PSC 405

Linear Models

Spring 2010
4:50-6:05 T/TH
Harkness 329

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PREREQUISITES

The prerequisites for this course include a mathematical statistics course at the level of PSC 404 and mathematical modeling at the level of PSC 407.

COURSE REQUIREMENTS

The requirements consist of problem sets and a three part data analysis project. The problem sets will be divided between analytic and empirical exercises, and all empirical exercises will be performed in R. The course grade will be calculated as follows: problem sets 25%, data analysis part I 25%, data analysis part II 25%, data analysis part III 25%.

COURSE WEBPAGE

`http://www.rochester.edu/College/PSC/clarke/405/405.html`

TEXTS

The required texts for this course are:

- Johnston, Jack, and John DiNardo. 1997. *Econometric Methods.* 4th edition. McGraw-Hill.

  `http://www-personal.umich.edu/~jdinardo/errata.html`

- Faraway, Julian. 2002. *Practical Regression and Anova using R.* The accompanying source code and data, are free on the web here:

  `http://www.maths.bath.ac.uk/~jjf23/LMR/`

- Achen, Christopher. 1982. *Interpreting and Using Regression.* Sage.

For when you need a simpler initial overview, the following lower-level texts may be helpful:

- Gujarati, Damodar N. 2003. *Basic Econometrics.* 4th edition. McGraw-Hill.
- Hamilton, Lawrence. 1999. *Regression with Graphics.*
- Hanushek and Jackson. 1976. *Statistical Methods for Social Scientists.*
- Kennedy, Peter. 2001. *A Guide to Econometrics.* 4th ed.
- Kmenta, Jan. 1986. *Elements of Eonometrics.* 2nd ed.
- Lardaro, Leonard. 1993. *Applied Econometrics.*
- Weisberg, Sanford. 1985. *Applied Linear Regression.* 2nd ed.
- Wooldridge, Jeffrey. 2003. *Introductory Econometrics: A Modern Approach.*

COURSE SCHEDULE

01/14: Course Overview and Introduction

- Achen, Ch. 1 and 2.
- Achen, C. 1977. "Measuring Representation: Perils of the Correlation Coefficient." *American Journal of Political Science* 21:805-815.
- Freedman, D. 1991. "Statistical Models and Shoe Leather." *Sociological Methodology* 21:291-313.
- Rosenbaum, P. 1999. "Choice as Alternative to Control in Observational Studies." *Statistical Science* 14:259-304.
- Faraway, Ch. 1.

01/19-01/21: Two-Variable Regression in Scalar Notation

- Johnston & DiNardo, Ch. 1.
- Achen, Ch. 3 and 4.
- Achen, C. 1990. "What Does 'Explained Variance' Explain?: Reply." *Political Analysis* 2:173-184.
- King, G. 1986. "How Not to Lie with Statistics," *American Journal of Political Science* 30:666-687.

01/26-01/28: Introduction to Matrix Algebra

- Johnston & DiNardo, App. A.

02/02-02/04: Multiple Regression in Matrix Notation

- Johnston & DiNardo, Ch. 3.
- Faraway, Ch. 2, 3, and 7.
- Belsley, Kuh, and Welsch. 1980. *Regression Diagnostics*, Ch. 2.
- Farrar & Glauber. 1967. "Multicollinearity in Regression Analysis: the Problem Revisited." *Review of Economics and Statistics* 49: 92-107.
- Lemieux, P. 1978. "A Note on the Detection of Multicollinearity." *American Journal of Political Science* 22: 183-186.

02/09-02/11: Specification in Multiple Regression

- Johnston & DiNardo, Ch. 4.
- Achen, Ch. 5 and 6.
- Faraway, Ch. 4, 6, and 10 (ignore the stepwise stuff).
- Clarke, K. 2005. "The Phantom Menace: Omitted Variable Bias in Econometric Research." *Journal of Conflict Management and Peace Science* 22: 341-352.
- Friedrich, R. 1982. "In Defense of Multiplicative Terms in Multiple Regression Equations." *American Journal of Political Science* 26: 797-833.
- Braumoeller, B. 2005. "Hypothesis Testing and Multiplicative Interaction Terms." *International Organization* 58: 807-820. (And the "author's checklist": `www.people.fas.harvard.edu/~bfbraum/checklist.html`)

02/12: Part I of the data analysis project is due by 5 PM.

02/16-02/18: ML, GLS, and IV Estimators

- Johnston & DiNardo, Ch. 5.
- Faraway. Ch. 5.
- Bartels, L. 1991. "Instrumental and 'Quasi-Instrumental' Variables." *American Journal of American Politics* 35: 777-800.
- Achen, C. 1985. "Proxy Variables and Incorrect Signs on Regression Coefficients." *Political Methodology* 11: 299-316.

02/23-02/25: No Class. We will reschedule.

03/02-03/04: Heteroscedasticity and Autocorrelation

- Johnston & DiNardo, Ch. 6.
- Faraway, Ch. 7 and Ch. 9 (only the relevant sections).
- Downes & Rockne. 1979. "Interpreting Heteroscedasticity." *American Journal of Political Science* 23: 816-828.

03/09-03/11: Break

03/16-03/18: Univariate Time Series

- Johnston & DiNardo, Ch. 7.

03/19: Part II of the data analysis project is due by 5 PM.

03/23-03/25: Autoregressive Distributed Lags

- Johnston & DiNardo, Ch. 8.

03/30-04/01: Multiple Equation Models I

- Johnston & DiNardo, Ch. 9.

04/06-04/08: Multiple Equation Models II

- Johnston & DiNardo: Ch. 9.

04/13-04/15: Generalized Method of Moments

- Johnston & DiNardo: Ch. 10.

04/20-04/27: Panel Data, No class 04/22.

- Johnston & DiNardo: Ch. 12.
- Mundlak, Y. 1978. "On the Pooling of Time Series and Cross Section Data." *Econometrica* 46: 69-85.
- Beck & Katz. 1995. "What to do (and not to do) with Time-Series Cross-Section Data." *American Political Science Review* 89: 634-647.

Part III of the data analysis is due during the final exam period scheduled by the University—unless an extension is previously arranged with the professor.