-vegetarians, these are:

- Italian vegetables with pasta (0.5 kg emissions)
- Chicken with fruity sauce and rice (1.4 kg emissions)
- Stuffed courgettes with croquettes (1.4 kg emissions)
- Sliced beef with potatoes (3.4 kg emissions)

Alternative: cheese sandwich (0.7 kg emissions)

# Label group (↑ awareness, ↑ knowledge)

## First round:

Which meal do you prefer? Click on one of the two buttons.

Sliced beef  
with potatoes



Sliced beef with potatoes

or

Cheese sandwich



Cheese sandwich

## Second round:

Which meal do you prefer? Click on one of the two buttons.

Sliced beef  
with potatoes

**CO<sub>2</sub>** Causes 3,4 kg CO<sub>2</sub>  
≈ 17,0 km car drive



Sliced beef with potatoes

or

Cheese sandwich

**CO<sub>2</sub>** Causes 0,7 kg CO<sub>2</sub>  
≈ 3,5 km car drive





Cheese sandwich



# Scenario B: Someone prefers the cheese sandwich

## Step 1

Which meal do you prefer? Click on one of the two buttons.

<p>Sliced beef with potatoes</p> 	or	<p>Cheese sandwich</p> 
<input type="button" value="Sliced beef with potatoes"/>		<input type="button" value="Cheese sandwich"/>

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## Scenario B: Someone prefers the cheese sandwich

### Step 2

Sliced beef with potatoes

Cheese sandwich

In case you are allocated to receive Sliced beef with potatoes: How much of your payment would you **at most** forego to exchange it for a cheese sandwich?

*(Click on the gray bar to make the slider visible.)*




You want to forego at most **0,80 €** of your payment to receive the **cheese sandwich** instead of Sliced beef with potatoes.


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# Label example

Sliced beef  
with potatoes

**CO<sub>2</sub>**  Causes 3,4 kg CO<sub>2</sub>  
≈ 17,0 km car drive

 Beef

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# Control group

## First round:

Which meal do you prefer? Click on one of the two buttons.

Sliced beef  
with potatoes



Beef

Sliced beef with potatoes

or

Cheese sandwich



Vegetarian

Cheese sandwich

## Second round:

Which meal do you prefer? Click on one of the two buttons.

Sliced beef  
with potatoes



Beef

Sliced beef with potatoes

or

Cheese sandwich



Vegetarian


Cheese sandwich


## Aware group (↑ awareness)

As control group, but in between rounds:

Guess the emissions:


**Sliced beef  
with potatoes**


 Causes 7 kg CO<sub>2</sub>

 Beef

As a comparison:

**Red Thai Curry with pork  
and rice**

 Causes 1,7 kg CO<sub>2</sub>  
≈ 8,5 km car drive

 Pork

I would guess that the meal 'Sliced beef with potatoes' causes emissions of

 kg.

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# Offset group (↓ guilt)

## First round:

Which meal do you prefer? Click on one of the two buttons.

Sliced beef  
with potatoes



Sliced beef with potatoes

or

Cheese sandwich



Cheese sandwich

## Second round:

Which meal do you prefer? Click on one of the two buttons.

Sliced beef  
with potatoes



Sliced beef with potatoes

CO<sub>2</sub>-neutral due to  
offsetting

or

Cheese sandwich



Cheese sandwich

CO<sub>2</sub>-neutral due to  
offsetting

# Descriptives experiment 1

Variable	Explanation	Mean	Std. Dev.
Age	Age of participant	24.16	7.05
Male	Dummy: 1 if participant is a man	0.33	–
Student	Dummy: 1 if participant is a student	0.80	–
Working	Dummy: 1 if participant is working in some form	0.62	–
Meat-eater	Dummy: 1 if participant eats meat	0.75	–
Hungry	Hunger on scale of 1 to 10 beginning experiment	5.16	2.58
N	289		

As pre-registered, I

- excluded participants who did not get the comprehension questions right on their 6th try
- excluded the 3% fastest participants

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## Descriptives experiment 2

Variable	Explanation	Mean	Std. Dev.
Age	Age of participant	25.77	7.02
Male	Dummy: 1 if participant is a man	0.45	–
Student	Dummy: 1 if participant is a student	0.69	–
Working	Dummy: 1 if participant is working in some form	0.74	–
Meat-eater	Dummy: 1 if participant eats meat	0.76	–
Hungry	Hunger on scale of 1 to 10 beginning experiment	4.85	2.54
N	444		

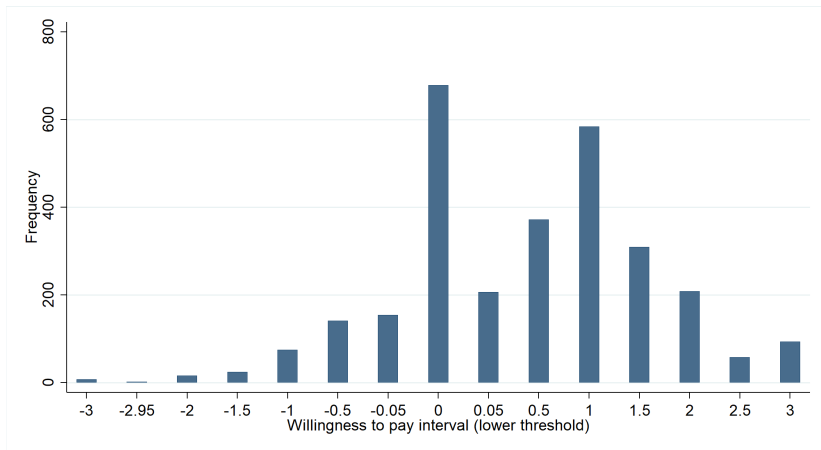
As pre-registered, I

- excluded participants who did not get the comprehension questions right on their 6th try
- excluded the 3% fastest participants

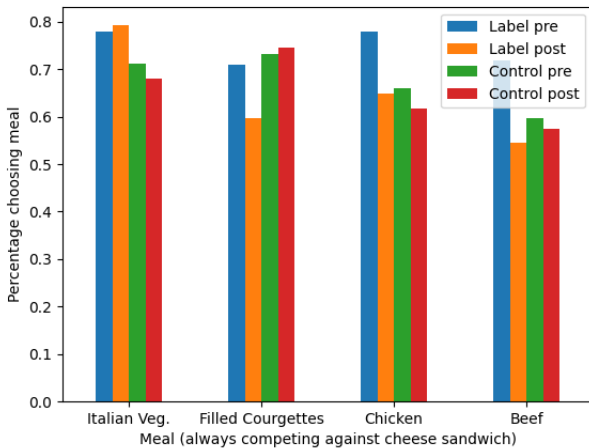
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# Frequency of initially indicated WTP values

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# Percentage choosing meal in info vs. no info condition



## Baseline WTP by treatment (only non-vegetarians)

Treatment	Count	WTP			
		Vegetables	Chicken	Courgettes	Beef
Control	144	0.57 (0.77)	0.58 (1.02)	0.54 (0.88)	0.65 (1.11)
Labels	169	0.71 (0.86)	0.64 (1.06)	0.64 (0.93)	0.59 (1.04)

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## Baseline WTP by treatment (only non-vegetarians)

Treatment	Count	WTP			
		Vegetables	Chicken	Courgettes	Beef
Attention	224	0.71 (0.96)	0.69 (1.21)	0.73 (1.04)	0.70 (1.19)
Labels	227	0.64 (0.87)	0.67 (0.96)	0.52 (0.91)	0.66 (1.05)

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	(1)
	Guess
True emissions	0.57*** (0.02)
Constant	0.39*** (0.02)
Participants	491
Observations	4,261

Standard errors in parentheses

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


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# Example guessing question

## Incentivized, comparison meal the same across guesses

Guess the emissions:


Sliced beef with potatoes


 Causes 7 kg CO<sub>2</sub>

 Beef

As a comparison:

Red Thai Curry with pork and rice

 Causes 1,7 kg CO<sub>2</sub>  
≈ 8,5 km car drive

 Pork

I would guess that the meal 'Sliced beef with potatoes' causes emissions of

kg.

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# WTP to see labels by treatment group

	(1) wtp
Control, then Label	-0.13 (0.08)
Label, then Offset	-0.11* (0.07)
Attent, then Attent	-0.08 (0.07)
Attent+Label, then Offset	-0.07 (0.07)
Attent+Offset, then Labels	-0.04 (0.07)
Control, then Control	0.00 (.)
Constant	0.28*** (0.05)
N	731

Standard errors in parentheses

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

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# WTP to see labels by individual characteristics

	(1)	(2)	(3)	(4)	(5)
Perceived strength of social norms	0.01* (0.01)				
In favor of labels in student restaurant		0.03*** (0.01)			
Self-reported willingness to use info			0.03*** (0.01)		
Self-reported confidence in own knowledge				-0.03 (0.02)	
Eating self-control					0.01 (0.03)
Constant	0.15*** (0.03)	-0.03 (0.06)	0.03 (0.04)	0.20*** (0.02)	0.20*** (0.02)
Observations	732	732	732	732	732

Standard errors in parentheses

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

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# WTP to see labels by treatment effect

	(1)
Decrease in WTP for highest-emission meal	-0.21*** (0.02)
Constant	0.15*** (0.02)
Observations	397

Standard errors in parentheses

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

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