

Econ 3334 Introduction to Econometrics L1 & L2 (4 Credits)

Department of Economics, HKUST

Fall 2020

Instructor: FENG, Junlong

Office: Room 6073, LSK

Office Hours: Mon 2 pm-3 pm (or by appointment)

Class Hours: Mon & Wed 9 am-10:20 am (L2), 10:30 am-11:50 am (L1)

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Course Description

This course introduces students to basic econometric techniques and their applications in empirical economic analysis. The course begins with a review of probability and mathematical statistics, and focuses on linear regression models with one regressor and multiple regressors. Basic theory of estimation and inference will be introduced, with an emphasis on practical issues in econometric analysis of cross-sectional data. R will be used for computer-based calculations.

Prerequisites

Basic statistics or consent of instructor.

Course Materials

- **Textbook.** Stock, James and Mark Watson. *Introduction to Econometrics* (4th edition), Pearson. We will also use materials from the companion website: https://media.pearsoncmg.com/intl/ge/2019/cws/ge_stock_econometrics_4/.
 - I reserved a few copies in the library. Ebook is also available from the library's website, although it only allows four concurrent users to access. To purchase, the HKUST bookstore provides the following link: https://w5.ab.ust.hk/cgi-bin/std.cgi.sh/WService=broker_ba_p/prg/ba_std_main.r, but of course you're free to use it or not.

- Some problem sets are from the required textbook. You may use its previous editions, **but you are responsible to make sure that your solutions are based on the 4th edition.**
- **Slides, problem sets, and other materials.** All these course related materials will be posted on **Canvas** (<http://canvas.ust.hk>). You should check Canvas at least twice per week for announcements and postings.

Computer Packages

- R will be used to apply the econometric tools to data. R is both a programming language and a software environment for statistical computing, which is free and open-source. To get started, you will need to install two pieces of software:
 1. R: <https://www.r-project.org/>.
 2. RStudio: <https://rstudio.com/>. You have to install R first. RStudio is only an interface making it easier for you to interact with R.
- You may use other software/packages (Stata, MATLAB, Python, Julia, etc.) for psetting. But they will not be taught in class.

Teaching and Learning Activities

Lectures

- Lectures will be conducted via **Zoom**. This is subject to change if the University changes its policies during the semester. Zoom links for the lectures will be posted on **Canvas**. Please make sure to use your ITSC account to access them. **Only users with domains @connect.ust.hk or @ust.hk will be given access to the Zoom meeting rooms.** You need to use the app version of Zoom to access all the functions. Please refer to the following ITSC websites for proper setup and troubleshooting: <https://itsc.ust.hk/zoom-online-teaching/student-guide-2020-spring> and <http://cei.ust.hk/files/public/suggested-settings-for-student-accounts-in-zoom.pdf>.
- Please make sure to attend all lectures. Not all the topics in the textbook will be covered, and the ones I cover in the lectures will be the focuses of the exams. I will post slides days before the lectures. It will be helpful if you read them in advance.
- Each lecture will be broken into two mini-lectures. When you have a question on the lecture, feel free to post it using the **chat to everyone** function in Zoom. Please include the page number of the relevant slide in your question. I will answer the questions at the end of each mini-lecture.

Tutorials

The TA will discuss problem sets in the tutorials. Tutorial sessions are NOT weekly. The TA will make an announcement and post the Zoom link through Canvas before each session. No tutorial sessions in the first week.

Assessment

Problem Sets (20%)

- There will be four to five problem sets during the semester. **If there are five, the lowest grade will be dropped. If there are four, all of them count.** Each counted problem set shares a weight of 5% towards the final grade. The problem sets will involve both theoretical and empirical work. You may discuss the questions and work in groups, **but you must submit your own solutions.**
- The problem sets will be posted in Canvas. You have to submit your solutions through **Canvas** by the due date and time. **Submissions by emails or to the department mailboxes will NOT be accepted. Only PDF/JPG/JPEG/HEIC files will be allowed.**

Midterm (30%)

- **Date and time (tentative): Oct. 16 (Friday), 8 pm-9 pm.**
- The midterm will be open-book, proctored, and online (unless the University changes relevant policies). Details including the rules and protocols will be announced later.
- The midterm will cover Modules 1-4.

Final (50%)

- Date and time: TBA.
- The final will be open-book, proctored, and online (unless the University changes relevant policies). Details including the rules and protocols will be announced later.
- The final will be cumulative, covering all the course materials including those covered by the midterm.

Course Intended Learning Outcomes (Course ILO)

Upon completion of the course, you will be able to:

1. Understand the key assumptions used in regression models, and explain the relationship between those assumptions and properties of estimators.
2. Use regression for basic economic data analysis, conduct statistical inference, and interpret the results.
3. Use the software R to conduct econometric analysis.
4. Collect data to conduct your desired empirical analysis, and provide answers to economic questions.
5. Present your understandings of certain economic problems, and use empirical results to justify your explanation.

Course Policies

These policies should not be regarded as exhaustive. I may add new ones should new circumstances arise.

During Class

You should use your official name to join a Zoom meeting. Any distracting behaviors, such as using the Chat function in Zoom to post lecture-unrelated materials, will not be tolerated. A student violating the rule will be removed from the Zoom meeting room and receive significant deduction of points from his/her final grade.

Exams

- There will be no make-up exam for the midterm. If you miss the midterm, you will receive a zero. The only exception is a verifiable medical reason, in which case the weight of the midterm will be moved to the final exam. If you miss the final, you will receive an "F" (fail) for the course. The only exception is that you apply for a make-up exam and get approved by the University (https://arr.ust.hk/reg/em/em_std_reg/reg_makeup.html). Only in that case a make-up final would be arranged.
- There is zero tolerance of cheating. If you are caught cheating, you will receive a zero for the course. The case will be reported to both the department and the school levels.
- For the online exams, you must comply all the rules that will be separately sent out before the exam. Some basic need-to-know/have are in order:
 - You will need to a computer (preferable with a webcam) and a mobile device.
 - It is your responsibility to find an isolated place where you have reliable internet connection to do the online exams.
 - You will be required to record your computer's screen throughout the exams.
 - You will be required to scan your written exam as PDF files and upload them to Canvas in the designated time.
 - Time zone, unstable internet or other technical difficulties other than Canvas/Zoom server failures, are NOT excuses for failure of complying the rules.
 - I may orally question you about your answers and in case of disputes over any suspicious activities, void your exam entirely without re-examination.

BE PREPARED!

Late Submission

Late submission of the problem sets, including uploading failure due to using a different file format other than instructed, will not be accepted unless you have a verifiable medical reason.

Re-grading

Re-grading must be completed within **one week** from the time the grade of a problem set or an exam is released. Please contact the TA regarding re-grading.

Academic Integrity and Honesty

Students are required to comply with the university policy on academic integrity found <http://ugadmin.ust.hk/integrity/student-1.html>

Tentative Schedule

The schedule is tentative and subject to change as the semester progresses. The chapter numbers refer to the textbook. Read the entire chapters, but focus on the parts covered in the lectures.

Module 1. Introduction (Ch. 1)

- Classes: Sept. 7 (Mon).

Module 2. Review of Probability (Ch. 2)

- Classes: Sept. 9 (Wed), Sept. 14 (Mon), Sept. 16 (Wed).

Module 3. Review of Statistics (Ch. 3)

- Classes: Sept. 21 (Mon), Sept. 23 (Wed), Sept. 28 (Mon).

Module 4. Linear Regression with a Single Regressor: Estimation (Ch. 4)

- Classes: Sept. 30 (Wed), Oct. 5 (Mon), Oct. 7 (Wed), Oct. 12 (Mon).

Midterm Review

- Class: Oct. 14 (Wed).

Midterm Exam

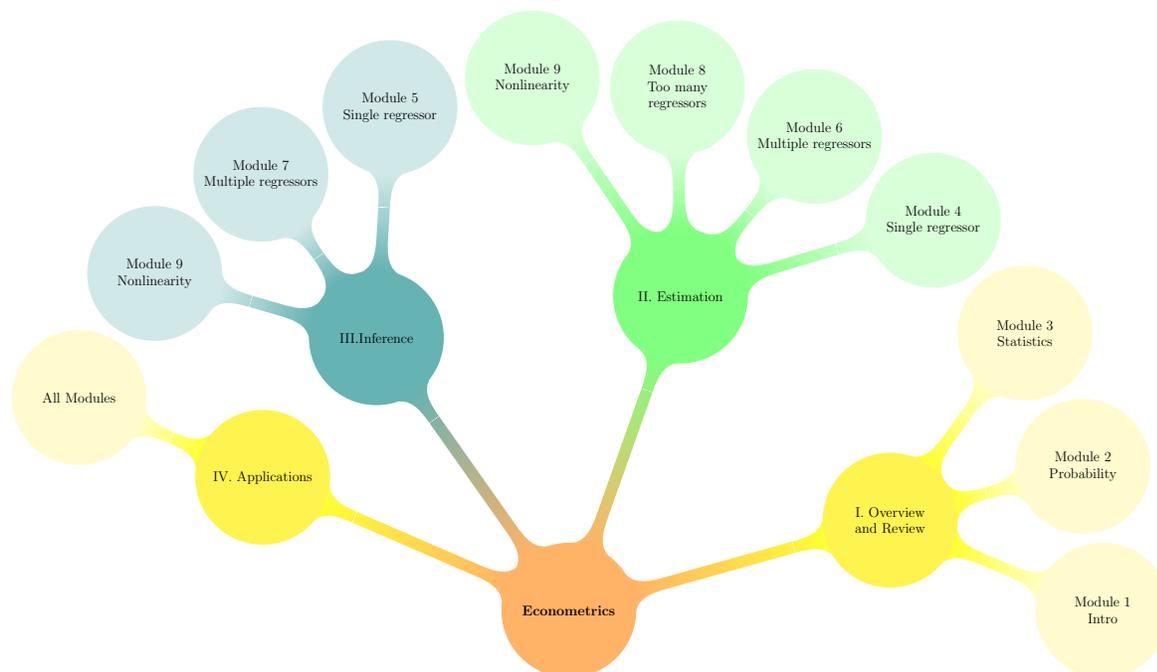
- **Date and time (tentative): Oct. 16 (Friday), 8 pm-9 pm.**
- Covers Modules 1-4.

Module 5. Linear Regression with a Single Regressor: Inference (Ch. 5)

- Classes: Oct. 19 (Mon), Oct. 21 (Wed).

Module 6. Linear Regression with Multiple Regressors: Estimation (Ch. 6)

- Classes: Oct. 28 (Wed), Nov. 2 (Mon), Nov. 4 (Wed).



A Knowledge Map of Econ 3334

Module 7. Linear Regression with Multiple Regressors: Inference (Ch. 7 & 9)

- Classes: Nov. 9 (Mon), Nov. 11 (Wed), Nov. 16 (Mon).

Module 8. Linear Regression with Too Many Regressors: Big Data (Ch. 14)

- Classes: Nov. 18 (Wed), Nov. 23 (Mon).

Module 9. Nonlinear Regression Function (Ch. 8)

- Classes: Nov. 25 (Wed), Nov. 30 (Mon).

Final Review

- Class: Dec. 2 (Wed).