

**Economics 245C/250B
Applied Econometrics**

Course Overview and Objectives:

This course in applied econometrics is part of the econometrics and labor economics graduate sequence. The emphasis of the course is on topics in microeconometrics and empirical modeling tools used in current research. The objective is to familiarize the students with the econometric theory, data sets, and empirical methodologies used in applied microeconomics. A key focus of the course is the credible identification of economic parameters from non-experimental data.

The evaluation for the course will be based on three components. First, students are expected to complete a series of 4 problem sets including analytic questions as well as data analysis questions. Students can work in groups of 1-3. All problem sets must be handed-in typed (one copy per group). For empirical problems, submit a short write up of your answers to the questions, and well as clearly labeled log files for your programs. Late problem sets will not be graded.

Second, the students will present short paper proposals, with focus on the question significance, the research design and the possible data sources. Presentations will be held in the last 3-4 lectures, and last 10-15 minutes, depending on the number of participants. I will post guidelines on how to form a good proposal later in the quarter. Third, the students will write an individual take-home examination, held during the exam week (June 4-10). The exam will be composed on empirical and analytical questions. Final grades will aggregate the assignments (40%), the take-home exam (40%) and the proposal presentation (20%).

Class Time:

Tuesday and Thursday, 2:00-3:15, HSSB 1237

Home Page:

<http://www.econ.ucsb.edu/~olivier/econ245c/econ245c.html>

Office Hours:

Wednesday 1:30 - 3:00, North Hall 2050
(or by appointment)

Textbooks used for the lecture notes. These are optional.

Colin Cameron and Pravin K. Trivedi, *Microeconometrics: Methods and Applications*, 2005, Cambridge University Press (also a companion volume, *Microeconometrics Using Stata* is available from Stata Press)

Joshua Angrist and Jörn-Steffen Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton University Press, 2008

Jeffrey Wooldridge, *Econometric Analysis of Cross Section and Panel Data*, MIT Press, 2010 (older edition also fine)

Survey articles (from the class webpage):

Angrist, Joshua D. and Alan B. Krueger (1999): "Empirical Strategies in Labor Economics," in Orley Ashenfelter and David Card, editors, *Handbook of Labor Economics*, volume 3A, (pp. 1339-1344).

Imbens, Guido W., and Jeffrey M. Wooldridge (2009): "Recent Developments in the Econometrics of Program Evaluation," *Journal of Economic Literature*, 47(1): 5-86.

TENTATIVE READING LIST AND COURSE OUTLINE (MORE TOPICS MAYBE COVERED AT THE END)

I. Review of regression and issues related to inference and measurement error

Conditional expectation functions and linear projections

Heteroskedasticity and group effects

Omitted-variables bias

Measurement error

Angrist, Joshua D. and Alan B. Krueger (1999): "Empirical Strategies in Labor Economics," in Orley Ashenfelter and David Card, editors, *Handbook of Labor Economics*, volume 3A, (pp. 1339-1344).

Ashenfelter, Orley and Alan B. Krueger (1994): "Estimates of the Economic Return to Schooling from a New Sample of Twins," *American Economic Review*, 84: 1157-1173.

Card, David (1996): "The Effect of Unions on Wages: A Longitudinal Analysis," *Econometrica*, 64: 957-979.

Griliches, Zvi, and Jerry A. Hausman (1986): "Errors in Variables in Panel Data," *Journal of Econometrics*, 31: 93-118.

Moulton, Brent (1986): "Random Group Effects and the Precision of Regression Estimates," *Journal of Econometrics*, 32: 385-397.

Wooldridge, Chapters 1-4.

II. Causality and estimation of causal parameters

Potential outcomes: The Roy model and Rubin's model of causal inference

Definitions of treatment effects

Angrist, Joshua D. and Alan B. Krueger (1999): "Empirical Strategies in Labor Economics," in Orley Ashenfelter and David Card, editors, *Handbook of Labor Economics*, volume 3A, (pp. 1278-1284).

Holland, Paul W. (1986): "Statistics and Causal Inference," *Journal of the American Statistical Association*, 81: 945-960

Wooldridge, Chapter 18 (pp. 603-607)

III. Selection on Observables

Regression methods

Multivariate matching and Propensity score matching

Fixed-effects and "Differences-in-differences" estimators

Angrist, Joshua D. and Alan B. Krueger (1999): "Empirical Strategies in Labor Economics," in Orley Ashenfelter and David Card, editors, *Handbook of Labor Economics*, volume 3A, (pp. 1284-1299, 1314-1320).

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan (2004): "How Much Should We Trust Differences-in-Differences Estimates?" *Quarterly Journal of Economics*, 119: 249-276.

Michael Greenstone and Ted Gayer (2009): "Quasi-Experimental and Experimental Approaches to Environmental Economics," *Journal of Environmental Economics and Management*, 57: 21-44.

Meyer, Bruce D., "Natural and Quasi-experiments in Economics," *Journal of Business and Economic Statistics*, 13: 151-161.

Rosenbaum, Paul and Donald Rubin, "Reducing Bias in Observational Studies Using Subclassification on the Propensity Score," *Journal of the American Statistical Association*, 79, 1985, pp. 516-524.

Wooldridge, Chapter 18 (p. 607-621)

Applications:

Angrist, Joshua D. (1998): "Estimating the Labor Market Impact of Voluntary Military Service Using Social Security Data on Military Applicants," *Econometrica*, March 1998.

Card, David and Daniel Sullivan (1988): "Measuring the Effect of Subsidized Training Programs on Movements In and Out of Employment," *Econometrica*, pp. 497-530.

Card, David (1991): "The Impact of the Mariel Boatlift on the Miami Labor Market," *Industrial and Labor Relations Review*, 43: 245-257.

Others to come

IV. Selection on Unobservables

IV and TSLS

Heterogeneous treatment effects, selection bias corrections and LATE

Small-sample bias

Etc

Angrist, Joshua D.: (2004): "Treatment Effect Heterogeneity in Theory and Practice," *The Economic Journal*, 114: 52-78.

Angrist, Joshua D. and Alan B. Krueger: (1995): "Split-Sample Instrumental Variables Estimates of the Returns to Education," *Journal of Business and Economic Statistics*, 13: 225-235.

Angrist, Joshua D. and Guido W. Imbens: (1995): "Two-Stage Least Squares Estimation of Average Causal Effects in Models with Variable Treatment Intensity," *Journal of The American Statistical Association*, 90: 431-442.

Angrist, Joshua D. and Alan B. Krueger (1999): "Empirical Strategies in Labor Economics," in Orley Ashenfelter and David Card, editors, *Handbook of Labor Economics*, volume 3A, (pp. 1300-1305, 1320-1326).

Bound, John, David A. Jaeger, and Regina M. Baker (1995): "Problems with Instrumental Variables Estimation When the Correlation Between the Instruments and the Endogeneous Explanatory Variable is Weak," *Journal of the American Statistical Association*, 90: 443-450.

Card, David (2001): "Estimating the Return to Schooling: Progress on Some Persistent Econometric Problems," *Econometrica*, 69: 1127-1160.

Heckman, James J. (1979): "Sample Selection Bias as a Specification Error," *Econometrica*, 47: 153-161.

Applications:

Angrist, Joshua D. (1990): "Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records," *American Economic Review*, 80: 313-336.

Angrist, Joshua D., and Stacy Chen (2007): "Long-Term Consequences of Vietnam-Era Concription: Schooling, Experience, and Earnings," NBER Working Paper No. 13411.

Angrist, Joshua D. and Alan B. Krueger: (1991): "Does Compulsory School Attendance Affect Schooling and Earnings," *Quarterly Journal of Economics*, 106: 979-1014.

Chay, Kenneth and Michael Greenstone (2003): "The Impact of Air Pollution on Infant Mortality: Evidence from Geographic Variation in Pollution Shocks Induced by a Recession," *Quarterly Journal of Economics*, 118: 1121-1167

Others to come

V. Regression Discontinuity Methods

Angrist, Joshua D. and Alan B. Krueger (1999): "Empirical Strategies in Labor Economics," in Orley Ashenfelter and David Card, editors, *Handbook of Labor Economics*, volume 3A. (pp. 1305-1309).

Hahn, Jinyong, Petra Todd, and Wilbert van der Klauuw (2001): "Identification and Estimation of Treatment Effects with a Regression-Discontinuity Design," *Econometrica*, 69: 201-209.

Imbens, Guido and Thomas Lemieux (2008): "Regression Discontinuity Designs: A Guide to Practice," *Journal of Econometrics*, Volume 142 Issue 2, pp. 615-635.
(Special Issue on Regression Discontinuity Methods)

Applications:

Angrist, Joshua D. and Victor Lavy (1999): "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement," *Quarterly Journal of Economics*, 114: 533-575.

Card, David, Carlos Dobkin, and Nicole Maestas (2008): "The Impact of Nearly Universal Insurance Coverage on Health Care Utilization: Evidence from Medicare," *American Economic Review*, 98: 2242-58

Carpenter Christopher and Carlos Dobkin: (2009) "The Effect of Alcohol Consumption on Mortality: Regression Discontinuity Evidence from the Minimum Drinking Age," *American Economic Journal: Applied Economics* 1: 164-182.

DiNardo John, and David Lee (2004): "Economic Impacts of New Unionization on Private Sector Employers: 1984-2001," *Quarterly Journal of Economics*, 119: 1383-1441.

McCrary Justin, and Heather Royer (2006): "The Effect of Maternal Education on Fertility and Infant Health: Evidence from School Entry Policies Using Exact Date of Birth," NBER Working Paper No. 12329

Oreopoulos, Phil (2006): "Estimating Average and Local Average Treatment Effects of Education when Compulsory School Laws Really Matter," *American Economic Review*, Vol. 96, No. 1, March 2006, pp. 152-175.