

ECON 222 – Microeconometrics

Fall 2016

Syllabus

1 Organization

Instructor:	Timothy Christensen	tmc8@nyu.edu
	office hours	540 McNeil Building 8:30-10:30am Tuesdays or by appointment
Teaching Assistant:	Pengfei Han	pengfeih@sas.upenn.edu
	office hours	537 McNeil Building 5:30-7:30pm Wednesdays
Lecture:	1:30-3pm Tues. and Thurs.	309 McNeil Building

2 Overview

2.1 Description

Official description: This course introduces students to advanced study in econometrics, with an emphasis on methods used in microeconomic applications and in evaluating the effects of social interventions. The methods covered include methods for handling limited dependent variables (useful, for example, in forecasting the demand for a new good), maximum likelihood estimators, flexible semiparametric and nonparametric estimation methods, and randomized and nonexperimental methods of estimating treatment effects. Applications of econometrics to the field of program evaluation will also be studied.

We begin by reviewing linear regression and IV estimation. We will then go on to study nonlinear models, especially models designed to analyze individuals' choice behavior and models with endogenous selection. We will conclude by looking at flexible nonparametric estimation methods. We will apply the models to study policy effects, consumer decisions, voter decisions, labor markets, and so on. Although the course deals primarily with statistical analysis of economic data, we will use economic theory to formulate the models and recognize which variables are endogenous (i.e. determined as the outcome of an equilibrium) and which are not. We will also learn programming and optimization methods which are useful in the estimation of nonlinear econometric models.

2.2 Prerequisites

Econ 101 intermediate micro

Econ 104 Intro Econometrics

Math 104 calculus 1

Math 114 or 115 calculus 2

Additional knowledge of linear algebra and statistics will be helpful

3 Policies

The departmental course policies apply. The policies are listed here: <http://economics.sas.upenn.edu/undergraduate-program/course-information/guidelines/policies>.

3.1 Grades

Course grades will be based on 4 problem sets (28 per cent) two midterms (20 per cent each) and a final exam (32 per cent). If the final grade is borderline, class attendance and participation will be taken into account.

3.2 Problem sets

There will be 5 problem sets during the semester. Problem sets will be a combination of theoretical exercises and computational/simulation exercises which you will do in R. You are strongly encouraged to work on the problem sets in small groups but you must write up the solutions independently.

You are expected to submit your problem set on time, meaning in class Thursday of the week they are due. Any problem sets turned in a week late will receive a maximum score of 50%. Your lowest score on the problem sets will not be counted in determining your final grade. In this way, students who are not able to complete a problem set for a legitimate reason will not be adversely affected.

3.3 Exams

There will be two midterms and a final exam. The exams will emphasize problem-solving ability. The exam content will be cumulative, but with an emphasis on the most recent material. All material discussed in the course is examinable unless stated otherwise.

The midterms will be held in class on Thursday September 29 and Tuesday November 8. The final exam date will be scheduled by the university registrar.

4 Materials

I will provide comprehensive notes. Should you wish to get a text to supplement the notes (this is optional), I recommend:

- Greene, *Econometric Analysis*, 7th edition. Pearson.

Course materials are not to be shared with those outside the class.

Course software: you will be required to write programs in the language R to analyze data and implement the econometric methods discussed in class. This course satisfies the university's quantitative data analysis requirement.

- download and install R (<https://cran.r-project.org/>)
- download and install R Studio (<https://www.rstudio.com/>).

Additional resources (optional) for learning basic commands and data manipulation in R:

- Try R (<http://tryr.codeschool.com/>)
- Data Camp (<https://www.datacamp.com/>)
- R Tutorial (<http://www.cyclismo.org/tutorial/R/>).

R is increasingly used in both academic settings and the private sector. Putting in a small amount of effort to learn R should serve you well in the future.

5 Outline

Please note that the following outline is tentative and may be revised throughout the semester.

Week 1 (beginning 8/29): Review of linear algebra and statistics

Week 2 (beginning 9/5): Review of multiple regression

Week 3 (beginning 9/12): Review of multiple regression

Week 4 (beginning 9/19): Review of multiple regression/instrumental variables

Week 5 (beginning 9/26): Midterm 1 on Thursday, September 29

Week 6 (beginning 10/3): Review of instrumental variables

Week 7 (beginning 10/10): Intro to maximum likelihood and optimization in R

Week 8 (beginning 10/17): Nonlinear models 1: binary choice

Week 9 (beginning 10/24): Nonlinear models 2: models for censored data

Week 10 (beginning 10/31): Nonlinear models 3: models for endogenous selection

Week 11 (beginning 11/7): Midterm 2 on Tuesday, November 8

Week 12 (beginning 11/14): Nonlinear models 4: some extensions

Week 13 (beginning 11/21): Intro to nonparametric estimation

Week 14 (beginning 11/28): Flexible estimation of linear and nonlinear models

Week 15 (beginning 12/5): Review