

SEMI/NON PARAMETRIC ECONOMETRICS

Economics 723

FALL 2007

Department of Economics, Cornell University

INSTRUCTOR:	Francesca Molinari
TIME AND LOCATION	TBA
OFFICE:	T&R 8:45-10:00am Uris 488
TELEPHONE:	(607) 255-6367
E-MAIL:	fm72@cornell.edu
OFFICE HOURS:	By Appointment
EVALUATION:	Problem Sets: 20%
	Presentation: 30%
	Original empirical or theoretical research paper: 50%
	Research proposals due: 10/11/07
	Research papers due: 01/21/08

Course Description

The course analyzes the ways in which identification problems limit the conclusions that may be drawn in empirical economic research, and studies how identified and partially identified parameters can be estimated. In the first part of the course, the focus is on nonparametric econometric models that are partially identified. Ways in which data can be combined with weak assumptions to yield partial identification of population parameters are discussed. In the second part of the course, a variety of point identified nonparametric and (mostly) semiparametric econometric models are covered, with emphasis on the assumptions that empirical economists bring to bear to supplement the empirical evidence to achieve point identification.

In every model, the first step is to determine what can be learned about features of interest without imposing strong assumptions that often lack credibility. Subsequent steps add additional assumptions and study the identified features of the model under these assumptions. Statistical problems are discussed with particular emphasis on the new literature on inference for partially identified models.

Prerequisites

It is assumed that students have a probability/statistics/econometrics background at the level of 619 and 620. The identification analysis in the first part of the course rests on the most elementary probability

theory. Standard asymptotic theory (laws of large numbers, central limit theorems, etc.) is used throughout the entire course.

Suggested Textbooks

First Part of the Course:

- Charles F. Manski, 1995, *Identification Problems in the Social Sciences*, Harvard University Press.
- Charles F. Manski, 2003, *Partial Identification of Probability Distributions*, Springer Verlag.

Second Part of the Course:

- Joel L. Horowitz, 1998, *Semiparametric Methods in Econometrics*, Springer Verlag.

The lectures will be mostly based on these textbooks. Specific references to journal articles and working papers from which the textbooks draw will be provided in class (and can be found in the References section of the books). Additional journal articles and working papers that might be at times presented in class are listed as references below.

Course Outline

- Preliminaries
 1. Credibility vs Sharpness of Inference (Manski (2003a), Introduction)
 2. Conditional Prediction Problems (Manski (1991))
 3. Asymptotic Properties of Extremum Estimators (Amemiya (1985), Ch. 4)
 4. Nonparametric Density and Conditional Moment Estimation (Horowitz (1998), Appendix, and Pagan and Ullah (1999), Ch. 2-3)
- Partial Identification of Probability Distributions
 1. Prediction with Censored-Sampling - I: Missing Outcome Data (Manski (2003a), Ch. 1-2)
 2. Prediction with Censored-Sampling - II: Missing Covariate Data (Manski (2003a), Ch. 3, Sections 1-6, Molinari (2003))
 3. Prediction with Contaminated Sampling (Manski (2003a), Ch. 4-5, Molinari (2004))
 4. Analysis of Treatment Effects: the Selection Problem (Manski (1995), Ch. 2, Manski (2003a), Ch. 7) and the Mixing Problem (Manski (1995), Ch. 3, Manski (2003a), Ch. 10)

5. Statistical Considerations:
- Confidence Intervals for Partially Identified Parameters (Imbens and Manski (2003), Andrews, Berry, and Jia (2004), Pakes, Porter, Ho, and Ishii (2005))
 - Parameter Set Inference (Chernozhukov, Hong, and Tamer (2003), Beresteanu and Molinari (2005))
- Adding Structure to Partially Identified Econometric Models
 1. Prediction with Censored-Sampling - III: Parametric Prediction with Missing Covariate Data (Manski (2003a), Ch. 3, Section 7)
 2. Prediction with Interval Data (Manski and Tamer (2002))
 3. Incomplete Models (Haile and Tamer (2003), Tamer (2003), Ciliberto and Tamer (2004))
 4. Nonparametric Binary Models with Endogeneity (Shaikh and Vytlacil (2005))
 - Semi and Nonparametric Estimation of Point Identified Parameters in Discrete Choice and Tobit Models
 1. Identification (Matzkin (1994))
 2. Binary Threshold Crossing Models (Horowitz (1998), Ch. 3):
 - Fully Nonparametric Methods (Matzkin (1992))
 - Semiparametric Methods
 - (a) Distribution Free Models (Cosslett (1983))
 - (b) Single Index Models (Horowitz (1998), Ch. 2, Klein and Spady (1993), Ichimura (1993))
 - (c) Maximum Score Methods (Manski (1975), Manski (1985), Horowitz (1992))
 - Parametric Methods: Probit and Logit Models (Amemiya (1985), Sections 9.1-9.3)
 3. Tobit Models (Pagan and Ullah (1999), Ch. 8-9):
 - Fully Nonparametric Methods (Lewbel and Linton (2002))
 - Semiparametric Methods
 - (a) Least Absolute Daviation (Powell (1984))
 - (b) Single Index Models (Powell, Stock, and Stoker (1989), Ichimura (1993))
 - (c) Maximum Rank Methods (Han (1987))
 - Parametric Methods (Amemiya (1985), Ch. 10)

References

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