This course covers empirical strategies for applied microeconometric research. Our agenda includes regression and matching, instrumental variables, differences-in-differences, regression discontinuity designs, standard errors, and the analysis of high-dimensional data sets, a.k.a. big data.

Course requirements and grading: Students are expected to do the readings and to show up (we take roll; ala carte participation is not appropriate). There are three graded problem sets, which must be submitted on time to be graded for credit. The atmosphere is informal, but we ask you to put electronic devices away when class is in session. We encourage questions and class discussion – we’ll be asking you questions too!

The course has no formal pre-requisites, but we assume our participants are comfortable with the tools of statistical inference. To ensure that all class participants are suitably equipped, we impose a brief qualifying exam, distributed in the first class and graded shortly thereafter. Auditors and listeners must also qualify.

Some classes begin with a peremptory pop quiz (PPQ) in which a randomly chosen student summarizes a paper from our reading list. Preparation for the PPQ is also a class requirement.

14.387 is graded pass/fail; 14.36 students may request a letter grade. Students in 14.387 are required to do an extended version of the third problem set, which includes a structured empirical project. 14.36 students are free to try this as well.

Angrist covers basic empirical tools in the first half. Chernozhukov takes the helm in the second half with a journey to the frontier of big data methods for causal inference. Empirical applications are prominent throughout.

We use the following texts:


Articles are posted on LMOD at 14.387 Class home.

**ANGRIST READINGS**

**I. REGRESSION RECAP**

*MM*, Chapters 1-2
*MHE*, Chapters 1-2 and 3.1-3.2
Bad control and measurement error

MM, 6.1-6.2; Appendix to Chapter 6

Limited dependent variables and marginal effects

*MHE*, Section 3.4.2

II. MATCHING AND TRAINING

Matching vs regression

*MHE*, Section 3.3.1


The propensity score

*MHE*, Sections 3.3.2-3.3.3

III. INSTRUMENTAL VARIABLES

2SLS with constant effects; the Wald estimator, grouped data

MM, Chapter 3
MHE, Section 4.1


Two-Sample IV and related estimators

MHE, Section 4.3


2SLS details

2SLS mistakes: MHE, Section 4.6.1
The bias of 2SLS: MHE, Section 4.6.4


**IV with heterogeneous potential outcomes**

*MHE*, Section 4.4


**Models with variable, continuous, and multiple treatments**

*MHE*, Section 4.5.3


**External Validity**


**Spec Tests Come LATEly**

*MHE*, Section 4.2.2


Angrist, Lavy and Schlosser on QQ, JOLE 2010 (see “External Validity” above)


**IV. REGRESSION-DISCONTINUITY DESIGNS**

*Basics, sharp and fuzzy*

*MM*, Chapter 4

*MHE*, Chapter 6


**Heaping**


2123.

Y. Dong, “Regression Discontinuity Applications with Rounding Errors in the Running Variable,”
F. Gerard, M. Rokkanen, and C. Rolfe, “Identification and Inference in Regression Discontinuity Designs

Nonpara-metrics

J. Hahn, P. Todd, and W. van der Klaauw, “Identification and Estimation of Treatment Effects with a
B. Frandsen, M. Frölich, and B. Melly, “Quantile Treatment Effects in the Regression Discontinuity
S. Calonico, M. Cattaneo, and R. Titiunik, “Robust Nonparametric Confidence Intervals for
Regression Discontinuity Designs,” Econometrica 82(6), 2014, 2295-2326.
S. Calonico, M. Cattaneo and R. Titiunik, “Optimal Data-Driven Regression Discontinuity Plots,”

Regression Kinks


Extrapolation

J. Angrist and M. Rokkanen, “Wanna Get Away? RD Identification Away from the Cutoff,” Journal of
the American Statistical Association, December 2015.
Y. Dong and A. Lewbel, "Identifying the effect of changing the policy threshold in regression
R. Maynard, K. Couch, C. Wing, and T. Cook, “Strengthening the Regression Discontinuity Design

V. NON-STANDARD STANDARD ERROR ISSUES

Review of large-sample theory

MHE, Section 3.1.3

G. Chamberlain, “Panel Data,” Chapter 22 in The Handbook of Econometrics, Volume II, Amsterdam:
North-Holland, 1983.
W.K. Newey and D. McFadden, "Large Sample Estimation an Hypothesis and Testing," Chapter 36 in
**Finite-sample and cluster-robust inference**

*MHE*, Chapter 8


**Permutation Inference**
