Barcelona School of Economics

COURSE SYLLABUS | 12E016

Econometric Methods II

6 ECTS | TERM 2 | ELECTIVE

Professor

Prof. Albrecht Glitz

Prerequisites to Enroll

The participants of this course should be familiar with basic concepts of statistics and econometrics that are usually covered in an undergraduate degree in economics. They should also have followed the course Econometric Methods I in the first term of the year.

Overview and Objectives

This course builds on and further extends the econometric and statistical content studied in Econometric Methods I in the first term. The course deals with key econometric issues related to the use of micro data (individual, household or firm data) in empirical analysis. We will discuss the most important microeconometric methods and their applicability in contexts typically encountered by empirical researchers. The course combines both theoretical and empirical aspects. The theoretical part of the course will be complemented with practical exercises to be solved by the students using real data sets and Stata.

Course Outline

Part I – Panel Data and More

1. Panel Data Models (10 hours)
    a. Basic linear models
    b. Random/fixed effects models
    c. Dynamic models
    d. GMM methods in panel data

2. Discrete Choice Models (6 hours)
    a. Binary choice models
    b. Multinomial choice models
    c. Ordered response models

3. Tobit and Selection Models (4 hours)
    a. Censoring and Truncation
    b. Tobit model
    c. Sample selection models

Part II – Causal Inference

1. Randomized Controlled Trials (6 hours)

2. Regression Discontinuity Designs (4 hours)

3. Selection on Observables and Matching (4 hours)

4. (Dynamic) Difference-in-Differences (4 hours)

5. Synthetic Control Methods (2 hours)

Required Activities

The course will comprise 4 hours of lectures per week. In addition, the students will have to hand in problem sets that are discussed during the tutorials.

Evaluation

Exam (70%) and problem sets (30%).

Students need a minimum grade of 3 in the final exam to be able to average that grade with the grade from the problem sets.

Materials

Part I

The course is largely based on lecture notes that will be provided during the course. Additional references for the different topics are the following:

Panel Data Models

Arellano, M. (2003), Panel Data Econometrics, Oxford University Press.

Baltagi, B. H. (2005), Econometric Analysis of Panel Data, 3rd Edition, John Wiley. Cameron, A. C. and P. K. Trivedi (2005), Microeconometrics: Methods and Applications, Cambridge University Press, New York, Chapters 21- 23.

Hsiao, C. (2003), Analysis of Panel Data, Cambridge University Press.

Wooldridge, J. M. (2010), Econometric Analysis of Cross Section and Panel Data, 2nd Edition, MIT Press, Cambridge MA.

Discrete Choice Models & Tobit and Selection Models

Cameron, A. C. and P. K. Trivedi (2005), Microeconometrics: Methods and Applications, Cambridge University Press, New York, Chapters 14- 16.

Greene, W. (2005), Econometric Analysis, 5th edition, Prentice-Hall International, Chapter 23.

Maddala, G. S. (1989), Limited Dependent and Qualitative Variables in Econometrics, Cambridge University Press, New York.

Wooldridge, J. M. (2010), Econometric Analysis of Cross Section and Panel Data, 2nd Edition, MIT Press, Cambridge MA, Chapters 15-17 & 19.

Part II – Causal Inference

The course is largely based on lecture notes that will be provided during the course. A textbook that contains a good deal of the material we cover in class (and more) is

J. D. Angrist and J.-S. Pischke (2009). Mostly Harmless Econometrics, An Empiricist´s Companion, Princeton University Press.

Also good sources are:

Wooldridge, J. M. (2002), Econometric Analysis of Cross Section and Panel Data, MIT Press, Cambridge MA

Cameron, A. C. and P. K. Trivedi (2005), Microeconometrics: Methods and Applications, Cambridge University Press, New York.

None of the sources below is required reading, and the references are listed not so much for exam preparation but rather if you want to have a deeper appreciation of certain topics.

Estimation and Inference with Complex Survey Design and Non-iid Data

Bertrand, M., E. Duflo, and S. Mullainathan. (2004). How much should we trust differences-in differences estimates? Quarterly Journal of Economics 119, 249–276.

Brownstone and Valletta (2001), The Bootstrap and Multiple Imputations: Harnessing Increased Computing Power for Improved Statistical Tests. Journal of Economic Perspectives, 15(4), 129-141.

Cameron and Miller (2015). A Practitioner's Guide to Cluster-Robust Inference. Journal of Human Resources, 50(2), 317-352.

Deaton, Angus (1997). The Analysis of Household Surveys: A Micro-econometric Approach to Development Policy. Johns Hopkins University Press: Baltimore, Maryland. (Chs. 1 and 2)

Wooldridge, J. M. (2002), Econometric Analysis of Cross Section and Panel Data, MIT Press, Cambridge MA, Chapter 17.

Randomized Controlled Trials

Deaton, Angus (2010). "Instruments, Randomization, and Learning about Development", Journal of Economic Literature, 48 (2): 424-455.

Deaton, Angus and Nancy Cartwright, 2018, "Understanding and Misunderstanding Randomized Controlled Trials", Social Science & Medicine, Vol. 210: 2-21.

Duflo, E., R. Glennerster and M. Kremer, 2007, "Using Randomization in Development Economics Research: A Toolkit," in Handbook of Development Economics, 4, Chapter 61, 3895-3962.

Regression Discontinuity Designs

Cattaneo, M., Idrobo, N., and R. Titiunik, 2020, "A Practical Introduction to Regression Discontinuity Designs: Foundations", in Elements in Quantitative and Computational Methods for the Social Sciences, Cambridge: Cambridge University Press.

Cattaneo, M., Idrobo, N., and R. Titiunik, 2023, "A Practical Introduction to Regression Discontinuity Designs: Extensions", in Elements in Quantitative and Computational Methods for the Social Sciences, Cambridge: Cambridge University Press.

Imbens, G. and T. Lemieux, 2007, "Regression Discontinuity Designs: A Guide to Practice," Journal of Econometrics, 2007, 142(2): 615-635.

David S. Lee and T. Lemieux, 2009, "Regression Discontinuity Designs in Economics," Journal of Economic Literature, 48(2): 281-355.

Selection on Observables and Matching

Dehejia, R. and S. Wahba, (2002), "Propensity Score Matching Methods for Non-experimental Causal Studies," Review of Economics and Statistics 84 (1), 151-161.

Imbens, G. W., 2015, "Matching Methods in Practice: Three Examples," Journal of Human Resources, 50 (2): 373-419.

Oster E., 2019, "Unobservable Selection and Coefficient Stability: Theory and Evidence," Journal of Business and Economics Statistics, 37 (3): 187-204.

(Dynamic) Difference-in-Differences

Borusyak, K., X. Jaravel and J. Spiess, 2024, "Revisiting Event Study Designs: Robust and Efficient Estimation", Review of Economic Studies 91: 3253–3285.

Callaway, B. and P. H.C. Sant'Anna (2021), "Difference-in-Differences with Multiple Time Periods", Journal of Econometrics, Vol. 225: 200-230.

De Chaisemartin, C. and X. D'Haultfoeuille, 2020, "Two-Way Fixed Effects Estimators with Heterogeneous Treatment Effects", American Economic Review, 110 (9): 2964-2996.

Goodman-Bacon, A., 2021, "Difference-in-Differences with Variation in Treatment Timing", Journal of Econometrics, 225 (2): 254-277.

Roth, J., 2022, "Pre-test with Caution: Event-study Estimates After Testing for Parallel Trends", American Economic Review: Insights, Vol. 4 (3), 305-322.

Sun, L. and S. Abraham, 2021, "Estimating Dynamic Treatment Effects in Event Studies with Heterogeneous Treatment Effects", Journal of Econometrics, 225 (2): 175-199.

Synthetic Control Methods

Arkhangelsky, D., Athey, S., Hirshberg, D., Imbens, G. W. and S. Wager, 2021, "Synthetic Difference-in-Differences", American Economic Review, 111 (12): 4088-4118.

Abadie, A., 2021, "Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects," Journal of Economic Literature, 59 (2): 391-425.

Abadie, A., Diamond, A. and J. Hainmueller, 2010, Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program. Journal of the American Statistical Association, 105 (490): 493–505.

Abadie, A., Diamond, A. and J. Hainmueller, 2015, Comparative Politics and the Synthetic Control Method, American Journal of Political Science, Vol. 59 (2): 495-510.

Competencies

☒ Capacity of utilization of the theoretical instruments of the to analyze situations of coherent form.

☒ Ability to use the appropriate (statistical and numerical) techniques.

☒ Ability to make independent judgments and defend them dialectically.

☒ Acquire a solid knowledge base for the study of quantitative issues.

☒ Ability to recognize and know how to use the principles of econometrics and statistics.

☒ Ability to work with microeconomic analysis tools and their empirical and theoretical applications.

Learning Outcomes

☒ Students should get an overview of economic and financial theory.

☒ Students must be able to recognize theories and present arguments with precise examples.

☒ Students will acquire the technical tools that will allow them to perform the advanced analytics required in the second module as econometric methods.

☒ Students will know what the appropriate inference for each situation is.