Topics in Microeconometrics

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Abstract

This course will introduce the student to methods and models used to analyze cross section and panel data. We will depart from the linear regression model to specifications for binary and censored data, ordered choices, count data and multinomial choices. The discussion will present basic models for cross section data then introduce theory and methods for extensions to panel data and stated choice experiments.

The presentation, over three days, will include roughly ten morning classroom meetings. In the afternoon of each day, we will do some hands on analysis using “live” data sets and a familiar computer package.

The course will be focused on models and methods. We will do some computation to illustrate some of the model specifications. However, the course is not intended to be a “how to” for using specific techniques with a particular program (e.g., “How to analyze panel data with ____.”)

Course Outline

Overview

This is a course in econometric analysis of cross section and panel data. There are a huge variety of models that are used in this context. We will focus on five which arguably comprise the foundation for the area: the linear regression model, the fundamental model of binary choice (and a number of variants); models for ordered choices; the Poisson regression model for count data; and the fundamental model for multinomial choice, the multinomial logit model, and a sixth, the stochastic frontier model, that is the foundation of a large and growing specialty in microeconometrics. Discussions will cover the topics listed below.

Prerequisites

Prior knowledge is assumed to include calculus at the level assumed in the first year of a Ph.D. program in economics and a course in econometrics at the beginning Ph.D. level using a textbook such as Greene, W., *Econometric Analysis*, 6th edition.
Resource

No specific textbook is assigned for the course. Useful references are

A recently published reference for some of the discrete choice models is

A lower level textbook that discusses some of the topics we will visit is

Some of the presentation will be based on *Econometric Analysis*, 7th ed., by Greene, W. (Prentice Hall, 2003). Six chapters are included with the course materials:

- Chapter 11: Models for Panel Data
- Chapter 12: Estimation Methods
- Chapter 14: Maximum Likelihood
- Chapter 15: Simulation Based Estimation and Inference
- Chapter 17: Models for Discrete Data
- Chapter 25: Models for Unordered and Ordered Discrete Choices

Topics

1. Linear Regression
   - Descriptive tools
   - Specification analysis
   - Estimation and inference

2. Endogeneity
   - IV and 2SLS estimators
   - Control functions
   - Sample selection
   - Propensity score matching

3. Panel Data
   - Pooled data, clustering
   - Difference in differences
   - Fixed effects, FEVD, random effects
   - Mundlak specification

4. Binary Choice Models
   - Nonlinear models and means
   - Binary choice
   - Partial effects and interactions
   - Estimation and inference
   - Endogenous RHS variables

5. Ordered Choices and Count Data
   - Ordered choice models
   - Fits, estimation, inference
   - Models for count data
   - Overdispersion, negative binomial

6. Censoring and Two Part Models
   - Tobit model
   - Truncation and censoring
   - Hurdle models and zero inflation

7. Nonlinear Panel Data Models
   - Binary choice
   - Clustering
   - Random effects, fixed effects
   - Dynamic models

8 Heterogeneity and Mixed Models
   - Latent class modeling
   - Random parameters

9 Multinomial choice models
   - Multinomial logit
   - Specification and estimation/inference
   - Extensions, nested logit, heterogeneity
   - Random parameter models
   - Stated preference data

10. Stochastic Frontiers
    - Normal-half normal model
    - Estimating inefficiency
    - Panel data models