

CROSS SECTION AND PANEL ECONOMETRICS

Economics 325

SPRING 2004

Department of Economics, Cornell University

MWF 11:15-12:05PM Baker Laboratory - 335

INSTRUCTOR: Prof. Francesca Molinari

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OFFICE HOURS: F 9:30-11:00 AM

Course Description

This course covers specialized topics in microeconometrics which are particularly useful for empirical economic analyses. Natural applications include estimation of cost functions, expenditure functions, determinants of labor force participation, wage differentials, returns to schooling, etc. The introductory part of the course introduces nonlinear least squares and maximum likelihood estimation methods, and discusses their asymptotic properties. We then move to studying issues arising in presence of specification and data problems. We then discuss how to apply multiple regression to independently pooled cross sections, and how panel data sets can be analyzed in a regression framework. We then cover more advanced panel data methods, namely fixed effects estimation and random effects estimation. At this point, we turn our attention to investigating the problem of endogenous explanatory variables, and study the method of instrumental variables and the method of two stages least squares. We conclude by studying models for limited dependent variables, and the selection problem. The last part of the course will put particular emphasis on identification problems.

Prerequisites

Econ 319-320. It is assumed that students have a good command of calculus and matrix

algebra. The linear regression model will be briefly reviewed in class, but it is essential that students already have a good knowledge of it.

Exams and Grade Policy

Grades in this course will be based on the following:

1. **6 problem sets** counting towards **25%** of the final grade. Problem sets will be due in class and the due dates will be firm. Late problem sets will not be accepted. The only exception is if you obtain my prior consent, or in unusual circumstances.
2. **3 tests** counting towards **75%** of the final grade (25% each). **Two of these tests will be given in class, during the 11:15-12:05 slot on Friday morning:**

Test 1: Friday, March 12

Test 2: Friday, April 9

The final test will be given during finals period:

Test 3: Wednesday, May 19, 3:00-5:30 PM

Note: The third test will not be cumulative.

The official policy of this course is that no makeup exams will be offered, because the first two exams are in class and the third exam is during finals.

Textbook

There is one required textbook for the course: *Introductory Econometrics*, 2E, by Jeffrey Wooldridge. The textbook is very good: readable, full of examples and not too technical. All of you should know already the text from Econ 320. My lectures will be based on this book, aiming at making technical material accessible. **Therefore, it is very important to attend all lectures.** The textbook, on the other hand, will provide extra intuition and many examples. From time to time, I will add material from another of Wooldridge's books: *Econometric Analysis of Cross Section and Panel Data*. This is an advanced book (graduate level) that covers in greater

generality and depth many of the topics we'll study in this class. I have put a copy of this book on reserve in the Olin Library, room 401, for consultation.

Handouts

Problem sets and solutions, and occasionally other handouts will be available in lecture. Problem set questions and some handouts will be made available on the course web page. Solutions will not be posted on the web page. Extra copies of problem sets, solutions and handouts will be placed in a box outside Uris 412. If these boxes are ever missing something you need, see me or my secretary, Taylor Ware, who is in Uris 412.

Course Outline

1. Review of Linear Algebra (Appendix D)
2. Extremum Estimators:
 - OLS (Chapter 5)
 - Nonlinear Least Squares (Handout)
 - Maximum Likelihood (Handout)
 - Asymptotic Properties of Extremum Estimators (Handout)
3. Specification and Data Problems (Chapter 9)
4. Simple Panel Data Methods (Chapter 13)
5. Advanced Panel Data Methods (Chapter 14)
6. Instrumental Variables Estimation and 2 Stage Least Squares
 - IV Estimation (Section 15.2)
 - Two Stage Least Squares (Section 15.3)
 - IV Approach to Measurement Error (Section 15.4)

- Testing for Endogeneity and Testing for Overidentifying Restrictions (Section 15.5)
- 2SLS with Pooled Cross Sections and Panel Data (Section 15.8)
- Misclassification (Handout)
- Measurement Error in Nonlinear Models (Handout)

7. Simultaneous Equation Models (Chapter 16)

8. Limited Dependent Variable Models and Sample Selection Corrections

- Parametric Identification and Estimation for Binary Response (Section 17.1)
- Semi and Nonparametric Identification for Binary Response (Handout)
- Tobit Model (Section 17.2)
- Censored and Truncated Regression Models (Section 17.4)
- Limited Dependent Variable Models with Panel Data (Handout)
- The Selection Problem (Handout)