

Quantitative Analysis - Elementary
Political Science 685

Introduction to Statistics and Regression Analysis

Ohio State University
Winter 1997
Course meets M, W, & F, 11:30-1:00
Derby Hall 0150

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Course Objectives:

This course provides an introduction to the theory and practice of quantitative data analysis techniques. The goals are to provide students with the skills that are necessary to: 1) read, understand, interpret and evaluate the professional literature; 2) design and carry out studies that employ these techniques for testing substantive theories; and 3) prepare the basis for future work in methodology, including 686. Formal, analytic treatments of the material will be counterbalanced by the use of substantive examples and class assignments. Top journal articles will be included in the assignments and are to be discussed and replicated. Again, the overall course objective is not to turn you into a statistician -- instead, we are trying to maximize your research skills as a social scientist. As social scientists, it is indeed important that we know how to use the statistical techniques presented. But it is also important for us to know why and how quantitative tools work or do not work under varying conditions. Given this, we will discuss much of the mathematical and statistical theory as well as some potential drawbacks and circumstantial limitations. Therefore, while the presentations will not be purely theoretical, neither will this course be "cookbook" in nature. Emphasis will be placed on the understanding of concepts and the development of intuition.

Computing is an integral aspect of this course. You will be asked to use SPSS for Windows to analyze data from a 1984 post-election Gallup Survey in homework assignments. Several articles based on this survey and primarily concerned with voting behavior have been published, including Young et al. (1987), Aldrich et al. (1989), and Sullivan et al. (1990), which are included in the reading assignments. In addition to replicating some of the reported results, you are encouraged to develop and work out your own research problems from the information contained in this survey.

You should expect to put in a lot of efforts in understanding the material, learning computing skills, and doing homework assignments. It is not uncommon for students to feel frustrated when they first encounter this material and/or the computing aspect. You need to use patience and carefulness in working with through the readings, problems and computer assignments.

Student Responsibilities:

Formal course requirements are as follows: 1) class attendance and active participation is high recommended. Statistical knowledge is cumulative, and gaps in early material will usually have detrimental consequences later on. It is imperative that you read designated portions of the text prior to the class to master the material presented in the lectures. I strongly encourage you to ask questions during class to maximize your benefit from this course. 5% of your final grade will be based on class participation. 2) in-class, written exams -- midterm and final. The exams will constitute 40% and 45% of your grade, respectively. 3) assignments -- 10%. Each student is expected to hand in computer projects (SPSS for windows) using the techniques learned in class. Detailed instructions are provided on the assignment sheets. Every lab is due exactly one week after it is assigned. The due date is at the top of each assignment. No credit will be given for any late assignments unless previously approved by the instructor. Wonnacott and Wonnacott provide numerous problems at the end of the chapters, which can provide additional practice with the material. Answers to the odd-numbered problems are in the back of the text. There is also a student workbook, that can be ordered through the bookstore, for students wanting additional problems to work.

Teaching Assistant: We are very fortunate to have Jason Pigg as the TA for this course. His office hours will be announced and he is located in Derby 2043. His office phone number is 292-3627 and E-mail: pigg.8@osu.edu.

Books and Readings:

Required:

Wonnacott and Wonnacott (W&W), Introductory Statistics for Business and Economics, Fourth Edition, (Wiley, 1990).

A number of papers are assigned as required readings (these are marked on the syllabus with A#@). Most of these papers are political science applications of the statistical methods that are being introduced. These papers are included primarily for use in homework assignments, and they often include parts that are beyond the scope of this course. These readings will be discussed in class/lab as time allows.

Recommended but not required:

We are looking into SPSS guides. As you know from 684, this has become complicated! Jason will no doubt be your best reference and don't hesitate to contact the Political Research Lab staff.

The following may be useful for you as an additional source should you have difficulty with a particular concept and would like an alternative written explanation of the material.

Moore, David S. 1991. Statistics: Concepts and Controversies, 3rd ed. New York: W. H. Freeman and Company. (A very readable book, especially for readers who are more interested in insights and ideas than in technique.)

Gujarati, Basic Econometrics (McGraw-Hill, 1988).

Achen, Interpreting and Using Regression (Sage, 1982).

Berry and Feldman, Multiple Regression in Practice (Sage, 1985)

Course Outline and Reading Assignments:

The syllabus is a guide to how I would like to progress during the year. There will be times that we bog down on a subject. If we get too far behind in the syllabus, I'll adjust it accordingly. Don't let a fear of bogging down prevent you from asking questions; at the same time, if everyone does the reading and thinks about the issues before class, we should be able to charge ahead pretty well. NOTE: A separate lab reading and due date schedule will be distributed.

Week 1: Introduction, Univariate Descriptive Statistics, & Probability

W&W, Chs. 1, 2, & 3.

Week 2: Bivariate Joint Distributions

W&W, Chs. 4 & 5.

Week 3: Sampling & Point Estimation

W&W, Ch. 6 & 7.

Week 4: Statistical Inference - Confidence Intervals & Hypothesis Testing

W&W, Chap. 8 & 9.

Week 5: Analysis of Variance (ANOVA)

W&W, Ch. 10.

Week 6: ANOVA and Review

Review

In-Class Midterm Exam

Week 7: Testing Relationships for Nominal, Ordinal, and Interval Data: Chi-Square Tests, Contingency Problems, Correlation, & Regression

W&W, Chs. 17 & 15.1

Week 8: Testing Relationships for Interval Data: Simple Regression

W&W, Chs. 11 & 12.

Week 9: Multiple Regression

W&W, Ch. 13

Week 10: Regression Extensions

W&W, Chs. 14 & 15.2-15.5

Final Exam: MARCH 17, 11:30-1:18