

Rutgers University
Department of Economics
Economics 609: Applied Econometrics for Microeconomics
Fall 2025

Class: Monday/Wednesday 2-3:20 pm, Scott Hall 203

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Office Hours: 1 -2 pm on Wednesdays or by appointment

Course objectives:

This course aims to help students become researchers in empirical microeconomics. It covers modern econometrics methods for cross-sectional and panel data. Topics include difference-in-difference, regression discontinuity, matching methods, and instrumental variable approaches and models for discrete choice, sample selection, and count data. The course emphasizes applications of these methods in practical research contexts and considers examples of research employing these methods from a variety of fields within microeconomics.

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

Learning assessment:

- **Stata exercises.** Submit code and discussion of your results on Canvas before class.
- **Midterm and final exam.** Dates to be arranged. Midterm in very late October or early November. Final after classes end.
- **For PhD students: Paper discussion.** Choose a paper (ideally, a working paper) for which you will act as a discussant. Pick something in your area of interest; it must have some econometric analysis, but not necessarily sophisticated methods. Please propose a paper for this purpose by September 15. I will try to schedule you at a time appropriate for the methods in your paper. You will give a 10-15 minute presentation to the class (summarizing the paper and offering a critique of its methods) and submit your presentation file.

Grading weights for PhD students: Stata exercises (10%), paper discussion (20%), midterm (25%), final (45%).

Grading weights for MA students: Stata exercises (15%), midterm (35%), final (50%).

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 [Canvas](#) site. Materials will be organized into weekly modules as much as possible. The materials on the website are for your personal use only. You may not repost them to other sites.

Required texts:

Two required texts are available as e-books from the RU Library:

- Jeffrey M. Wooldridge, *Econometric Analysis of Cross Section and Panel Data*, 2nd edition, MIT Press, 2010. (ISBN 978-0-262-23258-6).

- 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, Second Edition*. Stata Press, 2022. (ISBN 978-1-59718-359-8) 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. An undergraduate text that might be useful as a reference; expensive; old editions are fine.

Readings: The textbooks can serve as background for methodology and more rigorous presentations than class discussions. In addition to these texts, some articles will be assigned. Most of the articles are applications or at least methodological articles that emphasize applications. Links to the journal readings can be found through Canvas.

Software: We will do some exercises in Stata. Stata is available to students through a university license (<https://software.rutgers.edu/product/3886>).

Empirical Microeconomics Workshop: Fridays, 1:30 pm. Attending this workshop is strongly recommended and will help prepare you to become an empirical researcher. The schedule is available under the Workshops link on the Economics Department website.

Academic integrity:

Students must follow the [Rutgers Academic Integrity Policy](#). All violations of the policy will be referred to the proper authorities. Among other obligations, students must properly:

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

Course assignments must be completed on your own without use of another student's code or any solutions you may find on the web.

Use of AI: The Stata exercises are designed to help you learn to code in Stata and interpret real econometric results in all their messiness. Using an AI will weaken this function. And any feedback that I provide to an AI-generated response will not help you assess your understanding or prepare you for the exams (not to mention wasting my time). Therefore, do NOT use AI in responding to the Stata exercises. Suspected AI responses may be substantially marked down.

Course outline and readings

Readings may be updated as class progresses. Dates are approximate.

I. Research design (9/3)

Angrist and Pischke (A&P), chapters 1 and 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 to contrast with A&P)

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. Topics in application of linear models

Angrist and Pischke, ch 3 (to p. 40)

a. Choice of functional form (9/8)

Wooldridge, pp. 15-18, 137-8

b. Dummy variables (9/10)

Angrist and Pischke, pp. 48-51

c. Omitted variable bias and proxy variables (9/15)

Wooldridge, pp. 65-72

III. Issues with standard errors

a. Delta method (9/17)

Wooldridge, pp. 45-47

b. Clustered errors (9/17)

Wooldridge pp. 863-66

Angrist and Pischke, pp. 308-323

Abadie, A, S. Athey, G.W. Imbens & J. Wooldridge. 2023. "When Should You Adjust Standard Errors for Clustering?" *Quarterly Journal of Economics*, 138(1), 1 – 35.

c. Bootstrapping (9/22)

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

Angrist and Pischke, pp. 300-308

IV. Panel data models (9/29)

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

Angrist and Pischke, ch 5

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

V. Difference in differences and event study models (10/1;10/6)

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.

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 (10/8; 10/13)

Wooldridge, pp. 954-59

Angrist and Pischke, ch 6

Cattaneo MD, Idrobo N, Titiunik R. *A Practical Introduction to Regression Discontinuity Designs* Cambridge University Press; 2020.

VII. Instrumental variables and systems of equations

a. Single equation IV (10/20)

Wooldridge, pp. 89-112

Angrist and Pischke, ch 4

b. Weak instruments (10/22)

Andrews, I., J. H. Stock, and L. Sun. 2019. "Weak Instruments in Instrumental Variables Regression: Theory and Practice," *Annual Review of Economics* 11:727–53. <https://doi.org/10.1146/annurev-economics-080218-025643>

c. Heterogeneous treatment effects and IV (10/25)

Angrist and Pischke, pp. 151-161

d. Dynamic panel models (10/25)

Wooldridge, pp. 371-4

e. Systems of equations (10/27)

Wooldridge, Ch 9

f. Measurement error (10/27)

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

VIII. Matching approaches

a. Matching models (11/3)

Wooldridge, pp. 934-936

Angrist and Pischke, pp. 69-91

Imbens, G.W. 2015. Matching Methods in Practice: Three Examples. *The Journal of Human Resources* 50(2):373-419.

b. Synthetic controls and synthetic DID (11/5, 11/10)

Abadie, A. 2021. Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects. *Journal of Economic Literature* 59(2): 391-425. doi: [10.1257/jel.20191450](https://doi.org/10.1257/jel.20191450)

Arkhangelsky et al. 2021. Synthetic Difference-in-Differences. *American Economic Review* 111(12): 4088–4118. doi: [10.1257/aer.20190159](https://doi.org/10.1257/aer.20190159)

IX. Quantile regression(11/12)

Wooldridge, section 12.10

Angrist and Pischke, ch 7

Firpo, S. N.M. Fortin, and T. Lemieux. 2009. Unconditional Quantile Regressions. *Econometrica*. 77(3):953-973. doi:10.3982/ECTA6822

X. Bivariate response models (11/17)

Wooldridge 561-582, 608-625

XI. Count data models (11/19)

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

Application: 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

XII. Discrete-continuous and selection models

a. Two-part latent index models (11/24)

Wooldridge, pp. 667-677, 690-694

Angrist and Pischke, pp. 94-107

b. Sample selection and attrition (12/1)

Wooldridge, pp. 777-808 (sample selection); pp. 827-835 (attrition)

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

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

XIII. Multinomial models

A. Ordered and unordered models (12/3)

Wooldridge, ch 16

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

B. Nested logit and Random coefficient logit (12/8)

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

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

XIV. Duration models (if time, 12/10)

Wooldridge, ch 22

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