Maximum Likelihood Estimation

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Description

This course examines cases in which the assumptions of ordinary least squares (OLS) may be violated, focusing on data that are discrete, truncated, or non-normally distributed. We will use maximum likelihood and Bayesian techniques for estimating models applied to these data.

Required Books


Highly Recommended User’s Guides

Long, J. Scott, and Jeremy Freese. 2006. Regression Models for Categorical Dependent Variables Using Stata, 2nd Ed.. College Station, TX: Stata Press.

Other Useful References

Grading

If you are taking this course for a grade, your grade will be determined by your performance on homework assignments and computer labs. You may discuss the homework assignments with me, the teaching assistants, or other students, but you must turn in your own work. If you are not taking this course for a grade, I still recommend completing all homework assignments and labs.

Assignments are due at the start of class on the date due. Homework must be turned in as hard copy, meaning on paper. In rare circumstances I will accept electronic copies, but only as .pdf files. Most of your homework will consist of equations, tables, and graphs. All tables and graphs should be well formatted, self-contained, and understandable to someone who may not have read the assignment. Think of these as tables or graphs that you would not be embarrassed to include in your dissertation or as a journal submission. I will not accept late assignments since they delay our grading and set a bad precedent.

The labs will require you to use either STATA (version 11 or 12) or R as well as a word processing program such as Open Office, Microsoft Word or, even better, LaTeX. I will help you learn some of the STATA and R commands that we will use. The basics of both programs are available in extensive on-line help guides and from consultants in the computer labs. You are on your own to learn word processing or LaTeX.
Reading

We will cover roughly one topic per class day.

The Basics: Notation, Linear Models, and Regression
Long, Chs. 1 & 2.1–2.5

Introduction to Likelihood
Elliason, Ch.s 1 & 2
Long, Ch. 2.6–2.7

Linear Probability, Logit, and Probit
Long, Ch. 3.1–3.6

Interpreting Logit and Probit Results
Long, Ch. 3.7–3.9

Functional Forms and Interactions

Hypothesis Testing, Goodness of Fit, and Presenting Results
Long, Ch. 4
Ordered Dependent Variables
Long, Ch. 5

Bivariate and Multivariate Probit

Unordered DV’s: Multinomial Logit, Multinomial Probit, HEV, GEV, RPL
Long, Ch. 6

Unordered DV’s: Applications

Selection, Truncation, and Censoring
Long, Ch. 7
Count Models
Long, Ch. 8

Latent Class and Item Response Models

Conclusions
Long, Ch. 9