

**Causal Inference with Applications to the Economics of Innovation
Tel Aviv University (December 2018-January 2019)**

Mini-course Syllabus

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Office hour: by appointment

Course outline: In this course we study econometric techniques for estimating causal relationships and applications of these methods in the economics of innovation. Econometric topics covered include differences in differences, matching methods, instrumental variables to estimate local and marginal treatment effects, and regression discontinuity design. We will study empirical articles that apply these methods to innovation topics such as patent rights and R&D incentives, patent rights and cumulative innovation, and government support of innovation.

Teaching

Lectures: There will be six 90-minute sessions over a period of four weeks. We will cover econometric methods and one or two assigned empirical papers that use the technique. You are expected to contribute to the discussion and, to this end, you should definitely read the assigned articles (identified with a single asterisk) **before** the lecture. The final exam will cover both techniques and applications that we cover in lecture.

My office hour is designed for you to use to clarify any questions about the technical material or the assigned papers, but you can also discuss any research ideas that you have or are working on!

Class Organisation:

In addition to a 2-hour final examination after the course, each student will be required to prepare "referee reports" for any TWO of the four papers marked by **two stars**. The choice is yours. These reports will be due by 30 January 2019 (about two weeks after the final exam) and will count for a total of 40% of the final grade (the final exam counts for 60%). The comments should be maximum of 4 single-spaced pages (the idea is to distill the paper to its essential elements) and should address the following points:

- Why the paper is important to you (or why not)
- Brief description of the theoretical model (if there is one) and any empirical predictions it generates, the empirical specification used and the identification strategy

- Key empirical findings
- Critical assessment of the main strengths and/or weaknesses of the paper

General Reading

Angrist, Josh and Steve Pischke (2009) *Mostly Harmless Econometrics* (MHE)
Princeton University Press (strongly recommended textbook)

Readings with **one star** are required for lectures. Articles with **two stars** are the ones from which you will choose to do referee reports.

Lecture 1: Matching Methods and Difference-in-Differences

Angrist and Pischke (MHE), Chapters 1-3 and Chapter 5 pp. 221-246

*Moser, Petra (2012), "Compulsory Licensing: Evidence from the Trading with the Enemy Act" *American Economic Review*, 102(1): 396-427

**Azoulay, Pierre, Joshua Graff Zivin and Jialan Wang (2010), "Superstar Extinction," *Quarterly Journal of Economics*, 125 (2): 549-589

**Furman, Jeffrey and Scott Stern (2011), "Climbing atop the Shoulders of Giants: The Impact of Institutions on Cumulative Research," *American Economic Review*, 101: 1933-1963

Lecture 2: Instrumental Variables: Local Average Treatment Effect (LATE)

Angrist and Pischke (MHE), Chapter 4, pp. 113-161

Lecture 3: Marginal Treatment Effect (MTE)

*Carneiro, Pedro, James Heckman and Edward Vylacil, "Estimating Marginal Returns to Education," *American Economic Review*, 101(6): 2754-2759 and 2762-2768

**Galasso, Alberto, Mark Schankerman and Carlos Serrano, "Trading and Enforcing Patents Rights," *RAND Journal of Economics* (2013), 44: 275-312

Lecture 4: Regression Discontinuity Design

Angrist and Pischke (MHE), Chapter 6, pp.251-269

*Howell, Sabrina, "Financing Innovation: Evidence from R&D Grants," *American Economic Review* (2017), 107(4): 1136-1164

Lecture 5: Do Patent Rights Provide an Innovation Incentive?

*Budish, Eric, Benjamin Roin and Heidi Williams, "Do Firms Underinvest in Long-Term Research? Evidence from Cancer Clinical Trials," *American Economic Review* (2014)

*Galasso, Alberto and Mark Schankerman, "Patents Rights, Innovation and Firm Exit," *RAND Journal of Economics* (2018)

**Sampat, Baven and Heidi Williams (2018), "How Do Patents Affect Follow-On Innovation? Evidence from the Human Genome," *American Economic Review*

Lecture 6: Do Patent Rights Block Cumulative Innovation?

*Williams, Heidi (2013), "Intellectual Property Rights and Innovation: Evidence from the Human Genome," *Journal of Political Economy*, 121: 1-27

*Alberto Galasso and Mark Schankerman (2015), "Patents and Cumulative Innovation: Causal Evidence from the Courts," *Quarterly Journal of Economics*, 130(1): 317-369