PSC 405
Linear Models

Spring 2003
Mon, Fri 2pm-3:15
Harkness 329

Professor Curtis S. Signorino
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COURSE DESCRIPTION: In this course, we will examine the linear regression model and its variants. The course has two goals: (1) to provide students with the statistical theory of the linear model, and (2) to provide students with skills for analyzing data. The linear model is a natural starting point for understanding regression models in general, inferences based on them, and problems with our inferences due to data issues or to model misspecification. The model's relative tractability has made it an attractive tool for Political Scientists, resulting in volumes of research using the methods studied here. Familiarity with the linear model is now essentially required if one wants to be a consumer or producer of modern Political Science research.

PREREQUISITES: The prerequisites for this course include a mathematical statistics course at the level of PSC 404 and practical calculus at the level of PSC 403.

COURSE REQUIREMENTS: There will be weekly homework assignments and a final exam. The course grade will be calculated as follows: homework assignments 30%, final exam 70%. I encourage students to work together in groups of two or (at most) three for the homework assignments. In addition to office hours, the TA will hold a weekly recitation. The purpose of the recitation is to cover material not covered in lecture, to go over homework problems, and to review material that students find difficult. Please email the TA if you would like him/her to cover a particular topic in recitation. Students will be responsible for material covered in lecture, recitation, and the required readings.

COURSE WEBSITE: Data, codebooks, and other course material will be regularly made available at www.rochester.edu/College/PSC/signorino/ under "courses" and then "PSC 405".

TEXTS: In general, the course will proceed straight through

(Greene) Green, William H. *Econometric Analysis*. 5th Edition.

Recommended texts are also provided for those who would like additional (generally less technical) treatments on the course's topics:

(JD) Johnston, Jack and John DiNardo. *Econometric Methods*. 4th Edition.

(Achen) Achen, Chris. *Interpreting and Using Regression*. Sage.

Kennedy, Peter. *A Guide to Econometrics*. 4th Edition.

COURSE SCHEDULE:

1. Overview and Review	Greene 1, App B, C, D.
2. Matrix Algebra	Greene App A.
3. Simple (Two-Variable) Regression	Greene 2–6. JD 1.
4. Multiple Regression	Greene 2–6, 7.2. JD 3.
5. Data Problems, Model Specification, Model Selection	Greene 4.9, 5.6, 8. JD 4.
6. Heteroscedasticity	Greene 10–11. JD 5, 6.1–6.3.
7. Autocorrelation	Greene 12. JD 6.4–6.9.
8. Models for Panel Data	Greene 13. JD 12.
9. Systems of Equations	Greene 14. JD 9.1.
10. Simultaneous Equations	Greene 15. JD 9.4–9.6.
11. Errors in Variables	Greene 5.6. JD 5.5.
11. Expectations and Lagged Variables	Greene 19. JD 2.4, 8.
12. Time Series	Greene 20. JD 7.
13. Binary Data	Greene 21.1–21.4. JD 13.1–13.7

Final Exam: TBA, Covers Topics 1–13