

Outline of the Applied Economics and Econometrics Sequence at the EUI

Academic year: 2023-24

Courses and instructors

Compulsory Courses

Compulsory 1A: Pre-course on Probability and Statistics **Block I**

Cristina Lafuente Martinez (Cristina.Lafuente@eui.eu)

Compulsory 1B: Regression Analysis **Block I**

Andrea Ichino (andrea.ichino@eui.eu)

Compulsory 2: Econometric Models for Micro Data **Block II**

Fabrizia Mealli (fabrizia.mealli@eui.eu)

and Alessandro Tarozzi (alessandro.tarozzi@gmail.com or @eui.eu)

Compulsory 3a: Time Series Econometrics **Block III**

Jesus Bueren (jesus.bueren@eui.eu)

Compulsory 3b: Simulation-based Estimators **Block IV**

Russell Cooper (russellcoop@gmail.com)

Advanced Courses

Advanced 1: The Econometrics of Causality **Block I**

Fabrizia Mealli (fabrizia.mealli@eui.eu)

Advanced 2: Economic History: Policies, Development and Inequality in the Long Run
Block I

Felix Schaff (felix.schaff@eui.eu)

Advanced 3: Topics in the theory and practice of causal inference **Block II**

Fabrizia Mealli (fabrizia.mealli@eui.eu)

Advanced 4: Topics in Field Experiments and Measurement **Block III**

Sule Alan (sule.alan@eui.eu)

Advanced 5: Topics in Microeconometrics **Block III**

Alessandro Tarozzi (alessandro.tarozzi@gmail.com or @eui.eu)

Advanced 6: Recent Advances in Applied Micro-Econometrics for Causal Inference **Block
III**

Alessandro Tarozzi (alessandro.tarozzi@gmail.com or @eui.eu)

Advanced 7: Topics in Macroeconometrics **Block III**

Barbara Rossi (barbara.rossi@upf.edu)

Advanced 8: The Economics of Education **Block IV**

Ellen Greaves (ellen.greaves@eui.eu)

Compulsory 1A: Probability and Statistics

Cristina Lafuente Martinez (Cristina.Lafuente@eui.eu)

The main goal of this course is to review core concepts in probability theory and univariate and bivariate statistics. The pre-course will cover the building blocks of probability theory, moving to the study of random variables and their distributions (with a focus on the most important distributions for economists), basics of bivariate distributions, large sample theory and finish with an introduction to markov processes. All lectures will contain intuitive examples of basic concepts and practice problems.

There will be seven lectures and three exercise classes in this part.

Topics

Topic 1

Introduction. Set theory. Basic probability theory. Probability axioms. Joint, marginal and conditional probabilities.

Blitzstein and Hwang, chapters 1 and 2

Topic 2

Discrete random variables. Probability mass and cumulative distribution functions. Continuous Random Variables. Probability density functions. Important distributions: Normal, Poisson, Exponential.

Blitzstein and Hwang, chapters 3 and 5

Topic 3

Expected values. Moments and moment generating functions. Transformations of random variables.

Blitzstein and Hwang, chapters 4, 6 and 8

Topic 4

Multivariate random variables. Joint and marginal distributions. Conditional distributions and independence of random variables. Covariance and correlation. The distribution of order statistics. Bivariate and multivariate normal densities. Conditional normal densities. Bivariate transformations of random variables. Law of Iterated Expectations.

Blitzstein and Hwang, chapters 7 and 9

Topic 5

Large sample theory. Laws of large numbers. Central limit theorems. Markov Chains.

Blitzstein and Hwang, chapter 10 and 11

Exercise classes

There will be 3 exercise classes, one after topic 3, one after topic 5 and a final one covering problems from all topics.

Teaching material

- Joseph K. Blitzstein and Jessica Hwang. *Introduction to probability*. Chapman and Hall/CRC, Second Edition, 2019.
- Lecture notes by the instructor, which will highlight the parts of the textbook that would be relevant for the course.

Other reference books:

- George Casella and Roger L. Berger. *Statistical Inference*. Thomson, Second Edition, 2002.
- Richard J. Larsen and Morris L. Marx. *An introduction to mathematical statistics and its applications*. Prentice Hall, Fifth Edition, 2012.

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Compulsory 1B: Regression Analysis

Andrea Ichino (andrea.ichino@eui.eu)

The main goal of this Core course is to give an introduction to the basic tools that an econometrician needs: the most popular estimation methods; inference and hypothesis testing; asymptotics; simple and multiple regression; instrumental variables.

In addition to the lectures there will be six exercise classes. Examples and applications will be used to illustrate the theoretical content of the course.

Topics

Topic 1

Introduction: what is econometrics about; the tool-box of econometrics; the econometrics sequence at the EUI; Content of this course.

Estimation: Estimators and estimates; the Method of maximum Likelihood; the Method of Moments.

Larsen and Marx, chapter 5. Casella and Berger, chapter 7. Lecture notes.

Topic 2

Estimation: Finite sample properties of estimators; Unbiasedness, Efficiency, Sufficiency, Minimum variance estimators; The Cramer-Rao Lower Bound, Invariance.

Larsen and Marx, chapter 5. Casella and Berger, chapter 7 and chapter 5. Lecture notes.

Topic 3

Estimation: Asymptotic properties of estimators; Asymptotic Unbiasedness, Asymptotic Efficiency, Consistency; Asymptotic Normality

Basic asymptotics: concepts of convergence; Law of Large Numbers; Central Limit theorem; Continuous Mapping Theorem, Slutsky Theorem and Delta Method.

Larsen and Marx, chapter 5. Casella and Berger, chapter 7 and chapter 5. Lecture notes.

Topic 4

Simple regression: The Conditional Expectation Function; The Population Regression Function; The Sample Regression Function; OLS, Method of Moments and Maximum Likelihood estimation of a regression; Algebraic and geometric properties of the OLS-MM estimators.

Angrist and Pischke chapter 1, 2 and 3. Wooldridge part 1. Lecture notes.

Topic 5

Simple regression: Goodness of fit and the R-Squared; Statistical Properties of the OLS-MM estimator; The Gauss-Markov Theorem'.

Angrist and Pischke chapter 1, 2 and 3. Wooldridge part 1. Lecture notes.

Topic 6

Simple regression: Causality and Regression.

Angrist and Pischke chapter 1, 2 and 3. Lecture notes.

Topic 7

Multiple regression: The Conditional Independence Assumption; Interpretation of the partial Multiple Regression Coefficient; Multiple Regression in matrix notation; Omitted variable bias and inclusion of irrelevant regressors.

Angrist and Pischke chapter 1, 2 and 3. Wooldridge part 1. Lecture notes.

Topic 8

Multiple regression: The Gauss-Markov Theorem and Multiple Regression; “Partialling out” and the interpretation of coefficients; Good and bad habits concerning control variables;

Angrist and Pischke chapter 1, 2 and 3. Wooldridge part 1. Lecture notes.

Topic 9

Inference and Hypothesis testing: what is a statistical test and how it is constructed; The decision rule; Type I and type II errors; Power of a test.

Larsen and Marx, chapters 6 and 9. Casella and Berger, chapter 8. Lecture notes.

Topic 10

Inference and Hypothesis testing: finite sample and asymptotic tests in the context of a regression model.

Larsen and Marx, chapters 6 and 9. Casella and Berger, chapter 8. Lecture notes

Topic 11

Instrumental Variable estimation: The traditional interpretation and the Angrist-Imbens-Rubin interpretation of IV; Average Treatment Effect; Average Treatment Effect for the Treated; Local Average Treatment Effect.

Wooldridge (2009); Angrist and Pischke (2013). Lecture notes

Exercise classes: TBD

There will be 6 exercise classes.

Teaching material

- Richard J. Larsen and Morris L. Marx. *An introduction to mathematical statistics and its applications*. Prentice Hall, Fifth Edition, 2012.
- George Casella and Roger L. Berger. *Statistical Inference*. Thomson, Second Edition, 2002.
- Jeffrey Wooldridge, *Introductory Econometrics. A Modern Approach*. South Western Cengage Learning, 2009
- Joshua Angrist and Jorn-Steffen Pischke. *Mostly Harmless Econometrics. An Empiricist's Companion*. Princeton University Press, 2013.
- Lecture notes by the instructor.

Final exam and Grading

There will be two separate class room exams for Core 1A and Core 1B, but a single final grade based on:

- 20% of the Core 1A grade;
- 80% of the Core 1B grade;

The professors of each Core course will communicate in class the weights of the problems sets and of the final exam for the respective parts.

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Compulsory 2: Econometrics Models for Micro Data

Fabrizia Mealli (fabrizia.mealli@eui.eu)

and Alessandro Tarozzi (alessandro.tarozzi@eui.eu)

This course is intended to introduce students to some standard methods specifically designed for the analysis of micro-economic data. One half of the course (Mealli) covers methods for limited dependent variables, censoring, truncation, selection and duration data, applying ML and Bayesian estimation. Potential outcome framework to causality will also be introduced. Sampling and randomization designs and inference will be discussed as well missing data methods. The other half of the course (Tarozzi) covers methods for panel data. We discuss linear and binary response models for panel data. We also review method of moments and introduce generalized method of moments estimation.

Exercise classes

There will be some problem sets and exercise classes and one review class before the exam.

Teaching material

- Cameron and Trivedi, *Microeconometrics: Methods and Applications*, Cambridge University Press, 2005
- Joshua Angrist and Jorn-Steffen Pischke. *Mostly Harmless Econometrics. An Empiricist's Companion*. Princeton University Press, 2013.
- Jeffrey Wooldridge, *Introductory Econometrics. A Modern Approach*. South Western Cengage Learning, 2009
- Lecture notes by the instructors.

Final exam and Grading

- problem sets will count for 30% of the final grade;
- final exam will count for 70% of the final grade.

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Compulsory 3a: Time Series Econometrics

Jesus Bueren (jesus.bueren@eui.eu)

A ten-hour course introduces students to the analysis, modelling and estimation of stationary time series processes.

Topic 1

Basic Time Series concepts: Recap on difference equations, Stationarity, Ergodicity, ARMA processes.

Hamilton (Chapters 1, 3), Lecture notes.

Topic 2 *Maximum Likelihood Estimation:* Estimation of ARMA models using MLE. Statistical Inference. Likelihood Ratio test. Model selection criteria.

Hamilton (Chapter 5), Lecture notes.

Topic 3 *Multivariate VAR Models:* Stationarity, Conditional likelihood and OLS estimation, Granger Causality, Impulse responses, error bands, recursive VARs.

Hamilton (Chapter 11), Lecture notes.

Topic 4 *State-Space Representation and the Kalman Filter:* Representation, a recursive algorithm. *Hamilton (Chapter 13), Lecture notes.*

Exercise classes

There will be 3-4 exercise classes

Teaching material

- Hamilton, J. H. (1994), *Time Series Analysis*, Princeton University Press
- Slides notes by the instructor.

Final exam and Grading

There will be problems sets graded by TAs in classes (20%) and a final exam (80%).

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Compulsory 3b: Simulation-based Estimation

Russell Cooper(russellcoop@gmail.com)

This ten-hour course focuses on simulation based estimators. This will include simulated method of moments, indirect inference and the Generalized Method of Moments approach. The course is built around the book by Adda and Cooper. The lectures will be applications based, drawing on dynamic optimization problems for households, firms and the stochastic growth model. Here are key papers by topic. The full reading list is more substantial. All courses include Topics 1 and 2. Some years include the consumption component, Topic 3, while others include firm dynamics, Topic 4.

Topic 1

Tools

- Jérôme Adda and Russell Cooper, Dynamic Economics: Quantitative Methods and Applications, MIT Press, 2003. (AC), Chpt. 2-4
- Cooper, R “An Overview of Applied Dynamic Programming” February 2020

Topic 2

Stochastic Growth Model

- AC, Chpt. 5
- Altug, Sumru. “Time-to-build and aggregate fluctuations: some new evidence.” International Economic Review (1989): 889-920.
- Ingram, B. F., Kocherlakota, N. R., and Savin, N. E. (1994). Explaining business cycles: A multiple-shock approach. Journal of Monetary Economics, 34(3), 415-428.
- (E) Jordà, Ò. (2005). Estimation and inference of impulse responses by local projections. American economic review, 95(1), 161-182.
- King, Robert G., Charles I. Plosser, and Sergio T. Rebelo. “Production, growth and business cycles.” Journal of monetary Economics 21, no. 2/3 (1988): 196-232.
- Kydland, Finn E., and Edward C. Prescott. “Time to build and aggregate fluctuations.” Econometrica, (1982): 1345-1370.
- Krusell, Per, and Anthony A. Smith, Jr. “Income and wealth heterogeneity in the macroeconomy.” Journal of Political Economy 106.5 (1998): 867-896.
- (E) Smith, Anthony A. “Estimating nonlinear time-series models using simulated vector autoregressions.” Journal of Applied Econometrics 8.S1 (1993): S63-S84.

Topic 3a

Consumption

- AC, Chpt. 6
- Bonaparte, Yosef, Russell Cooper, and Guozhong Zhu. “Consumption smoothing and portfolio rebalancing: The effects of adjustment costs.” Journal of Monetary Economics 59, no. 8 (2012): 751-768.

- Carroll, Christopher D., Robert E. Hall, and Stephen P. Zeldes. “The buffer-stock theory of saving: Some macroeconomic evidence.” *Brookings papers on economic activity* 1992, no. 2 (1992): 61-156.
- Carroll, C. “Death to the Log-Linearized Consumption Euler Equation,” NBER Working Paper 6298, 1997.
- Cooper, Russell, and Guozhong Zhu. “Household finance over the life-cycle: What does education contribute?.” *Review of Economic Dynamics* 20 (2016): 63-89.
- Deaton, A. “Savings and Liquidity Constraints,” *Econometrica*, 59 (1991), 1121-42.
- Eichenbaum, M., Hansen, L. and K. Singleton, “A Time Series Analysis of Representative Agent Models of Consumption and Leisure Choice under Uncertainty,” *Quarterly Journal of Economics*, 103 (1988), 51-78.
- Gourinchas, P. and J. Parker, “Consumption over the Life Cycle”, *Econometrica*, 70 (2002), 47-89.
- Hall, R. “Stochastic Implications of the Life Cycle-Permanent Income Hypothesis: Theory and Evidence,” *Journal of Political Economy*, 86 (1978), 971-87.
- Hansen, L. “Proofs for Large Sample Properties of Generalized Method of Moments Estimators.” University of Chicago, March 2012. (M)
- Hansen, L. and K. Singleton, “Generalized Instrumental Variables Estimation of Nonlinear Rational Expectations Models,” *Econometrica*, 50 (1982), 1269-86.
- Newey, K. Whitney, “Generalized Method of Moments.” MIT October 2007 (M)
- Zeldes, S. “Consumption and Liquidity Constraints: An Empirical Investigation,” *Journal of Political Economy*, 97 (1989), 305-46.

Topic 3b

Durable Consumption

- AC, Chpt. 7
- Adda, J. and R. Cooper, “Balladurette and Juppette: A Discrete Approach,” *Journal of Political Economy*, August, 2000.
- Mankiw, N.G. “Hall’s Consumption Hypothesis and Durable Goods,” *Journal of Monetary Economics*, 10 (1982), 417-25.

Topic 4

Firm Dynamics

- AC, Chpt. 8
- Abel, A. and J. Eberly, “A Unified Model of Investment Under Uncertainty,” *American Economic Review*, 94 (1994), 1369-84.
- Bloom, N. “The Impact of Uncertainty Shocks,” *Econometrica*, 2009.
- Bloom, Nicholas, Max Floetotto, Nir Jaimovich, Itay Saporta-Eksten, and Stephen J. Terry. “Really uncertain business cycles.” *Econometrica* 86, no. 3 (2018): 1031-1065.

- Caballero, R. and E. Engel, “Explaining Investment Dynamics in U.S. Manufacturing: A Generalized (S,s) Approach”, *Econometrica*, 67 (1999), 783-826.
- Caballero, R., E. Engel and J. Haltiwanger, “Plant Level Adjustment and Aggregate Investment Dynamics,” *Brookings Papers on Economic Activity*, 2 (1995b), 1-39.
- Cooper, R. and J. Ejarque, “Financial Frictions and Investment: A Requiem in Q,” *Review of Economic Dynamics*, 6 (2003), 710-28.
- Cooper, R. and J. Haltiwanger, “On the Nature of Capital Adjustment Costs,” *Review of Economic Studies*, 73 (2006), 611-33.
- Khan, Aubhik, and Julia K. Thomas. “Idiosyncratic shocks and the role of nonconvexities in plant and aggregate investment dynamics.” *Econometrica* 76, no. 2 (2008): 395-436.
- Rust, John. “Optimal replacement of GMC bus engines: An empirical model of Harold Zurcher.” *Econometrica: Journal of the Econometric Society* (1987): 999-1033.
- Thomas, J. “Is Lumpy Investment Relevant for the Business Cycle?” *Journal of Political Economy* 110, no. 3 (2002): 508-534.

Homework, exams and grading

Over this course there will be three homework assignments. The way to learn this material is by using it, both in the homework assignments and beyond. The homework will be evaluated on a pass/fail basis. You are encouraged to work in a group, but you should submit answers independently. Your grade will be based entirely upon the exam.

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Advanced 1: The econometrics of causality

Fabrizia Mealli (fabrizia.mealli@unifi.it)

This course will feature 10 2-hour lectures.

1. Introduction to Causality and Causal Inference (1 lecture)
 - Setting up the problem: the potential outcome framework
 - The role of the assignment mechanism
 - Design and analysis of randomized experiments
 - Estimands and modes of inference: Fisher exact tests; Neyman frequentist perspective; Regression analysis; Bayesian model-based imputation
 - Examples
2. Introduction to observational studies under unconfoundedness (2 lectures)
 - The role of the propensity score
 - Designing observational studies: matching, weighting, trimming
 - Analysis of observational studies: stratification, weighting estimators, matching estimators, methods based on the outcome models and regression.
 - Methods combined: bias corrected estimators, doubly robust estimators
 - Sensitivity analysis
 - Enhancing causal inference with machine learning in high dimensional settings and heterogeneous effects
3. Instrumental variables (2-3 lectures)
 - Homogeneous vs heterogeneous causal effects
 - IV and RCT with noncompliance - revisited
 - Bayesian IV analysis: relaxing some of the assumptions
 - Point, partial, weak identification of causal effects
 - The role of covariates
4. Regression discontinuity designs (1-2 lectures)
 - The identification strategy: continuity vs local randomization
 - Sharp RDD
 - Fuzzy RDD and the local LATE interpretation of RDD
 - Graphical analysis, assessing identification assumptions
 - Bandwidth selection
 - Multiple thresholds, multiple forcing variables
 - Examples
5. Difference in difference, synthetic controls and beyond (2 lecture)
 - DID and extensions (e.g., CIC, Synthetic DID)
 - Lagged dependent variables
 - Synthetic controls and permutation inference
 - Some recent developments (e.g., Matrix Completion, Time Series)

Exercise classes

Three practical sessions on Causal Inference methods using R.

Teaching material

- Imbens G. W., Rubin D. B. (2015) Causal Inference for Statistics, Social, and Biomedical Sciences, Cambridge University Press
- Articles in journals.
- Lecture notes by the instructor.

Final exam and Grading

There will be three take-home assignments (simulation and real data exercises).

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Advanced 2: Economic History: Policies, Development and Inequality in the Long Run

Felix Schaff (felix.schaff@eui.eu)

Course description

Economic History is the application of the tools of economics to historical enquiry. This 10-hour course will start with an introduction to this discipline, and then survey the literature on five of its major topics:

1. “Great and Little Divergences” in Living Standards: Around the year 1500 Europe started to grow economically more rapidly compared to China (Great Divergence), after about 2000 years of Chinese economic superiority. Within Europe the North-West started to grow considerably faster than the rest (Little Divergence) at about the same time. These macro-divergences and their causes have been researched extensively by economic historians in the last 20 years. The insights will frame the rest of the course.
2. The Economic Consequences of the Black Death: In 1348 the Black Death epidemic killed about 50 percent of the European population. This was a major shock to the labour market and the institutional system. The economic consequences were profound and long-lasting: wage growth and technological innovation, but also the return of serfdom in some parts of Europe and a reshuffling of its economic geography.
3. The Protestant Reformation and Religiosity: The contrast between Catholicism and Protestantism continues to be one of the principal cultural dividing lines within Europe. However, the confessional split triggered by Martin Luther’s critique of the Old Church was not just an ideological shift, but also had profound consequences for the political economy in Europe. Moreover, the strength of religiosity might have had important consequences at the transition from the preindustrial to the industrial world.
4. Economic Inequality: Inequality is connected to the distribution of political power, has the potential to destabilise societies and can have profound effects on economic development. In Europe, the recorded historical peak was probably around the year 1914. But recent research by economic historians has shown that about three quarters of the inequality growth that led to this inequality maximum happened between the years 1500 and 1800. This part of the course will investigate these roots of inequality.
5. The Industrial Revolution: The period called the Industrial Revolution was the most rapid change in human living standards ever seen in history. It somewhat mysteriously started in Great Britain, and marked the transition from a “nasty, brutish and short” life (Thomas Hobbes) to modernity and prosperity. The explanations are wide-ranging, including exploitation during the colonial period, genetics, availability of coal, and inclusive political institutions.

Participants should have a solid working knowledge of applied econometrics (at the “Mostly Harmless Econometrics”-level), should be willing to read and to refresh their historical background knowledge.

Exercise classes

- No exercise classes.

Teaching material

Journal articles and other assigned readings, including (but not limited to) the following texts:

- Acemoglu, D., Johnson, S., Robinson, J.A., 2005. The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth. *American Economic Review* 95, 546–579.
- Alfani, G., 2021. Economic inequality in preindustrial times: Europe and beyond. *Journal of Economic Literature* 59, 3–44.
- Allen, R.C., 2001. The Great Divergence in European Wages and Prices from the Middle Ages to the First World War. *Explorations in Economic History* 38, 411–447.
- Belloc, M., Drago, F., Fochesato, M., Galbiati, R., 2022. Wealth Accumulation and Institutional Capture: the Rise of the Medici and Fall of the Florentine Republic. CEPR Press Discussion Paper No. 17456
- Cantoni, D., Dittmar, J., Yuchtman, N., 2018. Religious Competition and Reallocation: The Political Economy of Secularization in the Protestant Reformation. *Quarterly Journal of Economics* 133, 2037–2096.
- Diamond, J., 1999. *Guns, Germs and Steel: The Fate of Human Societies*. W.W. Norton & Co., New York.
- Kelly, M., Mokyr, J., O Grada, C., 2023. The Mechanics of the Industrial Revolution. *Journal of Political Economy* 131, 59–94.
- Kersting, F., Wohnsiedler, I., Wolf, N., 2020. Weber Revisited: The Protestant Ethic and the Spirit of Nationalism. *Journal of Economic History* 80, 710–745.
- Squicciarini, M., 2020. Devotion and Development: Religiosity, Education, and Economic Progress in Nineteenth-Century France. *American Economic Review* 110, 3454–3491.
- Voth, H.J., Caprettini, B., Trew, A., 2023. Fighting for Growth: Labor Scarcity and Technological Progress During the British Industrial Revolution. CEPR Discussion Paper 17881.

Evaluation

Every researcher will deliver either individually or in groups (depending on the number of sign-ups) a paper presentation. This presentation will kick-off the following class-discussion. At the beginning of the semester researchers will choose a paper for one of the five sessions of the course.

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Advanced 3: Topics in the Theory and Practice of Causal Inference

Fabrizia Mealli (fabrizia.mealli@eui.eu)

A 10-hour topics course in recent advances in causal inference from experimental and observational data.

1. Causal Inference with interference (2 lectures)
 - Cluster/partial interference in randomized studies
 - Design, detect, assess interference
 - Cluster/partial interference in observational settings
 - General network interference in experimental and observational settings
2. Principal stratification analysis (2 lectures)
 - Principal stratification analysis
 - Censoring due to death
 - Understanding mechanisms
 - Principal fairness
 - Identification and inference
3. Mediation analysis (1 lecture)
 - Natural direct and indirect effects
 - Controlled effect
 - Identification and inference

Exercise classes

No exercise class

Teaching material

Selected journal articles and lecture notes provided by the instructor.

Evaluation

- Participation (30%)
- Final project (70%)

The final project is intended to be carried out individually, or in teams of two or three students. The final product of the project will consist of a short (at most 10 pages) paper and a presentation given to the class at the end of the course. Applying the course's methods to your own research is most welcome, as is doing methodological work or simulation-based work. I can provide also data on specific case studies that the students can analyze in their final project. [Back to Overview](#)

Advanced 4: Topics in Field Experiments and Measurement

Sule Alan (sule.alan@eui.eu)

Advanced optional course on program evaluation using randomized controlled trials and advances in incentive compatible measurement systems. 20 hours.

Topic 1

Introduction to Impact Evaluation: Thinking about a major policy problem, designing an experiment to evaluate a program that aims to solve this problem, and evaluating the program in a causal manner to guide policy.

Topic 2

Theory of Change and Data: Establishing theory of change and underlying mechanisms in evaluation designs.

Topic 3

Randomization in Practice: Random assignment of program participation, cluster designs, phase-in designs, balance checks, research ethics in program participation.

Topic 4

Sampling: Determining optimal sample size, power calculations, study registration, pre-analysis plan (PAP).

Topic 5

Threats and Analysis: Dealing with missing data, non-compliance, demand effects, and attrition.

Topic 6

Measuring Economic Preferences: Preferences over Risk and Time Preferences. Incentivized measures and survey measures.

Topic 7

Measuring Social Preferences : Measuring cooperation, trust, reciprocity, altruism.

Topic 8

Designing task-based measurement systems : A guide to measuring a construct using incentive compatible behavioral tasks.

Teaching material

- Selected journal articles and additional reading assigned with each lecture.
- Lecture notes provided by the instructors.

Evaluation

- A project (100%):

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Advanced 5: Topics in Microeconometrics

Alessandro Tarozzi (alessandro.tarozzi@gmail.com)

A 20-hour topics course in applied micro-econometrics, with a particular emphasis on problems likely to be encountered in applied micro work, and techniques for dealing with those.

1. **Non-standard standard errors and inference** (10 hours): Adjusting standard errors with non-i:i:d: data in cross-sectional and panel data &/or with small samples (Moulton 1990, Bertrand et al. 2004, Cameron et al. 2011, Cameron and Miller 2015, Abadie et al. 2020, Abadie et al. 2022, Bhattacharya 2005, Fafchamps and Gubert 2007, Colella et al. 2019, Kelly 2019, Voth 2021, Athey and Imbens 2017); the bootstrap (Horowitz 2001, Horowitz 2019, Imbens 2021); randomization inference (Young 2019, Simonsohn 2021, Hess 2017); inference with multiple hypothesis and family-wise error rates (Holm 1979, Benjamini and Hochberg 1995, Clarke et al. 2020).
2. **Introduction to non-parametric and semi-parametric methods.** Non-parametric estimation of densities and regressions: Bandwidths and Kernels; Nadaraya-Watson and locally weighted regressions; partially linear models. Deaton (1997, Ch. 3.2, 3.3), Pagan and Ullah (1999), Yatchew (1998), Yatchew (2003), DiNardo et al. (1996).
3. **Quantile Regression.** Buchinsky (1998), Deaton (1997, pp. 80-85).
4. (if time allows) **Bounding causal estimates when exogeneity does not hold.** Altonji et al (JPE 2005), Oster (JBES 2017), Pei, Pischke and Schwandt (JBES 2019), De Luca, Magnus and Peracchi (JBES 2019)

Exercise classes

No exercise class

Teaching material

- Selected journal articles and additional reading assigned with each lecture.
- Lecture notes provided by the instructor.

Evaluation

There will be 2 or 3 problem sets (counting 60% in total) and a take home exam (40%). For the problem sets you can work in groups if you want, as long as no more than 3 persons are involved. If you work in a group, you can turn in a single problem set.

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Advanced 6: Recent Advances in Applied Micro-Econometrics for Causal Inference

Alessandro Tarozzi (alessandro.tarozzi@gmail.com)

A 10-hour topics course in Recent advances in DD and TWFE models with heterogeneous treatment effects.

For two very good recent surveys see de Chaisemartin and D'Haultfoeuille (2022b) and (more accessible) Roth et al. (2023). For a nice discussion on identification assumptions in DD in general see Kahn-Lang and Lang (2020). Goodman-Bacon (2021) (decomposition); Sun and Abraham (2021), Callaway and Sant'Anna (2021), de Chaisemartin and D'Haultfoeuille (2022a) (Dynamic TE in event studies with heterogeneity; treatment switching on and off (de Chaisemartin and D'Haultfoeuille 2020); pre-trends (Rambachan and Roth 2023, Roth 2022). TWFE redux (Wooldridge 2021). TWFE and Synthetic controls combined (Arkhangelsky et al. 2021).

Exercise classes

No exercise class

Teaching material

- Selected journal articles and lecture notes provided by the instructor.

Evaluation

There will be 1 problem set and a take home exam.

References

Arkhangelsky, D., S. Athey, D. A. Hirshberg, G. W. Imbens, and S. Wager (2021). Synthetic difference-in-differences. *American Economic Review* 111(12), 4088-4118.

Callaway, B. and P. Sant'Anna (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics* 225(2), 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.

de Chaisemartin, C. and X. D'Haultfoeuille (2022a). Difference-in-Differences estimators of intertemporal treatment effects. Working Paper.

de Chaisemartin, C. and X. D'Haultfoeuille (2022b). Two-way fixed effects and differences-in-differences with heterogeneous treatment effects: A survey. *Econometrics Journal* Forthcoming.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics* 225(2), 254-277.

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Advanced 7: Topics in Macroeconometrics

Barbara Rossi (barbara.rossi@upf.edu)

A course in Macroeconometrics. 20 hours.

The course will offer an overview of the econometric techniques used in the empirical analysis of monetary and fiscal policy as well as their empirical results.

The course has three specific objectives. The first is to equip students with the tools they need for empirical research on monetary and fiscal policy. The second objective is to lay out the econometric theory used in estimating the effects of economic policies, with an emphasis on recent developments. The third objective is to analyze selected recent empirical works.

1. Overview of econometric techniques to estimate the effects of economic policies
2. Selected works on monetary policy: identification, estimation and empirical results
3. Selected works on fiscal policy: identification, estimation and empirical results

Exercise classes

No exercise classes.

Teaching material

- Journal articles and other assigned readings.

Evaluation

The evaluation will be based on an in-class presentation and a written exam. [Back to Overview](#)

Optional 8: The Economics of Education

Ellen Greaves (ellen.greaves@eui.eu)

A course in the Economics of Education, with practical research skills elements. 10 hours.

This course will focus on three key and interesting topics within the broad field of the Economics of Education. Each topic will be covered in depth, including the theoretical framework, key empirical contributions, and research at the frontier.

The course will also include two general skills elements. First, how to conduct a thorough literature review, including identifying limitations and areas for future research. Second, how to logically structure an empirical academic article.

The three topics covered will be:

1. **Human capital formation:** this topic will study how multiple skills evolve and interact dynamically over the lifecycle. Also, how these skills are affected by the quality, quantity and timing of investments, and family background.
2. **Peer effects:** how class- or school-mates affect the educational and broader outcomes of a student. This topic will study the identification challenges to estimating peer effects, and empirical evidence from experiments and natural experiments.
3. **School choice and competition:** most education systems around the world include some mechanism so that parents' preferences are one input into where their child attends school. Most education systems encourage competition between schools to attract pupils, for example where funding follows the pupil, or schools face accountability through published school performance. This topic will present the theoretical and empirical role of school choice and competition on school productivity and segregation.

Exercise classes

No exercise classes.

Teaching material

- Journal articles and other assigned readings.

Evaluation

Each researcher will produce *either* a literature review of their chosen topic (which could be from their thesis) or a summary of one of the three topics covered in the course. Whichever written assignment is chosen, it should follow a logical structure. The aim of the assessment is for researchers to build their human capital, so the researcher should choose whichever method of assessment will best help them at their current stage of research. Each researcher will receive detailed formative feedback on their submitted work.

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