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Can we nudge sustainable food consumption? A field experiment at the University of Urbino canteen

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Overview

Scenario and Motivation (1)

➢ About one-third of the world's edible food is lost or wasted annually. A huge amount of food waste is attributable to final consumers

➢ Food choices have a high impact on the environment and climate, especially in terms of waste generation, resource consumption (energy and non-energy) and greenhouse gas emissions

➢ Canteens are a good context for studying people's food choice behaviors and the food waste production (**Kurz, 2018; Kallbekken & Sælen, 2013; Richardson et al., 2021**)

    ➢ possibility to standardise the activity

    ➢ high number of individuals that may be involved in the experiment

Scenario and Motivation (2)

➢ The existing literature addressing consumer food waste is expanding but limited.

➢ Few studies testify a limited consumers' knowledge and awareness about the relevance of the phenomenon and the environmental impact of food waste (**Qi and Roe, 2016**)

➢ **Principato et al (2015)**: the higher the awareness of the environmental impacts of food waste, the higher the probability that individuals change their behaviour towards the wastage of food

Our proposal: providing information may nudge canteen users to reduce the amount of plate leftovers

Project and Aim of the Research

FOR US AND EXP - FOod secu**R**ity and s**US**tain**A**bility: **N**u**D**ging and **EXP**erimental evidence

➢**University of Urbino Carlo Bo + ERDIS Marche:** Institutional entity for the Right to Education of Marche Region's universities ➔ Responsible for University canteens

➢GENERAL AIM: apply behavioural instruments to reduce food waste production

➢SPECIFIC AIM: implementation of an informative nudge aimed at promoting students conscious food consumption at the canteen «Ristorazione del Duca» of the University of Urbino, in terms of reducing food waste generated at the final consumption stage

➢Design and implement an experiment involving the introduction of a specific **NUDGE**

➢Analysis of potential determinants: Age, gender, education, individual university characteristics, family income level, etc.

Canteens characteristics

➢ 2 university canteens:

«Ristorazione Duca» → Directly managed by ERDIS MARCHE + City centre (highest n. of departments)

«Ristorazione Tridente» → Subcontracted managed + Outside city centre

➢ Canteens' users: **university** users (**students**, professors, university employees), and **ERDIS staff**

➢ **non payers** (depending on individual economic situation), **payers** (with or without subscription)

➢ **TWO MEAL OPTIONS:**
- **'complete' meal** (2 main courses, 1 side dish, bread, fruit/dessert)
- **'reduced' meal** (1 main course, 1 side dish, bread, fruit/dessert)

Experiment design (1)

➤ <u>Information nudge:</u> Message focusing on carbon emissions related to food waste generation

➤ <u>Two strategies</u>:

   ➤ information provided by email (conventional / action-distant message)

   ➤ information provided at the canteen (action-close message) (in the spirit of **Essl et al, 2021**) + suggestion on how to reduce food waste production

➤ <u>Objective:</u> **Evaluate the impact of the information nudge on the choice between complete vs reduced meal**

Experiment Design (2)

➢**PRE-TREATMENT PERIOD** – December, 1 2022 - January, 31 2023
- Monitoring the number of complete and reduced meals in both canteens (Tridente and Duca)

➢**TREATMENT PERIOD** – February, 1 – May, 15 2023
- Provision of the information nudge by email to all potential patrons of the two canteens:
  «Far from action» Treatment (February, 1 – March, 5): 2 emails sent
  First mail: January, 31 – February, 1
  Second mail: February, 15 - 17

- Provision of the information nudge **only** at the «Ristorazione del Duca» canteen by posters, flyers, placemats («Ristorazione Tridente» used as control in this stage):
  «Close to action» Treatment (March, 6 – May, 15):

- *Number of reduced and complete meals constantly recorded*

Experiment Design (3)

➢ **POST-TREATMENT PERIOD** – May, 15 – 31, 2023
- Removal of the message (posters, flyers, placemats) from «Ristorazione Duca» → Pre-treatment situation

- *Number of reduced and complete meals constantly recorded*

Additional Phase
QUESTIONNARIE SUBMISSION – June – July 2023
- Each nudge activity is removed → return to usual canteen activites

- Questionnaire focus: perception and level of intrusiveness associated with nudging and the factors that guided the choices of people attending the canteen

«Far from action treatment» - information provided by email

Lo sai che lo spreco alimentare è il **terzo emettitore di gas serra** al mondo dopo Cina e Stati Uniti?
Pensaci quando ti metti a tavola oggi! Contribuisci a ridurre lo spreco alimentare!
Considera quanta fame hai oggi: Normale o da lupi?
Se oggi vai a mensa e non hai una fame da lupi, scegli il pasto ridotto!
Per saperne di più, clicca qui.

Do you know that food waste ranks as the **third CO2 top emitter** after USA and China?
How hungry are you today? If you are not too hungry, choose the reduced meal at the canteen.
If you want to learn more, click here

«Close to action treatment» - information provided at the Duca canteen

Placemat

Flyer

Poster

«Close to action treatment» - information provided at the Duca canteen

Checkout/ Cash recorder

Meal Distribution Area

INFORMATIVE FLYER

Distribution of trays, tableware, informative placemats, bread

INFORMATIVE POSTER

Queue

Canteen Entrance
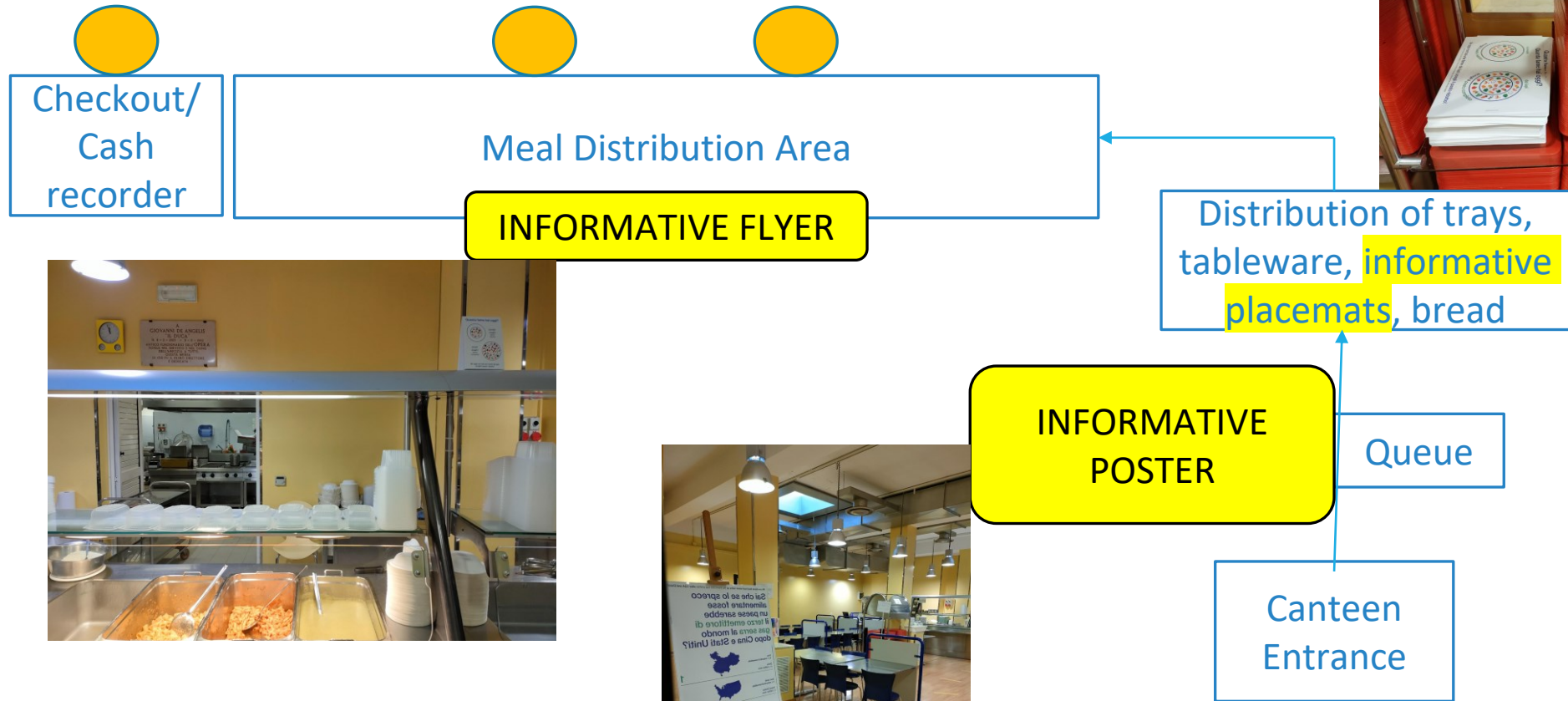
Descriptive Statistics– All Students - «Far from Action treatment»
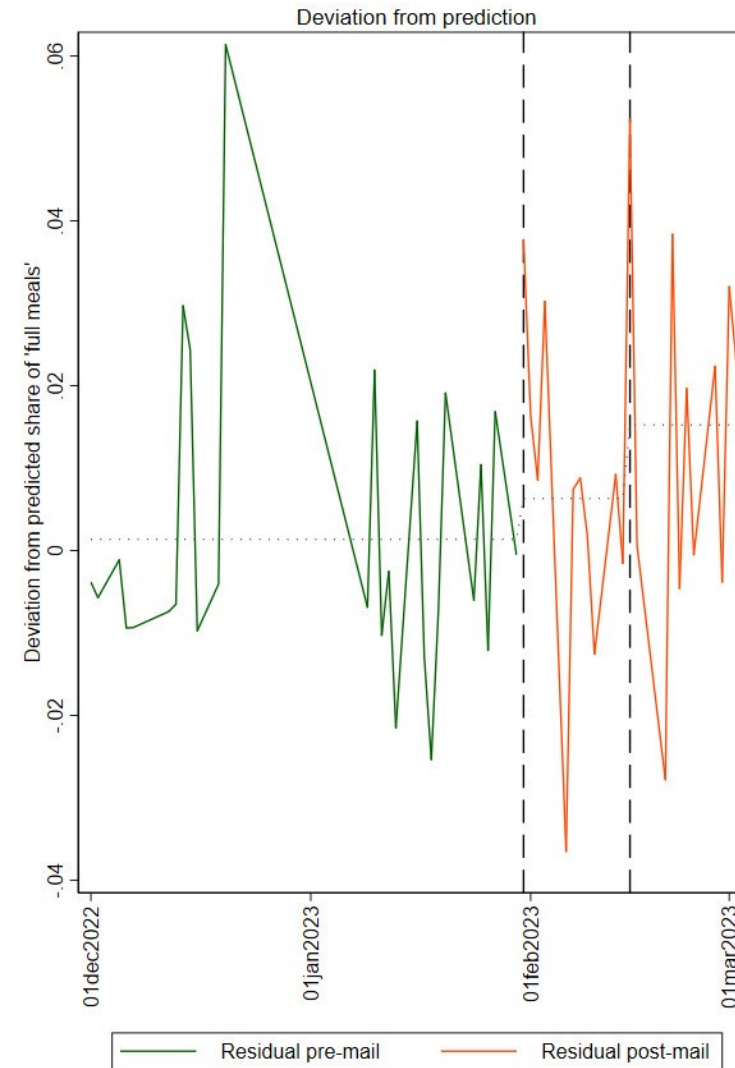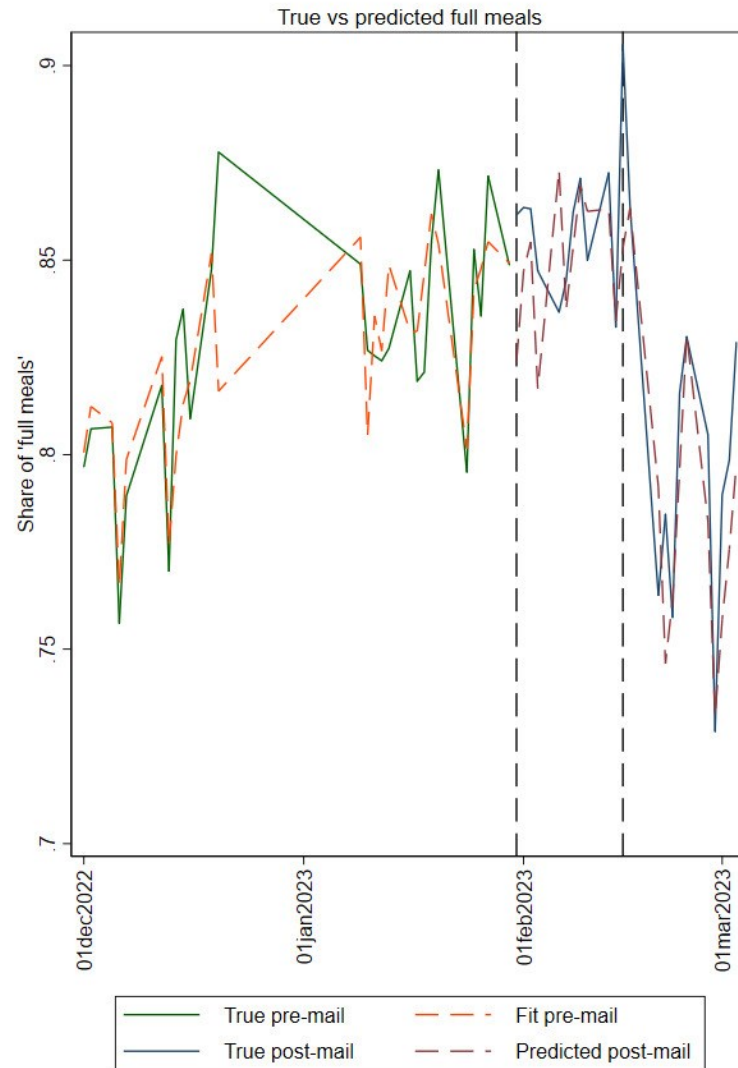
Descriptive Statistics – Different Students Categories - «Close to action treatment»
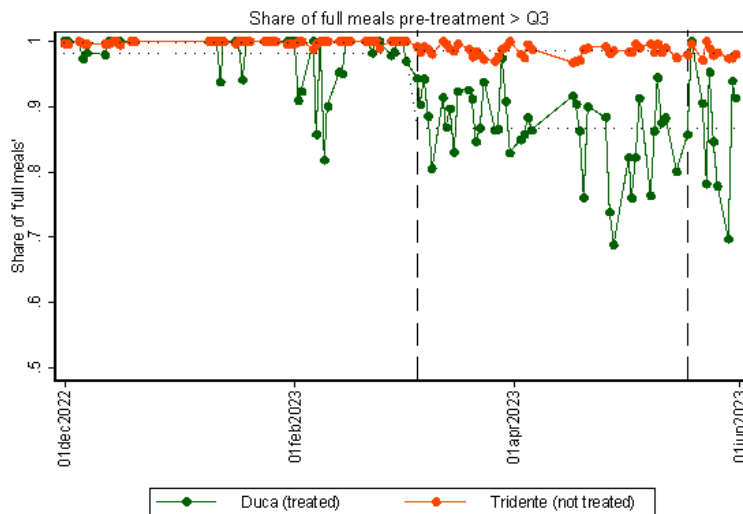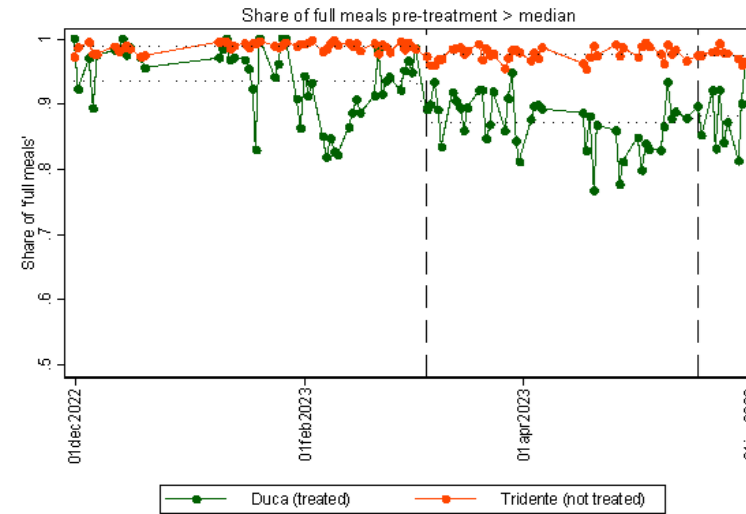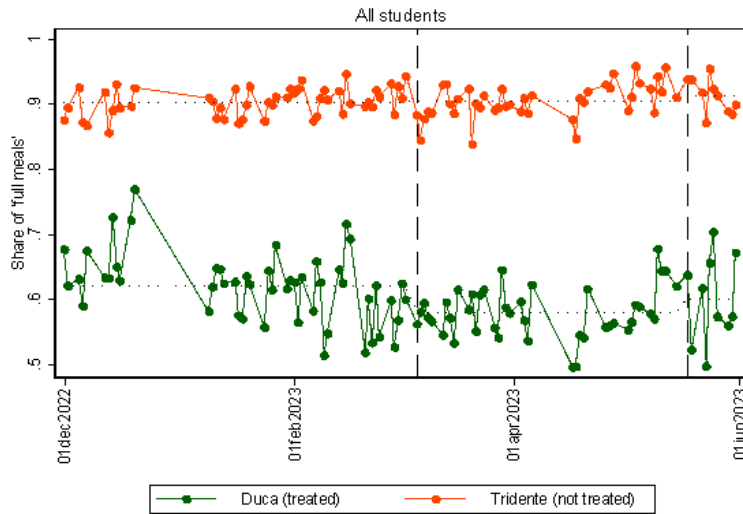
Data and Econometric Framework (1)

ERDIS MARCHE

- Meal type (complete, reduced)
- Type of consumers (Uniurb pletra and ERDIS staff
- Chosen dishes
- Payers/not payers
- Lunch/Dinner
- Canteen (Duca/Tridente)
- Meal composition (dishes specific content)
- Take away/not take away meal
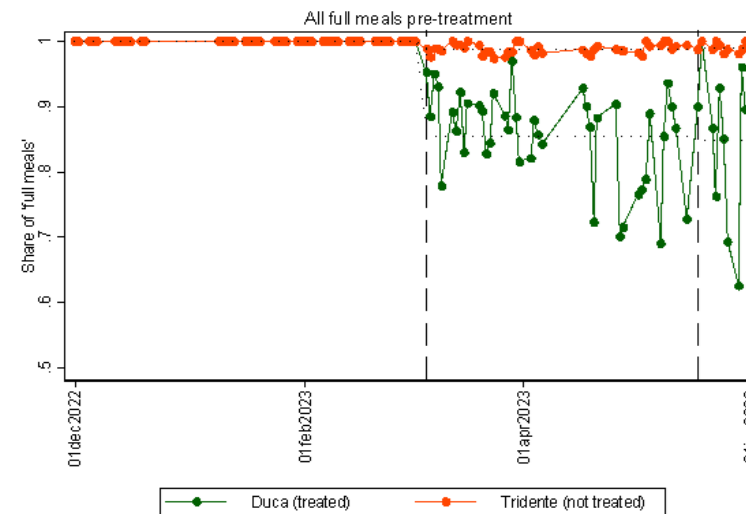- N. of dinners
- N. of meals in treated and untreated canteens in pre-treatment period

UNIVERSITY OF URBINO DATASET

- Enrolment year
- Residence (municipality)
- Gender
- Age
- Study course
- Department/School
- Degree course
- Average grade

Data and Econometric Framework (2)

Difference-in-Difference → <u>Linear Probability Model with Fixed effects</u>

Estimated baseline equation (full meal):

$$Full\ meal_{i,c,t,m} = X_i'\beta + \phi_m + \tau_t + \gamma Free_{i,c,t,m} + \theta Treated_c + \delta Treated_c \times Post_t + \varepsilon_{i,c,t,m}$$

Where
- $Full\ meal_{i,c,t,m}$ is a dummy variable equal to 1 if student *i* had the full meal in canteen *c* on day *t* for meal *m* (lunch or dinner)
- $Treated_c$ is a dummy variable equal to 1 if the meal had in the treated canteen *c*=Duca
- $Post_t$ is a dummy variable equal to 1 if day *t* ∈ treatment period
- $Free_{i,c,t,m}$ is a dummy variable equal to 1 if the meal *m* was given for free to student *i* in day *t* at canteen *c*
- X_i' is a set of time-invariant control variables student *i*
- ϕ_m is a dummy equal 1 if *m*=dinner →dinner fixed effect
- τ_t are day dummies → Day (time) fixed effect
- $\varepsilon_{i,c,t,m}$ error term

Preliminary Results – All Students – «Close to action treatment»

Dependent variable: full meal dummy	(1)	(2)	(3)	(4)	(5)
Treated canteen	-0.285***	-0.177***	-0.150***	-0.150***	-0.180***
	(0.0113)	(0.00931)	(0.00679)	(0.00765)	(0.00892)
Treated canteent x Treatment period	-0.0439***	-0.0341***	-0.0227***	-0.0231***	
	(0.00816)	(0.00735)	(0.00613)	(0.00799)	
Treated canteent x Treatment period	0.0168	-0.00130	-0.0142	-0.0132	
x Post-treatment period	(0.0131)	(0.0121)	(0.0100)	(0.0126)	
Treated canteen x 1-10 treatments					-0.0272***
					(0.00740)
Treated canteen x 11-20 treatments					-0.0381***
					(0.0103)
Treated canteen x 21-30 treatments					-0.0424***
					(0.0151)
Treated canteen x 31-40 treatments					-0.0343*
					(0.0203)
Treated canteen x 41+ treatments					-0.0735***
					(0.0274)
Day F.E.	x	x	x	x	x
Student controls		x			x
Student F.E.			x	x	
At least 50 meals in canteen				x	
N of observations	129021	129021	128989	105225	129021
N of students	2264	2264	2232	941	2264

Linear probability model. Standard errors clustered by student in parenthesis. * $p<0.1$, ** $p<0.05$, *** $p<0.01$. Student controls: gender, foreign born, age, free meal, number of meals in treated canteen in pre-treatment period, number of meals in non-treated canteen in pre-treatment period, number of dinners.

Current experiment phase: Questionnaire

Now we are administrating a voluntary questionnaire outside University canteens to:

- ➤ <u>Verify the perception of the nudge</u>: level of intrusiveness and transparency associated with the implementation of the nudge by the canteens

- ➤ <u>Identify individual factors influencing food choices and their interaction with the implemented nudge</u>

Further Steps

➢ Estimate the model by using also Uniurb data as control variables → new specifications

➢ Estimate the model for «Far from action approach» → mails

➢ Estimate the model also on academic staff and Technical and Administrative Staff

➢ Exploit the questionnaire on ethics and perception of our nudge approach

Thanks for Your attention

SUGGESTIONS ARE WELCOMED!

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