Advanced Applied Econometrics (PhD)
44825, Course Syllabus

Graduate School of Management and Economics (GSME)
Sharif University of Technology

Fall 2024

Instructor: Naser Amanzadeh
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Class Time: Sundays and Tuesdays 11:00 - 12:30
Office Hours: by appointment.
TAs:

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1 Course Description

This course is designed for graduate students who are interested in the econometric methods used in empirical research. The primary goal is to provide an overview of various empirical methods, with a strong emphasis on practical implementation. While I will provide a set of lecture slides, reference books and background papers are available for those who wish to delve deeper into the specifics of the results.

This course focuses on conveying my understanding and intuition of empirical methods as they are employed by practitioners. Rather than delving deeply into formal details, we will concentrate on the intuitive framework that guides these methods. However, we will cover the necessary formal aspects to ensure a solid understanding.

With a particular emphasis on causal inference and practical application, this course aims to enhance your research design skills. By the end of the course, you will have been exposed to a wide range of empirical methods and will have at least a basic familiarity with their strengths and weaknesses. You will also know where to find additional resources if you choose to employ these methods in your own research. Furthermore, you will develop the ability to critically engage with research papers, focusing on the underlying framework and the "experiment" that drives their causal inferences.

2 Prerequisites

The course requires completion of Econometrics I for MSc Students as a prerequisite. Additionally, students should have an intermediate-level understanding of economic theory, statistics, and calculus.

3 Grading

Course grades will be based on the following parts.

1. Homework: 30%
2. Research Proposal 30%
3. Final exam: 30%
4. Class Participation: 10%

4 Text Books

Here is a partial list of interesting and useful books that will be referenced throughout the course. (* denotes more advanced texts):

- *[**AP**] Angrist, J. D. and Pischke, J. S. (2009). *Mostly harmless econometrics: An empiricist's companion.* Princeton University Press.
- *[**SC**] Cunningham, S. (2021). *Causal Inference.* Yale University Press.
- *[**CT**] Cameron, C.A. and Trivedi, P.K. (2005). *Microeconometrics: methods and applications.* Cambridge University Press.
- *[**WD**] Wooldridge, J. M. (2010). *Econometric Analysis of Cross Section and Panel Data.*, 2nd edition, The MIT Press.
- *[**BB**] Baltagi, B. H. (2021). *Econometric analysis of panel data*, Sixth Edition, Springer.
- Wooldridge, J. M. (2013). *Introductory Econometrics: A Modern Approach*, 5th edition.
- Angrist, J. D., & Pischke, J. S. (2014). *Mastering metrics: The path from cause to effect.* Princeton University Press.

5 Course Outline

1. Session 1: An Introduction to the Course
    - **AP** chapters 1.
2. Sessions 2-4: Regression Review
    - Econometrics I, Wooldridge 2013.
3. Session 5: Causal Inference
    - **AP** Chapter 2, and **SC** Chapter 5.
4. Sessions 6-7: Directed Acyclical Graphs (DAG)
    - **SC** chapter 4.
    - Carlos Cinelli, Andrew Forneyy, and Judea Pearl, April 15, 2021, "*A Crash Course in Good and Bad Controls*"
5. Sessions 8-9: Matching
    - **SC** chapter 6, and **AP** chapter 3.
6. Sessions 10-13: Panel Data Models
    - **CT** chapter 21, **AP** chapter 5.1, **SC** chapter 9, and **BB** chapter ...
7. Sessions 14-17: Difference in Differences (DiD) and Event Studies
    - **SC** chapter 10, and **AP** chapter 5.
    - New literature: https://asjadnaqvi.github.io/DiD/
    - Useful resources: https://www.jonathandroth.com/did-resources/
    - Roth, J., Sant'Anna, P. H., Bilinski, A., and Poe, J. (2023). What's trending in difference-in-differences? A synthesis of the recent econometrics literature. Journal of Econometrics, 235(2), 2218-2244.
8. Session 18-19: Case Studies with Synthetic Controls
    - Abadie, A. (2021). Using synthetic controls: Feasibility, data requirements, and methodological aspects. Journal of Economic Literature, 59(2), 391-425.
    - Abadie, Alberto, Alexis Diamond, and Jens Hainmueller. "Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program." Journal of the American Statistical Association, 2010, 105, 493–505.

9. Sessions 20-23: Instrumental Variable (IV)

    - **SC** chapter 8. **AP** chapter 4.
    - Goldsmith-Pinkham, P., Sorkin, I., and Swift, H. (2020). Bartik instruments: What, when, why, and how. American Economic Review, 110(8), 2586-2624.

10. Sessions 24-26: Regression Discontinuity (RD)

    - **SC** chapter 7. **AP** chapter 6.

11. Sessions 27-29: Randomized Control Trials (RCT)

    - Athey, S., and Imbens, G. W. (2017). The econometrics of randomized experiments. In Handbook of Economic Field Experiments (Vol. 1, pp. 73-140). North-Holland.

12. Sessions 30-32: Discrete Choice Models

    - **CT** chapters 14-15. **WD** chapter 15.

13. Sessions 33-34: Duration Models (If time permits)