Econ 3334 Introduction to Econometrics L1 (4 Credits)

Department of Economics, HKUST

Fall 2023

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Office Hours: Wed 10:40 am-noon (or by appointment)
Class Hour and Venue: Mon & Wed 9:00 am-10:20 am, LSK 1003 (L1)

TA: MOK, Cindy **Email**: cindymok@ust.hk

TA's Office Hour: Tue 3 pm-4 pm, LSK 6066
Tutorials: Wed 4:30 pm-5:20 pm, LSK 1033

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.

Learning Outcomes

On 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. (SILO 1, 3)
2. Use regression for basic economic data analysis, conduct statistical inference, and interpret the results. (SILO 1, 3)
3. Use the software R to conduct basic econometric analysis. (SILO 1, 2, 3)
4. Collect data to conduct your desired empirical analysis, and provide answers to economic questions. (SILO 1, 2, 3)
5. Present your understandings of certain economic problems, and use empirical results to justify your explanation. (SILO 1, 2, 3, 4)

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.
  - 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 and Generative AI

- 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 sequentially install the following:
  1. R: https://www.r-project.org/.
  2. RStudio (or, changing name to Posit): 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.). But they will not be taught in class.
- **GPT and other generative AI**. You can use them freely for this course, including homework. Subject to change depending on the university's general policies. **If you use them for your homework questions, you are required to give them credit properly by stating how they helped you with the questions.**
  - You can access GPT-4 through https://chatgpt.ust.hk/.
  - GPT-4 is not very reliable when solving math problems. Don't always trust it. You, not GPT, are responsible for your own homework.
  - None of such tools is allowed in the exam.

Teaching and Learning Activities

Lectures

- The default teaching mode is in-person following the university's current policy. Subject to change if policies change.

- 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 before the lectures on Canvas.

Tutorials

Tutorial sessions are NOT weekly. The TA will make an announcement via Canvas before each session. No tutorial session in the first week.

Assessment

Problem Sets (20%)

- There will be four problem sets during the semester. Each 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%)

- In-class on Oct. 25 (Wednesday).

Final (50%)

- Date and time: TBA.
- The final will be cumulative, covering all the course materials including those covered by the midterm.

Policies on Exams and Problem Set Submission

- Proctored midterm and final exams will be held **on campus** for all students following the current policy of the university. More details will be announced before the exams.
- There will be no make-up exam for the midterm. If you miss the midterm, you will receive a zero except there is a verifiable medical reason or other emergency, 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.

- 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 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. 4 (Mon).

Module 2. Review of Probability (Ch. 2)

- Classes: Sept. 6 (Wed), Sept. 11 (Mon), Sept. 13 (Wed).

Module 3. Review of Statistics (Ch. 3)

- Classes: Sept. 18 (Mon), Sept. 20 (Wed), Sept. 25 (Mon).

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

- Classes: Sept. 27 (Wed), Oct. 4 (Wed), Oct. 9 (Mon), Oct. 11 (Wed).

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

- Classes: Oct. 16 (Mon), Oct. 18 (Wed).

Midterm Exam

- Oct. 25 (Wed), in-class.

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

- Classes: Oct. 30 (Mon), Nov. 1 (Wed), Nov. 6 (Mon).

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

- Classes: Nov. 8 (Wed), Nov. 13 (Mon), Nov. 15 (Wed), Nov. 20 (Mon).

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

- Classes: Nov. 22 (Wed), Nov. 27 (Mon).

Final Review

- Class: Nov. 29 (Wed).