

# EKT 816: Econometrics

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Office Hours: ???

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## Course Description

This is a graduate course in econometrics. Our goal is to learn some basic techniques that economists use to establish causal claims. An immediate payoff is that you will be able to read and evaluate empirical research. You may also find these methods useful in your own work.

## Required Texts

## Class Schedule

Please read at least the prescribed readings before class, even if you find it hard to follow everything; it makes for a more productive discussion if you have figured out the easy stuff first.

You may find it helpful to pattern your notes on the readings after a referee report; Berk, Harvey, and Hirshleifer (2017) and Berk, Harvey, and Hirshleifer (2015) is a useful guide to the requirements of this important type of professional communication.

### Week 01, 02/04 - 02/08: Probability and Statistics Review

Distributions, expectations, quantiles. Laws of large numbers and the central limit theorem. Estimation: mean square error vs bias. Sufficient and ancillary statistics.

### Week 02, 02/11 - 02/15: Probability and Statistics Review (continued)

Consistency and precision in estimation. Weighting and sample design. Identification. Hypothesis testing: size vs power.

### Week 03, 02/18 - 02/22: Counterfactuals and Causal Inference

Potential outcomes notation. Randomization delivers the ATE; brief aside on SUTVA, peer effects and general equilibrium. Examples of causal claims. Internal and external validity, and the

value of understanding mechanisms. The importance of a clear research design. Another aside on partial identification and “structural estimation”. Prediction vs causation.

#### *Required Readings*

- Angrist and Krueger (1999)
- Heckman and Smith (1995); Card, DellaVigna, and Malmendier (2011); Aron-Dine, Einav, and Finkelstein (2012); Muralidharan and Niehaus (2017)
- Angrist and Pischke (2010); Keane (2010b); Keane (2010a)
- Goldberger (1972)
- Imbens and Wooldridge (2009)
- James J Heckman and Vytlacil (2007a)
- Heckman (2010)

#### *Optional Readings*

- Acemoglu (2010)
- Heckman (2008); Sims (2010);
- Deaton (2010); Imbens (2010)
- Manski (1995)
- Mullainathan and Spiess (2017)

### **Week 04, 02/25 - 03/01: Linear Regression**

Derivation of the OLS formula; Frisch-Waugh-Lovell theorem. Implications for interpreting regression output. Conditional expectations and best linear predictors. Typical violations of conditional independence: simultaneity, measurement error, self-selection. Applications: growth accounting and labor market discrimination.

#### *Required Readings*

- Meyer, Mok, and Sullivan (2015); Griliches (1986)
- Neal and Johnson (1996)
- Altonji and Blank (1999)
- Topel (1999); Barro (1999)
- Bazzi and Clemens (2013)

### **Week 05, 03/04 - 03/08: Matching and Inverse Probability Weighting**

Basic similarities between matching and regression: matching methods aim for unweighted averages of treatment-control differences, while regression weights by the variance of  $P(D = 1|X)$ . Applications to the evaluation of job training programs.

#### *Required Readings*

- Kline (2011); see also the slides on Kline’s website.
- Dehejia and Wahba (1999); Dehejia and Wahba (2002)
- Smith and Todd (2005); Dehejia (2005)
- Imbens (2015)
- Solon, Haider, and Wooldridge (2015)

#### *Optional Readings*

- LaLonde (1986); LaLonde (1995)
- Heckman, LaLonde, and Smith (1999)

### **Week 06, 03/11 - 03/15: Instrumental Variables with Homogenous Treatment Effects**

Just-identified IV; 2SLS and GMM. Identification and (asymptotic) inference. Applications to the effects of Catholic schooling, the effects of childbearing on labor supply, and the returns to education.

#### *Required Readings*

- Neal (1997); Altonji, Elder, and Taber (2005); Angrist (2001)
- Oster (2017)
- Angrist (1990); Angrist and Evans (1998)

#### *Optional Readings*

- Heckman, Lochner, and Todd (2006)
- Card (1999); Card (2001)

### **Week 07, 03/18 - 03/22: Weak Instruments; GMM; Selection Models (Part I)**

#### *Required Readings*

- Bound, Jaeger, and Baker (1995)
- Stock (2010)
- Andrews, Stock, and Sun (2018)
- Eisenhauer, Heckman, and Vytlačil (2015)

### **Week 08, 03/25 - 03/29: Selection Models (Part II); Marginal Treatment Effects, LATE, and “Monotonicity”**

#### *Required Readings*

- Heckman, Urzua, and Vytlačil (2006)
- James J Heckman and Vytlačil (2007b)
- Kline and Walters (2019)

#### *Optional Readings*

- Chyn (2018)
- Mueller-Smith (2015)
- Arnold, Dobbie, and Yang (2018)

### **Week 09, 04/01 - 04/05: Applications; MTEs and LATE in Practice**

#### *Required Readings*

- Cornelissen et al. (2016)
- Wooldridge (2015)

*Optional Readings*

- Bazzi (2017)
- Lull (2018)
- Cornelissen et al. (2018)
- Amity and Davis (2012)
- Carneiro, Heckman, and Vytlačil (2011)

**Week 10, 04/08 - 04/12: Synthetic Panels and Diff-in-Diff***Required Readings*

- Garthwaite, Gross, and Notowidigdo (2014)
- Kearney and Levine (2015); Jaeger and Joyce (2018); Kahn-Lang and Lang (2018)
- Goodman-Bacon (2018)
- Cameron and Miller (2015)
- Abadie et al. (2017)

*Optional Readings*

- Hornbeck (2010); Hornbeck and Naidu (2014)
- Malkova (2018)
- Duflo (2001)
- Cunningham and Shah (2018)
- Muralidharan and Prakash (2017)

**Week 11, 04/15 - 04/19: Individual-Level Panel Data (Part I)***Required Readings*

- Ashenfelter and Card (1985)
- MaCurdy (1981)
- Jacobson, LaLonde, and Sullivan (1993)
- Griliches and Hausman (1986)

*Optional Readings*

- Diamond, McQuade, and Qian (2018)
- MaCurdy (2007)
- Topel (1991); Acemoglu and Pischke (1999)

**Week 12, 04/22 - 04/26: Individual-Level Panel Data, Part II - Mover Designs***Required Readings*

- Finkelstein, Gentzkow, and Williams (2016); Finkelstein, Gentzkow, and Williams (2018)
- Hull (2018)

*Optional Readings*

- Abowd, Kramarz, and Margolis (1999); Borovičková and Shimer (2017); Song et al. (2018)
- Heckman and Pinto (2018)

## Week 13, 04/29 - 05/03: Individual-Level Panel Data, Part III - Event Studies

### Required Readings

- Kleven, Landais, and Sogaard (2018)
- Abraham and Sun (2018)
- Borusyak and Jaravel (2016)
- Schulhofer-Wohl (2018)

### Optional Readings

- Allcott et al. (2018)
- Lagakos et al. (2018b); Lagakos et al. (2018a); Hendricks (2002); Hendricks and Schoellman (2018)
- Fama et al. (1969)
- Atkin (2016)
- Atkin, Faber, and Gonzalez-Navarro (2018)

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