

Econometrics (ECON30130)

Lecturer

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Office hours: Tuesday, 4-5pm; sign up on <https://calendly.com/benjamin-elsner/office-hour>

Course Description and Learning Outcomes

Description This course provides an introduction to econometric methods. Econometrics is a statistical toolbox that is used to analyse data in economics and other social sciences. The goal of this module is to provide students with the knowledge to conduct their own empirical research in economics, to evaluate economic policies, and to critically read the quantitative analysis of other researchers. In addition to using the computer as a tool for regression analysis, the course will focus upon the underlying statistical methods such that students understand when particular methods are likely to be valid (or invalid).

Learning outcomes By the end of this course, students will have learned to

- Use linear regression for data analysis;
- Carry out an empirical project using appropriate statistical techniques and software;
- Interpret and evaluate statistical analyses of other researchers.

Prior knowledge Students are required to have completed ECON 20040 Statistics for Economists, MIS 10010 Quantitative Analysis for Business, or an equivalent module on Basic Statistics and Probability.

Lectures and Office Hours

Lectures We have two lectures per week:

- Tuesday, 3-4pm, Theatre P
- Thursday, 4-5pm, Theatre P

Lectures will take place in person, although there is a contingency plan for online lectures. Due to covid restrictions, each lecture takes 45 minutes. We will start on time and finish after 45 minutes.

Tutorials In weekly tutorial sessions, the tutors will show you how to use R to apply the estimators that we cover in lecture. Instruction will be “flipped classroom” style: students work through the tutorial sheet beforehand and ask the tutor if they have any questions. Therefore, it is very important to prepare for these sessions. Note that you can only attend the session you have signed up for, as computer spaces are limited, and we have to follow the covid regulations.

There are several locations and times:

- PB5, Tuesday, 1-2pm, F20-NEWST
- PA6, Tuesday, 5-6pm, G5-DAE
- PB6, Tuesday, 6-7pm, G5-DAE
- PB4, Thursday, 5-6pm, G5-DAE

- PB3, Friday, 1-2pm, G5-DAE

You can register for the tutorials on SISWeb. In case you have problems registering, please contact Anna John (anna.john@ucd.ie).

Office Hours I hold weekly office hours on **Tuesdays from 4-5pm**. Students who want to attend the office hours can book a slot using this link: <https://calendly.com/benjamin-elsner/office-hour>. The default is that the office hour takes place on Zoom (link provided on calendly and Brightspace). Covid restrictions permitting, we can also arrange an in-person meeting.

Reading week. There will be no lectures, tutorials or office hours during reading week (Oct 25-31).

Communication

I strive to provide every student with the best possible support. However, to be able to do justice to over 250 students, I require everyone to follow a few simple rules:

1) You can ask me questions after the lecture. This is by far the easiest way to approach me for quick questions.

2) Instead of sending questions by email, use Brightspace Discussions. The in-built forum (*Discussions* in the menu at the top) is great because it ensures maximum transparency. All students can see all the questions that have been asked along with my answers. Any non-personal question (i.e. anything about the logistics or the material) needs to be asked here. If you email me with a question that should be asked on the forum, I will respond by telling you to do so.

3) Before asking a question about the logistics, please check the FAQs . From the questions asked in the forum and office hours, I will compile a list and add to it as we go along.

4) Only email me with questions that include personal information. If the content of your email is personal, i.e. it is no one else's business, you can email me. Otherwise, please use the forum.

5) Please adhere to netiquette. If you email me, please use my name; first or last name, with or without title, I do not care; but it should be clear that the email is for me. In emails and the discussion forum, please use a courteous tone.

Textbook and Teaching Materials

I will make lecture slides, tutorial sheets and practice problems available on Brightspace.

The module is based on the textbook **Introduction to Econometrics** by James H. Stock and Mark W. Watson, published by Pearson, which is currently in its fourth edition.

The textbook is available in the Campus Bookshop. Earlier versions may differ in some of the content, but should work just as well.

Software

Students will learn to use the statistical software R in this course. We will use R (the statistical language) in conjunction with RStudio (the integrated development environment; i.e. the software you use). In comparison with other statistical languages, R has a little bit of a learning curve and requires some practice. But once you master the basics, R offers many advantages:

- R and RStudio are free; it is an open source software.
- There is a global support community that develops packages and answers questions in forums.

- Many tutorials are available online.
- Data analytics is a key skill in the job market; and R, along with Python, is the dominant statistical programming language used in data science and other industries.

Software Download: Please **download and install R** from <https://cran.r-project.org/> and **download and install RStudio** (the desktop version) from <https://www.rstudio.com/>. Note: there are paid version of RStudio for commercial applications. The free version is perfectly fine for what we are doing.

Resources:

- This free online textbook (<https://rstudio-education.github.io/hopr/>) offers an excellent introduction to the programming language R. It also has a guide to installing R and R Studio.
- The website <https://www.econometrics-with-r.org/> is a great resource. It covers the same material as this module and demonstrates the use of R based on empirical examples.
- The textbook *Using R for Introductory Econometrics* is an excellent companion to the course material. The book can be bought for about 27 EUR, but there is a free html version available on the website <http://www.urfie.net/>.

MCQs on McEmpirics

McEmpirics is an e-learning platform for undergraduate econometrics students. Developed by Prof. Thomas Siedler over many years, the platform has **over 800 multiple choice questions** on the material we cover in this course. A particularly useful feature is that students can practice the MCQs on their own, and they receive feedback on their answers. After a student finishes a quiz, they receive additional information about the topic and links to resources that explain the material in greater detail. You can access the site here: mcempirics.com

How we will use McEmpirics

- From October, I will organise **regular MCQs on McEmpirics**. These are not graded, but they are an excellent way for students to prepare for the exam.
- I will invite students to these tests via Brightspace or email.
- To take the tests, students need to make a paid account. This is a worthwhile investment in one's skills: students have access to over 800 MCQs and can practice the material in their own time. This service very affordable: a four-month subscription is 10 EUR, which is the price of two pints (not even these days..).

Important: when signing up, please use your ucdconnect.ie address so that you can be matched to UCD-specific tests.

Disclaimer: the paid account is purely a recommendation. I don't have any financial interest in this venture, and there is no obligation whatsoever for students to sign up. But in my view this is an excellent resource, and I am convinced that students can benefit a lot from signing up and doing the quizzes.

Assessment and Grading

Your grade will be the result of an empirical project (30%) and a final exam (70%). For the project, students will receive a letter grade. For the final exam, the alternative linear grade scale (40% pass, A- with 85%) will apply.

Instructions for the empirical project will be provided in October. Submission deadline will be in November, but the precise dates are yet to be confirmed.

It is not clear yet whether the exams will take place online or in person. More information will be provided at a later stage.

TABLE 1 – GRADE SCALES

<i>Scale</i>	<i>Standard Numeric Scale</i>	<i>Alternative Numeric Scale</i>
A+	90.00-100	95.00-100
A	80.00-89.99	90.00-94.99
A-	70.00-79.99	85.00-89.99
B+	66.67-69.99	80.00-84.99
B	63.33-66.66	75.00-79.99
B-	60.00-63.32	70.00-74.99
C+	56.67-59.99	65.00-69.99
C	53.33-56.66	60.00-64.99
C-	50.00-53.32	55.00-59.99
D+	46.67-49.99	50.00-54.99
D	43.33-46.66	45.00-49.99
D-	40.00-43.32	40.00-44.99
E+	36.67-39.99	35.00-39.99
E	33.33-36.66	30.00-34.99
E-	30.00-33.32	25.00-29.99
F (or FM)	20.00-29.99	20.00-24.99
G	0.01-19.99	0.01-19.99
NG	0	0

Course Outline and Reading List

We will definitely cover topics 1-5. Whether we get to advanced topics depends very much on how the semester goes. With lectures being 45 minutes long, I expect that we will not cover much more than the core. If time permits, I will provide an introduction to advanced topics in the end, which will give students an outlook on advanced econometrics courses.

Topic	Chapters in Stock & Watson ed.4
1) Introduction and statistics refresher	Ch. 1, 2, 3
2) Linear regression with one regressor	Ch. 4, 5
3) Linear regression with multiple regressors	Ch. 6, 7, 9
5) Non-linear models	Ch. 8
6) Advanced topics	
Binary dependent variables	Ch. 11
Introduction to causal inference	Ch. 12, Ch. 13
Introduction to prediction	Ch. 14