Carbon information, pricing, and bans. Evidence from a field experiment

Yurii Handziuk Stefano Lovo

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Motivation and Research question

- **Fact 1:** whereas firms are responsible for a large fraction of greenhouse gasses emission, 100% of human emission occur to produce the goods and service people consume.
- **Fact 2:** Green technologies are not yet widespread and affordable.
- Given the urgency to slow down global warming, **what is the most effective and 'politically acceptable' policy to induce people to reduce the carbon footprint of their consumption choice?**

Classical tools to induce the adoption of a more sustainable lifestyle

- **Changing supply:** banning the supply of carbon intensive goods.
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- **Changing prices:** increase relative price of carbon intensive goods.
  $\Rightarrow$ Effective on price sensitive people, but unpopular in the form of carbon tax.
- **Providing information:** give clear and reliable information about the carbon footprint of consumption choices.
  $\Rightarrow$ Difficult to be against, but rational selfish agents shall not react. Only effective on value-aligned consumers.

This paper research questions

Changing supply
Changing prices
Providing information

1. Which one of the above policies is the most effective in inducing more sustainable habits?

2. Which one of the above policies would be more likely to be implemented in democracy?

Our Methodology

- Field experiment at HEC restuarant: Test of the effectiveness of each policy
- Online survey: Test of the desirability of each policy

Related literature

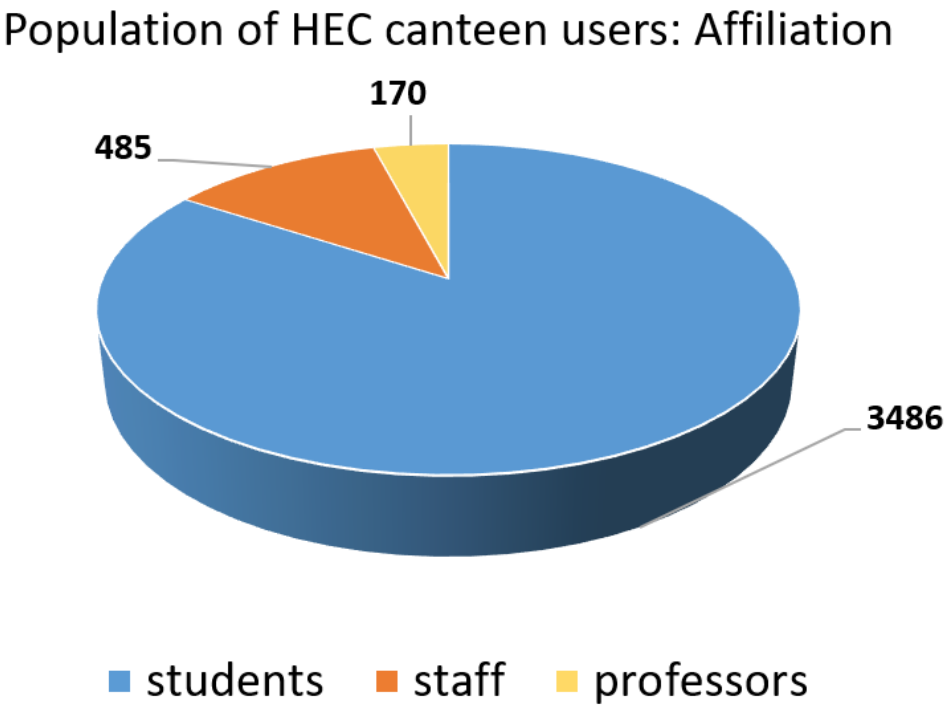
- **The effect of carbon information on food choice:** Spaargaren et al (2013), Brunner et al (2019) Lohmann et al. (2022), Beyer et al. (2023), Malaingre (2022), etc.
- **The effect of information on sustainability performance on investors and industrial clients:** Schiller (2018), Banerjee et al. (2022) and Dai et al. (2019), Bisetti et al. (2023), Christensen et al. (2023) and Leonelli et al. (2023), etc.
- **Theoretical role of investors' preference:** Chowdhry et al. (2014), Hart and Zingales (2017), Morgan and Tumlinson (2019),Broccardo et al. (2020), Oehmke and Opp (2019) and Green and Roth (2020), Landier and Lovo (2020), etc

Experimental design: Where, when and why

- **Where :** At the HEC self-service restaurant
  - Captive users: Alternatives restaurant to HEC canteen are substantially more costly both in terms of prices and time . (HEC Paris in not in Paris but in the countryside)
  - We have detailed anonymized i.d.s with individuals' demographics and daily meal choices.
- **When:**
  1. Benchmark phase: September 1st 2021 until November 21 2022
  2. Treatments phases November 21 2022- June 2023
     - Information treatment
     - Price treatments
     - resilience treatments
- **Why:**
  - About 25% of human CO_2 emission are from the food industry.
  - HEC students will be the next generation of firm managers.

Descriptive statistics: People

- Data on individual purchases of dishes at HEC canteen between August 2021 and June 2023
- In total, more than 4,000 distinct individuals
- In total, about 140,000 purchased dishes



Details

Descriptive statistics: Dishes

- 81 dish in total
- Pre-experiment summary of menu:

Variable	Average	Min	Max
Carbon footprint, kg CO2 eq./meal	3.28	0.1	12.4
Price, EUR/meal	4.16	3.5	6.5

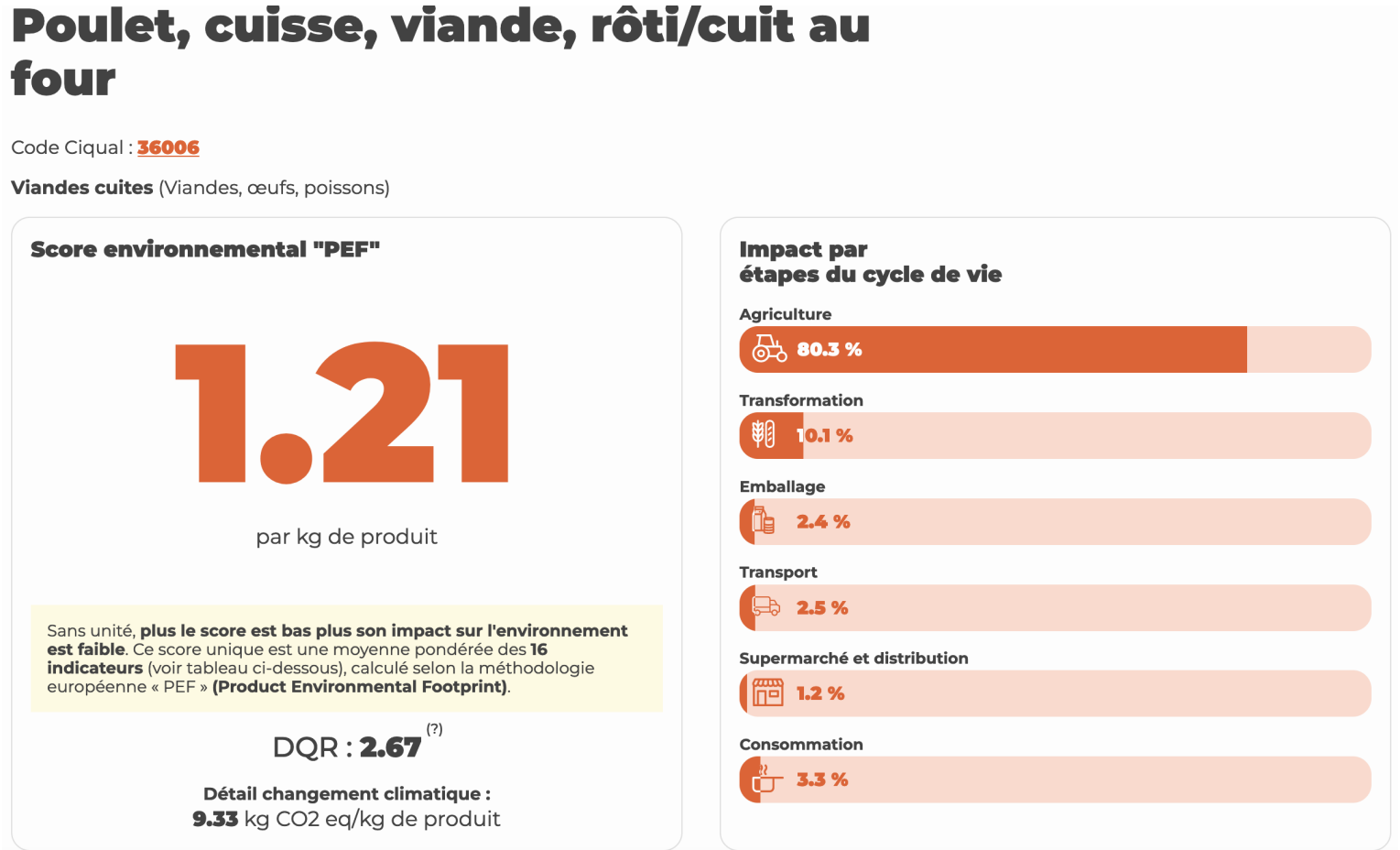
Panel B: Top 10 Dishes by Popularity (Pre-InfoTreat)

article_ENG	n_purch	CO2	CO2_ranking	price.orig	freq_purch	cum.freq
Eco meat (beef)	24962	6.4	E	4	0.179	0.179
Plancha (salmon, tuna, calamari)	18477	1	B	6.5	0.133	0.312
Minced steak	13839	6.4	E	3.7	0.099	0.411
Vegetarian plate	12026	0.3	A+	5	0.086	0.497
Pasta with meat	7887	1.8	B	4.6	0.057	0.554
Meat casserole	7599	5.6	E	4.5	0.055	0.609
Quiche	5275	0.8	A	3.8	0.038	0.647
Eco vegetarian	3359	0.1	A+	4	0.024	0.671
Cereal pallet	3161	0.1	A+	3.8	0.023	0.693
Chicken thigh	2797	1.7	B	3.9	0.02	0.713

▸ Details

Source of dishes' carbon footprint estimates

For all main dishes, we obtain the per-portion carbon footprint from the French Agency for the Ecological Transition (ADEME) website agribalyse.ademe.fr



Poulet, cuisse, viande, rôti/cuit au four

Code Ciqual : 36006

Viandes cuites (Viandes, œufs, poissons)

Score environnemental "PEF"

1.21

par kg de produit

Sans unité, **plus le score est bas plus son impact sur l'environnement est faible**. Ce score unique est une moyenne pondérée des **16 indicateurs** (voir tableau ci-dessous), calculé selon la méthodologie européenne « PEF » **(Product Environmental Footprint)**.

DQR : **2.67** (?)

Détail changement climatique :
9.33 kg CO2 eq/kg de produit

Impact par étapes du cycle de vie

Agriculture — 80.3 %

Transformation — 10.1 %

Emballage — 2.4 %

Transport — 2.5 %

Supermarché et distribution — 1.2 %

Consommation — 3.3 %

Carbon footprint and demographics pre-experiment

Pre-experiment individual food carbon footprint:

- Average of *purchased meal*: 3.3 kg CO2 eq.
- It decreases with age: 6% less for each 10 years
- It is about 20% lower food carbon footprint than men
- After controlling for gender and age,
  - Staff's ICFC is 14% lower than student's.
  - Faculty's ICFC is 23% lower than student's.

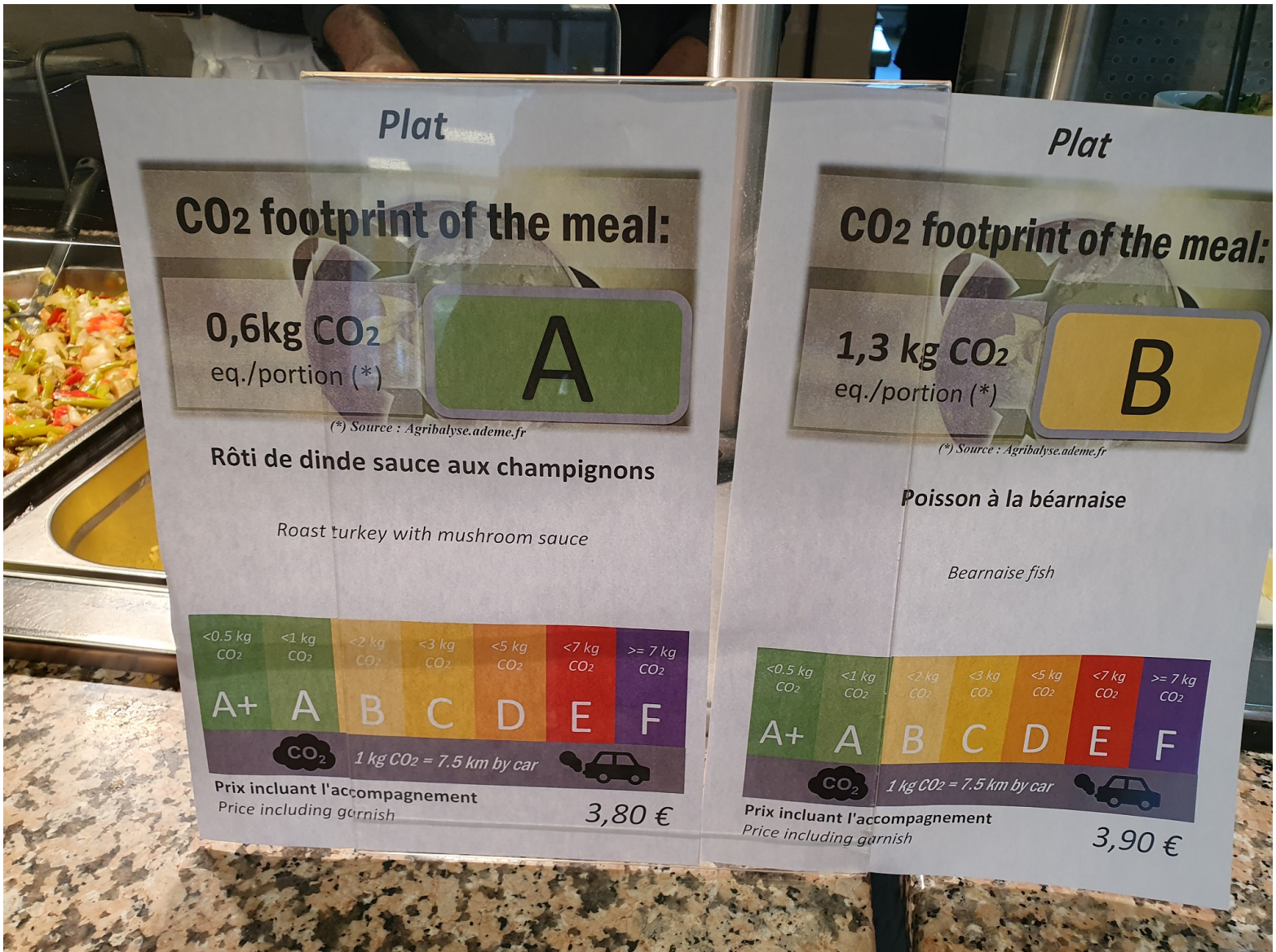
Details

Information treatment

Does providing clear and reliable information about the carbon footprint change consumption habits?

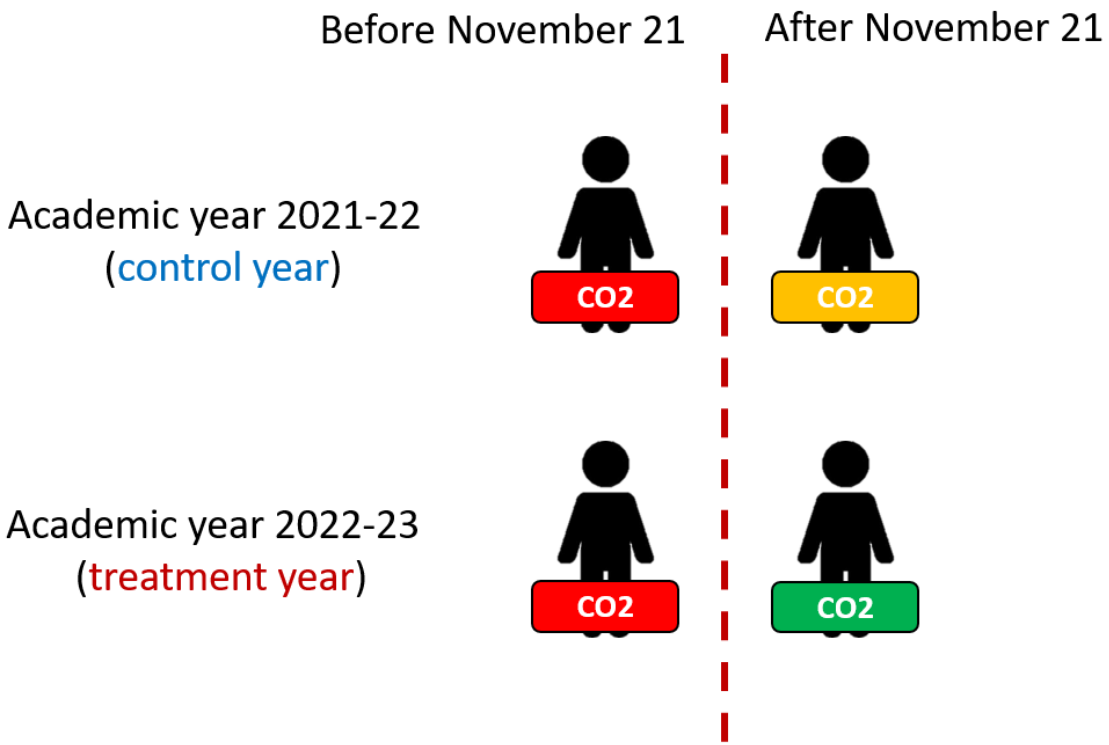
Before 21/11/2022 information

After 21/11/2022



Methodology of analysis

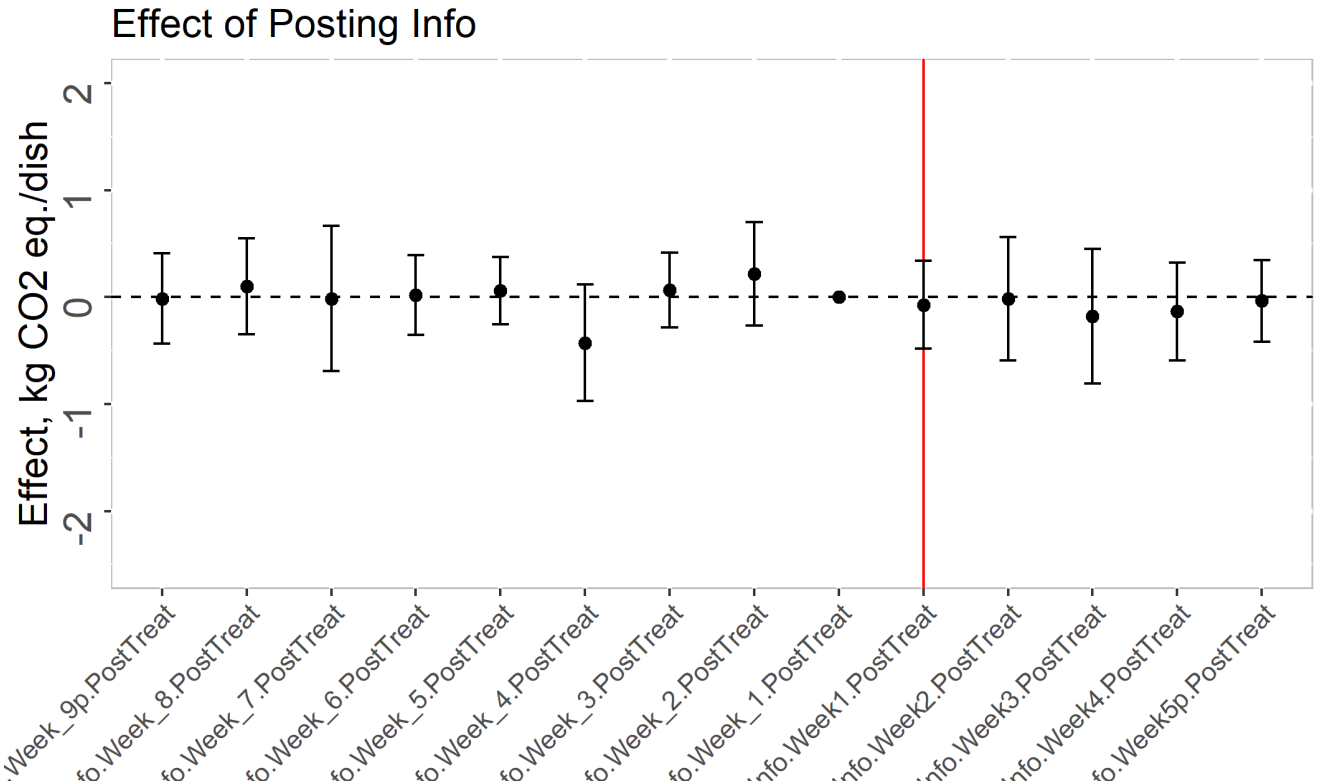
- Posters with carbon footprint information were introduced on November 21, 2022
  - we are interested in how posting carbon footprint information changed the *usual* behavior of consumers at the HEC canteen
  - but how to understand what is the *usual* behavior?



Posting dish carbon footprint has no significant effect

- sample span: 11 weeks before → 12 weeks after posting info
- regular customers (≥ 5 obs-s per individual before AND ≥ 5 after posting info)
- Control and treatment groups are comparable before the treatment
- **No effect** of posting information on carbon footprint. ▸ Details ▸ Robustness

$$CO2_{i,y,t} = \sum_{w \neq -1} \theta_w InfoPostTreat(w)_{y,t} + \zeta Controls_{y,t} + Person \times AcademYearFE_{i,y}$$
$$+ AcademWeek \times ProgamFE_{i,t} + AcademYear \times WeekdayFE_{y,t} + \epsilon_{i,y,t}$$



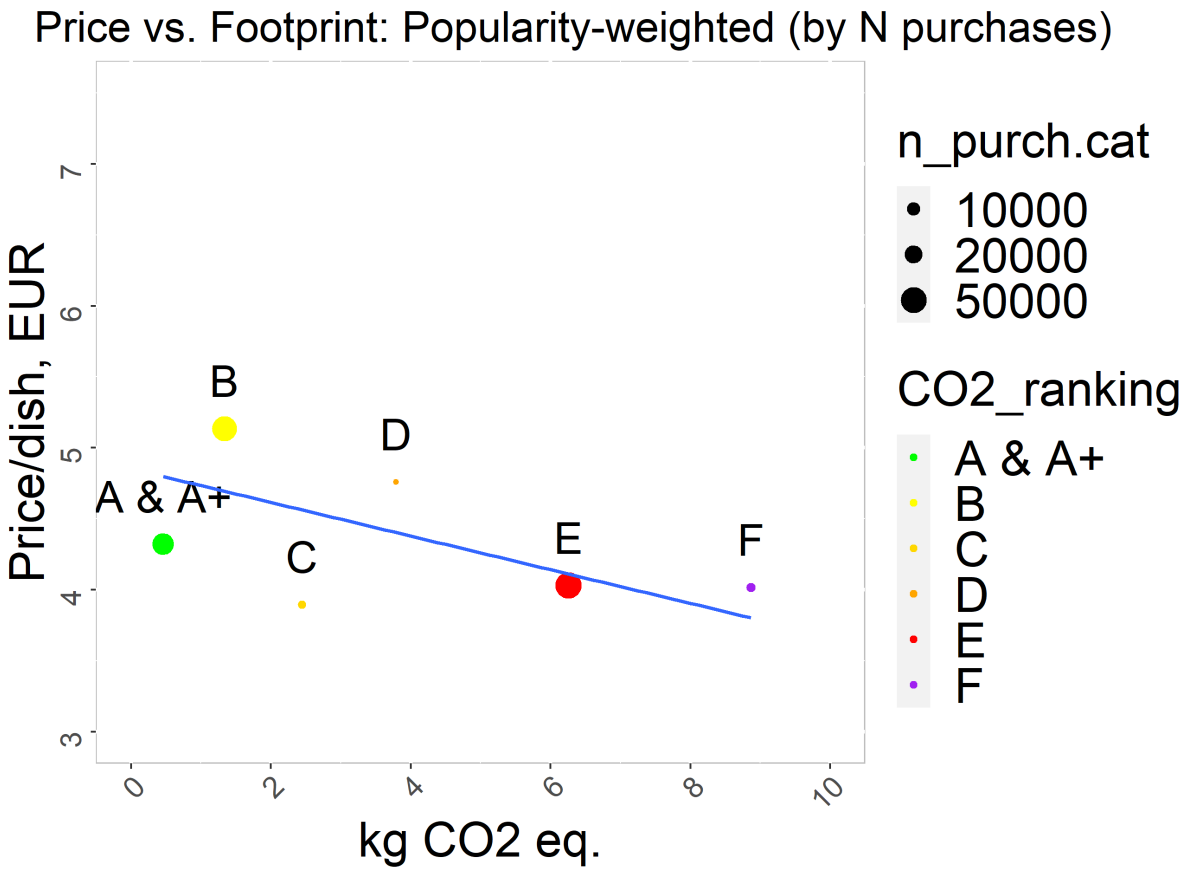
Demographics and reaction to posting information

- We found **no difference in reaction** to information:
  - by age group
  - by gender
  - by the continent of origin
  - students vs. staff vs. professors

▸ Detailed regression results

Original dish prices at HEC canteen

- Price of most popular dishes is negatively correlated with the dish's carbon footprint
- This is consistent with the general tendency of sustainable products to be more expensive ▸ Other goods

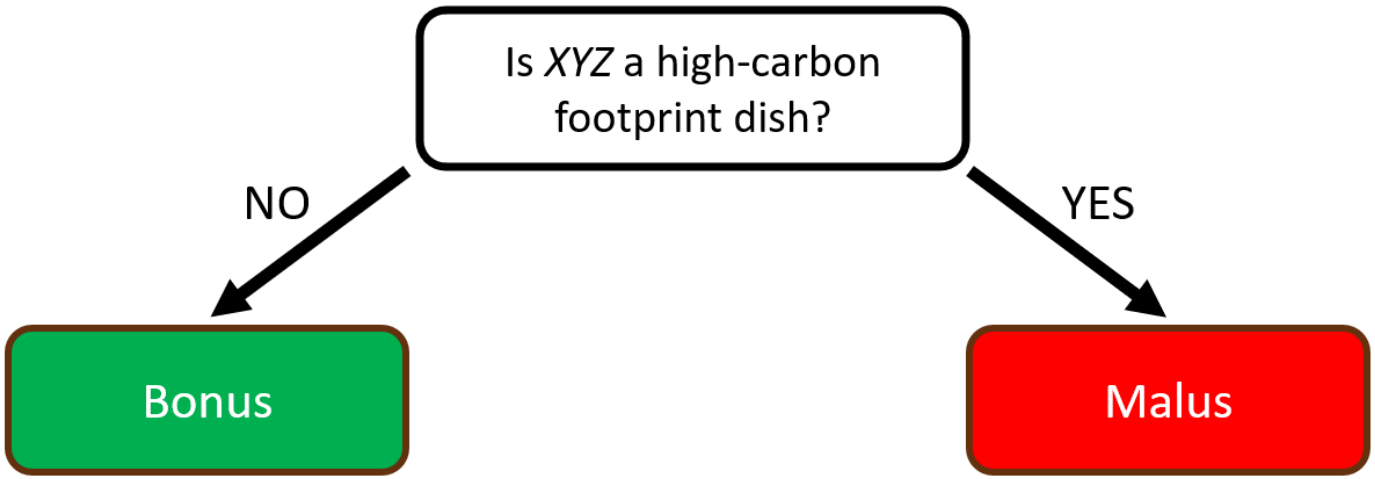


Price treatment

What is the minimum change in price necessary to provide a significant reduction in CO_2 footprint?

Bonus-malus pricing

Changing dishes' price to better reflect carbon footprint



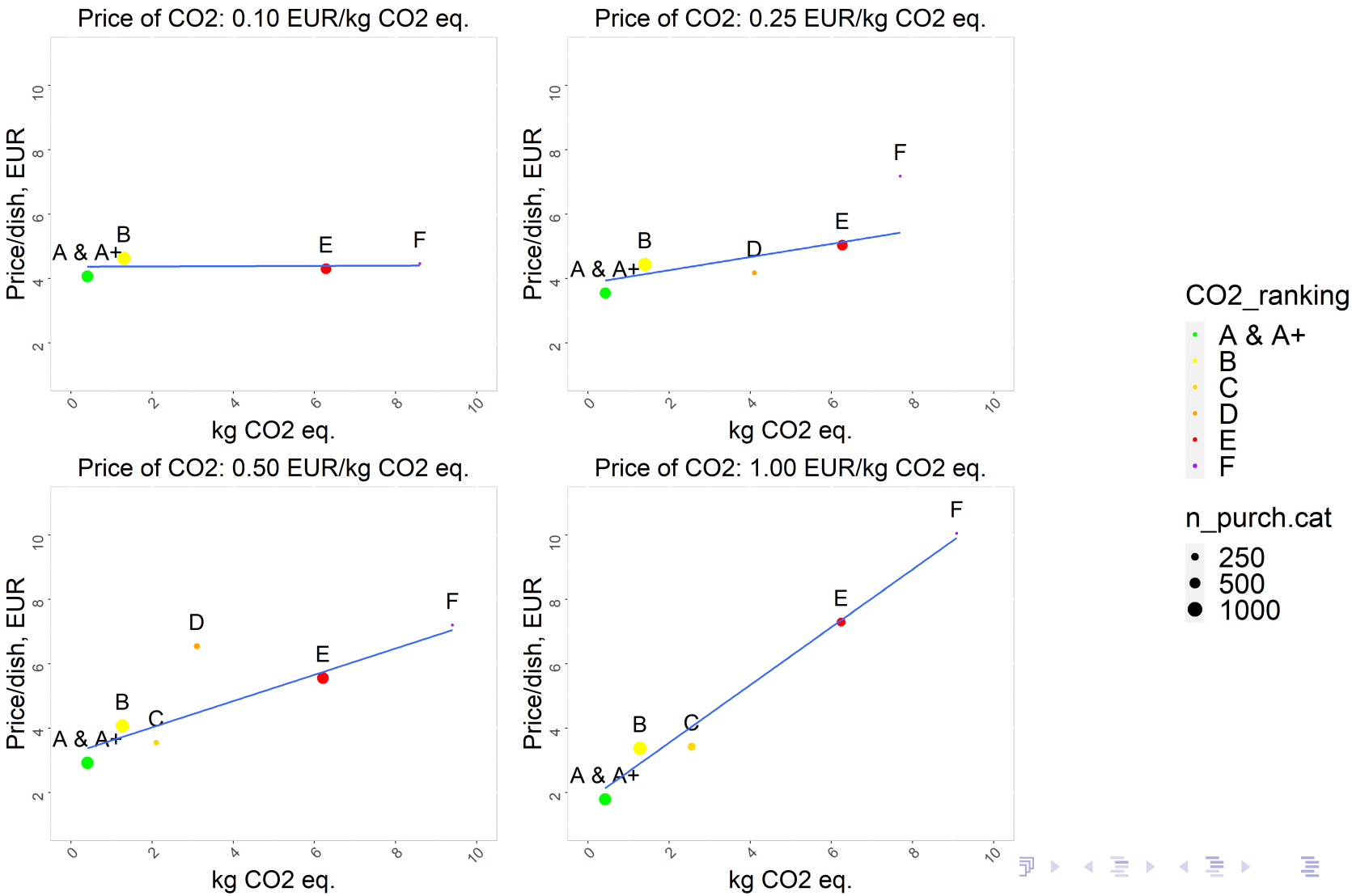
- We define **high-carbon footprint dishes** as such that have CO_2 above the median in our data ($\approx$ 3 kg CO_2 eq.)
- New prices are computed then via the following formula:

$$New\ Price = Old\ Price + (Dish\ CO_2 - 3) \times Value\ of\ Carbon$$

- *Value of Carbon* determines the intensity of carbon pricing

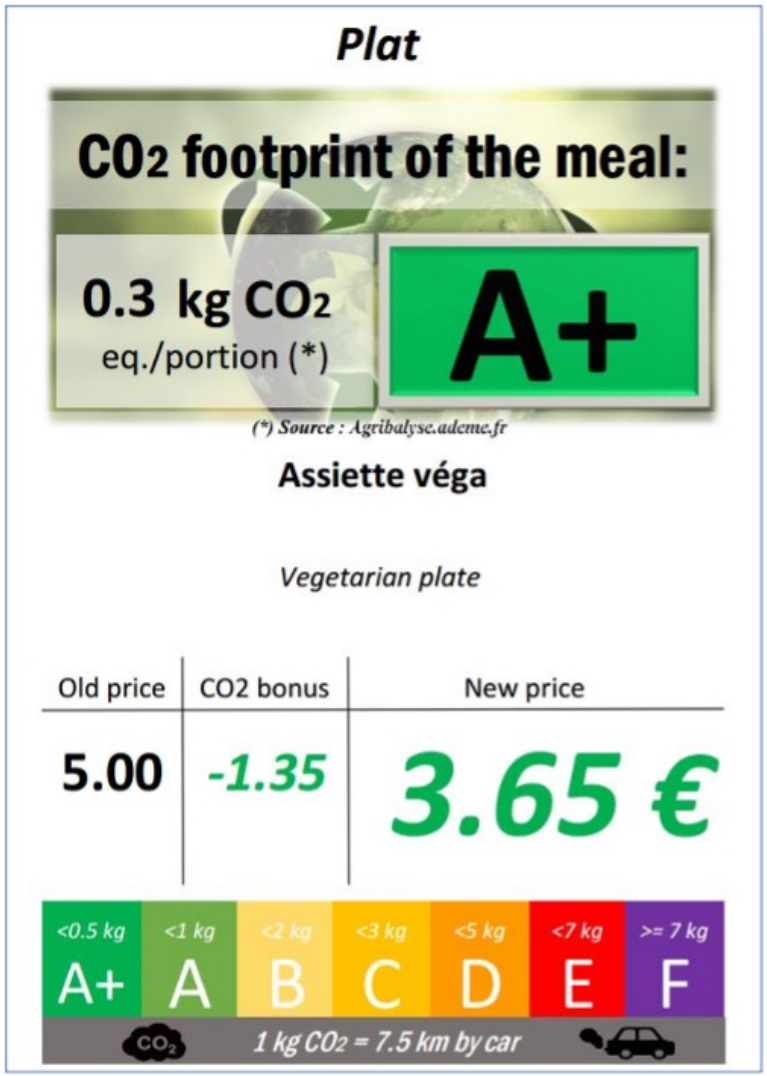
Bonus-malus pricing

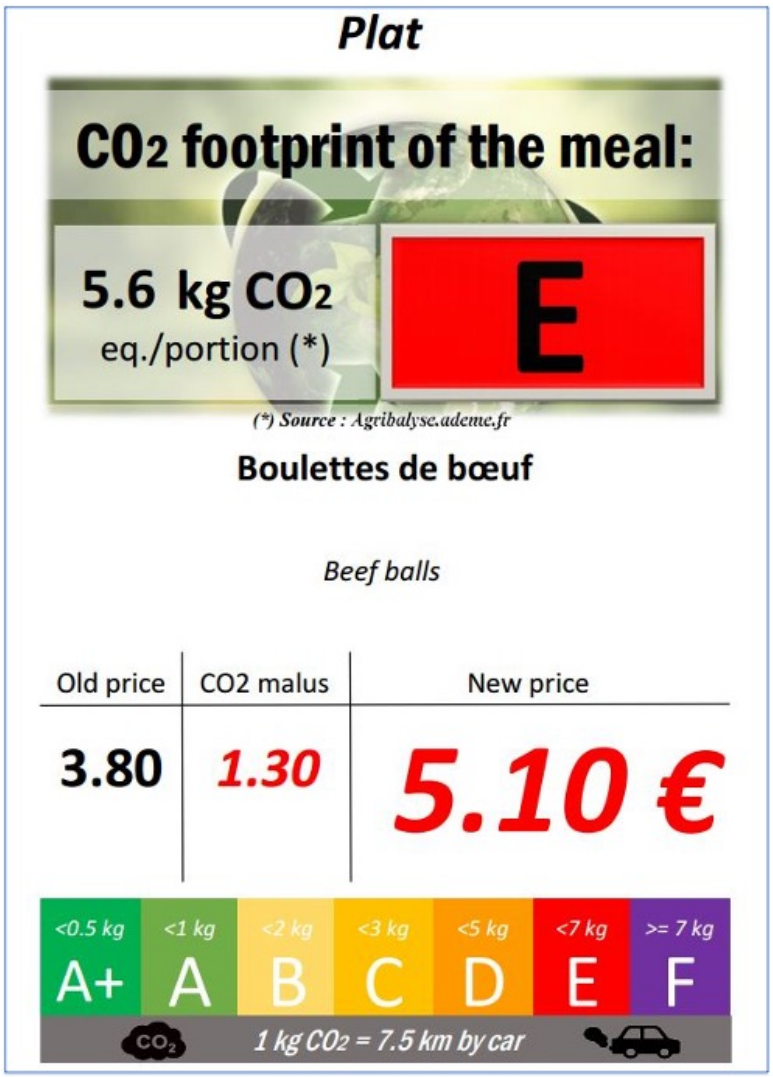
The effect on prices: $V_{CO2} \in \{0.1, 0.25, 0.5, 1\} Euro/kgCO_2eq.$



Bonus-malus pricing

- Posters installed during bonus-malus treatment
  - Example for *Value of Carbon* $= 0.5$ *EUR*/kg CO_2 eq.

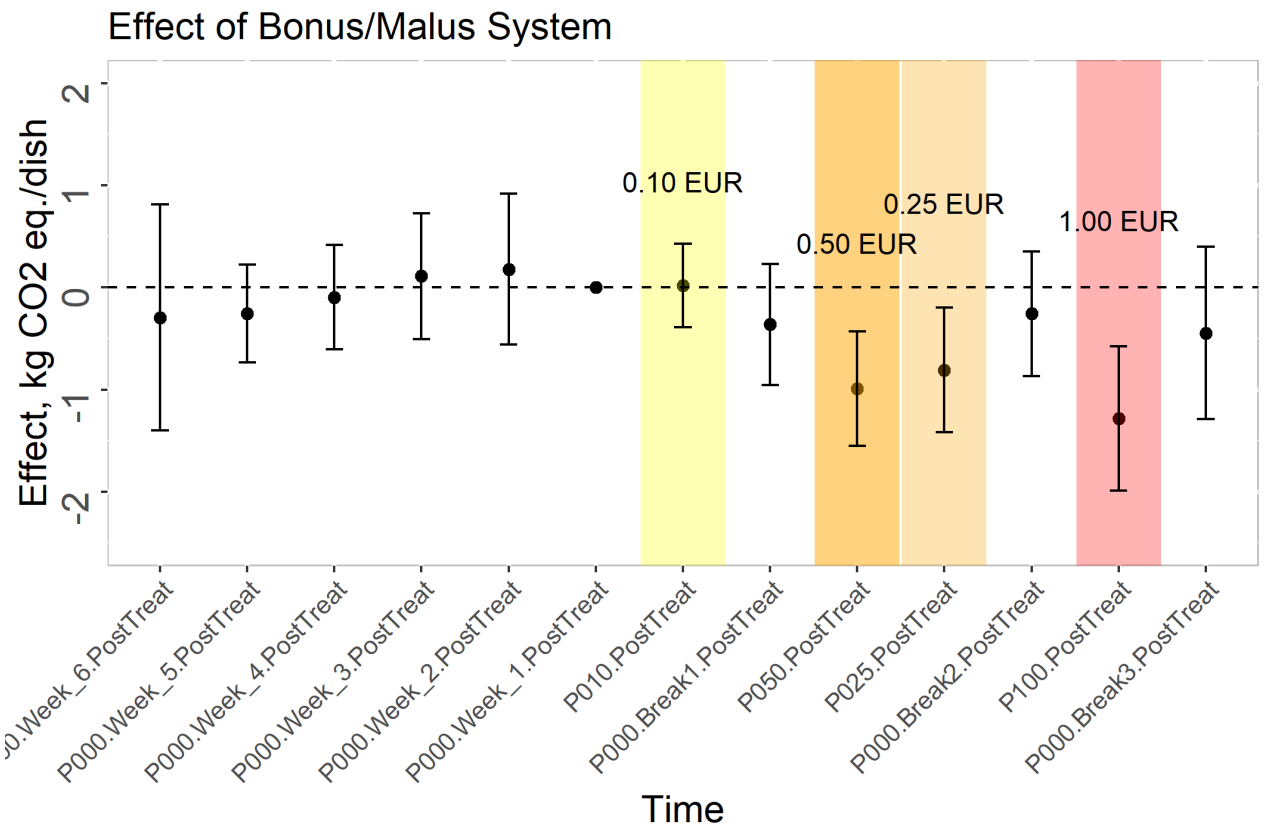




Bonus-malus pricing

The effect on consumption carbon footprint

- 0.1 EUR/kg CO_2 eq. is **insufficient** to change the behavior of the average HEC canteen user
- 0.25 EUR/kg or higher is needed to obtain the reduction in carbon footprint



▸ Details ▸ Cross section reaction ▸ effect on people spending

The effect of banning red meat on Thursdays

- Key results of estimation:
  - $CO2$ reduction of 64.2% on Thursdays

    $\Longrightarrow$ $\approx$ 12.8% per day
  - no change on other weekdays
  - But significant decrease in number of customers on Thursday

	CO2 reduction, kg CO2 eq. / meal	CO2 reduction, %	t-statistic
After Red Meat Ban (Thursday)	-2.124***	-64.2%***	-9.122
After Red Meat Ban (Other day)	-0.113	≈0%	-0.449

Statistical significance: ***: significant at 1%, **: significant at 5 %, *: significant at 10 %.
Standard errors are clustered by *person_id* and *date*.

▸ Detailed regression results

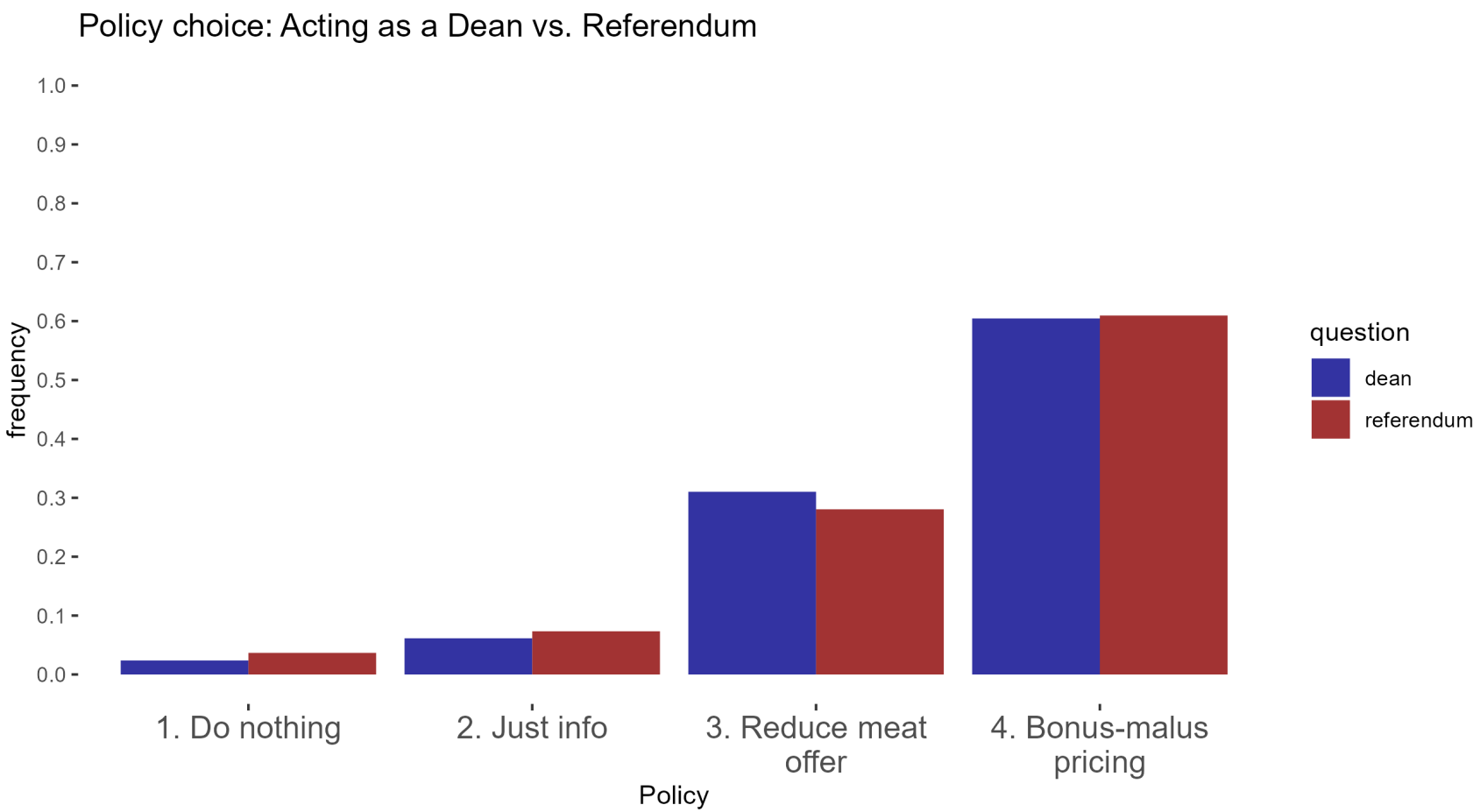
Would democracy bring to what seems a socially desirable outcome?

- E-mail to the whole HEC community asking to answer a survey on the HEC canteen carbon footprint.
- In the survey participant were informed of the experiment's findings.
- Key questions:
- Would you like dishes carbon footprint information to be posted?
- What would vote for among:
  - Do nothing
  - Just post information
  - Ban red meat 2 days per week
  - Use the bonus-malus pricing

Survey results

What policy would you vote for?

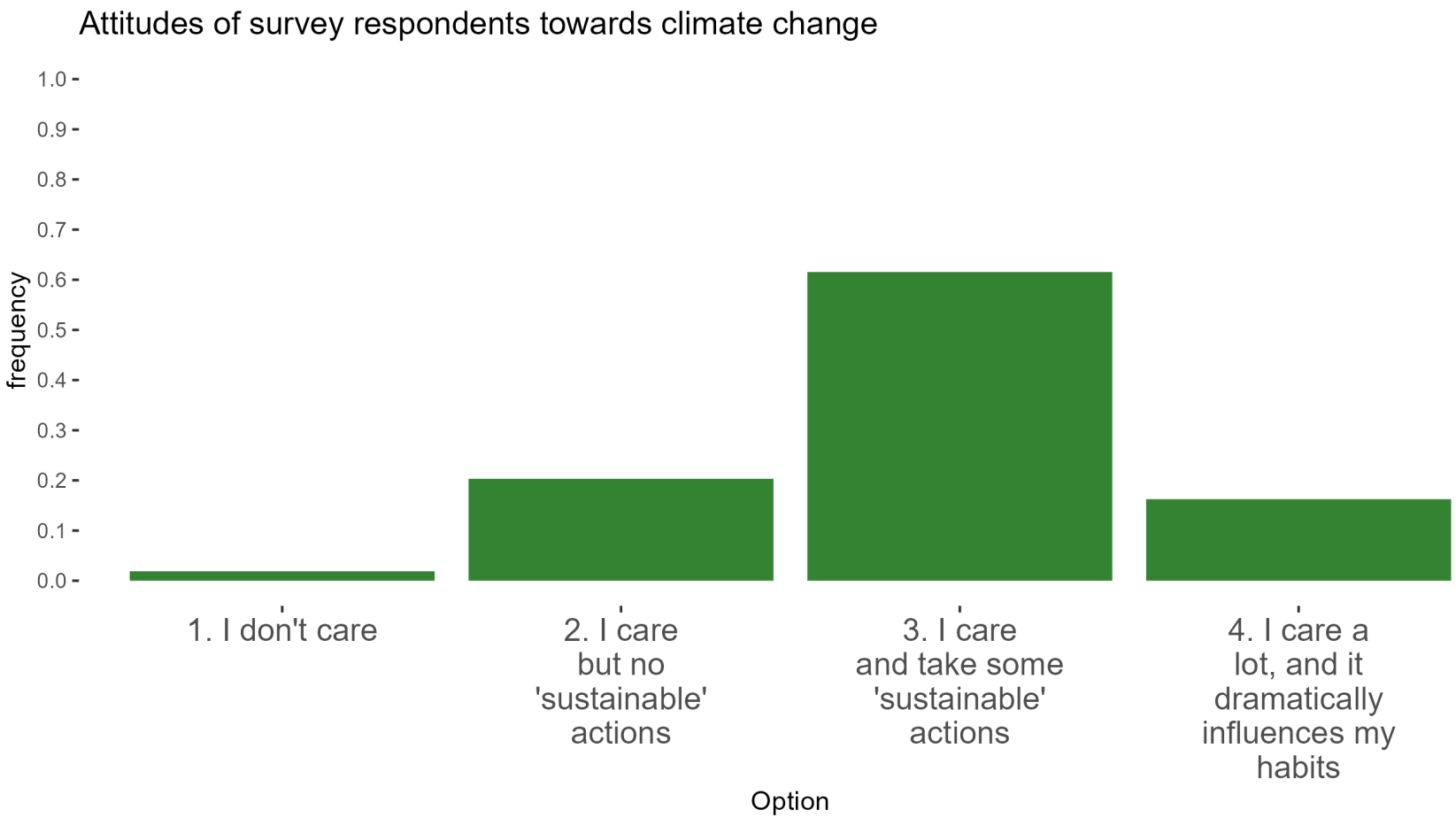
- Sample: 1009 respondents who were expecting to have meals at HEC canteen in the 6 months following the survey ("skin-in-the-game")



Survey results

People attitude toward climate change

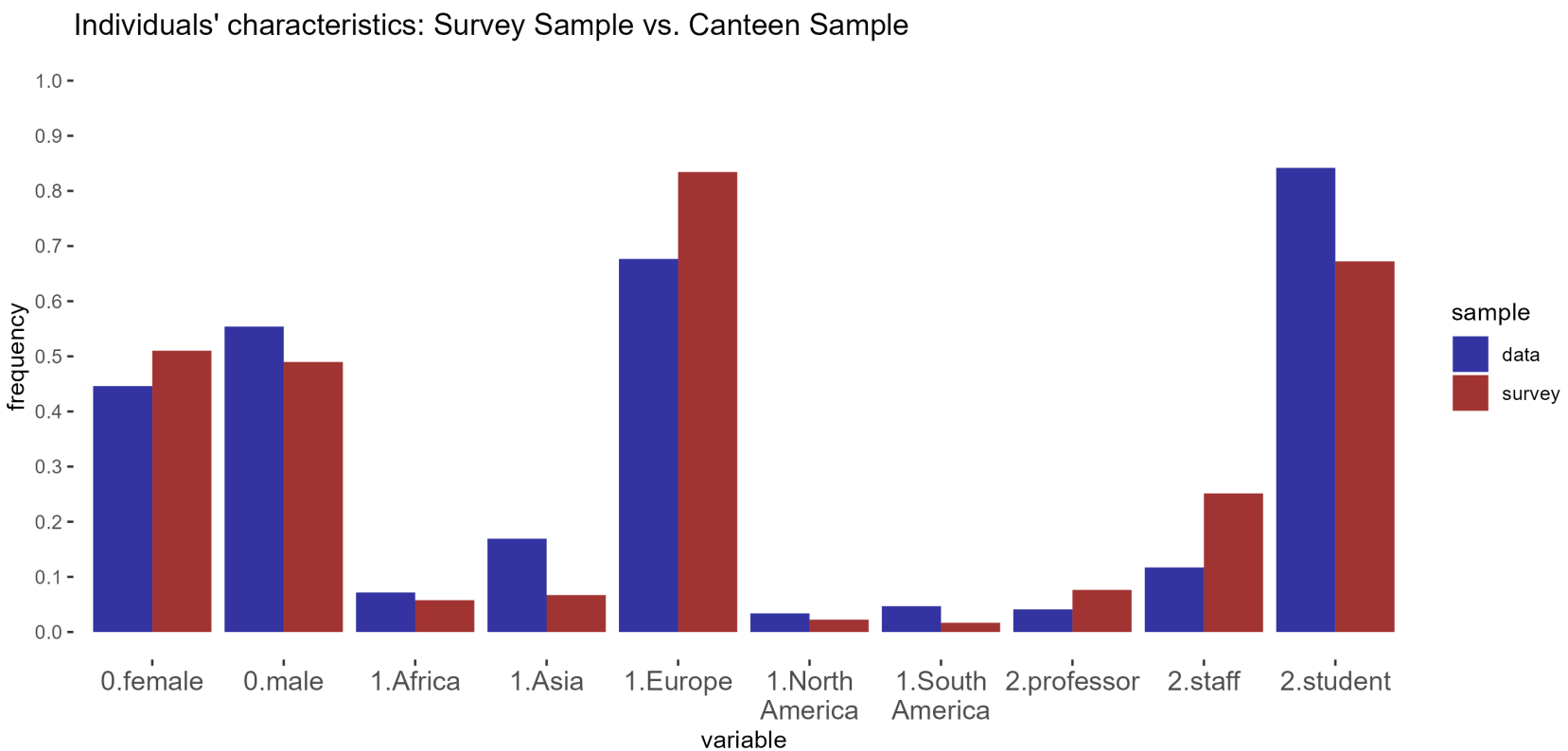
- Sample: 1009 respondents who were expecting to have meals at HEC canteen in the 6 months following the survey ("skin-in-the-game")



Survey results

Respondent composition

- Total response rate: 12.7%
- 1368 complete responses



Survey results

Would you like dishes carbon footprint information to be displayed?

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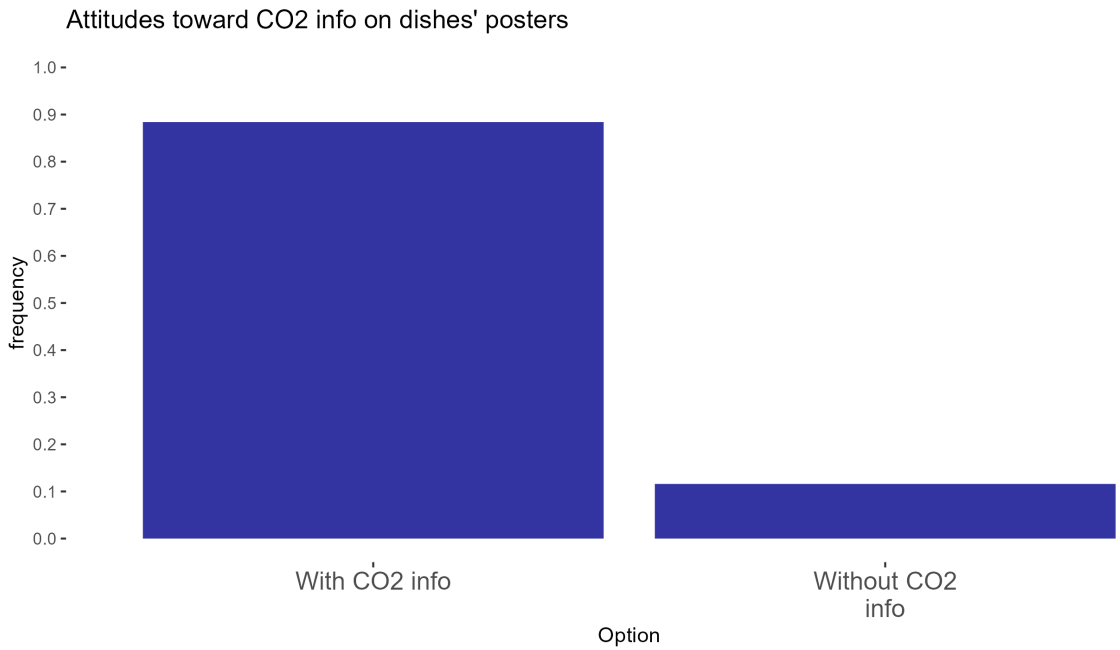

Summary of results

Treatment (voted for)	Info	Relative Effect on CO_2	Relative effect on spending
Do nothing (3.5%)	No Info		
Info.PostTreat (6.5%)	Info	$\approx 0\%$	$\approx 0\%$
P010.PostTreat	Info	$\approx 0\%$	$\approx 0\%$
P025.PostTreat (60%)	Info	-26.8%	-4.2%
P050.PostTreat	Info	-32.9%	-7.1%
P100.PostTreat	Info	-42.6%	-32.8%
Removal	No Info	$\approx 0\%$	$\approx 0\%$
Meat-Free Thursday (30%)	No Info	-12.8%	$\approx 0\%$

Conclusion and Policy implications (preliminary)

- Informing people about their action's carbon footprint does not change their behavior.

$$\Downarrow$$

Little hope in low carbon consumption habits been adopted as long as they are more expensive than high carbon ones.

- Making high (low) carbon option more (less) expensive than low (high) carbon option does boost changes towards sustainable habits.
- There is hope as people prefer such pricing option to no-action, purely cosmetic actions (just inform) , or more dictatorship policy (ban of red meat)

THANK YOU!

Conclusion (from our preliminary analysis)

1. **Demographics matter for levels but not reaction.** Average meal carbon footprint:
   - is lower for women than for men
   - decreases with users' age
   - lower for employees than for students
2. **No significant effect of information.** Maybe because...
   - people already knew (but this would contrast with evidence by Malaingre 2022)
   - people did not pay attention to CO_2 posted information.
   - people are consequentialist
3. **Pricing matters.** Aligning dishes' prices to reflect their carbon footprint is necessary to achieve a substantial reduction in average meal carbon footprint.
4. **Aspiration vs Realization.** To realize a reduction of CO_2 food footprint of 30% (aspiration of people), one should put the price of 1 ton of CO_2 at 500 Euros.
5. **Banning (red) meat** seems to be a simple and effective policy to reduce food CO_2.

APPENDIX

Summary statistics: Dishes

Panel A: All Dishes (Pre-InfoTreat)

variable	n_dishes	n_purch	mean	sd	min	max
n_purch	81	139308	1719.85	4006.81	6	24962
freq_purch.pct	81	139308	1.23	2.88	0	17.92
CO2.EW	81	139308	3.28	2.98	0.1	12.4
CO2.PW	81	139308	3.31	2.74	0.1	12.4
price.orig.EW	81	139308	4.16	0.7	3.5	6.5
price.orig.PW	81	139308	4.46	0.93	3.5	6.5

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Summary statistics: 10 most popular dishes

Panel B: Top 10 Dishes by Popularity (Pre-InfoTreat)

article_ENG	n_purch	CO2	CO2_ranking	price.orig	freq_purch	cum.freq
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Price Treatments & Queuing (1)

- *queue_past_Hmin*: N individuals purchasing in *H*-minute interval before a individual *i*'s purchase on a given day
- *queue_past_Hmin_Q_NORM*: Quintile of the former in time-series - 1

Dependent Variables:	CO2				CO2_rank_EF			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
Price.PostTreat	-1.314***	-1.069***	-1.072***	-1.168***	-0.2469***	-0.1896***	-0.1871***	-0.2059***
	(-5.042)	(-3.540)	(-3.422)	(-3.593)	(-5.611)	(-3.794)	(-3.576)	(-3.744)
queue_past_5min_Q_NORM		0.0188				0.0022		
		(1.269)				(0.7791)		
Price.PostTreat × queue_past_5min_Q_NORM		-0.1641				-0.0292*		
		(-1.645)				(-1.896)		
queue_past_10min_Q_NORM			0.0332**				0.0043	
			(2.001)				(1.373)	
Price.PostTreat × queue_past_10min_Q_NORM			-0.1671				-0.0315*	
			(-1.581)				(-1.813)	
queue_past_15min_Q_NORM				0.0346**				0.0050
				(2.178)				(1.609)
Price.PostTreat × queue_past_15min_Q_NORM				-0.1057				-0.0196
				(-1.062)				(-1.160)
Fixed-effects								
person_id_AY	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
academ.year-weekday	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
academ.week_id-type_x_program	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Acad. Day	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Person	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,344	28,340	28,340	28,340	28,344	28,340	28,340	28,340
R^2	0.32106	0.32131	0.32135	0.32124	0.31163	0.31213	0.31218	0.31204
Within R^2	0.01814	0.01847	0.01854	0.01838	0.01425	0.01494	0.01500	0.01480

Clustered (person_id & academ.day_id) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Back to Price Treatment

Price Treatments & Queuing (2)

- interacted with program tuition fee (students only)

Dependent Variable:	CO2			
Model:	(1)	(2)	(3)	(4)
Variables				
Price.PostTreat	-1.594***	-1.152***	-1.253***	-1.458***
	(-5.032)	(-3.389)	(-3.263)	(-3.302)
Price.PostTreat × full_tuition_fee_euro_NORM	0.0119	0.0071	0.0116	0.0157
	(1.009)	(0.6532)	(0.8841)	(1.034)
queue_past_5min_Q_NORM		0.0096		
		(0.5509)		
Price.PostTreat × queue_past_5min_Q_NORM		-0.2722**		
		(-2.325)		
Price.PostTreat × full_tuition_fee_euro_NORM × queue_past_5min_Q_NORM		0.0030		
		(0.5299)		
queue_past_10min_Q_NORM			0.0232	
			(1.240)	
Price.PostTreat × queue_past_10min_Q_NORM			-0.2046	
			(-1.442)	
Price.PostTreat × full_tuition_fee_euro_NORM × queue_past_10min_Q_NORM			-0.0004	
			(-0.0504)	
queue_past_15min_Q_NORM				0.0321*
				(1.733)
Price.PostTreat × queue_past_15min_Q_NORM				-0.0911
				(-0.5971)
Price.PostTreat × full_tuition_fee_euro_NORM × queue_past_15min_Q_NORM				-0.0026
				(-0.3708)
Fixed-effects				
person_id_AY	Yes	Yes	Yes	Yes
academ.year-weekday	Yes	Yes	Yes	Yes
academ.week_id-type_x_program	Yes	Yes	Yes	Yes
Fit statistics				
Controls	Yes	Yes	Yes	Yes
Cluster S.E.: Acad. Day	Yes	Yes	Yes	Yes
Cluster S.E.: Person	Yes	Yes	Yes	Yes
Observations	20,849	20,846	20,846	20,846
R^2	0.32046	0.32093	0.32092	0.32075
Within R^2	0.01328	0.01388	0.01386	0.01361

Clustered (person_id & academ.day_id) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Back to Price Treatment

Demographics and reaction to posting information

Dependent Variable:	CO2					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
Info.PostTreat	-0.0825	-0.0917	-0.1981	-0.0596	-0.1027	-0.5942**
	(-0.7295)	(-0.8399)	(-1.228)	(-0.2994)	(-0.9701)	(-2.171)
Info.PostTreat × d.Staff		0.0401				
		(0.2517)				
Info.PostTreat × d.Prof		0.1136				
		(0.6056)				
age × Info.PostTreat			0.0056			
			(0.9101)			
female × Info.PostTreat			-0.0493			
			(-0.5100)			
Quint.mean.CO2.PRE_NORM × Info.PostTreat				-0.0099		
				(-0.1386)		
Quint.sd.CO2.PRE_NORM × Info.PostTreat				-0.0078		
				(-0.1426)		
d.Asia × Info.PostTreat					0.0476	
					(0.3393)	
d.Africa × Info.PostTreat					0.0822	
					(0.5871)	
d.NorthAmerica × Info.PostTreat					0.2586	
					(1.290)	
d.SouthAmerica × Info.PostTreat					0.0554	
					(0.2827)	
Info.PostTreat × full_tuition_fee_euro_NORM						0.0215**
						(2.259)
Info.PostTreat × d.SASI						-0.0026
						(-0.0074)
Fixed-effects						
person_id-academ.year	Yes	Yes	Yes	Yes	Yes	Yes
academ.year-weekday	Yes	Yes	Yes	Yes	Yes	Yes
academ.week_id-type_x_program	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics						
HTE x-Post Interactions	No	FE	Yes	Yes	Yes	Yes
Controls:	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Academ Day	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Person	Yes	Yes	Yes	Yes	Yes	Yes
Observations	121,650	121,650	121,650	121,650	121,650	83,947
R^2	0.31945	0.31945	0.31952	0.32187	0.31950	0.31927
Within R^2	0.01977	0.01977	0.01987	0.02326	0.01983	0.01493

Clustered (person_id & academ.day_id) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

▸ Back to main results ▸ HTE by program

Program pursued & reaction to posting info

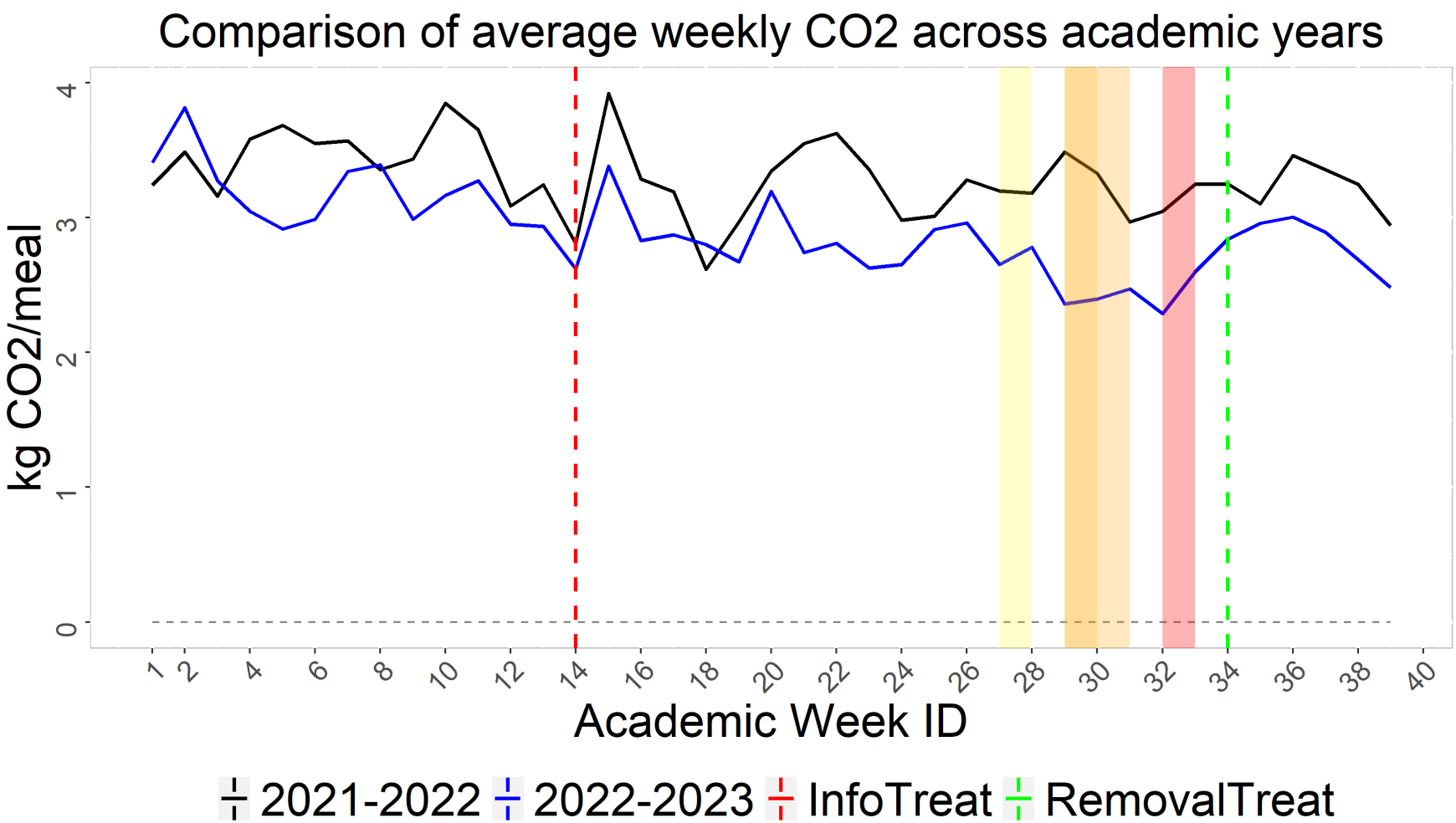
Dependent Variables:	CO2				CO2_rank_EF			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
Info.PostTreat	-0.0825	-0.5942**	-0.0500	0.3911	-0.0186	-0.1244***	-0.0103	0.0824
	(-0.7295)	(-2.171)	(-0.4873)	(0.7945)	(-0.9445)	(-2.775)	(-0.5260)	(0.8340)
Info.PostTreat × full_tuition_fee_euro_NORM		0.0215**				0.0045***		
		(2.259)				(2.890)		
Info.PostTreat × d.SASI		-0.0026	-0.3392	-0.3354		0.0073	-0.0635	-0.0639
		(-0.0074)	(-0.9742)	(-0.9485)		(0.1198)	(-1.052)	(-1.043)
Info.PostTreat × d.DM			-0.7151*	-0.7532*			-0.1736**	-0.1810**
			(-1.702)	(-1.773)			(-2.140)	(-2.210)
Info.PostTreat × d.MKG			0.2286	0.2246			0.0365	0.0347
			(0.6045)	(0.5463)			(0.5636)	(0.5135)
Info.PostTreat × d.AFM			-1.064***	-1.051***			-0.1519***	-0.1504**
			(-3.180)	(-2.949)			(-2.719)	(-2.389)
Info.PostTreat × d.MFE			0.1133	0.0650			0.0095	-0.0002
			(0.3552)	(0.1997)			(0.1696)	(-0.0035)
Info.PostTreat × d.STR			-1.119***	-1.137***			-0.1971***	-0.2010***
			(-3.928)	(-3.753)			(-3.828)	(-3.806)
Info.PostTreat × d.FI			0.1656	0.1719			0.0220	0.0237
			(0.8880)	(0.7830)			(0.6681)	(0.6359)
Info.PostTreat × d.MBA			1.351***	1.587***			0.2964***	0.3508***
			(4.974)	(8.435)			(6.173)	(7.241)
Info.PostTreat × age				-0.0222				-0.0047
				(-0.8037)				(-0.8856)
Info.PostTreat × female				-1.08×10^{-5}				0.0035
				(-8.37×10^{-5})				(0.1604)
Fixed-effects								
person_id-academ.year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
academ.year-weekday	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
academ.week_id-type_x_program	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
HTE x-Post Interactions	No	FE	FE	Yes	No	FE	FE	Yes
Controls:	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Academ Day	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Person	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	121,650	83,947	83,947	83,947	121,650	83,947	83,947	83,947
R^2	0.31945	0.31927	0.31955	0.31964	0.30209	0.30090	0.30113	0.30125
Within R^2	0.01977	0.01493	0.01533	0.01546	0.01527	0.01276	0.01308	0.01325

Clustered (person_id & academ.day_id) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

▸ Back to demographics

Average Weekly CO_2

By academic year



Back to Identification

Carbon footprint and demographics pre-experiment

Dependent Variables:	CO2					CO2_rank_EF		
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
(Intercept)	3.309***	0.0286	0.8799***	0.8788***	0.4051***	0.0041	0.1800***	0.1797***
	(50.86)	(0.1039)	(2.850)	(2.851)	(35.72)	(0.1038)	(3.987)	(3.980)
CO2.EW		1.287***	1.296***	1.294***				
		(12.35)	(12.49)	(12.47)				
age			-0.0218***	-0.0187***			-0.0050***	-0.0041***
			(-4.534)	(-3.861)			(-6.442)	(-5.329)
female			-0.6764***	-0.6387***			-0.1126***	-0.1044***
			(-13.65)	(-12.74)			(-12.78)	(-11.84)
d.Staff			-0.4738***	-0.6107***			-0.0832***	-0.1216***
			(-3.978)	(-4.765)			(-4.357)	(-5.955)
d.Prof			-0.7682***	-0.8676***			-0.1262***	-0.1536***
			(-6.589)	(-7.076)			(-6.750)	(-7.877)
d.NorthAmerica				-0.4704***				-0.1000***
				(-3.243)				(-4.043)
d.SouthAmerica				0.1442				0.0051
				(1.181)				(0.2334)
d.Africa				-0.1042				-0.0329*
				(-1.076)				(-1.967)
d.Asia				-0.1844**				-0.0626***
				(-2.316)				(-4.610)
d.MBA				-0.1245				-0.0101
				(-0.9624)				(-0.4358)
d.SASI				-0.7396***				-0.1036***
				(-4.673)				(-3.822)
log(CO2.EW)						0.1507	0.1437	0.1376
						(1.464)	(1.401)	(1.338)
frac_dishes.CO2_EF						0.8839***	0.9186***	0.9326***
						(3.376)	(3.546)	(3.607)
Fit statistics								
Sample	Pre-Info	Pre-Info	Pre-Info	Pre-Info	Pre-Info	Pre-Info	Pre-Info	Pre-Info
Cluster S.E.: Academ Day	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Person	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	138,395	138,395	138,395	138,395	138,395	138,395	138,395	138,395
R^2		0.04643	0.08390	0.08672		0.03726	0.07691	0.08071
Adjusted R^2		0.04643	0.08386	0.08665		0.03724	0.07687	0.08063

Clustered (person_id & academ.day_id) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

▸ Back to the main results

Summary statistics: People

Panel A: Students

variable	n_indiv	mean	sd	min	max
n_obs.per.person	3486	51.48	40.68	10	281
age	3486	21.34	3.6	20	50
female	3486	0.41			
mean.CO2.preInfo	3371	3.33	1.35	0.14	6.75
sd.CO2.preInfo	3371	2.37	0.63	0	4.03

continent	n_individuals	total_individuals	frequency
Europe	2203	3486	0.632
Asia	692	3486	0.199
Africa	255	3486	0.073
South America	192	3486	0.055
North America	137	3486	0.039
Oceania	7	3486	0.002

Panel B: Staff

variable	n_indiv	mean	sd	min	max
n_obs.per.person	485	65.81	52.55	10	321
age	485	38.99	11.35	20	60
female	485	0.71			
mean.CO2.preInfo	473	2.24	1.17	0.24	6.4
sd.CO2.preInfo	473	1.98	0.87	0	4.06

Panel C: Faculty

variable	n_indiv	mean	sd	min	max
n_obs.per.person	170	57.14	46.37	10	261
age	170	34.35	10.87	20	60
female	170	0.49			
mean.CO2.preInfo	161	2.23	1.03	0.3	4.93
sd.CO2.preInfo	161	2.07	0.81	0	3.86

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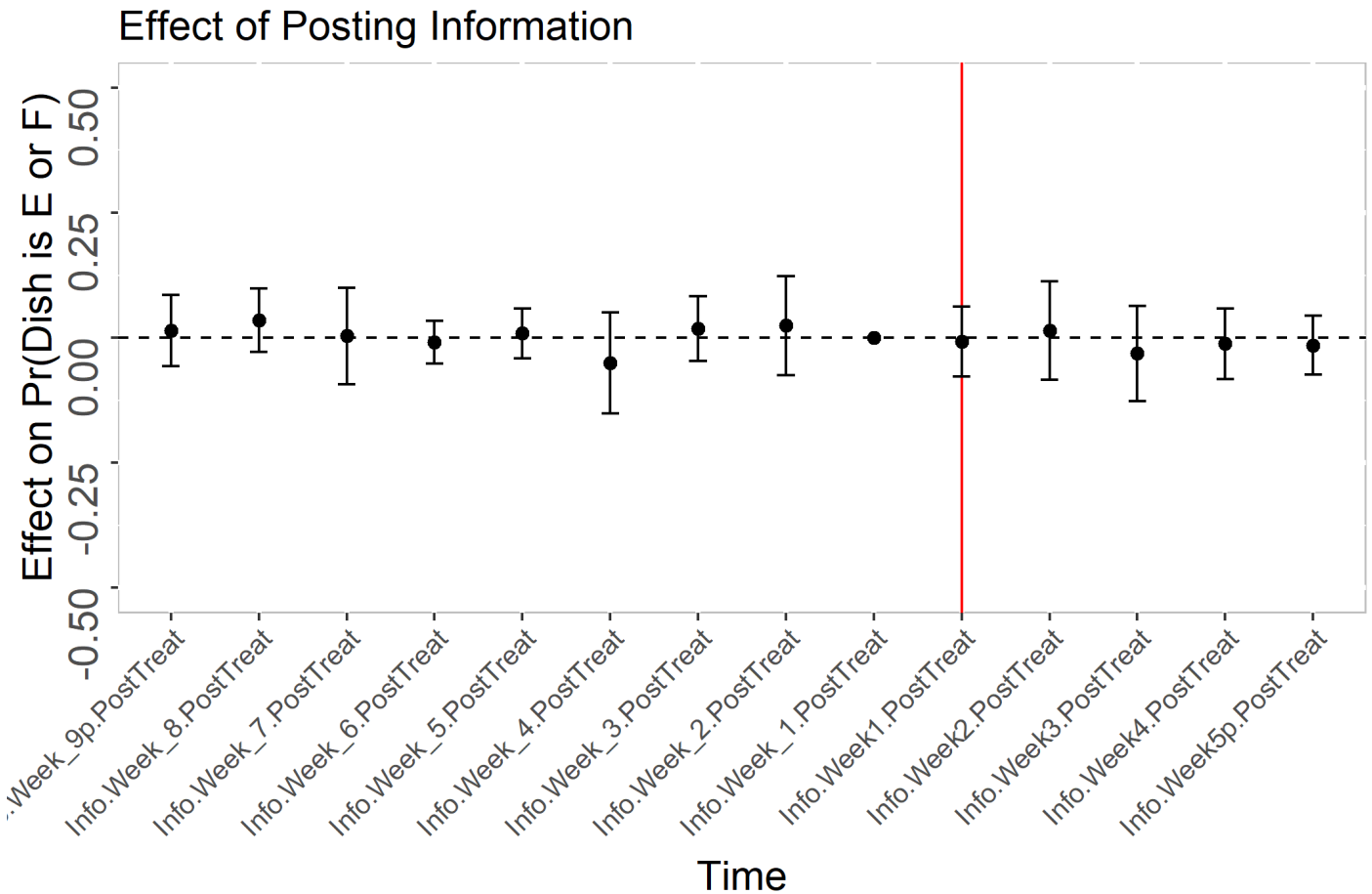
Effect of Posting Info (1): Linear Probability Model

Back

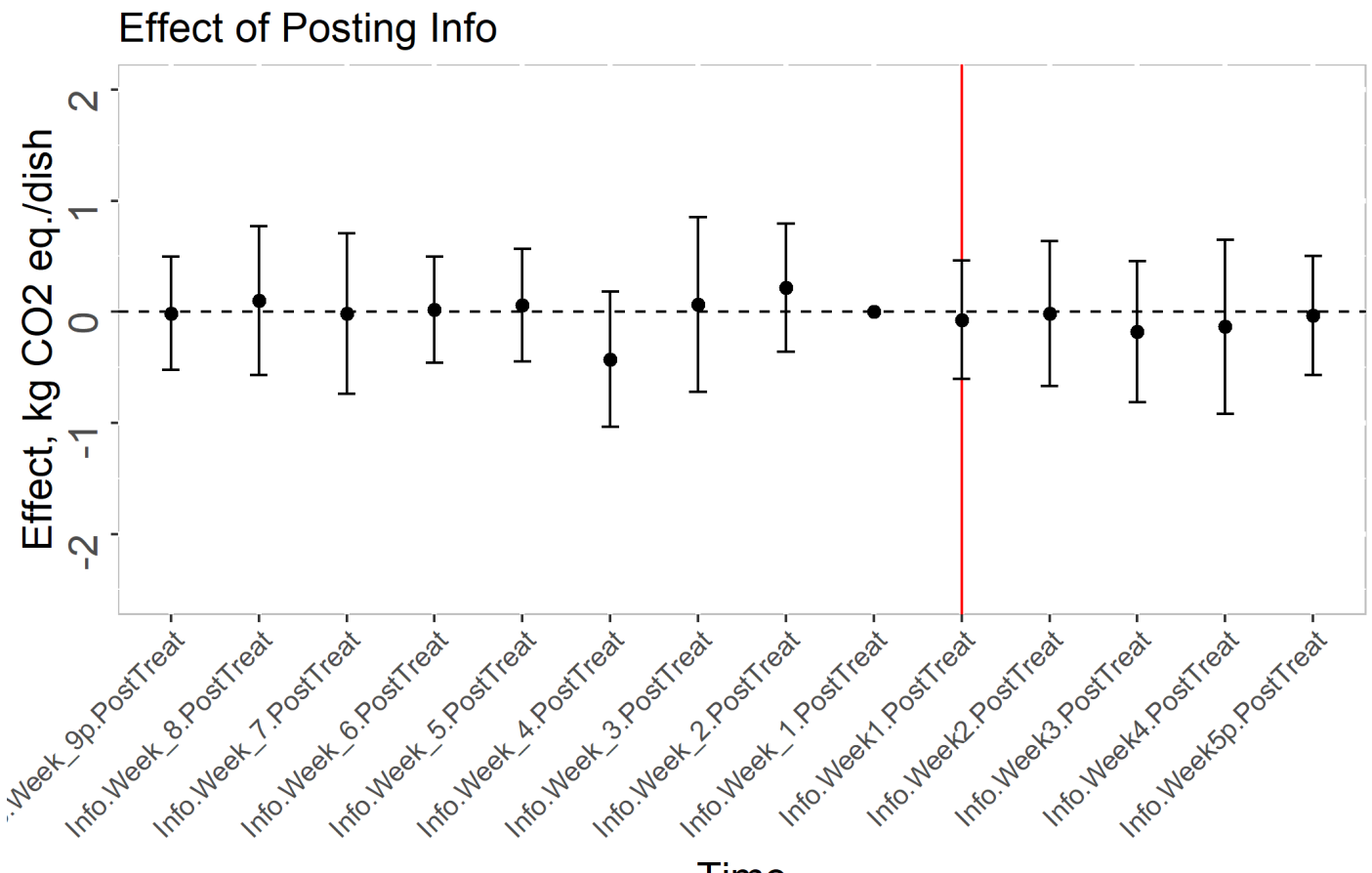
$$CO2\_rank\_EF_{i,y,t} = \sum_{w \neq 1} \theta_w InfoPostTreat(w)_{y,t} + \zeta Controls_{y,t} + Person \times AcademYearFE_{i,y}$$
$$+ AcademWeek \times ProgamFE_{i,t} + AcademYear \times WeekdayFE_{y,t} + \epsilon_{i,y,t}$$



Effect of Posting Info (2): Alternative Clustering

- original: *person_id* and *AcademDay*
- alternative clustering: *person_id* and calendar date

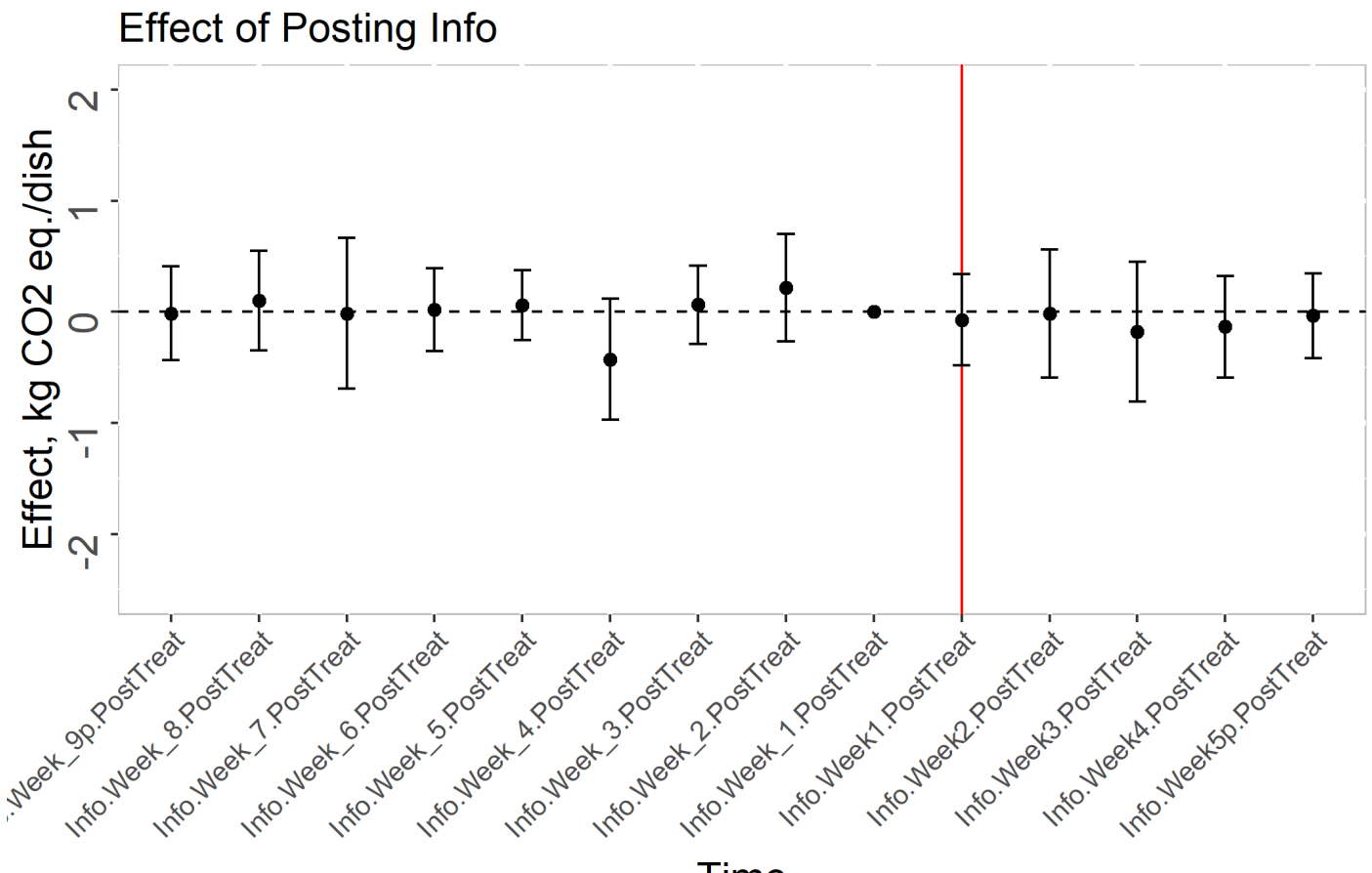
$$CO2_{i,y,t} = \sum_{w \neq 1} \theta_w InfoPostTreat(w)_{y,t} + \zeta Controls_{y,t} + Person \times AcademYearFE_{i,y}$$
$$+ AcademWeek \times ProgamFE_{i,t} + AcademYear \times WeekdayFE_{y,t} + \epsilon_{i,y,t}$$



Effect of Posting Info (3): Alternative Clustering

- original: *person_id* and *AcademDay*
- alternative clustering: *person_id* × *AcademYear* and *AcademDay*

$$CO2_{i,y,t} = \sum_{w \neq 1} \theta_w InfoPostTreat(w)_{y,t} + \zeta Controls_{y,t} + Person \times AcademYearFE_{i,y}$$
$$+ AcademWeek \times ProgamFE_{i,t} + AcademYear \times WeekdayFE_{y,t} + \epsilon_{i,y,t}$$



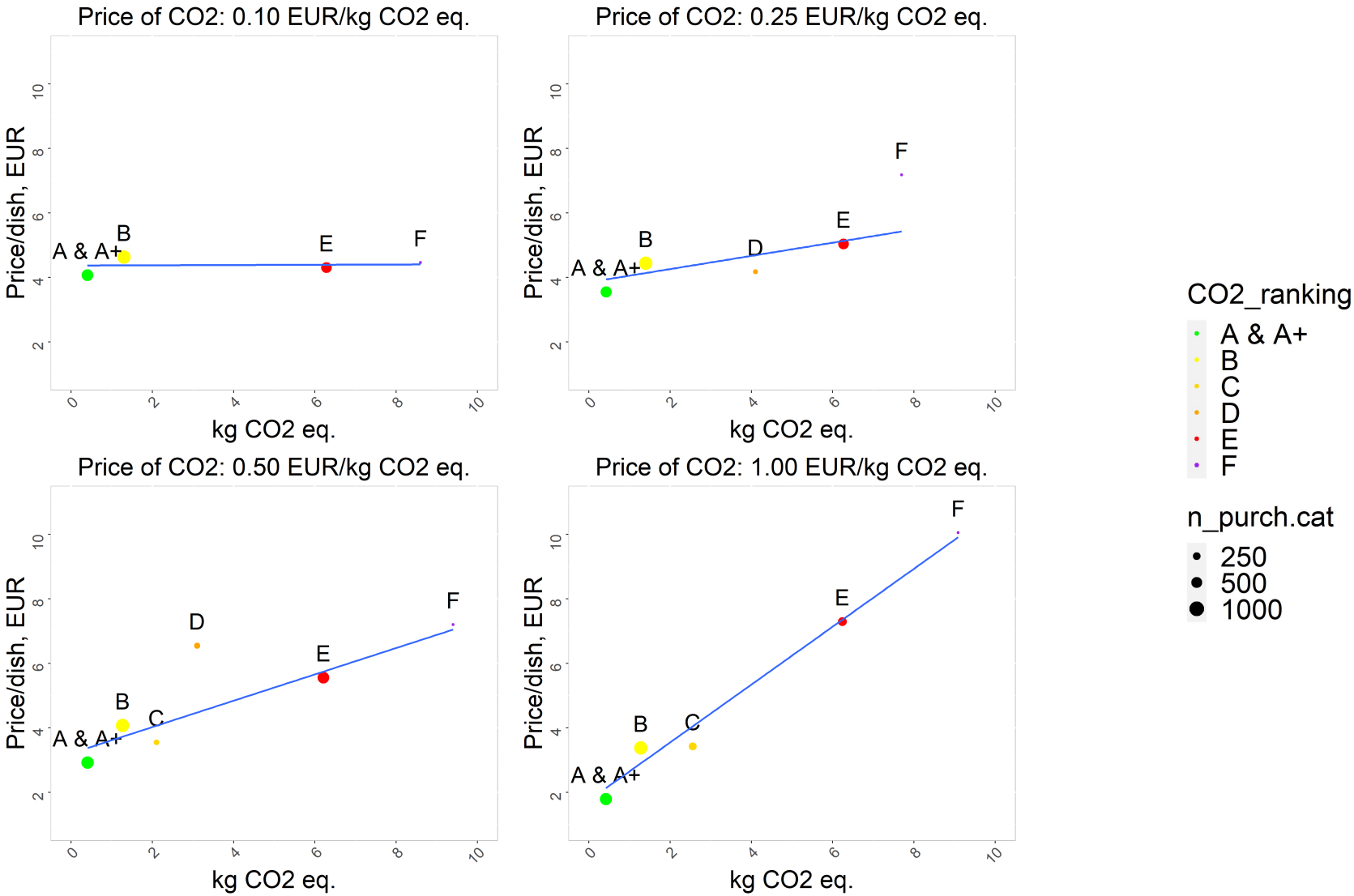
Effect of Posting Info: Log specification

Dependent Variable:	log(CO2)				
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
(Intercept)	0.6462***				
	(17.74)				
Info.PostTreat	-0.2312***	0.0211	0.0345	0.0177	0.0099
	(-3.055)	(0.2277)	(0.6549)	(0.4683)	(0.2479)
Info.Post		-0.0981***	-0.0208	-0.0735*	
		(-2.752)	(-0.4322)	(-1.955)	
log(CO2.EW)			1.337***	0.6045***	0.5800***
			(15.52)	(7.327)	(7.372)
Temperature			-0.0383	-0.0213	-0.0397
			(-1.173)	(-1.012)	(-1.382)
Precipitation			-0.0263	-0.0454***	-0.0303*
			(-1.211)	(-2.948)	(-1.800)
Cloudcover			0.0359*	0.0455***	0.0432***
			(1.971)	(3.431)	(3.546)
N Daily Customers			0.0002**	6.64×10^{-5}	0.0002*
			(2.343)	(0.7257)	(1.919)
GoogleTrendsCarbFootprint			-0.0051***	-0.0030**	-0.0030*
			(-2.879)	(-2.059)	(-1.854)
Fixed-effects					
person_id		Yes			
academ.year		Yes			
person_id-academ.year			Yes	Yes	Yes
academ.year-weekday				Yes	Yes
academ.week_id-type_x_program					Yes
Fit statistics					
Cluster S.E.: Acad. Day	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Person	Yes	Yes	Yes	Yes	Yes
Observations	121,650	121,650	121,650	121,650	121,650
R^2	0.00667	0.25587	0.33894	0.35493	0.36019
Within R^2		0.00147	0.10240	0.01170	0.00801

Clustered (person_id & academ.day_id) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Back to Info Treatment

Bonus-malus pricing



Back to main results

Bonus-malus pricing

The effect on consumption carbon footprint

$$CO2_{i,y,t} = \sum_{w \neq -1} \theta_w PriceTreatWeek(w)_{y,t} + \zeta Controls_{y,t} + Person \times AcademYearFE_{i,y}$$
$$+ AcademWeek \times ProgamFE_{i,t} + AcademYear \times WeekdayFE_{y,t} + \epsilon_{i,y,t}$$

▸ Back to main results

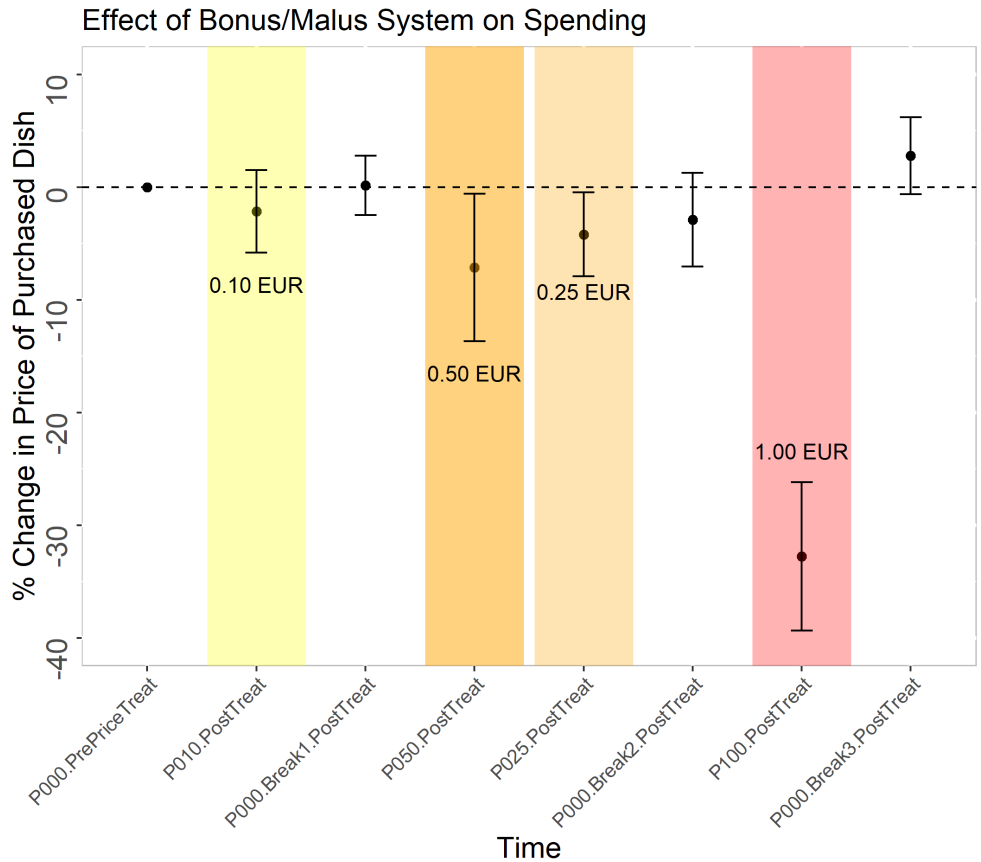
Dependent Variables:	CO2		log(CO2)		CO2_rank_ABC		CO2_rank_EF	
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
P010.PostTreat	-0.0466	0.0189	0.0392	0.0672	0.0297	0.0185	-0.0218	-0.0137
	(-0.2342)	(0.0901)	(0.4192)	(0.6776)	(0.8465)	(0.5371)	(-0.7141)	(-0.4187)
P000.Break1.PostTreat	-0.3836	-0.3629	-0.2189	-0.2025	0.0606	0.0621	-0.0655	-0.0670
	(-1.184)	(-1.202)	(-1.482)	(-1.475)	(1.167)	(1.304)	(-1.326)	(-1.468)
P050.PostTreat	-1.069***	-0.9925***	-0.2802**	-0.2527**	0.1643***	0.1529***	-0.2116***	-0.1992***
	(-3.728)	(-3.469)	(-2.361)	(-2.063)	(4.104)	(4.016)	(-5.025)	(-4.990)
P025.PostTreat	-0.8174***	-0.8082**	-0.1667	-0.1549	0.1261***	0.1259***	-0.2018***	-0.2010***
	(-2.701)	(-2.600)	(-1.336)	(-1.194)	(3.212)	(3.183)	(-4.327)	(-4.344)
P000.Break2.PostTreat	-0.3339	-0.2573	-0.1379	-0.1094	0.0812	0.0698	-0.0608	-0.0463
	(-1.139)	(-0.8256)	(-1.086)	(-0.8155)	(1.252)	(1.046)	(-1.415)	(-1.006)
P100.PostTreat	-1.447***	-1.285***	-0.4165**	-0.3514**	0.2542***	0.2249***	-0.2819***	-0.2527***
	(-4.173)	(-3.565)	(-2.511)	(-2.149)	(5.439)	(4.450)	(-5.653)	(-4.686)
P000.Break3.PostTreat	-0.5284	-0.4453	-0.1400	-0.0904	0.0644	0.0520	-0.0939	-0.0805
	(-1.272)	(-1.031)	(-0.9251)	(-0.5622)	(0.8900)	(0.6861)	(-1.408)	(-1.143)
Fixed-effects								
person_id_AY	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
academ.year-weekday	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
academ.week_id-type_x_program		Yes		Yes		Yes		Yes
Fit statistics								
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post Indicators	Yes	FE	Yes	FE	Yes	FE	Yes	FE
Cluster S.E.: Acad. Day	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Person	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,347	28,344	28,347	28,344	28,347	28,344	28,347	28,344
R^2	0.31717	0.32240	0.36536	0.36966	0.30891	0.31419	0.30801	0.31317
Within R^2	0.02979	0.02008	0.01320	0.00855	0.02667	0.01390	0.02776	0.01645

Clustered (person_id & academ.day_id) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Bonus-malus pricing: Effect on the cost of meals to users

$$ln(PriceActual)_{i,y,t} = \sum_{w \neq -1} \theta_w PriceTreatWeek(w)_{y,t} + \zeta Controls_{y,t} + Person \times AcademYearFE_{i,y} + AcademWeek \times ProgamFE_{i,t} + AcademYear \times WeekdayFE_{y,t} + \epsilon_{i,y,t}$$

▸ Back to main results



Bonus-malus pricing

The effect on consumption carbon footprint and demographics

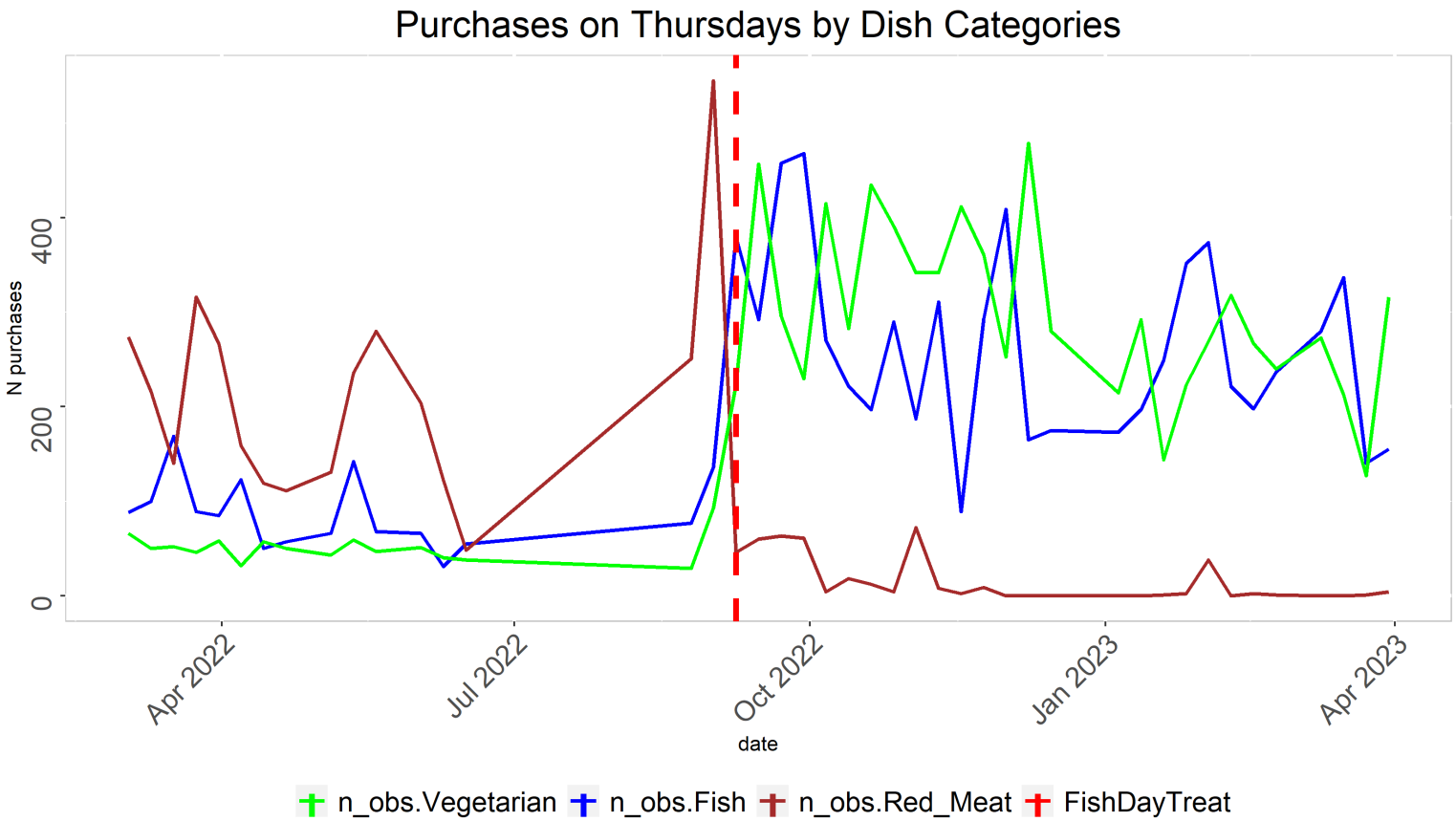
- $V_{CO2} \in \{0, 0.1, 0.25, 0.5, 1.0\}$ depending on the week

Dependent Variable:	CO2					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
Price.PostTreat	-1.314***	-1.425***	-2.033***	-1.200***	-1.404***	-1.594***
	(-5.042)	(-5.120)	(-4.272)	(-3.689)	(-5.051)	(-5.032)
Price.PostTreat × d.Staff		0.6891*				
		(1.711)				
Price.PostTreat × d.Prof		0.1415				
		(0.2765)				
age × Price.PostTreat			0.0264*			
			(1.952)			
female × Price.PostTreat			0.1991			
			(0.9796)			
Quint.mean.CO2.PRE_NORM × Price.PostTreat				-0.1908*		
				(-1.838)		
Quint.sd.CO2.PRE_NORM × Price.PostTreat				0.1294		
				(1.060)		
d.Asia × Price.PostTreat					0.4391	
					(1.159)	
d.Africa × Price.PostTreat					0.1359	
					(0.2715)	
d.NorthAmerica × Price.PostTreat					1.158**	
					(2.520)	
d.SouthAmerica × Price.PostTreat					-0.3483	
					(-0.6894)	
full_tuition_fee_euro_NORM × Price.PostTreat						0.0119
						(1.009)
Fixed-effects						
person_id-academ.year	Yes	Yes	Yes	Yes	Yes	Yes
academ.year-weekday	Yes	Yes	Yes	Yes	Yes	Yes
academ.week_id-type_x_program	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics						
HTE x-Post Interactions	No	FE	Yes	Yes	Yes	Yes
Controls:	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Academ Day	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Person	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,347	28,347	28,347	28,347	28,347	20,849
R^2	0.32114	0.32128	0.32155	0.32485	0.32137	0.32046
Within R^2	0.01814	0.01833	0.01873	0.02349	0.01846	0.01328

Clustered (person_id & academ.day_id) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

▸ Back to main results ▸ Robustness to Queuing

Ban of red meat on Thursdays



▸ Back to red meat ban

The effect of banning meat on Thursdays

- Sample span: 2 weeks before the ban (start of semester) → 4 weeks after the ban (completely pre-Info) ▸ Back to main results

Dependent Variables:	CO2	CO2_rank_ABC	CO2_rank_EF	CO2	CO2_rank_ABC	CO2_rank_EF
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
NoMeat.PostTreat	-0.1126	-0.0142	0.0140	0.1748	-0.0701*	0.0570
	(-0.4486)	(-0.3285)	(0.2867)	(0.7973)	(-1.842)	(1.152)
Temperature	0.1829	-0.0322	0.0731**	0.0047	0.0027	0.0463
	(1.139)	(-1.103)	(2.448)	(0.0318)	(0.1037)	(1.619)
Cloudcover	0.0943	-0.0042	0.0096	0.0760	-0.0007	0.0069
	(1.467)	(-0.3781)	(0.7596)	(1.381)	(-0.0830)	(0.5875)
Precipitation	0.0446	-0.0147	0.0107	0.0111	-0.0080	0.0056
	(0.4860)	(-0.8963)	(0.6454)	(0.1277)	(-0.5342)	(0.3342)
GoogleTrendsCarbFootprint	0.0389	-0.0032	0.0047	0.0310	-0.0025	0.0042
	(0.7318)	(-0.3544)	(0.4951)	(0.7583)	(-0.3790)	(0.5435)
NoMeat.PostTreat × d.Thu	-2.124***	0.3907***	-0.3904***	-2.353***	0.4352***	-0.4246***
	(-9.122)	(8.877)	(-8.798)	(-12.64)	(13.78)	(-11.34)
CO2.EW.noThu				0.7021***		
				(5.434)		
log(CO2.EW.noThu)					-0.3452***	0.2652***
					(-7.145)	(3.830)
Fixed-effects						
person_id_AY	Yes	Yes	Yes	Yes	Yes	Yes
academ.year-weekday	Yes	Yes	Yes	Yes	Yes	Yes
academ.week_id-type_x_program	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics						
Cluster S.E.: Date	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Person	Yes	Yes	Yes	Yes	Yes	Yes
Observations	41,461	41,883	41,883	41,461	41,883	41,883
R^2	0.35519	0.33306	0.33609	0.35992	0.33790	0.33902
Within R^2	0.02210	0.01816	0.02246	0.02928	0.02527	0.02677

Clustered (person_id & date) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Resilience of habits

▸ Back to main results

Last phase:

- All information about carbon footprint is removed
- Prices are back to normal

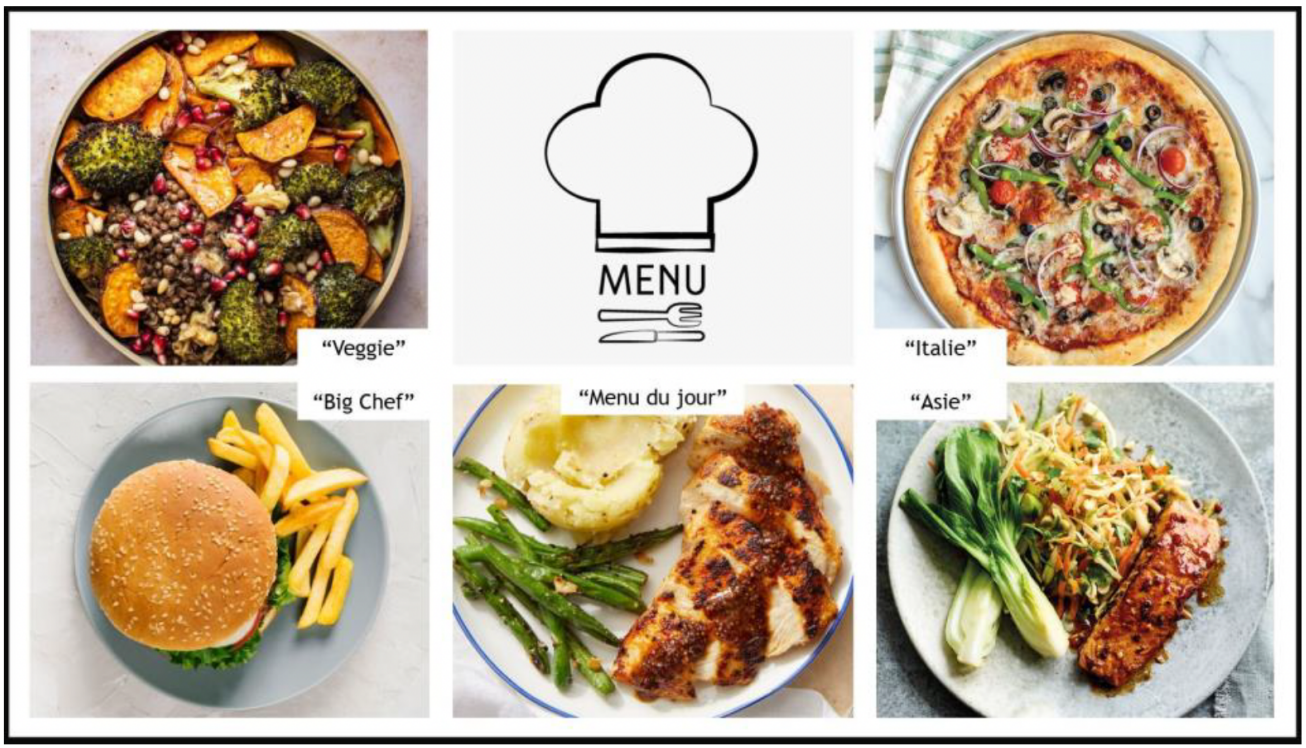
Dependent Variables:	CO2			log(CO2)		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
P010.PostTreat	-0.2093	-0.1145	-0.1417	-0.0678	-0.0142	-0.0162
	(-0.9095)	(-0.5165)	(-0.6193)	(-0.6534)	(-0.1378)	(-0.1518)
P000.Break1.PostTreat	-0.4154	-0.4077	-0.4078	-0.2327	-0.2188	-0.2239
	(-1.128)	(-1.286)	(-1.273)	(-1.375)	(-1.495)	(-1.518)
P050.PostTreat	-1.187***	-1.108***	-1.132***	-0.4011***	-0.3586**	-0.3570**
	(-3.393)	(-3.348)	(-3.310)	(-2.918)	(-2.601)	(-2.477)
P025.PostTreat	-1.085***	-1.058***	-1.105***	-0.3729**	-0.3351**	-0.3387**
	(-3.025)	(-3.048)	(-3.032)	(-2.570)	(-2.421)	(-2.351)
P000.Break2.PostTreat	-0.4155	-0.3341	-0.3432	-0.1889	-0.1566	-0.1703
	(-1.323)	(-1.078)	(-1.088)	(-1.412)	(-1.189)	(-1.277)
P100.PostTreat	-1.650***	-1.458***	-1.482***	-0.5515***	-0.4724***	-0.4809***
	(-4.540)	(-3.853)	(-3.845)	(-3.328)	(-2.856)	(-2.899)
P000.Break3.PostTreat	-0.5717	-0.5030	-0.5159	-0.1864	-0.1446	-0.1533
	(-1.309)	(-1.140)	(-1.169)	(-1.205)	(-0.9106)	(-0.9635)
Removal.PostTreat	-0.4074	-0.2834		-0.0993	-0.0407	
	(-1.542)	(-1.139)		(-0.9035)	(-0.3932)	
Removal.Week1.PostTreat			-0.1169			0.0059
			(-0.3766)			(0.0455)
Removal.Week2.PostTreat			-0.4373			-0.1645
			(-1.180)			(-1.162)
Removal.Week3.PostTreat			-0.2946			-0.0379
			(-1.038)			(-0.3106)
Removal.Week4.PostTreat			-0.4932			0.0517
			(-1.353)			(0.3216)
Fixed-effects						
person_id_AY	Yes	Yes	Yes	Yes	Yes	Yes
academ.year-weekday	Yes	Yes	Yes	Yes	Yes	Yes
academ.week_id-type_x_program		Yes	Yes		Yes	Yes
Fit statistics						
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Preliminary evidence in favor of the information channel

Malaingre 2022:
Internet survey run on subjects among HEC students and employees (# 642 subjects):
Comparison of what people choose in a menu of 5 dishes before and after providing information about dishes carbon footprint

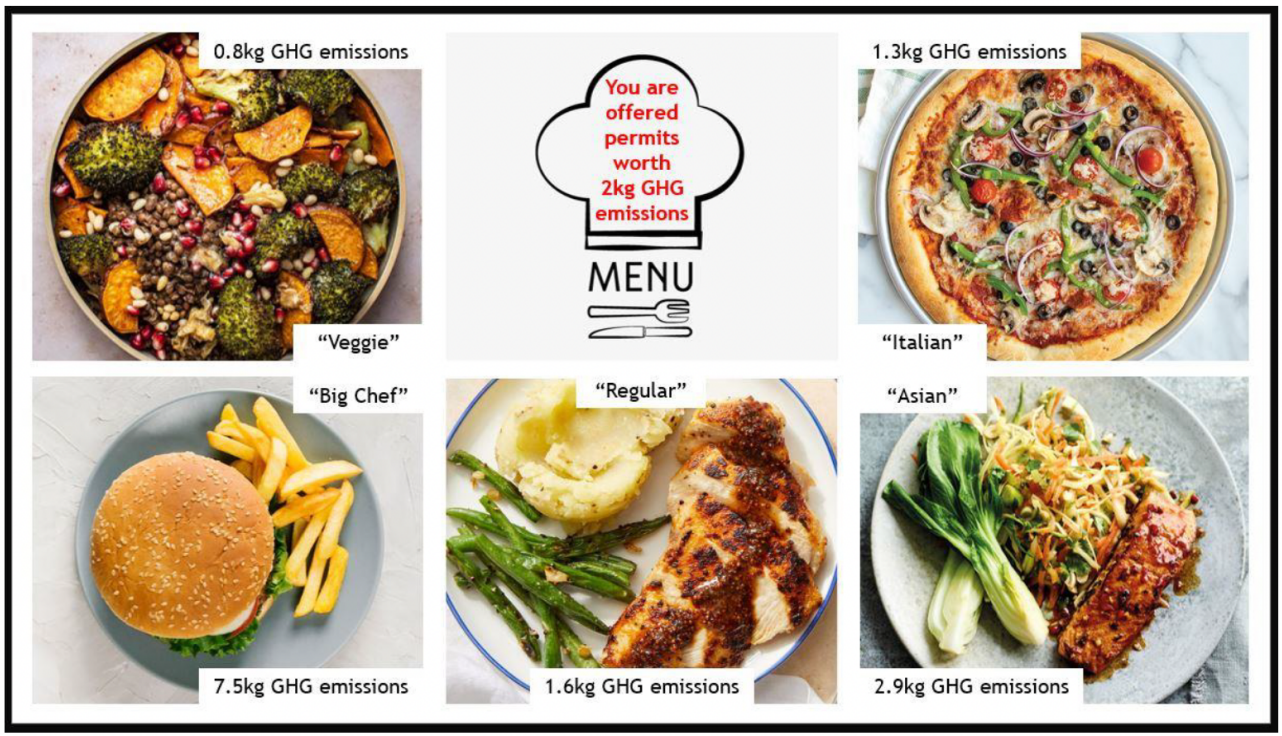
Malaingre 2022:

“Here are the available dishes today. Which one do you choose?"



Malaingre 2022:

"Here are the available dishes today. Which one do you choose?"



Malaingre 2022:

According to the answers in the survey, providing **information** about dishes' carbon footprint would **reduce** food-related **GHG** emission by about **30%**.

$\Downarrow$

TAKE AWAY: According to the survey, people seem not to be aware of dishes' carbon footprint and would substantially adjust their diet if informed.

Summary statistics: People

Panel A: Students

variable	n_indiv	mean	sd	min	max
n_obs.per.person	3486	51.48	40.68	10	281
age	3486	21.34	3.6	20	50
female	3486	0.41			
mean.CO2.preInfo	3371	3.33	1.35	0.14	6.75
sd.CO2.preInfo	3371	2.37	0.63	0	4.03

continent	n_individuals	total_individuals	frequency
Europe	2203	3486	0.632
Asia	692	3486	0.199
Africa	255	3486	0.073
South America	192	3486	0.055
North America	137	3486	0.039
Oceania	7	3486	0.002

Panel B: Staff

variable	n_indiv	mean	sd	min	max
n_obs.per.person	485	65.81	52.55	10	321
age	485	38.99	11.35	20	60
female	485	0.71			
mean.CO2.preInfo	473	2.24	1.17	0.24	6.4
sd.CO2.preInfo	473	1.98	0.87	0	4.06

Panel C: Faculty

variable	n_indiv	mean	sd	min	max
n_obs.per.person	170	57.14	46.37	10	261
age	170	34.35	10.87	20	60
female	170	0.49			
mean.CO2.preInfo	161	2.23	1.03	0.3	4.93
sd.CO2.preInfo	161	2.07	0.81	0	3.86

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Carbon footprint letter grades

Rating	CO_2 footprint/portion
A+	Less than 0.5 kg CO_2-eq.
A	Between 0.5 and 1 kg CO_2-eq.
B	Between 1 and 2 kg CO_2-eq.
C	Between 2 and 3 kg CO_2-eq.
D	Between 3 and 5 kg CO_2-eq.
E	Between 5 and 7 kg CO_2-eq.
F	More than 7 kg CO_2-eq.

back

Experimental design: Why

Why running an experiment in the HEC canteen?

- Food represents between 25% and 35% of anthropogenic greenhouse gas emission.

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Experimental design: Why

Why running an experiment in the HEC canteen?

- Food represents between 25% and 35% of anthropogenic greenhouse gas emission.
- Firms are responsible for most of the emission $\Rightarrow$ It is important to probe future managers' attitude toward GHG relevant matters.
- HEC population is not representative of the general population but representative of the next generation managers population.

Experiment design: When

- **When:**

1. Benchmark phase: September 1st 2021 until November 21 2022
2. Carbon footprint information phase: November 21 2022 until March 12 2023
3. Bonus-malus pricing:
   - Price of carbon: 0.1 $Euro/KgCO_2eq$. March 13-17 2023
   - Price of carbon: 0.5 $Euro/KgCO_2eq$. March 27-31 2023
   - Price of carbon: 0.25 $Euro/KgCO_2eq$. April 3-7 2023
   - Price of carbon: 1 $Euro/KgCO_2eq$. April 17-21 2023
4. Resilience phase: May 9 2023 onward.

The effect of posting dish carbon footprint

No significant effect

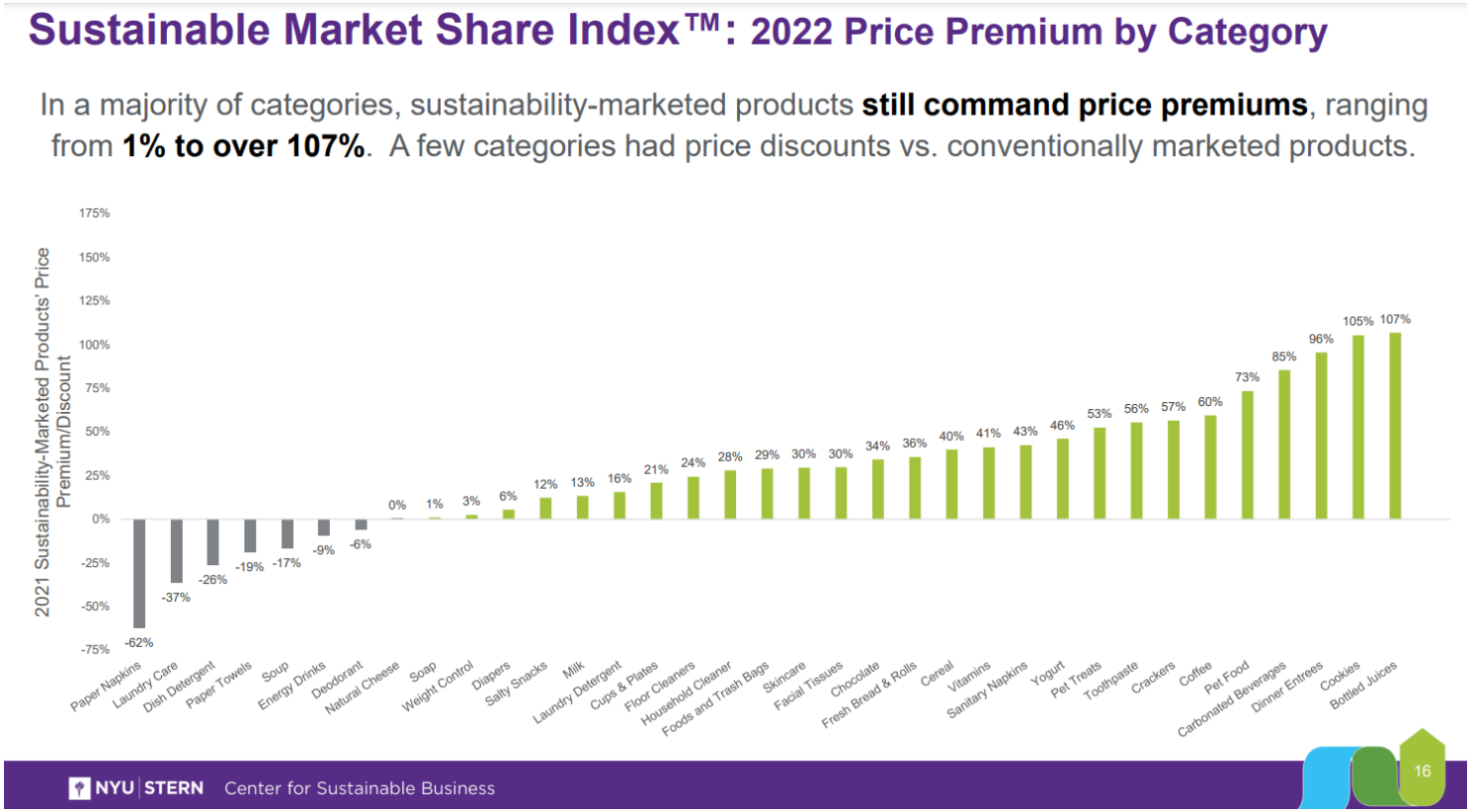
back

Dependent Variable:			CO2		
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
(Intercept)	3.326***				
	(40.38)				
Info.PostTreat	-0.4178**	0.0066	-0.0824	-0.0561	-0.0825
	(-2.572)	(0.0328)	(-0.6404)	(-0.5108)	(-0.7295)
Info.Post		-0.2149*	-0.0830	-0.1934*	
		(-1.771)	(-0.6598)	(-1.709)	
CO2.EW			1.491***	0.9922***	0.9925***
			(19.74)	(10.92)	(11.73)
Temperature			-0.1268*	-0.0873	-0.1352*
			(-1.739)	(-1.544)	(-1.817)
Precipitation			-0.0575	-0.0984***	-0.0597
			(-1.299)	(-2.884)	(-1.429)
Cloudcover			0.0933**	0.1149***	0.1151***
			(2.221)	(3.466)	(3.148)
N Daily Customers			0.0004*	2.02×10^{-5}	0.0004
			(1.819)	(0.0829)	(1.409)
GoogleTrendsCarbFootprint			-0.0127***	-0.0080*	-0.0103**
			(-2.899)	(-1.971)	(-2.264)
Fixed-effects					
person_id		Yes			
academ.year		Yes			
person_id-academ.year			Yes	Yes	Yes
academ.year-weekday				Yes	Yes
academ.week_id-type_x_program					Yes
Fit statistics					
Cluster S.E.: Acad. Day	Yes	Yes	Yes	Yes	Yes
Cluster S.E.: Person	Yes	Yes	Yes	Yes	Yes
Observations	121,650	121,650	121,650	121,650	121,650
R^2	0.00460	0.22088	0.30105	0.31324	0.31945
Within R^2		0.00177	0.09629	0.02538	0.01977

Clustered (person_id & academ.day_id) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Price premium of "green" goods

- According to NYU Stern's Center for Sustainable Business, sustainability-marketed products enjoyed a price premium of 28% in 2022



Back

Resilience of habits

Last phase:

- All information about carbon footprint is removed
- Prices are back to normal
- **Result:** Habits of consumers are back to normal

	CO2 reduction, kg CO2 eq. / meal	t-statistic	Statistically significant
Week 1 after removal	-0.1169	-0.3766	No
Week 2 after removal	-0.4373	-1.180	No
Week 3 after removal	-0.2946	-1.038	No
Week 4 after removal	-0.4932	-1.353	No

Statistical significance: ***: significant at 1%, **: significant at 5 %, *: significant at 10 %.
Standard errors are clustered by *person_id* and *academic day*.

▸ Detailed regression results

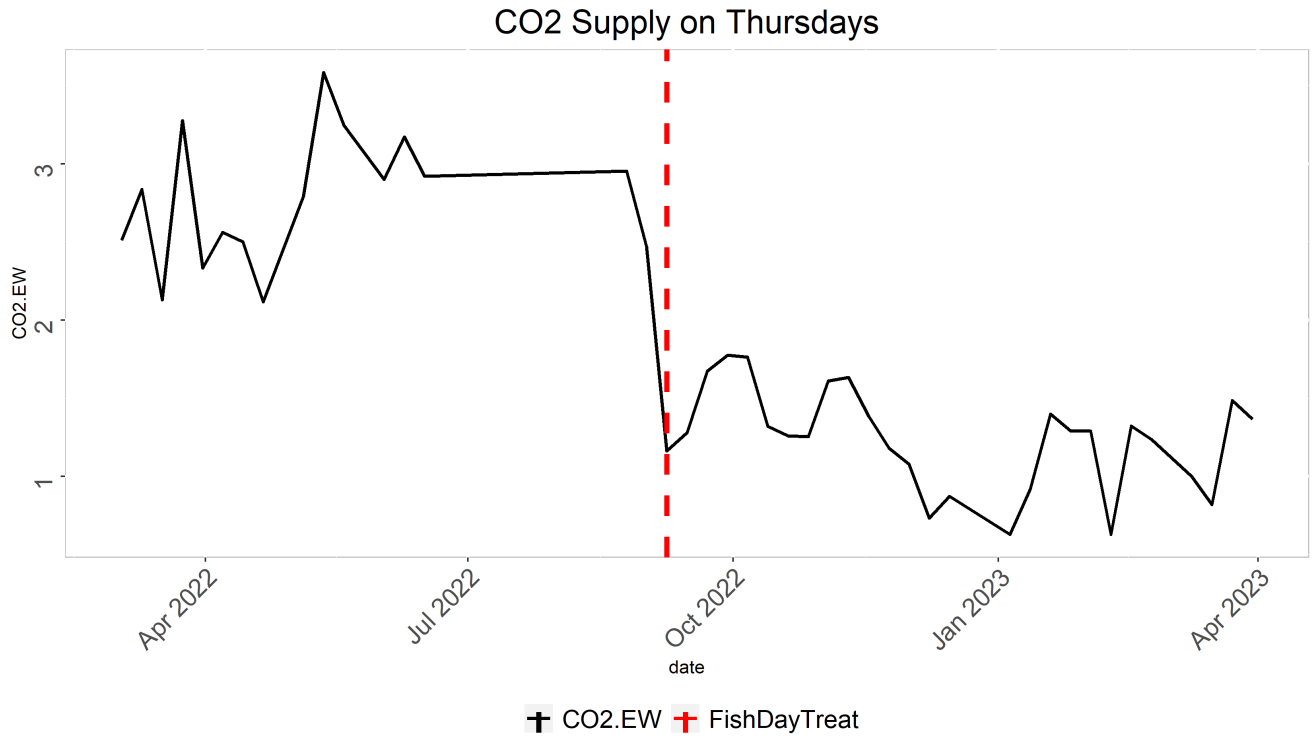
Bonus-malus pricing

- We also analyzed whether there are differences in response to bonus-malus pricing among the population of HEC canteen users:
  - no difference by gender
  - no difference by affiliation (students vs. staff vs. professors)
  - older individuals tend to be less sensitive
    - marginally statistically significant at 10%
  - individuals coming from North America tend to be less sensitive

▸ Detailed regression results ▸ Back

The effect of banning red meat on Thursdays

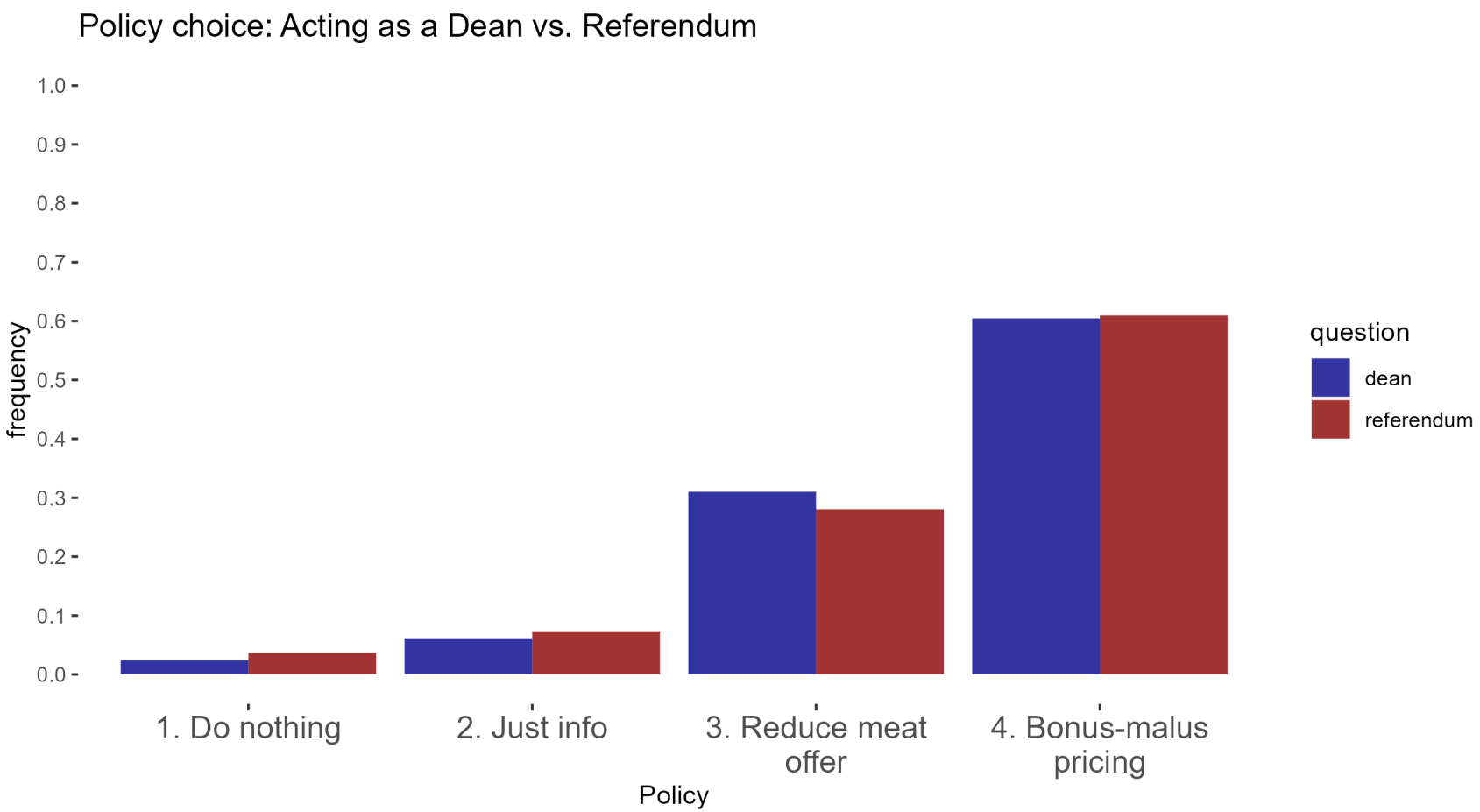
- Starting from September 8th 2022, HEC canteen has introduced "Meat-free Thursdays"



▸ Graph by dish

Survey results

- Sample: 1009 respondents who were expecting to have meals at HEC canteen in the 6 months following the survey ("skin-in-the-game")



Bonus-malus pricing: Effect on the cost of meals to users

- Did bonus-malus pricing change the average amount spent by HEC canteen users per meal?

Value of Carbon	Effect on spending	t-statistic	Statistically significant
0.1 EUR/kg CO2 eq.	≈ 0	-1.145	No
0.25 EUR/kg CO2 eq.	-4.2% **	-2.208	Yes
0.5 EUR/kg CO2 eq.	-7.1% **	-2.140	Yes
1.0 EUR/kg CO2 eq.	-32.8% ***	-9.761	Yes

Statistical significance: ***: significant at 1%, **: significant at 5 %, *: significant at 10 %.
Standard errors are clustered by *person_id* and *academic day*.

▸ Details ▸ Back