Computer Lab I
Choice data and datasets

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Outline

1. Part 1
   - Useful information
   - Organization of the lectures
   - Organization of the labs
   - Your participation and involvement
2. Part 2
   - Choice data
   - Datasets

Part 1

Useful information

1. Teaching assistants:
   - Anna Fernandez Antolin
   - Meritxell Pacheco
   - Evanthia Kazagli
2. Course webpage: http://transp-or.epfl.ch/courses/dca2016/
3. Exam info: http://transp-or.epfl.ch/courses/dca2016/exam.php

Organization of the lectures

Your participation to the lectures:

- Read the material before the beginning of the course!

  Textbook and additional reading material available here:

  http://transp-or.epfl.ch/courses/dca2016/schedule2016.php

Organisation of the labs

The necessary material is available on the course webpage
http://transp-or.epfl.ch/courses/dca2016/labs.php

1. Computer labs using biogeme
   - Work with one dataset
   - Test and interpret the provided example models
   - Specify and interpret your own models
2. Exercises with pen and paper

⋆ During the semester you will have to give in one assignment.

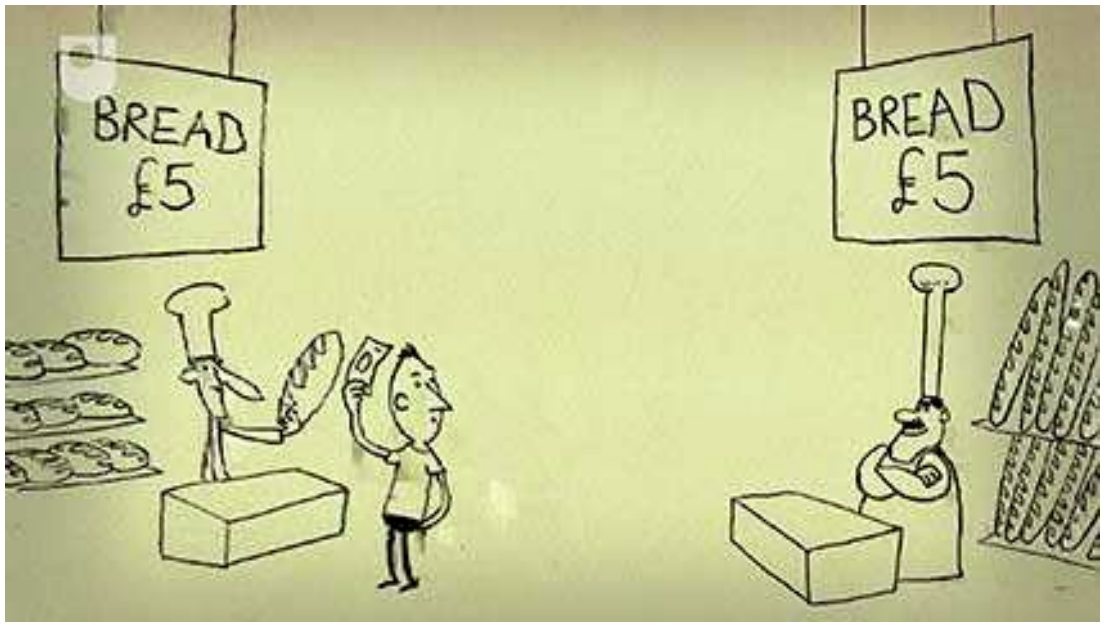
Your participation to the labs

- The labs and the assignement will be organized in groups.
- The groups will be determined by the teaching assistants and communicated via email to enrolled participants.
- Work jointly with your group.

The assignment

- Use the **assigned** dataset to develop your own model specification.
- **By e-mail**, give back your results:
  - **Max. 1 double-sided page** of assignment in PDF format.
  - Model specification in .mod (text) format.
  - **Output file** in **HTML** format.
- Deadline: 29^{th} November!

Part 2: Choice data



Sampling

- Identify the population of interest.
- In general, it is not possible to collect data about each individual.
- Identify a list of N representative individuals.
- Various sampling methods are presented later in this course.
- Collect choice data for each individual in the sample.

Choice context

Revealed preferences

- Observe actual behavior.
- Real market situations.
- Example: scanner data in supermarkets.

Stated preferences

- Hypothetical situations.
- Choice context defined by the analyst.
- Example: Swissmetro.

Revealed preferences

Data about the decision-maker: socio-economic characteristics

- Age, income, level of education, etc.
- Collected in any survey.
- Not specific to choice models.
- Collect those that seem relevant for the analysis.

Choice set

- Identify the list of alternatives considered by the respondent.
- Context dependent.
- Awareness difficult to observe.

Revealed preferences

Data about the alternatives

- Utility[a] is a latent concept, cannot be observed.
- Value of the attributes.
- Particularly difficult for non chosen alternatives.

[a] One assumption of the Discrete choice theory that is studied in this course is that the decision maker associates a utility with each alternative. Utility is a function that captures the attractiveness of an alternative. It is presented in next weeks class.

Observed outcome

- The chosen alternative

Stated preferences

Hypothetical situations

- Choice context is constructed by the analyst.
- Several scenarios can be created for each respondent.
- Preferences are expressed through statements or intentions.

Stated preferences

Data about the decision-maker: socio-economic characteristics

- Age, income, level of education, etc.
- Collected in any survey.
- Not specific to choice models.
- Collect those that seem relevant for the analysis.

Choice set

- Constructed by the analyst.
- May contain hypothetical alternatives.
- May vary across scenarios and across respondents.

Stated preferences

Data about the alternatives

- Constructed by the analyst.
- Provided for each alternative
- Experimental design.

Preferences

- Choice
- Ranking
- Rating
- Allocation

Preference data

Consider the following beers

1. Cardinal
2. Kronenbourg
3. Orval
4. Tsing Tao

Choice

What is your preferred option?

Preference data

Consider the following beers

1. Cardinal
2. Kronenbourg
3. Orval
4. Tsing Tao

Ranking

Rank the beers, from the best to the worst

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Preference data

Consider the following beers

1. Cardinal
2. Kronenbourg
3. Orval
4. Tsing Tao

Rating

Associate a rate from 0 (worst) to 10 (best) with each beer

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Preference data

Consider the following beers

1. Cardinal
2. Kronenbourg
3. Orval
4. Tsing Tao

Allocation

Distribute 100 points among the beers

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A transportation example

Boeing Commercial Airplanes

- 2004—2005.
- Designed by Boeing staff with the assistance of Jordan Louviere of the University of Technology, Sydney.
- Objective: understanding the sensitivity that air passengers have toward the attributes of an airline itinerary.
- Recruitment: intercepting customers of an internet airline booking service that searches for low-cost travel deals

Boeing Commercial Airplanes

Pick Your Preferred Flight

Three flight options are described for your trip from Chicago to San Diego . These are options that might be available on this route or might be new options actively being considered for this route as well as replacing some options that are offered now. The options differ from each other in one or more of the features described on the left.

Please evaluate these options, assuming that eveything about the options is the same except these particular features. Indicate your choices at the bottom of the appropriate column and press the Continue button.

FEATURES	Non-Stop (Option 1)	1 Stop (Option 2)	1 Stop (Option 3)
Departure time (local)	6:00 PM	4:30 PM	6:00 PM
Arrival time (local)	8:14 PM	8:44 PM	9:44 PM
Total time in air	4 hr 14 min	4 hr 44 min	4 hr 44 min
Total trip time	4 hr 14 min	6 hr 14 min	5 hr 44 min
Legroom	typical legroom	2-in more of legroom	4-in more of legroom
Airline [Airplane]	Depart Chicago Continental Airlines [B737] to San Diego	Depart Chicago Southwest Airlines [A320], connecting with Southwest Airlines [MD80] to San Diego	Depart Chicago Northwest Airlines [MD80], connecting with American Airlines [DC9] to San Diego
Fare	$565	$485	$620

1. Which is MOST attractive? ○ Option 1 ○ Option 2 ○ Option 3

2. Which is LEAST attractive? ○ Option 1 ○ Option 2 ○ Option 3

3. If these were the ONLY three options available, I would NOT make this trip by air. ○ Yes ○ No

RP data: advantages

- Real life choices
- Possibility to replicate market shares
- Decision-makers have to assume their choice
- "A bike or a Ferrari?" — "A Ferrari, of course!"
- Real constraints involved

RP data: drawbacks

- Limited to existing alternatives, attributes and attributes levels.
- Lack of variability of some attributes
- Lack of information about non chosen alternatives
- High level of correlation
- Data collection cost
- In general, one individual = one observation

SP data: advantages

- Exploring new alternatives, attributes and attributes levels
- Control of the attributes variability
- Control on all alternatives
- Control on the level of correlation
- One individual can answer several questions

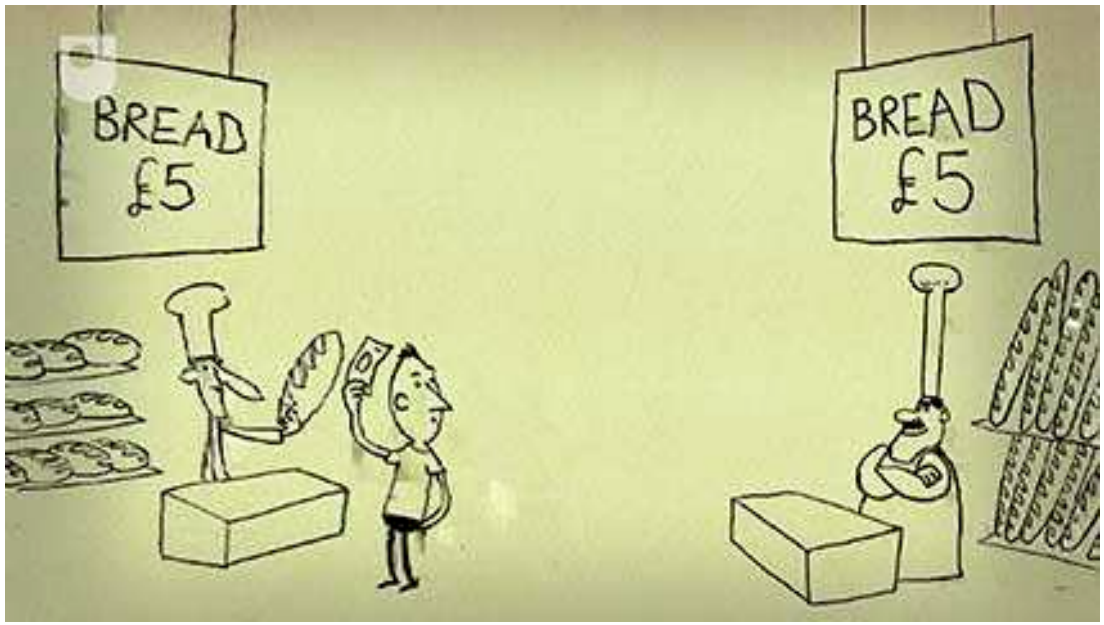
SP data: drawbacks

- Hypothetical situations
- Cannot be used for market shares
- Decision-makers do not have to assume their choice
- Real constraints not involved
- Credibility
- Valid within the range of the experimental design
- Policy bias (example: "every body else should take the bus")
- Justification bias (or inertia)
- Framing: phrasing of the question matters
- Anchoring: one variable explains it all
- Fatigue effect

Summary

- Both revealed and stated preferences data have pros and cons
- RP: real behavior
- SP: control of the experiment
- It is common to combine them

Part 2: Datasets for the course



Case Studies

- ***Goal***

  Study discrete choice models.

- ***Problem statement***

  Can the observed pattern of choice be explained in terms of basic economic variables such as relative prices, income, and underlying individual characteristics (gender, age, etc.)?

Available datasets

- ***Netherlands mode choice*** Data on intercity travelers' choices between the transport modes of rail and car.
- ***Swissmetro*** Data on travelers' choices of transport mode among a proposed underground system (Swissmetro), traditional train and car.
- ***Choice of residential telephone services*** Data on households' choices of local telephone service.
- ***Boeing*** Data on flight options for a particular origin-destination trip.
- ***Optima*** Data on transportation mode choice in low-density areas of Switzerland. More information: `http://transport.epfl.ch/optima`