

Sociology 506/CSSS 507: Quantitative Techniques in Sociology (3/29/2011)

Instructor: Jerald R. Herting

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Hours: W 11:00-12:20 pm and by appointment

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Description: This course builds on the Sociology 504-5 series, especially Soc505, which covered the general linear model in the form of multiple regression and logistic regression. The first half (or so) of Soc506/CSSS507 will re-introduce you to these models with some different estimation approaches and ways to evaluate models, then will focus on additional methods for analyzing categorical and "limited" dependent variables (for example, multinomial logistic regression for a k-category outcome or Poisson regression for limited count outcomes). The second part of the course will cover applications of OLS regression (and slight variants) to more complicated data structures than simple cross-sectional data. This will include time and nested data structures common in the social sciences--- such as pooled cross-section time-series data, limited wave panel data, and clustered data. These types of data designs will offend basic assumptions about the error term in the OLS model (and will require techniques to accommodate this issue), as well as provide some interesting methodological twists/benefits. We will also include models that deal with endogeneity and possibly introduce system of equations. Overall, the goals are to give you the background needed to become a competent user of these techniques as well as a good judge of how others' use of them. In general, the intent is to expand your literacy with regard to these reasonably common place, yet advanced, methods in the literature.

Although this is a course on data analysis techniques, one of its main messages is that the information produced by those techniques is only as good as the substantive and theoretical knowledge that researchers possess *before* they use them. Thus, we will emphasize the presuppositions and prerequisites of the techniques, and their implications for good research practice.

Assignments: There will be four "homework" assignments. The homework will be, for the most part, hands-on computer assignments that apply STATA to various problems; these problems have the intent of illustrating the statistical techniques, honing your abilities to provide interpretation of results, and increase your computer/statistical package expertise, as well as enhancing your general research skills. Each homework assignment will have 1) collaborative parts (ones you are encouraged to work together on as partners---but with your on write up) and 2) an independent work section where you are expected to work alone on the problem.

Class: Lectures will occur on T/Th typically from 3:30 to 5:00 (or so). I do, however, reserve the ½ hour extra to have separate sections for computing and tutorials/re-cover problem areas.

Main Text:

- 1) *Regression Models for Categorical and Limited Dependent Variables*
J. Scott Long
Sage Publications: Thousand Oaks (1997)
- 2) *Fixed Effects Regression Models*
Paul Allison
Sage Publications. Thousand Oaks (2009)

Related Texts:

- 1) *Statistical Methods for the Social Sciences, 4th Edition*
Alan Agresti and Barbara Finlay
Prentice Hall: Upper Saddle River, NJ (1997-2009)
- 2) *Introductory Econometrics: A Modern Approach 4th Edition*
Jeffrey M. Wooldridge
South-Western. Mason, OH (2009, 2006)
- 3) *Applied Regression Analysis, Linear Models, and Related Methods.*
John Fox.
Sage Publications: Thousand Oaks (1997)
- 4) *Regression with Graphics: A Second Course in Applied Statistics*
Lawrence G. Hamilton
Brooks/Cole. Pacific Grove, CA(1992)

The above texts offer alternative readings on some of the topics we will cover. Other alternative readings will be assigned as useful guides or additional approaches for the benefit of providing alternate views/explanations of the same topic.

Course Outline (The following outline does **not** represent a course contract. There will likely be slight changes as the course moves forward especially regarding the timing of topics):

Boldface indicates required reading

Weeks 1-2 Introduction and Review of Estimation, Multiple Regression, and Assessing Model Fit (**Long Chapter 1, 2; any other review on regression you care to do**)

NOTE: No class Thursday March 31st --- I will be attending the Population Association of America annual meetings

Week 2-3 Linear Probability Model and Logistic Regression (**Long Chapter 3, 4**)

Week 4 Multinomial Logistic Model (**Long Chapters 6**)

Week 5 Ordinal Model (**Long Chapter 5**)

Week 6 Count models (**Long Chapter 8**)

Week 7 Limited dependent variables---censored/truncated and count outcomes (**Long Chapter 7**)

Week 8-9-10 Pooled-time series models/fixed and random effects (**Allison**)

Finals week

(June 6-10): (last homework set will be due during this week)

Rough plan for homework assignments: first homework will be due around the 3rd week, second in the 5th week, 3rd around week 8; and the last will be due early in finals week.