

New York University
Robert F. Wagner Graduate School of Public Service

Quantitative Methods 1

Autumn 2017

2:00 pm – 3:40 pm, 60 5th Avenue, Room 125

Rajeev Dehejia

Office: 3030 Puck Building, 295 Lafayette Street

E-mail: dehejia.nyu@gmail.com

Office Hours

Wednesday 3.45 pm-5:00 pm

By appointment: <https://goo.gl/Z2Jf5S>

Course Description and Objectives

The goal of this course is to provide students with an introduction to key methods of quantitative policy analysis. We develop the statistical toolkit of regression analysis, reviewing the bivariate regression model and then continuing with multiple regression, and explore how these methods are applied to policy analysis in five benchmark techniques: randomized trials, direct regression analysis, instrumental variables, regression discontinuity, and difference in differences. We emphasize the distinction between regression as a statistical tool and the additional context knowledge (and occasionally assumptions) that are required to address causal policy questions.

Approach

The focus will be on learning to use the methods discussed. This involves a counterpoint between methods discussion and application. The methods discussion will lean on basic statistical concepts, but the emphasis will be on the intuition and ideas. The applications will be based on analysis of real and realistic policy-relevant data.

Grading

The course will be evaluated through five problem sets (15 points each), and a midterm exam (25%). All problem sets will make use of Stata, so please ensure you are familiar with how to access this program at NYU.

Course Structure

The class includes lectures, readings, and independent computer lab work. You are strongly encouraged to relate the general material of the course to your specific policy interests throughout the course. Class attendance is critical as interaction within the classroom is an essential aspect of this course and the learning process associated with it.

Required Books

James Stock and Mark Watson (SW below), *Introduction to Econometrics*, Pearson Addison Wesley.

Joshua Angrist and Jörn-Steffen Pischke (MM below), *Mastering Metrics*, Princeton University Press.

Schedule

- Class 1: Introduction to causality and review of the bivariate regression model
 - Class 2: Randomized controlled trials: **Assigned:** PS1.
 - Class 3: Multiple regression: estimation and interpretation
 - Class 4: Multiple regression: hypothesis testing. **Due:** PS1.
 - Class 5: Multiple regression: challenges **Assigned:** PS2.
 - Class 6: Dummy variables
 - Class 7: Direct regression analysis of policy: possibilities and perils. **Due:** PS2.
 - Class 8: Midterm
 - Class 9: Multiple regression: functional form
 - Class 10: Instrumental variables. **Assigned:** PS3.
 - Class 11: Regression Discontinuity. **Assigned:** PS4. **Due:** PS3.
 - Class 12: Introduction to panel data.
 - Class 13: Difference-in-differences: using policy variation. **Due:** PS4. **Assigned:** PS5
 - Class 14: Introduction to time series and forecasting
- Due Dec 18th:** PS5.

Readings

* denotes required, # denotes an advanced reading where you should only skim the non-technical portions. All other readings are optional. All required readings are on the web directory. Some optional readings are there as well.

Class 1: Causality and the Treatment Effect, Review of Bivariate Regressions

* MM, Introduction.

* SW, Chapters 1, 4, and 5

Holland, P. (1986), "Statistics and Causal Inference" (with discussion), *Journal of the American Statistical Association*, 81, 945-970.

DiNardo, John, "Interesting Questions in Freakonomics," *Journal of Economic Literature*, Volume 45, No. 4, pp. 973-1000.

Whitehurst, Grover, and Matthew Chingos, "Class Size: What Research Says and What it Means for Policy," Brown Center for Education at Brookings, Working Paper, 2011.

Autor, David H. and Susan N. Houseman, "Do Temporary Help Jobs Improve Labor Market Outcomes for Low-Skilled Workers? Evidence from 'Work First.'" *American Economic Journal: Applied Economics* 2(3): July 2010, pp. 96-128.

Class 2: Randomized trials

* MM, Chapter 1.

* Bertrand, Marianne, and Sendhil Mullainathan, "Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination," *American Economic Review*, Volume 94, Number 4 (2004), pp. 991-1013.

* Duflo, Esther, Pasqualine Dupas, and Michael Kremer, "Education, HIV, and Early Fertility: Experimental Evidence from Kenya," *American Economic Review*, Volume 109, Number 9, pp. 2257-97.

* Chetty, Raj, John Friedman, Nathaniel Hilger, Emmanuel Saez, Diane Whitmore Schanzenback, and Danny Yagan, "How Does Your Kindergarten Classroom Affect your Earnings? Evidence from Project Star," *Quarterly Journal of Economics*, Volume 126, Number 4 (2011), pp. 1593-1660

Angrist, Joshua, and Victor Lavy, "The Effect of High School Matriculation: Evidence from Randomized Trials," NBER Working Paper No. 9389.

Duflo, Esther, and Emmanuel Saez, "The Role of Information and Social Interactions in Retirement Savings Decisions: Evidence from a Randomized Experiment," *Quarterly Journal of Economics*, August 2003

Bertrand, Marianne, Dean Karlan, Sendhil Mullainathan, Eldar Shafir, and Jonathan Zinman, "What's Psychology Worth? A Field Experiment in the Consumer Credit Market," working paper.

Cox, D. R., *The Planning of Experiments*. Wiley.

Imbens, Guido, and Donald Rubin, *Causal Inference for Statistics, Social and Biomedical Sciences*. Cambridge.

Class 3: Multiple Regression: Estimation and Interpretation

* SW, Chapter 6

Class 4: Multiple Regression: Hypothesis Testing

* SW, Chapter 7.1-7.4

Class 5: Multiple Regression: Challenges

* SW, Chapters 5.4, 7.5-7.7, and 9.

Class 6: Binary Dependent Variables

* SW, Chapter 11.

* Krueger, Alan, and Jitka Malecková, "Education, Poverty, and Terrorism: Is There a Causal Connection," *Journal of Economic Perspectives*, Volume 17, Number 4, pp. 119-144.

Ladd, Helen, "Evidence on Discrimination in Mortgage Lending," *Journal of Economic Perspectives*, Volume 12, Number 2 (1998), pp. 41-62.

Class 7: Multivariate Regression and the Analysis of Policy

* MM, Chapters 2 and 6.

* SW, Chapter 9.

Dale, Stacy, and Alan Kruger, "Estimating the Payoff to Attending a More Selective College," *Quarterly Journal of Economics*, 2002.

Krueger, Alan, "How Computers Have Changed the Wage Structure: Evidence from Micro Data," *Quarterly Journal of Economics* 108[1], February 1993, 33-60.

DiNardo, John, and J.S. Pischke, "The Returns to Computer Use Revisited: Have Pencils Changed the Wage Structure Too?," *The Quarterly Journal of Economics* 112 [1], February 1997, 291-303.

Class 8: Midterm

Class 9: Multiple Regression and Functional Form

* SW, Chapter 8.

Class 10: Instrumental Variables

* MM, Chapter 3.

*SW, Chapter 12.

* Card, David, “Using Geographic Variation in College Proximity to Estimate the Return to Schooling,” NBER Working Paper. No. 4483.

Angrist, Joshua, and William Evans, “Children and Their Parents’ Labor Supply: Evidence from Exogenous Variation in Family Size,” *American Economic Review* 88 (3), June 1998, pp. 450-77.

Angrist, Joshua, and A. Krueger, “Does Compulsory School Attendance Affect Schooling and Earnings?,” *Quarterly Journal of Economics* 106, November 1991.

Angrist, Joshua, *et al.*, “Who benefits from KIPP?,” *J. of Policy Analysis and Management*, Fall 2012.

Angrist, Joshua, Victor Lavy, and Analia Schlosser, “Multiple Experiments for the Causal Link between the Quantity and Quality of Children,” *Journal of Labor Economics*, Volume 28, Number 4 (October 2010), pp. 773-824.

Angrist, Joshua, “Instrumental Variables Methods in Experimental Criminological Research: What, Why, How,” *Journal of Experimental Criminology*, Volume 2, Number 1 (April 2006), pp. 23-44.

Class 11: Regression Discontinuity

* MM, Chapter 4.

* SW, Chapter 13.4

* Thistlewaite, Donald, and Donald Campbell, “Regression-Discontinuity Analysis: An Alternative to the Ex Post Facto Experiment,” *Journal of Experimental Psychology*, Volume 51, Number 6 (1960).

* Carpenter, C., and C. Dobkin, “The Effect of Alcohol Consumption on Mortality: Regression Discontinuity Evidence from the MLDA,” *American Economic Journal: Applied Economics* 1 (2009), 164-182.

Abdulkadiroglu, Atila, Joshua Angrist, and Parag Pathak, “The Elite Illusion: Achievement Effects at Boston and New York Exam Schools,” *Econometrica*, Volume 82, Number 1 (2014), pp. 137-196.

Hahn, Jinyong, Petra Todd, and Wilbert Van der Klaauw, “Evaluating the Effect of an Antidiscrimination Law using a Regression-Discontinuity Design,” NBER Working Paper No. 7131 (1999).

van der Klaauw Wilbert. (2002) “Estimating the Effect of Financial Aid Offers on College Enrollment: A Regression–Discontinuity Approach”, *International Economic Review* 43(4): 1249–1287.

Trochim, William, “The Regression-Discontinuity Design: An Introduction”, manuscript.

Berk, Richard (2008), “Recent Perspectives on the Regression Discontinuity Design,” manuscript, Department of Statistics, University of Pennsylvania.

Class 12: Introduction to Panel Data

* SW, Chapter 10.

Class 13: Difference-in-Differences

* MM, Chapter 5.

* Card, David, "The Impact of the Mariel Boatlift of the Miami Labor Market," *Industrial and Labor Relations Review*, Volume 43, Number 2, pp. 245-257.

Card, David, and A. Krueger, "Minimum Wages and Employment: A Case Study of the Fast Food Industry in New Jersey and Pennsylvania," *American Economic Review* 90 (1994), 1397-420.

Meyer, Bruce, Kip Viscusi, and David Durbin (1995), "Workers' Compensation and Injury Duration: Evidence from a Natural Experiment," *American Economic Review*, Volume 85, Number3, pp. 322-340.

Class 14: Introduction to Time Series and Forecasting

* SW, Chapter 14.