30C00200 Econometrics (6 cr)

SYLLABUS

16th November 2020

Instructor's contact information	Course information
Name: Professor Timo Kuosmanen E-mail: timo.kuosmanen@aalto.fi Office hours: by appointment Teaching assistant: Sheng Dai (sheng.dai@aalto.fi)	**Status of the course**: can be included as elective studies in various B.Sc. and M.Sc. programmes and in the minor in Quantitative Methods. Please check the current status at https://into.aalto.fi/ **Level of the Course**: Intermediate / Advanced **Academic Year and Period**: 2020-2021, III period **Location**: Online course **Language of Instruction**: English **Course web page**: https://mycourses.aalto.fi/course/view.php?id=23721

1. OVERVIEW

Econometrics is a branch of economics that aims to give empirical content to economic theory by applying statistical methods to real world data. This course focuses on the application of linear regression to economic data, its assumptions, and statistical significance tests of parameters and linear restrictions. We also extend the basic linear regression for modeling endogeneity, heteroskedasticity and autocorrelation. Time series and panel data models are considered towards the end of the course. All topics are examined by means of economic examples with actual empirical data.

2. PREREQUISITES

Participants should have mastered at least an introductory level statistics course (e.g., 30A02000 Tilastotieteen perusteet) and be familiar with fitting a regression line to data as well as the use of Excel.

3. LEARNING OUTCOMES

The main objective of the course is to obtain a basic understanding of the econometric methodology. The aim is to motivate the students to examine causal relationships between economic phenomena by using a linear regression model. The course focuses on least squares estimation of the model and related statistical inferences. The assumptions of least squares estimation will be critically investigated. We examine the violations of these assumptions and the possible ways to alleviate the assumptions. The emphasis of the course is in the empirical application of the least squares method and its extensions. The

economic interpretation of the estimated parameters of regression model and their statistical significance is given a special focus. After the course, students should have the skills to conduct basic empirical econometric analysis.

4, LECTURES

Due to the Covid-19 pandemic, this time the course is organized fully in online format. The lectures are organized as video lectures, which are available through the course website https://mycourses.aalto.fi/course/view.php?id=27596&section=1.
The video lessons will be added to the course website as they are recorded so that students can view them in their own pace.

To facilitate interaction, students are encouraged to submit a question to the professor as a part of the weekly assignments. Valid questions will contribute to the grade through the assignments. The answers to the most interesting questions (anonymized) will be posted to the course website on weekly basis.

5. ASSIGNMENTS

Weekly homework assignments include both theoretical and empirical problems, and a question for the professor. The problems are mainly based on the lectures, but it may be useful to consult the textbooks indicated below and/or other (online) resources. Students may collaborate to solve homework assignments, but everyone needs to submit independently their own solutions for grading. The deadline for submitting the solutions for grading is 15:00 every Tuesday (before the start of the first exercise session). Solutions submitted after the deadline will not be graded. Detailed instructions for how to submit the solutions to the course assistant will be provided in the problem sets (to be published on the course website).

During the live exercise sessions organized through Zoom (Tue, Wed), the teaching assistant Sheng Dai will present the example solutions to assignments, discuss possible alternative ways of approaching the problem, and provide tips to solving the next problem sets.

Before the final exam, there will be an extra problem set that can be submitted for grading. Points earned from the extra problem set can be used to compensate any missing points from weekly homework assignments or quizzes.

To solve the empirical problems, students are free to use any software preferred. See Lesson 1d) for the discussion of the main alternatives and their relative advantages and disadvantages.

6. ASSESSMENT AND GRADING

- Online exam 70%
- Homework assignments 30 %

The exam and the homework assignments will be based on the lectures and the course textbook.

The online exam will be organized through the course website The exam includes both theoretical and empirical questions. To eliminate the possibility of cheating, in the empirical questions each student will be analyzing unique randomly generated data that are personalized using the student number.

The points earned from the online exam and homework assignments will be weighted as indicated above, and converted to the percentage scale. The following grading scale will be used:

excellent 5	= 90% - 100% of total points
very good 4	= 80% - 89% of total points
good 3	= 70% - 79% of total points
satisfactory 2	= 60% - 69% of total points
sufficient 1	= 50% - 59% of total points
failed 0	= less than 50% of total points

7. READINGS

Video lectures, lecture slides and additional materials will be provided through the course website (https://mycourses.aalto.fi/course/view.php?id=27596#section-1).

For the self-study and supporting material, the following text books are recommended:

Wooldridge, J.M. (2009) Introductory econometrics: A modern approach. (or any newer edition)

Dougherty, Christopher (2007) Introduction to econometrics. (or any newer edition)

Other intermediate econometrics textbooks book can also be used as supporting materal.

8. PRELIMINARY SCHEDULE

List of themes covered

1) Introduction to Econometrics
2) Linear regression model and the OLS estimator
3) Statistical properties of the OLS estimator
4) Statistical inference
5) Dummy variables
6) Model specification
7) Endogeneity
8) Instrumental variables
9) Heteroscedasticity and autocorrelation
10) Time series econometrics
11) Panel data models
12) Limited dependent variables and maximum likelihood

There will be 4-5 video lectures per each theme, usually 15-30 minutes long.

Exercises and assignments

Problem set 1) due 19 Jan, Exercises Tue 19 and Wed 20 Jan
Problem set 2) due 26 Jan, Exercises Tue 26 and Wed 27 Jan
Problem set 3) due 2 Feb, Exercises Tue 2 and Wed 3 Feb
Problem set 4) due 9 Feb, Exercises Tue 9 and Wed 10 Feb
Problem set 5) due 16 Feb, Exercises Tue 16 and Wed 17 Feb

Extra problem set: due 23 Feb

9. COURSE WORKLOAD

Lectures	36 h
Exercise sessions	16 h
Self-study and other independent work	108 h
Total	160 h

10. ETHICAL RULES

Aalto University Code of Academic Integrity and Handling Violations Thereof:
https://into.aalto.fi/display/ensaannot/Aalto+University+Code+of+Academic+Integrity+and+Handling+Violations+Thereof