EC320 Econometrics
(Fall 2022)

Seminar Leader: Israel Waichman

Course Times: Tue, Thu 14:00-15:30

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Course Description

Econometrics is the application of statistical methods to the analysis of economic data. Hence econometrics is essential to every branch of applied economics. In particular, econometrics methods are used to estimate economic relationships, test economic theories, and evaluate policies. The main objective of the course is to introduce students to basic econometrics techniques (mainly ordinary least squares regression) and to show them how to use these techniques to analyze empirical data. Another important objective is to develop the students' critical thinking about statistical inference (what can and cannot be inferred from the data). Finally, the course will enable students to apply their knowledge in analyzing field data. To this end, some of the classes are devoted to working with a statistical software (Stata). At the end of the course, students will have to demonstrate their econometrics skills by analyzing field data, presenting it to the class in a research workshop, and writing a short research paper.

Learning Outcomes

- Introduce students to the problem of causal inference
- Introduce students to basic econometrics techniques
- Study how to apply econometrics analysis to economics questions
- Enable students to conduct basic econometric analysis using Stata (or an equivalent statistical package such as R)
- Develop critical thinking about statistical inference

Requirements

Prerequisites

Students taking this course should have already successfully completed the courses “Statistics,” “Mathematics for Economics,” and “Principles of Economics.”

This course is a follow-up to the statistics course.

Textbooks

For this course, we will use the following textbook:

- *Principles of Econometrics* (2018) by R. Carter Hill, William E. Griffiths, and Guay C. Lim (John Wiley & Sons).

Two excellent textbooks that we will also use (not as textbooks but we use their explanations) are:

- *Mastering Metrics: The Path from Cause to Effect* (2014) by Joshua D. Angrist and Jörn-Steffen Pischke (Princeton University Press)

- *A Guide to Econometrics* by Peter Kennedy (Wiley-Blackwell)

It is essential that you will repeat at home the material that we cover in class! (including solving again all the exercises that we did in the classroom).

Attendance

Attendance at ALL classes is expected. More than two absences (that is absences from two sessions of 90 minutes) in a semester will significantly affect the grade for the course.

Use of cell phones

The use of cell phones is not allowed during the classes. Please leave your cell phone in your bag during the classes.

Computer and Software requirements

The students will be required to bring their laptops to some of the classes. During the course we will use the statistical software Stata. You are required to get yourself a copy. Link:

https://dpc-onlineshop.de/epages/1188aeca-9275-49f6-be7a-ac117311e6ae.sf/de_DE/?ObjectPath=/Shops/1188aeca-9275-49f6-be7a-ac117311e6ae/Products/7170455

Assessment

Assessment will be based on attendance, preparation for classes, regular and active participation, possible quizzes, handing in group problems sets, as well as a mid-term (60 minutes) or an equivalent empirical work. The course will be concluded with a final empirical work where students will have to apply what they have learned to answer a research question by analyzing data as they learned in the class.

Grade breakdown

- Seminar participation, problem sets, and possible quizzes 30%
- Mid-term exam or an equivalent work 30%
- Final empirical work 40% (20% presentations (including serving as discussants) 20% final written work). **Attendance of final presentations is mandatory to pass the course**

Final empirical work

As part of the course each pair of students will conduct an independent (empirical) research project. The aim of the research project is to use field data to answer a well-defined research question. The research project requires the students to obtain and analyze a relevant data set (from an online source or to get the data, e.g., conduct a survey). The students will have to present their project in a workshop to be held in the final 2 weeks of the semester (**with a possible 3-hour session in the completion week**). Finally, they will have to submit a short research paper.

Policy on Late Submission of empirical work

Please note the policy from the Student Handbook on the submission of essays: *essays that are up to 24 hours late will be downgraded one full grade (from B+ to C+, for example). Instructors*

are not obliged to accept essays that are more than 24 hours late. Where an instructor agrees to accept a late essay, it must be submitted within four days of the deadline and cannot receive a grade of higher than C.

Thereafter, the student will receive a failing grade for the assignment.

Schedule and Course structure

Classes start on Tuesday Aug 30 and run until Thursday Dec 8, with spring break planned for Oct 24 – Oct 30. Completion week is from Dec 12 until Dec 16. **Attendance is mandatory during completion week.**

The following course structure is provisional in order to allow for flexibility. It is the students' responsibility to keep themselves informed of any changes to the schedule provided here. An up-to-date schedule will be maintained by the course management in our Google classroom system. Lecture slides and problem sets will be posted in Google classroom. Please sign in for the course, password will be given in the first class.

Tentative course structure:

1. Introduction: causal inference, data, and the research process [Week 1]
2. Repetition and extensions (Statistics): [Week 2-3]
    a. Review of probability
    b. Review of statistics (including statistical tests)
3. The simple linear regression model
    a. estimating the coefficients, least square assumptions, non-linear transformations, etc.
    b. Applications using a statical software
4. Hypothesis testing
    a. Simple tests, tests of a linear combination of parameters,
5. Predictions, goodness of fit and modeling issues
6. The multiple linear regression model
    a. Estimation, goodness of fit, estimating joint tests, non-linearities
    b. Using indicator variables, heteroskedasticity
    c. Endogenous regressions and instrumental variables
7. Binary dependent variable models
8. Presentations of empirical work and dealing with the practicality of econometrics analysis.

Classes missed due to federal holidays will not be rescheduled.

(this version: July 29, 2022)