POL 572
Multivariate Political Analysis

Fall 2007

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Office Hours: Tues. and Thurs. 4–5pm and by appointment

Course Goals

Please note that everything on this syllabus is tentative and subject to change. I want to tailor this course to meet the needs of the students, but since I am a visiting instructor, I first want to get a better sense of what those needs are. I have some idea about how this course was taught in the past, as well as my own beliefs about what you should learn, but I will need input from the students in order to maximize the utility that they will get from this course.

Instructional Approach

The course will be taught using calculus and matrix notation and thus assumes some knowledge of calculus and matrix algebra. The absence of training in calculus and matrix algebra should not, however, constitute an insurmountable obstacle to taking the course so long as you are prepared to put in some additional work early on to learn some fundamental notation and operations.

Course Requirements

The final grades are based on problem sets and a paper. You may also choose to write several short essays instead of a final paper (please see me in advance if you want to do the short essay option). The problem sets will be a mixture of theory and applications and will account for 40 percent of your final grade. The final paper, which accounts for 60 percent of your final grade, will be on a topic of the students' choosing, but conditional on my approval. Midway through the semester you will submit a short proposal that clearly and concisely lays out the question that you will address in your term paper and discusses in detail how you propose to answer this question—specifically, what methods and data you will use. The paper should contain a brief summary of your hypotheses and a minimal literature review. The bulk of your paper will be devoted to discussing the methods, data, and results. The final paper will be evaluated based on the level of methodological sophistication and **is to be no longer than 25 pages (double-spaced) including tables and figures**. The final paper is due by 5pm on **January 15**. A two page proposal outlining your paper project is due in class on **November 15**. Given my visiting status, I cannot accept incompletes.

Statistical Software

The statistical software packages of choice for this course are `Stata` and `R`. The latter which is free and available for download from `http://www.r-project.org/`. While the notes will make references to `Stata`, the assignments will require students to use `R` because of its flexibility, especially in terms of matrix operations. Students are welcome to use other software packages that they are familiar with, but we will provide support only for `R`.

Lecture Notes
PDF versions of my lecture notes are available from the course web site (`http://www.columbia.edu/~gjw10/pol572.html`). Students should download and print up a copy of the notes for themselves so that they can follow along with the lectures. Students who do not have a copy of the notes will be at a severe disadvantage. I may make periodic changes to the notes and students should check the web site frequently for updates.

Books
I have ordered the following books for this course through the Princeton book store:

Badi H. Baltagi, *Econometric Analysis of Panel Data*, 1995, John Wiley & Sons.

John Fox, *An R and S-Plus Companion to Applied Regression*, 2002, Sage Publications.

William H. Greene, *Econometric Analysis*, 2003, 5th Edition, Prentice-Hall.

William H. Greene, *Econometric Analysis*, 2007, 6th Edition, Prentice-Hall.

Cheng Hsiao, *Analysis of Panel Data*, 2003, 2nd edition, York: Cambridge University Press.

Peter Kennedy, *A Guide to Econometrics*, 2003, 5th Edition, MIT Press.

Tony Lancaster, *The Econometric Analysis of Transition Data*, 1990, Cambridge University Press.

J. Scott Long, *Regression Models for Categorical and Limited Dependent Variables*, 1997, Sage Publications.

G. S. Maddala, *Limited-Dependent and Qualitative Variables in Econometrics*, 1983, Cambridge University Press.

These will serve as the primary texts. In my experience, it is extremely useful for students to read more than one treatment of the material. While these books can be expensive, they are useful references that you will want to have on your shelf if you are at all serious about conducting quantitative analysis beyond this course. New or like new copies of these books can often be purchased at a reduced price through various online book stores. I have requested that all of these texts be placed on reserve at Firestone Library. Other texts that you may find useful include:

Fumio Hayashi, *Econometrics*, 2000, Princeton University Press.

G. S. Maddala, *Introduction to Econometrics*, 2001, Third Edition, John Wiley and Sons.

Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*, 2002, Southwestern College Publishing.

Jeffrey M. Wooldridge, *Econometric Analysis of Cross Section and Panel Data*, 2002, MIT Press.

Course Outline

I. Asymptotics and Violations of Gauss-Markov Assumptions in the Classical Linear Regression Model

1. Large Sample Results and Asymptotics

   Readings

   - Greene, Appendix D

2. Heteroskedasticity

   Readings

   - Greene, 10.1–10.3, 11.1–11.2, 11.4–11.6 (6th ed: 8.1–8.7).
   - Optional: Kennedy, Ch. 8.

3. Autocorrelation

   Readings

   - Greene, 12.1–12.3, 12.7–12.9 (6th ed: 19.1–19.3, 19.7–19.9).
   - Optional: Kennedy, Ch. 17.

4. Simultaneous Equations Models and 2SLS

   Readings

   - Greene, 15.1–15.6 (6th ed: 13.1–13.6).
   - Optional: Kennedy, Ch. 10.

5. Time Series Modeling

   Readings

   - Greene, Ch. 20 (6th ed: Chs. 21–22).
   - Optional: Kennedy, Ch. 18.

II. Maximum Likelihood Estimation

Readings

- Greene, Ch. 17 (6th ed: Ch. 16).
- Long, Ch. 1 and 2.

III. Models for Repeated Observations Data—Continuous Dependent Variables

1. Fixed effects estimators
2. Random effects estimators
   i. Generalized least squares
   ii. Maximum likelihood estimation
3. Non-spherical errors

Readings

- Greene, Ch. 13 (except 13.6) (6th ed: Ch. 9, except 9.9).
- Hsiao, Chapters 1–3 or Baltagi, Chapters 1, 2, and 4.
- Beck, Nathaniel, and Jonathan N. Katz. 1995. "What To Do (and Not To Do) with Time-Series Cross-Section Data in Comparative Politics." *American Political Science Review* 89: 634–647.

IV. Qualitative and Limited Dependent Variable Models Based on the Normal Regression Model

1. Introduction, Dichotomous, and Ordered Probit
   Readings
   - Long, Ch. 2, 3, and 5.
   - Maddala, Ch. 2.1–2.5.
2. Censored Regression
   Readings
   - Greene, Ch. 22.3 (6th ed: 24.3).
   - Long, Ch. 7.
   - Maddala, 6.1–6.6.
3. Truncated Regression
   Readings
   - Greene, Ch. 22.2 (6th ed: 24.2).
   - Maddala, Ch. 6.9–6.10.
4. Sample and Self-Selection Models
   Readings
   - Greene, 22.4 (6th ed: 24.5).
   - Maddala, Ch. 9.

V. Probabilistic Choice Models

1. The Multinomial Logit Model
   Readings
   - Greene, Ch. 21.7 (6th ed: 23.11).
   - Long, Ch. 6.
   - Maddala, Ch. 2.10–2.12, Ch. 3.
2. The Conditional Logit Model
   Readings
   - Long, Ch. 6.
   - Maddala, Ch. 3.

3. The Nested Logit Model

   Readings

   - Greene, pp. 725–727 (6th ed: pp. 847–850).
   - Maddala, pp. 67–70.

4. The Multinomial Probit Model

   Readings

   - Greene, pp. 727–728 (6th ed: pp. 850–851).
   - Alvarez, R. Michael and Jonathan Nagler. 1995 "Economics, Issues, and the Perot Candidacy: Voter Choice in the 1992 Election," *American Journal of Political Science* 39:714–744.

VI. Duration Models

Readings

- Box-Steffensmeier, Janet M. and Bradford S. Jones. 1997. "Time is of the Essence: Event History Models in Political Science." *American Journal of Political Science* 41: 1414–1461.
- Lancaster, *The Econometric Analysis of Transition Data*, Ch. 1–3.

VII. Event Count Models

Readings

- Long, Ch. 8.

VIII. Models for Repeated Observations—Dichotomous Dependent Variables

Readings

- Greene, Ch. 21.5 (6th ed: 23.5).
- Zorn, Christopher J. W. 2001. "Generalized Estimating Equations Models for Correlated Data: A Review With Applications." *American Journal of Political Science* 45: 470–90 (see also Errata on p. 748).