
PSC 505

Maximum Likelihood Estimation

Fall 2007

3:15-5:45 Thurs, Hark 329

Professor Curtis S. Signorino

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COURSE DESCRIPTION: This course builds upon the analytical and applied foundations of PSC 404 and 405, taking the latter's emphasis on the classical linear model as its point of departure. Because the classical linear regression model is inappropriate for data that arises in many interesting areas of political science, students need additional statistical tools in order to conduct rigorous empirical research. In this course, students will learn methods to analyze models and data for event counts, durations, censoring, truncation, selection, multinomial ordered/unordered categories, strategic choices, and time series – in other words, all the other data out there.

A major goal of the course will be to teach students how to develop new models and techniques for analyzing issues they encounter in their own research. “Canned” statistical routines are often not appropriate for most of the micro-level models we develop as political science researchers. Students will therefore be required to program their own statistical routines (primarily in R).

PREREQUISITES: PSC 404 and 405, or the equivalent.

COURSE REQUIREMENTS: Course grades will be based on a series of homeworks (50%), a course project (25%), and a final exam (25%). The exercises will consist of a combination of analytical problems and data analysis. Students are encouraged to work in groups of any size, so long as that size is two.

READINGS: Students are responsible for keeping up with the reading each week. I will hand out my lecture notes and will provide links or copies of articles from time to time. In addition, students should read the appropriate chapters in the following, many of which are available in the star lab:

- **Gary King. 1998. *Unifying Political Methodology*. Michigan.**
- **G.S. Maddala. *Limited-Dependent and Qualitative Variables in Econometrics*. Cambridge.**
- **William H. Greene. 1997. *Econometric Analysis*. 5th edition. Prentice Hall.**
- Fumio Hayashi. *Econometrics*. Princeton.
- Peter Kennedy. 1998. *A Guide to Econometrics*. 4th edition. MIT.
- Rebecca Morton. 1999. *Methods & Models*. Cambridge.
- Arthur Spirling. The star lab introduction to R.
- W.N. Venables and B.D. Ripley. *Modern Applied Statistics with S*. Springer.

COURSE OUTLINE:

- 1. R Programming and Monte Carlo Simulation**
- 2. Maximum Likelihood Estimation**
- 3. Count Models**
- 4. Duration Models**
- 5. Categorical Data Models**
- 6. Censoring, Truncation, and Selection Models**
- 7. Strategic Models**
- 8. Comparative Model Testing**
- 9. Time Series**

Topic and Data OK'd *Nov 8*
Rough Draft Due *Nov 22 (no class that day)*
Comments Returned *Nov 29*
Final Exam *Exam Week*
Final Paper Due *1st day of class, Spring semester*