PSC 506: Advanced Topics in Methods

Spring 2008
Lecture: 3:25-6:05, Monday, Harkness 112
Course website: http://mail.rochester.edu/~mperess/atm2008.html

Prof. Michael Peress
mperess@mail.rochester.edu
Harkness 326
OH: T 3:00-4:30

Overview: This course is designed for graduate students intending to pursue political methodology as a major field. It covers advanced statistical methods that are not yet standard fare in political methodology courses: e.g., semiparametric methods, nonparametric regression, time-series econometrics, Bayesian methods, and ideal point estimation. As a research workshop, this course also allows students to pursue areas of individual interest in more depth. Course content is therefore determined each semester based on the interests of both the professor and the students. Prerequisites: PSC 404, PSC 405, and PSC 505.

Grading: Grading will be based on a ~4 take-home assignments (60%) and ~3 in class presentations (40%).

Syllabus: I plan on covering the following topics throughout the semester. The list may be contracted or expanded based on how long things are taking.

Time Series Models: Parametric Estimation

Topics:

- ARMA Processes
- The Linear Model
- Nonlinear Models

References:

- Hamilton, James D. (1994). Time Series Analysis.

Semiparametric Estimation: M-Estimators

Topics:

- Identification
- Examples of M-Estimators
- Large Sample Properties

References:

- Newey, Whitney, and Daniel McFadden (1994). "Large Sample Estimation and Hypothesis Testing", in R. Engle and D. McFadden, eds., Handbook of Econometric, Vol. IV, 2111-2245, North Holland: Amsterdam.
- Gallant, A. Ronald (1997). *An Introduction to Econometric Theory: Measure Theoretic Probability and Statistics with Applications to Economics*. Princeton: Princeton University Press.

Advanced Hypothesis Testing

Topics:

- The Delta Method
- The Wald Test
- Constrained Estimation
- The Lagrange Multiplier Test
- The Likelihood Ratio and Distance Metric Tests
- Higher Order Inference
- The Jackknife and the Bootstrap
- Non-nested Hypothesis Tests

References:

- Newey, Whitney, and Daniel McFadden (1994). "Large Sample Estimation and Hypothesis Testing", in R. Engle and D. McFadden, eds., Handbook of Econometric, Vol. IV, 2111-2245, North Holland: Amsterdam.
- Hall, Peter G. (1997). *The Bootstrap and the Edgeworth Expansion*. New York: Springer Verlag.
- Gallant, A. Ronald (1997). *An Introduction to Econometric Theory: Measure Theoretic Probability and Statistics with Applications to Economics*. Princeton: Princeton University Press.
- Voung, Quang (1990). "Likelihood Ratio Tests for Model Selection and Non-Nested Hypotheses". *Econometrica* 57:307–333.
- Clarke, Kevin (2007). **"**A Simple Distribution-Free Test for Nonnested Hypotheses. *Political Analysis* 15:3.

- King, Gary, and Langche Zeng (2001). "Logistic Regression in Rare Events Data". *Political Analysis*, 9:137-163.
- King, Gary, Michael Tomz, and Jason Wittenberg. "Making the Most of Statistical Analyses: Improving Interpretation and Presentation". *American Journal of Political Science* 44:341-355.

Semiparametric Estimation: GMM Estimators

Topics:

- Examples of GMM-Estimators
- Large Sample Properties
- Efficiency
- Hypothesis Testing

References:

- Hansen, Lars P. (1982). "Large Sample Properties of Generalized-Method of Moments Estimators". *Econometrica* 50: 1029-1054.
- Newey, Whitney, and Daniel McFadden (1994). "Large Sample Estimation and Hypothesis Testing", in R. Engle and D. McFadden, eds., Handbook of Econometric, Vol. IV, 2111-2245, North Holland: Amsterdam.
- Matyas, Laszlo (1999). Generalized Method of Moments Estimation.

Simulation Based Estimation

Topics:

- Simulated Maximum Likelihood
- Simulated Method of Moments

References:

- Pakes, Ariel, and David Pollard (1989). "Simulation and Asymptotics of Optimization Estimators". *Econometrica* 54:755–785.
- Train, Kenneth (2003). *Discrete Choice Methods with Simulation*. Cambridge University Press.

Nonparametric Estimation: Kernels

Topics:

- Overview
- Density Estimation
- Regressions
- Discrete Choice Models
- The Bootstrap

References:

- Silverman, Bernard (1986). *Density Estimation*. London: Chapman and Hall.
- Hardle, W. (1992) Applied Nonparametric Regression, Cambridge University Press.
- Pagan, Adrian, and Amman Ullah (1999). Nonparametric Econometrics. Cambridge: Cambridge University Press.

- Ichimura, Hidehiko and Todd, Petra (2006). “Implementing Nonparametric and Semiparametric Estimators,” in: Handbook of Econometrics, Volume 6.

Nonparametric Estimation: Matching

Topics:

- Large Sample Properties
- Applications

References:

- Rosenbaum, P. and D. Rubin (1983). ”The central role of the propensity score in observational studies for causal effects”. *Biometrika* 70:41-55.
- Abadie, Alberto and Guido Imbens (2006). ”Large Sample Properties of Matching Estimators for Average Treatment Effects”. *Econometrica* 74:235-267.
- Kouser, Thad, and Megan Mullin (2007). “Does Voting by Mail Increase Participation? Using Matching to Analyze a Natural Experiment”. Political Analysis 15:428-445.

Causal Inference

Topics:

- Sample Selection
- Regression Discontinuity Design

References:

- Hahn, Jinyong, Van der Klauww, Wilbert and Todd, Petra (2001). ”Identification of Treatment Effects by Regression Discontinuity Designs”. *Econometrica*.

- Arceneaux, Kevin (2005). "Comparing Experimental and Matching Methods Using a Large-Scale Voter Mobilization Experiment". Political Analysis 14:37-62.

Time Series Models: Semi-parametric Estimation

Topics:

- Ordinary Least Squares
- Nonlinear Least Squares
- Discrete Choice Models
- Covariance Matrix Estimation

References:

- Hamilton, James D. (1994). Time Series Analysis.
- Matyas, Laszlo (1999). Generalized Method of Moments Estimation.
- Newey, W.K., and K.D. West (1987). "A Simple Positive Definite Heteroskedasticity and Autocorrelation Consistent Covariance Matrix". *Econometrica* 55:703-708.
- Ruud, Paul (1983). "Sufficient Conditions for the Consistency of Maximum Likelihood Estimation despite Misspecification of Distribution in Multinomial Discrete Choice Models". *Econometrica* 51:225–228.

Topics in Bayesian Estimation

- Overview
- Large Sample Properties and Quasi-Bayesian Estimation

- Discrete Choice Models
- Time Series Models

References:

- Chernozhukov, Victor, and Han Hong (2003). "An MCMC Approach to Classical Estimation". *Journal of Econometrics* 2:293-346.
- Quinn, Kevin M. (2004). "Bayesian Factor Analysis for Mixed Ordinal and Continuous Responses". Political Analysis 12:338-353.

Panel Data Models and Ideal Point Estimation

- Overview
- Clustering and Semiparametric Estimation
- Ideal Point Estimation

References:

- Hsiao, Cheng (2003). Analysis of Panel Data.
- Clinton, Joshua D., and Adam Meirowitz (2001). "Agenda Constrained Legislator Ideal Points and the Spatial Voting Model". Political Analysis 9:1-18.
- Peress, Michael (2007). "Small Chamber Ideal Point Estimation". Working Paper.