

New Developments in Causal Inference

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Lecturer

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Aim & Scope

Causal inference has become the predominant toolbox in empirical research. Quasi-experimental methods such as difference-in-differences, instrumental variables or regression discontinuity are popular because they are intuitive and allow for the estimation of causal effects in many settings. Over the last couple of years, an active community of econometricians have added new methods to the toolbox and refined old ones. The goal of this course is to provide an overview of the most recent developments in these methods. On each course day we will have 4 lectures of 1.5 hours. Day 1 will cover the basic techniques of causal inference, as well as matching and duration models. Day 2 will cover refinements to the basic techniques such as marginal treatment effects, regression kink designs or bounding. Each technique will be explained based on empirical examples.

Reading

We will mainly discuss recent papers. I will provide a reading list closer to the time. For background reading, I recommend the following textbooks:

[MHE] Angrist, Joshua and Pischke, Jorn-Steffen, (2009), *Mostly Harmless Econometrics: An Empiricist's Companion*, 1 ed., Princeton University Press.

[MM] Angrist, Joshua and Pischke, Jorn-Steffen, (2014), *Mastering 'Metrics: The Path from Cause to Effect*, 1 ed., Princeton University Press.

[MT] Cunningham, Scott (2018), *Causal Inference: the Mixtape*, free e-book, http://scunning.com/cunningham_mixtape.pdf

MHE covers the basic methods in greater detail. MM is an introductory text based on examples. The Mixtape is easily accessible and covers the broadest range of techniques.

Day 1

Lecture 1: Research Design — New Insights

- Research designs based on Directed Acyclical Graphs
- Common pitfalls in Research Design

Main papers discussed: Fryer (2019), Gelbach (2016), Knox *et al.* (2019)

Additional references Bellemare (2014), Elsner & Ispording (2017), Hünermund (2019), Levitt & Syverson (2008), Pearl & Mackenzie (2018), Pei *et al.* (2019)

Lecture 2: Matching, Instrumental Variables

- Introduction to matching
- Introduction to instrumental variables (IV)

Main papers discussed: Angrist & Evans (1998), Becker & Egger (2013), Dehejia & Wahba (1999), Dell & Querubin (2018), Elsner & Wozny (2018), Imbens (2015), Jäger & Heining (2019)

Additional references Angrist (1998), Athey *et al.* (2018a), Dahl *et al.* (2014), Ho *et al.* (2007), Pearl & Mackenzie (2018), LaLonde (1986)

Lecture 3: Fixed Effects and Difference-in-Differences

- Fixed effect regressions and decompositions
- Introduction to difference-in-differences (DiD)

Main papers discussed: Abowd *et al.* (1999), Duflo (2001), Autor (2003), Card & Krueger (1994), Card & Krueger (2000), Card *et al.* (2013), Carrell & Hoekstra (2010), Gibbons *et al.* (2019), Miller *et al.* (2019)

Additional references Finkelstein *et al.* (2016), Thiemann (2017)

Lecture 4: Synthetic Controls, Duration Models, Bunching

Main papers discussed: Abadie & Gardeazabal (2003), Abadie *et al.* (2010), Best & Kleven (2018), Born *et al.* (2019), Cameron & Trivedi (2005), Chetty *et al.* (2011), Chetty *et al.* (2013), Kiefer (1988), Kleven & Waseem (2013), Kleven (2016), Saez (2010)

Additional references Acemoglu *et al.* (2016), Borjas & Doran (2012), Carrillo *et al.* (2018), Fougère & Kamionka (2008), Garicano *et al.* (2016), Lacetera *et al.* (2012), Xu (2017)

Lecture 5: DiD part II, Quantile and Distribution Regressions

- Event studies
- Interpretation of DiD estimates; re-weighting
- A primer on matrix completion methods
- Quantile regressions
- Distribution regressions

Main papers discussed: Athey *et al.* (2018b), Autor (2003), Bertrand *et al.* (2004), Bitler *et al.* (2006), Chernozhukov *et al.* (2013), Dube (2019), Fuest *et al.* (2018), Goodman-Bacon (2018), Koenker & Hallock (2001), Lafortune *et al.* (2018)

Additional references Abadie *et al.* (2010), Arkhangelsky *et al.* (2019), Athey & Imbens (2018), Autor *et al.* (2017), Borusyak & Jaravel (2016), Cameron & Miller (2015), de Chaisemartin & D'Haultfoeuille (2019), Chernozhukov & Hansen (2005), Chernozhukov & Hansen (2013), Firpo *et al.* (2009), Imbens & Rubin (2015), Stevenson & Wolfers (2006)

Lecture 6: IV Part II, Regression Discontinuity and Kink Design

- Marginal Treatment Effects
- Shift-share and Examiner IVs
- Regression Discontinuity and Kink Designs

Main papers discussed: Angrist & Lavy (1999) Card *et al.* (2015) Carpenter & Dobkin (2009) Cornelissen *et al.* (2016), Cornelissen *et al.* (2018)

Additional references Calonico *et al.* (2014) Carneiro *et al.* (2011) Imbens & Kalyanaraman (2012) Ganong & Jäger (2018) Landais (2015) Lee & Lemieux (2010) Simonsen *et al.* (2016)

Lecture 7: Monte Carlo Simulations, Inference

Main papers discussed: Buchmueller *et al.* (2011) Elsner & Ispording (2017) Elsner & Wozny (2018) Kelly (2019)

Additional references C Adkins & N Gade (2012) Anderson (2008) Romano & Wolf (2005)

Lecture 8: Bounding

Main papers discussed: Altonji *et al.* (2005) Chevalier *et al.* (2018) Conley *et al.* (2012) De Haan (2017) Elsner & Wozny (2018) Oster (2017)

Additional references Manski (1989), Manski (1990)

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