

Syllabus: ECON 30130 (Econometrics)

Meeting time/place: Monday 3-4pm, C-H2.22SCH
Friday 12-1pm, C-H2.22SCH
No lectures or tutorials on March 30 and April 2 (Easter)

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Office hours: by appointment (please email me)

Summary: This course provides an introduction to econometric methods. The goal is to provide students with the knowledge to conduct their own empirical research in economics, to evaluate economic policy, 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 models so that students understand when particular methods are likely to be valid (or invalid!).

Textbook: The required textbook for this course is *Introductory Econometrics: A Modern Approach*, 6th edition, by Jeffrey Wooldridge. The 4th or 5th edition is also fine. Although we will jump around in the book throughout the course, we will follow the content in the book rather closely. Many of the sample datasets and homework problems will be taken from the textbook.

Prerequisites: 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. **You should be familiar with most, if not all, of the material in Appendices A (“Basic Mathematical Tools”), B (“Fundamentals of Probability”), and C (“Fundamentals of Mathematical Statistics”) of the textbook.**

Software: Students are required to use the statistical package **Stata** in this course. It is very easy to learn. Class examples will be illustrated using Stata, and students will be expected to use Stata for the empirical exercises on their problem sets. There are a couple of options for accessing Stata: (i) access Stata through **Application Jukebox (Software for U)** in UCD Connect) or (ii) purchase your own license (€40 6mos/€80 year) for Stata/IC 15 (not Small Stata) through

<http://www.timberlake.co.uk/software/stata/educational/students/students.html>

If you have trouble accessing Stata through Application Jukebox, please contact the UCD IT

Services. Do not contact the lecturer.

Website: All homework assignments/solutions and Stata datasets will be posted on the course Blackboard site.

Stata Tutorials: In these weekly sessions, the tutors will show you how to use Stata to apply the estimators that we cover in lecture. It is very important that you attend these sessions. There are several locations and times. You can register for the tutorials on SISWeb. In case you have problems registering, please contact Rodrigo Marcondes (rodrigo.marcondes@ucd.ie).

Stata assignment: The assignment will be made available on Blackboard on March 27. Deadline for submission is Monday, April 16, 3pm. Instructions about the submission will be announced on Blackboard.

Practice problems: I will provide practice problems that help with the preparation for the exam. I will also provide the solutions at a later stage. However, I highly recommend trying to solve the problems without consulting the solutions.

Grades: Course grades will be determined by the following weights

Stata Assignment: 20%

Final exam 80%

Course outline (topics near end to be covered as time permits; “W”=Wooldridge):

1. Introduction (W 1)

- a. What is econometrics?
- b. Types of economic data
- c. Causality vs. correlation

2. The simple regression model (W 2.1-2.5)

- a. Model and assumptions
- b. Ordinary least squares (OLS) estimator
- c. Goodness-of-fit and R-squared
- d. Non-linear (logarithmic) transformations
- e. Properties of OLS

3. The multiple regression model (W 3)

- a. How do the simple regression results extend?
- b. Omitted variables bias
- c. Multicollinearity
- d. Gauss-Markov theorem: efficiency of OLS

4. Statistical inference (“finite sample”) for OLS (W 4)

- a. Confidence intervals
- b. Single parameter tests: “t test”
- c. Two-sided versus one-sided test
- d. p-values
- e. Multiple restriction tests: “F test”

5. Asymptotic (“large sample”) theory for OLS (W 5.1-5.2, skip the LM statistic in 5.2)

6. Additional issues in regression analysis

- a. Binary variables (W 7.1-7.4)
 - b. Interactions and Polynomials (W 6.2)
 - c. The linear probability model (W 7.5)
 - d. Heteroskedasticity (W 8.1-8.3, skip LM test in 8.2, skip White test in 8.3)
 - e. Measurement error (W 9.4)
7. Instrumental variables (W 15.1-15.4)
- a. Endogeneity
 - b. Two-stage least squares estimation
 - c. Using 2SLS to deal with measurement error
8. Time series analysis (W 10, 12.1-12.3)
- a. Types of models
 - b. Trends and seasonality
 - c. Serial correlation --- AR(1) model, "random walk"
9. Pooled cross-sections and panel data (W 13)