Goals of Course

James J. Heckman

Economics 312, Spring 2022

General Information

Lecture times: Tuesday and Thursday, 5:00pm – 6:20 pm
Lecture classroom: Saieh 146
Teaching Assistants: Filippo Cavaleri (fcavaler@uchicago.edu)
Conroy Lau (ccplau@uchicago.edu)
TA Sessions: Fridays, 3:30pm-4:20pm, Saieh 146
Note: NOTE: Please email the TAs if you plan to attend their Office Hours so that they do not wait unnecessarily. Please email them before office hours with any specific questions so that they can prepare.

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Course Description

This course examines alternative ways to describe and learn from economic data using economic analysis. We consider:

1. Counterfactuals and economic policy evaluation in three current "causal" frameworks
2. Alternative modes of inference, including different approaches to testing theories synthesizing evidence from multiple sources using economic models (abduction, exploration and discovery)
3. Using economics to analyze economic data with a focus on discrete choice and the Generalized Roy model and its extensions and applications
4. The fundamental role of economics and information asymmetries in choosing estimators.

Goals of the Course

1. Understand that econometrics is a field rooted in economics. Econometrics is much more than statistics:
   a. Using economics to interpret data and to motivate choices of estimators and test statistics
   b. Using economics and data to address policy problems
      i. Different classes of policy problems pose different challenges
      ii. "Causal parameters" vs. "structural parameters:" is there any useful distinction?

Goals of the Course, Continued

2. Develop a critical understanding of evidence using economics
   a. Understand the consequences of how data are generated (sampling plans) and how to account for them
   b. Replicability and consilience as essential activities of scientific economics
   c. Alternative modes of inference
      i. Classical statistics and its limitations
      ii. Bayesian and likelihood alternatives
      iii. Testing hypotheses
      iv. How to learn from data: Abduction

Goals of the Course, Continued

3. Tools
   a. Basic economic choice models that help to organize and interpret evidence in a variety of fields
   b. Comparison of estimation methods in the context of Generalized Roy Models and extensions:
      i. Structural methods
      ii. IV
      iii. Matching
      iv. Control functions
      v. Longitudinal data and difference-in-differences
      vi. Duration models
      vii. Fundamental role of information and information asymmetrics in choosing estimators and devising test statistics

Class Requirements

There will be a written exam during finals week. Problem sets are due each week. They will be graded and count toward the final grade. The assignments will include analytical, free-response, and empirical questions. These questions will require the use of programming languages like Python, R, or MATLAB. Any programming language is accepted for the simulation exercises. If students have any questions on Problem Sets they should first ask the TA and only ask the professor if the TA is unable to help.

Class Requirements, Continued

For the problem sets in Part B of the course, you may form groups of up to 3 people, maximum, with no exceptions. These study groups will be permanent for the rest of the course. Please send the list of people with your names as seen on Canvas to the TAs by Friday, April 30. The TAs will set up groups on Canvas so that a group can submit its answers. Please upload an electronic version to Canvas (no late submissions are accepted) before the deadline, with one submission per group. Note that groups consisting of more than 3 members earn a mark of 0.

Class Requirements, Continued

Rules for submission:

- Include everyone's names in the submitted document.
- The deadline for each assignment is the start of the lecture on the day that the problem set is due (5PM on Tuesdays and Thursdays unless otherwise stated).
- The documents containing the write-up (including but not limited to paragraph answers, equations, graphs, plots, diagrams, tables) must be in PDF format and you are strongly encouraged to use LaTeX to typeset your solutions. A collaborative platform like Overleaf would be useful.
- Please submit your code along with the write-up: both the source file(s) and the PDF version of the code if possible. Platforms like RMarkdown (for R), Jupyter (for Python and R) and MATLAB live scripts can be especially useful to include equations and text in Markdown cells alongside code blocks. The code should be well-formatted, with comments and well-labeled variable names as appropriate.

2021 Syllabus

1. Causality
2. Learning from Data
   A. Replicability in Economics
   B. Abduction
3. Discrete Choice, Self-Selection and the Generalized Roy Model
4. Randomization
5. Instrumental Variables
6. Matching
7. General Principles Underlying All Econometric Estimators
8. Simultaneous Equations and Social Interactions
9. Longitudinal and Panel Data