

1st Term Seminar, Academic Year 2022-2023

Introduction to Quantitative Methods

Instructor: Giacomo Vagni (giacomo.vagni@eui.eu)

Office Hours: Mon., 2–3pm. Request by email.

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Course Description and Objectives

Note: This course fulfils your requirement to take one quantitative course during your first two years. This course can be substituted with more advanced ones: Intermediate Quantitative Methods from the SPS Department or Introduction to Econometrics and Regression, offered by the Economics Department.

This course will introduce students to quantitative methods in the social sciences. The aim is to provide the fundamental skills for independent research.

Students will learn the main methods for descriptive and inferential statistics as well as modern techniques to evaluate causal relationships. It will introduce students to statistical programming using R. Students will learn where to find and how to use social science data. The course will be example-driven and will focus on theoretical principles underlying the different techniques and methods. Mathematics will be kept at a minimum. No prerequisite is expected for this course.

Learning Outcomes

By the end of the course, students will have acquired the skills to critically read and interpret the quantitative content of sociological and political science papers.

Students will also be able to formulate quantitative research questions, and to find and analyse data with appropriate statistical methods.

Requirements

Students will have to produce a short research brief (2 pages) of their choice. In this research brief, students should be able to articulate a coherent research question, formulate testable hypotheses, find appropriate data, analyse the data with quantitative methods, interpret the results and discuss the limitations of their analyses. Each student will present their findings in a 5-minute presentation in the last class.

Schedule

<i>Lecture</i>	<i>Title</i>	<i>Lectures</i>	<i>Lab</i>
		Monday, h. 11.00 – 13.00 <i>Seminar Room 2</i>	Tuesday, h. 11.00 – 13.00 <i>Seminar Room 2</i>
1	Introduction	03/10	04/10
2	Descriptive statistics	10/10	11/10
3	Probability and inference	17/10	18/10
4	Probability and inference	24/10	25/10
5	Group comparison	Wednesday 02/11	Friday 4/11 h. 13-15, Sala del Capitolo
6	Regression I	07/11	08/11
7	Regression II	14/11	15/11
8	Regression III	21/11	22/11
9	Exploratory Methods	28/11	29/11
10	Student presentations	05/12	06/12

Core Readings

References	Links (free)
Agresti A., and Finlay B. (2009) <i>Statistical Methods for the Social Sciences</i> . Pearson (4 th edition)	https://tinyurl.com/mtb565b2
Navarro D. (2022) <i>Learning statistics with R: A tutorial for psychology students and other beginners</i>	https://learningstatisticswithr.com/book/
Brophy J. (2020) <i>(Mostly Clinical) Epidemiology with R</i>	https://bookdown.org/jbrophy115/bookdown-clinepi/
Hanck C., Arnold M., Gerber A., and Schmelzer M. (2020) <i>Introduction to Econometrics with R</i>	https://www.econometrics-with-r.org
Cunningham, S. (2021). <i>Causal inference: the Mixtape</i> . Yale University Press.	https://mixtape.scunning.com

Coursework

Lecture 1. Introduction 3 October 2022, 11.00 – 13.00 Seminar Room 2, Badia Fiesolana	
Topic	Introduction
Core Readings	Hubbard (2007) <i>How to Measure Anything</i> . Wiley. Chapter 1 & 2. Link Roser (2022). “The world is awful. The world is much better. The world can be much better”. <i>Our World in Data</i> . link Ord (2013). “The Moral Imperative toward Cost-Effectiveness in Global Health”. <i>Center For Global Development</i> . Link
Additional	(Mostly Clinical) Epidemiology with R. Chapter 3. Exploratory Data Analysis - Data visualization. Link

Lecture 2. Descriptive Statistics 10 October 2022 11.00 – 13.00 Seminar Room 2, Badia Fiesolana	
Topic	Refresher on mean, median, variance, histogram, boxplot, distribution, probability
Core Readings	<i>Learning statistics with R</i> . Chapter 5 Descriptive statistics. Link Altintas and Sullivan (2016) “Fifty years of change updated: Cross-national gender convergence in housework” <i>Demographic Research</i> . Link Agresti and Finlay, Chapter 3.
Additional	<i>Learning statistics with R</i> . Chapter 9. Link

Lecture 3. Probability and inference 17 October 2022 11.00 – 13.00 Seminar Room 2, Badia Fiesolana	
Topic	Sampling, hypothesis testing, estimation
Core Readings	<i>Learning statistics with R</i> . Chapter 10. Link <i>Learning statistics with R</i> . Chapter 11. Link Agresti and Finlay, Chapter 5
Additional	Bernardi, F., Chakhaia L. and Leopold L. (2016) “‘Sing Me a Song with Social Significance’: The (Mis)Use of Statistical Significance Testing”. <i>ESR</i> . Link

Lecture 4. Probability and inference 24 October 2022 11.00 – 13.00 Seminar Room 2, Badia Fiesolana	
Topic	Inference, intervals, goodness of fit
Core Readings	Agresti and Finlay, Chapter 6 <i>(Mostly Clinical) Epidemiology with R</i> . Chapter 5. Statistical inference. Link
Additional	Bukodi et al. (2014) “The mobility problem in Britain: new findings from the analysis of birth cohort data”. <i>BJS</i> . Link Lambert et al. (2007) “By Slow Degrees: Two Centuries of Social Reproduction and Mobility in Britain”. <i>Soc Res Online</i> . Link

Lecture 5. Group comparison Wed. 2 November 2022 11.00 – 13.00 Seminar Room 2, Badia Fiesolana	
Topic	Introduction to group comparison, covariance, potential outcome framework, DAG, experiments
Core Readings	Agresti and Finlay, Chapter 7 <i>Introduction to Econometrics with R</i> , Chapter 3.5. Link Cunningham (2021) Causal Inference: The Mixtape. Chapter 3. Link Cunningham (2021) Causal Inference: The Mixtape. Chapter 4. Link
Additional	Heckman (2013) <i>Giving Kids a Fair Chance</i> . MIT Press. Barone et al. (2021) “Social origins, shared book reading and language skills in early childhood. Evidence from an information experiment”. <i>ESR</i> . Link .

Lecture 6. Regression I 7 November 2022 11.00 – 13.00 Seminar Room 2, Badia Fiesolana	
Topic	Regression models
Core Readings	Agresti and Finlay, Chapter 9 Cunningham (2021) Causal Inference: The Mixtape. Chapter 2. Link Elkind (2013) “Some notes on presenting and interpreting regressions” Link

Additional	<i>Introduction to Econometrics with R</i> , Chapter 4. Link and Link Altintas (2016) “The Widening Education Gap in Developmental Child Care Activities in the United States, 1965–2013”, <i>JMF</i> . Link
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Lecture 7. Regression II 14 November 2022 11.00 – 13.00 Seminar Room 2, Badia Fiesolana	
Topic	Multivariate Regression, Decomposition Methods, Mediation
Core Readings	Cinelli et al. (2022) “A Crash Course in Good and Bad Controls”. <i>Socio Meth and Res</i> . Link
Additional	Bianchi et al. (2000) “Is Anyone Doing the Housework? Trends in the Gender Division of Household Labor”. <i>Social Forces</i> . Link Pailhé et al. (2021) “The Great Convergence: Gender and Unpaid Work in Europe and the United States”, <i>J of Pop Dev</i> . Link

Lecture 8. Regression III 21 November 2022 11.00 – 13.00 Seminar Room 2, Badia Fiesolana	
Topic	PSM, Fixed Effects, Difference-in-Differences, Natural Experiments, Synthetic Controls
Core Readings	Cunningham (2021) <i>Causal Inference: The Mixtape</i> . Chapter 5. Link Cunningham (2021) <i>Causal Inference: The Mixtape</i> . Chapter 9. link Betthäuser (2019) “The Effect of the Post-Socialist Transition on Inequality of Educational Opportunity: Evidence from German Unification”. <i>European Sociological Review</i> . Link Grätz (2021) “Does Regime Change Affect Intergenerational Mobility? Evidence from German Reunification”, <i>European Sociological Review</i> . Link
Additional	Ho et al. (2011) “MatchIt: Nonparametric Preprocessing for Parametric Causal Inference”, <i>Journal of Stat Soft</i> . Link .

Lecture 9. Exploratory Data Methods

28 November 2022

11.00 – 13.00

Seminar Room 2, Badia Fiesolana

Topic	Clustering, MCA, Latent Class, Sequence Analysis
Core Readings	Gabadino (2011) <i>TraMineR</i> . Link and link Knight and Brinton (2017) “One Egalitarianism or Several? Two Decades of Gender-Role Attitude Change in Europe”. Link Savage et al. (2013) “A New Model of Social Class? Findings from the BBC’s Great British Class Survey Experiment”. Link
Additional	Tan, Steinbach and Kumar (2005) <i>Introduction to Data Mining</i> . 2.4 Measures of Similarity and Dissimilarity (p.65). Link Vagni (2020). “The Social Stratification of Time Use Patterns”. <i>BJS</i> . Link Studer (2016) <i>WeightedCluster Library Manual</i> . Link

Lecture 10. Student presentations

05 December 2022

11.00 – 13.00

Seminar Room 2, Badia Fiesolana

Additional Bibliography

- *Mastering 'Metrics: The Path from Cause to Effect* by Angrist and Pischke (2014)
- *Causal Inference in Statistics: A Primer* by Pearl, Glymour, and Jewell (2016)
- *Counterfactuals and Causal Inference: Methods and Principles for Social Research* by Winship and Morgan (2007)
- *Advanced R* by Hadley Wickham (Link: <https://adv-r.hadley.nz>)
- Math Prefresher ⇒ <https://iqss.github.io/prefresher/>