

**Economics 673**  
**Econometrics of Program Evaluation**

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This course is designed to provide econometric theory and applications on the subject of program evaluation. We will explore the following topics in this course:

- Social Experiments
- Difference in difference estimators
- Matching and unconfounded assignment
- Regression discontinuity design
- Instrumental variables and local average treatment effects (LATE)
- Program evaluation and economic theory

### Organization

There are weekly lectures. The grade will be based on a take home exam in the middle of the course and a paper. There are three options for the paper: (i) it can be based on research that you are involved in, (ii) it can be an exploration of an econometric method discussed in this class, e.g. a small simulation study, or (iii) it can be a critical evaluation of a (small) number of papers on a particular topic covered in the course. We encourage you to decide soon which option you will pursue so that we can give some guidance.

### Blackboard

Some of the lecture notes will be made available on blackboard.

## Reading List

### General:

- Imbens, Guido and Jeffrey Wooldridge. 2009. "Recent developments in the econometrics of program evaluation", *Journal of Economic Literature*, 47(1):5-86.
- Deaton, Angus. 2010. Instruments, randomization and learning about development, *Journal of Economic Literature*, 48(2):424-455.
- Heckman, James J. 2010. Building bridges between structural and program evaluation approaches to evaluating policy, *Journal of Economic Literature*, 48(2):356-398.
- Imbens, Guido. 2010. Better LATE than nothing: Some comments on Deaton (2009) and Heckman and Urzua (2009), *Journal of Economic Literature*, 48(2):399-423.
- Jeffrey Wooldridge. 2010. *Econometric Analysis of Cross Section and Panel Data, Second Edition*, Cambridge: MIT Press.
- Joshua Angrist and Jorn-Steffen Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton: Princeton University Press.
- Blundell, R. and M. Costa Dias. 2009. Alternative approaches to evaluation in empirical microeconomics, *Journal of Human Resources*, 44(3):565-640.
- Heckman, James and Edward Vytlacil. 2007. "Econometric evaluation of social programs, Part 1: Structural models and econometric policy evaluation" in J. Heckman and E. Leamer (eds.), *Handbook of Econometrics, Volume 6B*, Amsterdam: North Holland Press.
- Heckman, James and Edward Vytlacil. 2007. "Econometric evaluation of social programs, Part 2: Using the marginal treatment effect to organize alternative econometric estimators to evaluate social programs and to forecast their effects in new environments", in J. Heckman and E. Leamer (eds.), *Handbook of Econometrics, Volume 6B*, Amsterdam: North Holland Press.
- M. Ravallion. 2008. Evaluating anti-poverty programs, in T.P. Schultz and J. Strauss (eds.), *Handbook of Development Economics, Volume 4*, Amsterdam: North Holland Press.
- Todd, P. 2008. Evaluating social programs with endogenous program placement and selection of the treated, in T.P. Schultz and J. Strauss (eds.), *Handbook of Development Economics, Volume 4*, Amsterdam: North Holland Press.
- Heckman, J and J. Smith. (1995). Assessing the case for social experiments, *Journal of Economic Perspectives*, 9(2):85-110.

Rosenzweig, M. and K. Wolpin. (1986). Evaluating the effects of optimally distributed public programs: Child health and family planning interventions. *American Economic Review*, 76(3):470-482.

### *Experiments*

### *Theory and Methods*

Duflo, E., R. Glennerster and M. Kremer. 2008. Using randomization in development economics research: A toolkit, in T.P. Schultz and J. Strauss (eds.), *Handbook of Development Economics, Volume 4*, Amsterdam: North Holland Press.

### *Applications*

Thomas, D. et al. (2008). Causal effect of health on social and economic prosperity, mimeo, Duke University.

Manning, Willard et al. 1987. "Health insurance and the demand for health care: Evidence from a randomized experiment", *American Economic Review*, 77:251-277.

LaLonde, Robert. 1986. "Evaluating the econometric evaluations of training programs", *American Economic Review*, 76(4):604-620.

Ashraf, Nava, Dean Karlan and Wesley Yin. 2006. "Tying Odysseus to the Mast: Evidence from a commitment savings product in the Philippines", *Quarterly Journal of Economics*, 121(2):635-672.

Miguel E. and M. Kremer (2004). Worms: Identifying impacts on education and health in the presence of treatment externalities, *Econometrica*, 72.1:159-217.

Hoddinott, J, J. Maluccio, J. Behrman, R. Flores and R. Martorell. 2008. "Effect of a nutrition intervention during early childhood on economic productivity of Guatemalan adults", *Lancet*, 371:411-416 and online web appendix.

Moffitt, Robert. 1979. "The labor supply response in the Gary experiment", *Journal of Human Resources*, 14(4):477-487.

Jeffrey Kling, Jeffrey Liebman and Lawrence Katz, "Experimental Analysis of Neighborhood Effects," *Econometrica*, vol. 75, January 2007, 83-119.

Todd, P. and K. Wolpin. 2006. Assessing the impact of a school subsidy program in Mexico: Using a social experiment to validate a dynamic behavioral model of child schooling and fertility, *American Economic Review*, 96(5):1384-1417.

## IV

### *Methods*

- Imbens Guido and Joshua Angrist. 1994. "Identification and estimation of local average treatment effects", *Econometrica*, 62(2):467-475.
- Imbens, Guido, Joshua Angrist and Donald Rubin. 1996. "Identification of causal effects using instrumental variables", *Journal of Econometrics*, 71(1-2):145-160.
- Heckman, James, Justin Tobias and Edward Vytlacil. 2001. "Four parameters of interest in the evaluation of social programs", *Southern Economic Journal*, 68(2):2102-223.
- Heckman, James, Sergio Urzua and Edward Vytlacil .2006. "Understanding Instrumental Variables in Models with Essential Heterogeneity," *Review of Economics and Statistics*, 88(3):389-432
- Hahn, Jinyong and Geert Ridder .2009. "Conditional Moment Restrictions and Triangular Simultaneous Equations", Working Paper.
- Imbens, Guido. 2010. Better LATE than nothing: Some comments on Deaton (2009) and Heckman and Urzua (2009), *Journal of Economic Literature*, 48(2):399-423.

### *Applications*

- Angrist, Joshua, Kathryn Graddy and Guido Imbens. 2000. "The interpretation of instrumental variables estimators in simultaneous equation models with an application to fish", *Review of Economic Studies*, 67:499-527.
- Card, David. 2001. "Estimating the return to schooling: Progress on some persistent econometric problems", *Econometrica*, 69(5):1127-1160.

### *Diff-in-diff*

#### *Methods*

- Moffitt, R. 1991. Program evaluation with nonexperimental data, *Evaluation Review*, 15.3:291-314.
- Bertrand, Marianne, Esther Duflo and S. Mullainathan. 2004. "How much should we trust difference-in-difference estimates?" *Quarterly Journal of Economics*, 119:249-275.
- Meyer, Bruce. 1995. "Natural and Quasi- Experiments in Economics," *Journal of Business & Economic Statistics*, 13:151-162.
- Stephen Donald and Kevin Lang. 2007. "Inference with Difference-in-Differences and Other Panel Data", *Review of Economics and Statistics* 89:221-233.

### *Applications*

- Meyer, Bruce, Kip Viscusi and David Durbin. 1995. "Workers' Compensation and Injury Duration: Evidence from a Natural Experiment," *American Economic Review*, 85:322-340.
- Card, David and Alan Krueger. 1994. "Minimum wages and employment: A case study of the fast food industry in New Jersey and Pennsylvania", *American Economic Review*, 84(4):772-793.
- Duflo, E. 2001. "Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence From an Unusual Policy Experiment", *American Economic Review*, 91:795-813.
- Chay, Kenneth, Douglas Almond and Michael Greenstone. Forthcoming. *American Economic Review*, "The Civil Rights Act of 1964, hospital desegregation and Black infant mortality in the South and Mississippi".
- Abadie, Alberto, Alexis Diamond and Jens Hainmueller, Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program, NBER working paper, no. 12831, 2007.
- Athey, Susan and Guido Imbens. Changes in changes (Geert, which paper?)

### *Matching and unconfounded assignment*

#### *Methods*

- Abadie, Alberto and Guido Imbens, Matching on the Estimated Propensity Score, working paper, 2009.
- Abadie, Alberto and Guido Imbens, A Martingale Representation for Matching Estimators, working paper, 2009.
- Imbens, Guido. 2004. "Nonparametric estimation of average treatment effects under exogeneity", *Review of Economics and Statistics*, 86(1):4-29.
- Crumb, Richard, Guido Imbens, Joseph Hotz, Oscar Mitnik, "Dealing with Limited Overlap in Estimation of Average Treatment Effects," *Biometrika*, Vol 96, 2008, 187-199
- Heckman, James, Hideo Ichimura and Petra Todd. 1997. "Matching as an econometric evaluation estimator: Evidence from evaluating a job training program", *Review of Economic Studies*, 64(4):605-654.

Hahn, Jinyong and Geert Ridder .2010. “The Asymptotic Variance of Semiparametric Estimators with Generated Regressors”, Working Paper.

Hirano, Keisuke , Guido Imbens and Geert Ridder. 2003. “Efficient estimation of average treatment effects using the estimated propensity score”, *Econometrica*, 71(4):1161-1189.

Rosenbaum, Paul, and Don Rubin. 1983. “The Central Role of the Propensity Score in Observational Studies for Causal effects”, *Biometrika*, 70, pp. 41-55.

Angrist, Joshua and Jinyong Hahn, 2004. "When to Control for Covariates? Panel Asymptotics for Estimates of Treatment Effects," *Review of Economics and Statistics*, 86, 58-72.

Dehejia, Rajeev and Sadek Wahba. 2002. “Propensity score matching methods for nonexperimental causal studies”, *Review of Economics and Statistics*, 84(1):151-161.

### *Applications*

Dehejia, Rajeev and Sadek Wahba. 2002. “Causal effects in non-experimental studies: Re-evaluating the Evaluation of training studies” *Journal of the American Statistical Association*, 94(448):1053-1062.

Altonji, Joseph, Todd Elder and Christopher Taber. 2005. “Selection on observed and unobserved variables: Assessing the effectiveness of Catholic schools”, *Journal of Political Economy*, 113(1):151-184.

### *Diff-in-diff matching*

Abadie, Alberto, Semiparametric Difference-in-Differences Estimators, *Review of Economic Studies*, vol. 72(1), 1-19, 2005.

Smith, Jeffrey and Petra Todd. 2008. “Does matching overcome LaLonde’s critique of non-experimental estimators”, *Journal of Econometrics*, 125(1-2):305-353.

Newman, John, Menno Pradhan, Laura Rawlings, Geert Ridder, Ramiro Coa and Jose Luis Evia. 2002. “An impact evaluation of education, health and water supply investments by the Bolivian Social Investment Fund”, *World Bank Economic Review*, 16(2):241-274.

### *Regression discontinuity*

Hahn, Jinyong, Petra Todd, and Wilbert Van der Klaauw. 2001. “Identification and estimation of treatment effects with a regression-discontinuity design”, *Econometrica*, 69(1):201-209.

Imbens, Guido and Thomas Lemieux. 2008. "Regression discontinuity designs: A guide to practice", *Journal of Econometrics*, 142(2):615-635.

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Chay, Kenneth, Patrick Mc Ewan and Miguel Urquiola. 2005. "The central role of noise in evaluating interventions that use test scores to rank schools", *American Economic Review*, 95(4):1237-1258.

#### *Program evaluation and economic theory*

Chetty, Raj. 2008. "Sufficient statistics for welfare analysis: A bridge between structural and reduced form methods", NBER Working Paper 14399.

Chetty, Raj and Emmanuel Saez. 2008. "Optimal taxation and social insurance with endogenous private insurance", NBER Working Paper 14403.

Saez, Emmanuel. (2001). "Using Elasticities to Derive Optimal Income Tax Rates,," *Review of Economic Studies*, 68: 205-229.