WOODROW WILSON DEPARTMENT OF GOVERNMENT AND FOREIGN AFFAIRS

PLAD 832
Advanced Multivariate Analysis: Categorical and Limited Dependent Variables
Spring 2004

Mr. Steven Finkel
100 Cabell
Hours: M 1-3:00 and by appt.
Phone: 924-6994

Course Description

The focus of PLAD831 was on the analysis of continuous dependent variables, for which linear least squares regression (or variants such as weighted least squares) was the preferred methods of estimation. This course focuses on models for the analysis of categorical and other kinds of *non-continuous* dependent variables, which are typically estimated via maximum likelihood estimation methods. We will begin with standard logit and probit models for *binary* outcomes (e.g. individuals voting Republican or voted Democratic), move to *ordinal* outcomes (e.g., regimes being "repressive," "semi-repressive," or "free"), and then to *nominal* outcomes with more than two categories (e.g. undergraduates choosing to attend law school, business school, graduate school, etc. upon graduation). We will then consider models where the dependent variable is a *count*, that is, the number of times an event occurs during a particular period of time (e.g. the number of vetoes exercised by Presidents during his term in office), models where the dependent variable is *censored*, i.e. where the value of observations above or below a certain point are unknown, and models where the dependent variable is *sample-selected*, i.e., observed only when another variable is above or below a certain value. We will then consider methods for estimating the causes of *events*, i.e., changes in qualitative variables such as birth, revolution, cabinet dissolution, war, etc. These methods are known as event history, duration, or hazard models.

For one week at the end of the semester, we will return to the analysis of continuous variables and discuss methods appropriate for "time series/cross-sectional data," or data collected on the same units at several points in time. These methods are very common in the quantitative literature, especially in comparative and international politics.

The goals of the class are for you to be able to use these methods in your own research, and to understand and critique published works in the discipline that make use of these techniques.

Texts

Long, *Regression Models for Categorical and Limited Dependent Variables* (Sage, 1997)
Long and Freese, *Regression Models for Categorical Dependent Variables Using Stata*, *Revised Edition* (Stata Press 2003)
Liao, *Interpreting Probability Models* (Sage, 1994)
Breen, *Regression Models: Censored, Sample Selected or Truncated Data* (Sage, 1996)
Allison, *Event History Analysis* (Sage, 1984)

You may wish to purchase STATA 8.0 from the ITC Computing Center under the GradPlan arrangement that UVA has made with STATA (see http://www.itc.virginia.edu/research/stata.html).

Requirements

Grades will be based on a 20-25 page research paper (40%), three homework exercises which relate to specific statistical methods and problems we will discuss (16% each), and an oral presentation of your research paper on April 26 (12%). The paper will be a quantitative analysis using methods from this course of data that you will collect or access from social science archives or other sources. The paper should have some substantive interest to you or be relevant to your studies in the graduate program; ideally, you can think of it as the first draft of a convention paper or possible journal publication. The paper will discuss your basic theoretical framework, your hypotheses, statistical models, results, possible problems with the analysis and what you may have done to correct or account for these problems. It will conclude with a discussion of the relevance of your findings for the general topic and for future research. The final version of the paper should also incorporate the comments, critiques, and suggestions from your presentation the class. The paper will be due on May 3, one week after the presentation.

The homework exercises will be periodic problems or data to analyze and will illustrate aspects of the statistical techniques being covered in class.

Course Outline

January 19: **Introduction to the Course**

January 26: **Logit and Probit Models**
Long, chapters 1, 3.
Long and Freese, chapters 1-2, and chapter 4, sections 4.1-4.2.

February 2: **Interpretation and Presentation of Logit and Probit Results**
Long and Freese, chapter 3, sections 3.1 and 3.5, chapter 4, sections 4.6-4.7.
Liao, chapters 1-3.

February 9: **Maximum Likelihood Estimation of Logit and Probit Models**
Long, chapters 2, 4.
Long and Freese, chapter 3, sections 3.2-3.4, chapter 4, 4.3-4.5.
EXERCISE 1 HANDED OUT

February 16: **Ordered Logit and Probit Models**
Long, chapter 5.
Long and Freese, chapter 5.
Liao, chapter 5.
EXERCISE 1 DUE

February 23: **Multinomial Logit Models**
Long, chapter 6, sections 6.1-6.6.
Long and Freese, chapter 6, sections 6.1-6.6.

March 1: **Conditional Logit Models**
Long, chapter 6, sections 6.7-6.10.
Long and Freese, chapter 6, section 6.7.
Liao, chapter 7.

March 15: **Models for Count Data**
Long, chapter 8.
Long and Freese, chapter 7.
Liao, chapter 8.
EXERCISE 2 HANDED OUT

March 22: **Censored Dependent Variable Models**
Long, chapter 7 until 7.6.5
Breen, chapters 1-2.
EXERCISE 2 DUE

March 29: **Models with Sample Selected Dependent Variables**
Long, sections 7.6.5-7.8.
Breen, chapters 3-5.

April 5: **Event History Models**
Allison, chapters 1-4
Box-Steffensmeier and Jones, "Time is of the Essence: Event History Models in Political Science," *American Journal of Political Science* 41: 1414-1461 (October 1997).
EXERCISE 3 HANDED OUT

April 12: **Models for Time Series/Cross-Section Data**
Gujarati, chapter 16.
Stimson, "Regression In Space and Time," *American Journal of Political Science* 29: 914-947 (November 1985)
EXERCISE 3 HANDED OUT

April 19: **Catch-Up Session**

EXERCISE 3 DUE

April 26: **Paper Presentations**