

30C00200 Econometrics (6 cr)

SYLLABUS

19th December 2018

Instructor's contact information	Course information
Name: Professor Timo Kuosmanen E-mail: timo.kuosmanen@aalto.fi Office hours: by appointment Teaching assistants: Xun Zhou (xun.zhou@aalto.fi), 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: 2018-2019, III period Location: Otaniemi (for details see course home page) Language of Instruction: English Course web page: https://mycourses.aalto.fi/course/view.php?id=19983

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. ASSESSMENT AND GRADING

- Exam 70%
- Homework assignments 25 %
- Quizzes 5%

The exam and the homework assignments will be based on the lectures and the course textbook. Before the start of each lecture there will be a short quiz related to the topics of the previous lecture.

Grading 0-5

5. ASSIGNMENTS

Weekly assignments are mainly based on the lectures, but it may be useful to consult the textbook, too. 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. The detailed instructions for how to submit the solutions to the course assistant will be provided in the problem sets (to be published later).

During the exercise sessions (Tue, Wed), the teaching assistants Xun Zhou and 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.

6. QUIZZES

The quizzes start exactly at 9:10 am before each lecture and end at 9:15 am at the beginning of the lecture. Each quiz consists of 3 “true or false” statements displayed on screen in the class. Answers must be submitted online in mycourses. Note: the questions are only available offline in the class, but the answers are submitted online.

The main purpose of the quizzes is to provide students with regular feedback about the learning outcomes and help students attending the lectures orient to the topic at hand before the lecture starts. Lectures are not mandatory, but highly recommended. The opportunity to earn points from quizzes offers an additional incentive to attend lectures and be present on time.

7. READINGS

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

Alternatively, the following book can also be used:

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

Lecture notes and additional materials will be provided through the course website (<https://mycourses.aalto.fi/course/view.php?id=16337>) during the course.

8. PRELIMINARY SCHEDULE

Lectures

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|----------------|--|
| 1) Mon 7 Jan | Introduction to Econometrics |
| 2) Wed 9 Jan | Linear regression model and the OLS estimator |
| 3) Mon 14 Jan | Statistical properties of the OLS estimator |
| 4) Wed 16 Jan | Statistical inference |
| 5) Mon 21 Jan | Dummy variables |
| 6) Wed 23 Jan | Model specification |
| 7) Mon 28 Jan | Endogeneity* |
| 8) Wed 30 Jan | Instrumental variables* |
| 9) Mon 4 Feb | Heteroscedasticity and autocorrelation |
| 10) Wed 6 Feb | Time series econometrics |
| 11) Mon 11 Feb | Panel data models |
| 12) Wed 13 Feb | Limited dependent variables and maximum likelihood |

* = lectured by Xun Zhou

Note 1: lectures start at 9:15 am and continue till 11:45 am. There will be a break of 15 minutes at around 10:30 – 10:45. Before each lecture, there will be a quiz related to the topics of the previous lecture, starting at 9:10 am. Please arrive on time!

Exercises and assignments

Problem set 1) due 15 Jan, Exercises Tue 15 and Wed 16 Jan

Problem set 2) due 22 Jan, Exercises Tue 22 and Wed 23 Jan

Problem set 3) due 29 Jan, Exercises Tue 29 and Wed 30 Jan

Problem set 4) due 5 Feb, Exercises Tue 5 and Wed 6 Feb

Problem set 5) due 12 Feb, Exercises Tue 12 and Wed 13 Feb

Extra problem set: due 19 Feb

Note 2: students are free to use any software they prefer for solving the empirical problems. Most empirical problems can be solved using the Excel Analysis ToolPak. Instructions for installing the Analysis ToolPak are available online here:

<https://technet.microsoft.com/en-us/magazine/ff969363.aspx>

Note 3: some of the problems towards the end of the course may require the use of more advanced statistical packages such as Stata, SPSS, or Maple.

9. COURSE WORKLOAD

Lectures	36 h
Exercise sessions	15 h
Self-study and other independent work	108 h
Total	159 h

10. ETHICAL RULES

Aalto University Code of Academic Integrity and Handling Thereof:

<https://into.aalto.fi/pages/viewpage.action?pagelId=3772443>

11. OTHER ISSUES

- Professor Kuosmanen is available for quick questions concerning the content or practical matters of the course in the classroom after each lecture. For more extensive questions, please make an appointment by sending email.
- Questions concerning the weekly exercises should be addressed to the teaching assistants Xun Zhou and Sheng Dai.