

Rutgers University  
Department of Economics, Graduate Program  
**Economics 509: Applied Econometrics for Microeconomics**  
**Spring 2017**

Tuesday, 1:10-2:30, NJH 105 and Friday, 9:50-11:10 am, Scott Hall 201

Professor Hilary Sigman ([hsigman@rutgers.edu](mailto:hsigman@rutgers.edu)), 848-932-8667

Office Hours: NJ Hall 422, Tuesday and Friday 11:15-noon or by appointment.

**Course Objectives:** This course aims to help students become researchers in empirical microeconomics. It covers modern methods in econometrics for cross-sectional and panel data. It emphasizes the application of these methods in practice and strategies for designing and implementing research questions in light of the available econometric techniques. We will analyze scholarly research employing these methods from a wide variety of fields within microeconomics.

**Learning Goals:** Prepare students to conduct econometric research on topics in applied microeconomics; build ability to evaluate econometric methods in empirical papers; develop familiarity with the statistical programming language Stata and with other research resources.

**Learning Assessment:**

- **Stata exercises (15%).** A few exercises during the term. Students will have at least 10 days' notice before the assignments' due dates.
- **Paper discussion (15%).** Choose a paper (ideally a working paper) for which you will act as a discussant. Pick something in your area of interest; it has to have some econometric analysis, but not necessarily sophisticated methods. Please propose a paper for this purpose by February 3. We'll try to schedule you at a time appropriate for the methods in your paper. You will give a 10-20 minute presentation to the class (summarizing the paper and offering a critique of its methods) and submit your presentation file.
- **Empirical methods paper and presentation (35%).** Write a 7-10 page paper discussing the econometric issues for addressing some particular research question in empirical microeconomics. The paper should state the research question, identify data that could be used for analysis, describe two alternative econometric methods that might be applied, and discuss the advantages and disadvantages of these methods. This paper must be original and distinct to this course. You may work on a topic related to your second-year paper proposal or proposals for other courses, but please clear any overlap with me first. Your paper for this course should be different from those submitted to other courses and should focus on methodological issues.

A tentative title and abstract are due by March 10 (before spring break). You will present this work during the last few classes; the papers themselves are due at the end of the semester.

- **Final exam (35%).** Date to be arranged.

In addition, regular attendance in class is expected; up to 10% of credit may be deducted for markedly poor attendance.

**Website:** The course has a [Sakai](#) site that has presentations, assignments, and other course materials. Where possible, please use the Sakai Dropbox to submit assignments.

**Texts:**

- Jeffrey M. Wooldridge, *Econometric Analysis of Cross Section and Panel Data*, 2<sup>nd</sup> edition, MIT Press, 2010. (ISBN 978-0-262-23258-6).  
Note: This book is available for various printing/and online reading options through Rutgers Libraries' "ebrary" subscription: [link here](#).
- Joshua D. Angrist and Jörn-Steffen Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton U. Press, 2009. (ISBN 978-0-691-12035-5),

**Other recommended sources for the entire course:**

- A. Colin Cameron and Pravin Trivedi, *Microeconometrics Using Stata*, Stata Press, 2010. (ISBN 978-1-59718-073-3) (highly recommended: a summary of their text, but with commands provided)
- A. Colin Cameron and Pravin K. Trivedi, *Microeconometrics: Methods and Applications*, Cambridge U. Press, 2005. (ISBN 0-521-24805-9)
- Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*, Thomson-Southwestern (ISBN 0-324-11364-1) (an undergraduate text that might be useful as a reference; expensive; old editions are fine)
- Guido Imbens and Jeffrey Wooldridge "NBER Summer Institute 2007 Minicourse: What's New in Econometrics?" <http://www.nber.org/minicourse3.html>

**Readings:** For the most part, we will use textbooks for reading about methodology. Most of the articles are applications of the methods or at least methodological articles that emphasize applications. Links to the journal readings can be found through [our class page on RefShare](http://tinyurl.com/komq3u) (tinyurl.com/komq3u). You will need to be on campus or authenticated through the Rutgers Library proxy to click through for full text.

**Software:** We will do some exercises in Stata. Stata is available on networked computers in the department and through apps.rutgers.edu. If you are a Rutgers employee, you may also be able to download it for free from the [RU Software Portal](#).

**Empirical Microeconomics Workshop:** Friday, 2-3:30 pm, Simon Library. Attending this workshop is strongly recommended. Nothing will help you develop as an empirical researcher as much as participating in a discussion of current research. The schedule is available under the Workshops link on the Economics Department website.

**Academic integrity:** Students must follow the [Rutgers Academic Integrity Policy](#). In particular, students must properly:

- acknowledge and cite all use of the ideas, results, or words of others, and
- recognize all contributors to a given piece of work.

Your words must be your own. Direct quotation is infrequent in economics scholarship; however, if you do use any direct quotation, it must be in quotation marks with its source properly cited. A passage is still plagiarized even if you change some of the words.

If you have questions about proper citation or other matters, ask those questions before submitting work. Ignorance is not a defense. All violations of the policy will be referred to the proper authorities and may cause students to fall out of good standing or be dismissed from the program.

**Course outline and readings**  
**Rutgers Economics 509: Applied Econometrics for Microeconomics**  
**Spring 2017, Prof. Sigman**

**I. Research design**

Angrist and Pischke (A&P), chapters 1 and 2

Wooldridge, chapter 2

Heckman, J.J. 2000. Causal parameters and policy analysis in economics: a twentieth century retrospective, *Quarterly Journal of Economics*, 115(1): 45-97 (see especially pp. 84-86 in response to A&P)

Chetty, R. 2009. Sufficient statistics for welfare analysis: a bridge between structural and reduced-form methods, *Annual Review of Economics*, vol. 1, no. 1.

**Application:** Olmstead, S.M. 2009. Reduced-form versus structural models of water demand under nonlinear prices, *Journal of Business Economics and Statistics* 27(1): 84-94.

**II. Some topics in linear models**

Wooldridge, ch 4

Angrist and Pischke, ch 3 (to p. 68)

**a. Choice of functional form**

Wooldridge, *Introductory Econometrics*, Sections 6.2, 6.4 and appendix A.4

Wooldridge, pp. 137-8

**b. Dummy variables**

Angrist and Pischke, pp. 48-51

**c. Omitted variable bias and proxy variables**

Wooldridge, pp. 65-72

**III. Issues with standard errors**

**a. Delta method**

**b. Clustered errors**

Wooldridge pp. 863-66

Angrist and Pischke, pp. 308-323

Wooldridge, NBER Minicourse, Lecture 8

Moulton, B. R. 1990. An illustration of a pitfall in estimating the effects of aggregate variables on micro units, *Review of Economics and Statistics* 72: 334-38

**Application:** Angrist and Lavy. 2009. The effect of high stakes high school achievement awards: evidence from a school-centered randomized trial, *American Economic Review* 99: 877-908.

### c. Bootstrapping

Cameron and Trivedi, *Microeconometrics Using Stata*, Ch. 13

Angrist and Pischke, pp. 300-308

Brownstone, D. and R. Valletta. 2001. The bootstrap and multiple imputations: Harnessing Increased computing power for improved statistical tests. *Journal of Economic Perspectives* 15(4): 129-41.

**Application:** Steckel, R.H. and C. M. Moehling. 2001. Rising inequality: Trends in the distribution of wealth in industrializing New England. *Journal of Economic History* 61: 160-83 (<http://www.jstor.org/stable/2697859>)

## IV. Panel data models

Wooldridge, ch 10 and pp. 866-70 (comparison with clustering)

Wooldridge, NBER Minicourse Lecture 2 (2 parts)

Angrist and Pischke, ch 5

**Application:** Garces, E., Thomas, D. and J. Currie. 2002. Longer-term effects of Head Start. *American Economic Review* 92.

## V. Difference in differences

Wooldridge, pp. 146-151

Bertrand, M. , E. Duflo and S. Mullainathan. 2004. How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics* 119, (1) (February): 249-75.

Cameron, A. C., J.B. Gelbach and D. L. Miller. 2008. Bootstrap-based improvements for inference with clustered errors. *Review of Economics and Statistics* 90(3): 414-27.

**Applications:** Card, D. and A.B. 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

## VI. Regression Discontinuity

Wooldridge, pp. 954-59

Angrist and Pischke, ch 6

Imbens and Lemieux, Regression discontinuity designs: a guide to practice, NBER Technical Working Paper 337, <http://www.nber.org/papers/t0337>

**Application:** Lee, D.S. 2008. Randomized experiments for non-random selection in US House elections. *Journal of Econometrics*, 142.

## VII. Instrumental variables and systems of equations

### a. Single equation IV

Wooldridge, pp. 89-112

Angrist and Pischke, ch 4

**Application:** Chay, K. and M. Greenstone. 2005. Does air quality matter? Evidence from the housing market, *Journal of Political Economy* 113: 376-424

### b. Weak instruments

Bound, J., D.A. Jaeger, and R. Baker. 1995. Problems with instrumental variables estimation when the correlation between the instruments and the endogenous explanatory variables is weak. *Journal of the American Statistical Association*, 90, 443–50.

Stock, J.H., et al. 2002. A survey of weak instruments and weak identification in generalized method of moments. *Journal of Business & Economic Statistics* 20(4): 518-28.

### c. Heterogenous treatment effects and IV

Angrist and Pischke, pp. 151-161

**Application:** Ebenstein, Avraham. 2009. "When Is the Local Average Treatment Close to the Average? Evidence from Fertility and Labor Supply." *The Journal of Human Resources* 44 (4): 955–75.

### d. Dynamic panel models

Wooldridge, pp. 371-4

### e. Systems of equations

Wooldridge, Ch 9

## VIII. Measurement error

Wooldridge, pp. 76-82 and pp. 112-114

**Application:** Goolsbee, A. 2000. The importance of measurement error in the cost of capital, *National Tax Journal* 53(2): 215-28

## IX. Bivariate choice models

Wooldridge 561-582, 608-625

## X. Tobit and selection models

### a. Two-part latent index models

Wooldridge, pp. 667-677, 690-694

Angrist and Pischke, pp. 94-107

### b. Sample selection

Wooldridge, pp. 777-808

Vella, F. 1998. Estimating models with sample selection bias: a survey. *The Journal of Human Resources*, 33 (1), 127-69

### c. Attrition

Wooldridge, pp. 827-835

Hausman, J.A. and D.A. Wise, 1979. Attrition Bias in Experimental and Panel Data: The Gary Income Maintenance Experiment, *Econometrica* 47(2): 455-473

**Application:** Seru, Shumway, and Stoffman. 2010. Learning by trading, *The Review of Financial Studies* 23(2): 705-739.

### d. Control function approaches

**Application:** Levinsohn, J. and A. Petrin, A. 2003. Estimating production functions using inputs to control for unobservables, *Review of Economic Studies*, vol. 70, no. 2, pp. 317.

Petrin, A., Poi, B.P. and J. Levinsohn. 2004. Production function estimation in Stata using inputs to control for unobservables, *Stata Journal*, vol. 4, no. 2, pp. 113-123.

## XI. Multinomial models

### a. Ordered and unordered models

Wooldridge, ch 16

**Applications:** Hausman, Lo, MacKinlay. 1992. An ordered probit analysis of transaction stock prices. *Journal of Financial Economics* 31(3), 319-79

Goldberg, P.K. 1995. Product Differentiation and Oligopoly in International Markets: The Case of the U.S. Automobile Industry. *Econometrica* 63, 891-951.

### b. Random coefficients logit

Nevo, A. 2000. A practitioner's guide to estimation of random-coefficients logit models of demand, *Journal of Economics & Management Strategy*, 9( 4), 513-48

**Application:** Berry, S., J. Levinsohn and A. Pakes. 1995. Automobile prices in market equilibrium, *Econometrica*, Vol. 63 (4), 841-890

## XII. Count data and fractional response models

Wooldridge, chap 18, especially pp. 723-739, 748-753, 755-764

Winklemann and Zimmermann. 1995. Recent Developments in Count Data Modelling: Theory and Application, *Journal of Economic Surveys* 9(1): 1-24

**Applications:** Hausman, J., B. H. Hall, Z. Griliches. 1984. Econometric models for count data with an application to the patents-R & D relationship, *Econometrica*, 52 (4) 909-938

Papke, L.E. and J.M. Wooldridge. 1996. Econometric methods for fractional response variables with an application to 401 (k) plan participation rates. *Journal of Applied Econometrics* 11(6): 619-632

## XIII. Duration models

Wooldridge, ch 22

Kiefer, N.M. 1988. Economic duration data and hazard functions, *Journal of Economic Literature* 26(2): 646-679

**Application:** Meyer, B. D. 1990. Unemployment insurance and unemployment spells, *Econometrica* 58( 4): 757-782.

## XIV. Quantile regression

Wooldridge, section 12.10

Wooldridge, NBER Minicourse Lecture 14

Angrist and Pischke, ch 7



**Applications:** Buchinsky, M. 1994. Changes in the U.S. wage structure 1963-1987: Application of quantile regression. *Econometrica* 62(2): 405-58

Yasar, M. and C.J. Morrison Paul. 2007. International linkages and productivity at the plant level: Foreign direct investment, exports, imports and licensing, *Journal of International Economics* 71: 373-388

#### **XV. Matching and propensity score methods**

Wooldridge, pp. 934-936

Imbens, G.W. 2014. Matching Methods in Practice: Three Examples. NBER working paper.  
<http://papers.nber.org/papers/W19959>

**Application:** Liu and Lynch, L. 2011. Do agricultural preservation programs affect farmland conversion? Evidence from a propensity score matching estimator, *Land Economics*.

#### **XVI. Spatial econometrics (if time permits)**

Conley, T. G. 2008. [Spatial econometrics](#). *The New Palgrave Dictionary of Economics*. Second Edition. Eds. Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan, 2008.

**Application:** Albers, Ando and Chen. 2008. Spatial-econometric analysis of attraction and repulsion of private conservation by public reserves, *J. Environmental Econ & Management*