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Econometrics B
Econ 120B, Fall 2020

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The information below should be considered extremely tentative, and will likely change depending on our pace and situation through the quarter. I reserve the right to modify this information as needed. Please check the syllabus and Canvas announcements regularly for updates.

Course description: As a follow-up to the course Econ 120A, this course provides an introduction to the regression analysis frequently used in economics, business, and many other areas. It deals with applications of statistical methods for testing and estimation of causal relationships can be inferred from data. The material can be challenging and the workload is substantial. However, the payoff for this course is a set of skills and analytical tools that are very useful and in high demand in the marketplace.

Learning objectives:
1. The goal is to learn enough theory and get enough practice to be able to do some simple but sensible regression analysis on your own.
2. The students should obtain the skills for basic regression analysis with real economic data.
3. The students will develop a working knowledge of Stata, an econometric software package.

Prerequisites: Econ 120A or ECE 109 or MAE 108 or Math 180A or Math 183 or Math 186.

Lectures: Tu/Th: 9:30 am – 10:50 am @ https://ucsd.zoom.us/j/97338871440

Instructor: Dr. Munpyung O
- Office hours: 5:00 pm – 6:00 pm on Thursday and by appointment
      @ https://ucsd.zoom.us/j/6571145643.
- email: m1o@ucsd.edu

  Please use your **UCSD email** and include "**Econ 120B**" in the subject line of your email.

TA discussion sections: 4:00 – 4:50 pm on Wednesdays.

Teaching assistants and UIAs:

Name	email	Zoom id for office hours
Xi, Jin (TA)	x5jin@ucsd.edu	https://ucsd.zoom.us/j/235442208
Winseck, Kevin Lee (TA)	kwinseck@ucsd.edu	https://ucsd.zoom.us/j/99331195802
Zheng, Jiawei (UIA)	jiz613@ucsd.edu	https://ucsd.zoom.us/j/3809048657
Chi, Dian (UIA)	dchi@ucsd.edu	https://ucsd.zoom.us/j/9725074554

Office hours:	1) Mondays	10:00 - 11:00 am	(TA: Winseck, Kevin Lee or Xi, Jin)
	2) Tuesday	1:00 - 2:00 pm	(UIA: Zheng, Jiawei)
	3) Thursday	5:00 - 6:00 pm	(Dr. O)
	4) Friday	2:00 - 3:00 pm	(TA: Winseck, Kevin Lee or Xi, Jin)
	5) Saturday	2:00 - 3:00 pm	(UIA: Chi, Dian)

Lectures, discussion sections, office hours, and tests will be delivered remotely. Both lectures and TA's discussion sections will be recorded and made available to students asynchronously. You are **strongly** recommended to attend TA discussion sections since the TA will review material covered in class, and also introduce material not covered in class and go over practice problems, the kind of problems you may encounter on exams. You will also be able to ask the TA any question about the material covered in the lectures during the discussion section.

Course web page: A course web page is available at http://canvas.ucsd.edu/. It will include information relevant to the course, such as syllabus, announcement, problem sets and more. **You should check this page regularly**.

Course materials:

- Required textbook: James H. Stock and Mark W. Watson, *Introduction to Econometrics*, 4th edition, Pearson. You can use other editions of the textbook if you wish, but the problem set will refer to the 4th edition.

    - Your digital course materials are provided by the UC San Diego Bookstore through Canvas and are free for the first two weeks of classes. If you decide not to purchase these materials, you can opt-out by going to the Redshelf link in your Canvas page and clicking "OPT-OUT". If you opt-out by 10/17/20, your student account will NOT be charged.

- Required Statistical Software: STATA

    Our school has a site license for STATA/SE 16. You can download and install Stata in your computer freely. The code, serial number, software file, and Stata installation guide have been posted on Canvas.

- Optional textbook on using STATA: Lawrence Hamilton (2012), *Statistics with STATA (updated for Version 12)*, 8th edition, Cengage Learning.

Problem sets: I will periodically assign problem sets throughout the course. Even though they will not be collected or graded, it is VERY important to do them. The problem sets are the best way to learn and be prepared for the exams.

Exams:
1. Practice test on Thursday, Oct. 15.
2. Midterm 1 on Tuesday, Oct. 27.
3. Midterm 2 on Thursday, Nov. 19.
4. Final exam during 8:00 - 11:00 am on Thursday, Dec. 17.

It is the student's responsibility to create a schedule that does not have any conflicts.

"We will use Zoom/LockDown for proctoring this quarter. This program use video and audio recording or other personal information capture for the purpose of facilitating the course and/or test environment. UC San Diego does not allow vendors to use this information for other purposes. Recordings will be deleted when no longer necessary. However, if cheating is suspected, the recording may become part of the student's administrative disciplinary record. Finally, I reserve the right to give an oral test if I feel it is necessary to uphold academic integrity."

Makeup exams: Make-up examinations will be given only under very unusual circumstances and only if the student provides official written notification to the instructor no less than a week prior to the missed test. Students who miss a test without a **justifiable** and **verifiable** reason, will most likely fail the course. No exception!

Grades: The overall score will be computed as follows:

- Practice test: 3%
- Midterm 1: 20%
- Midterm 2: 30%
- A comprehensive final: 47%

There is no opportunity in this course to do "extra credit" work. Your grade will be determined solely by the test scores. The overall course grade will be curved. **I reserve the right to modify these weights as needed during the quarter.**

Technical resources for students:

- Digital Learning: https://keeplearning.ucsd.edu
- Academic Support for Remote Learning: https://commons.ucsd.edu/for-students/index.html
- COVID-19 Information: https://vcsa.ucsd.edu/news/covid-19-info.html

Disability: If you have a documented disability, please bring your documentation to me as soon as possible so that I can make suitable accommodations for you. If you believe that you have a disability and desire accommodation, please register with the Office for Students with Disabilities.

Class conduct: Each student is expected to contribute and help to maintain a positive classroom environment conducive to learning. Do not socialize or read newspapers during class, and be sure your cell phones are turned off. No text messaging is allowed. If you must arrive late or leave early, do so quietly.

Academic integrity: Any student found responsible for violating UCSD's academic integrity policy will earn a failing grade for the course. In addition, the Council of Deans of Student Affairs will impose a disciplinary penalty. You can find information on the university's policy on academic integrity at this website: http://academicintegrity.ucsd.edu

General comments

- Even if I don't explicitly assign reading from the text, it is a good idea to read the chapter before coming to class in order to have some understanding of the concepts to be presented.
- ***This class moves rapidly***. *Cramming* is not an effective way to learn this material. A student who keeps up with the topics as they presented will find the course much more enjoyable and will master the concepts more quickly.
- **Attend all lectures**. You are responsible for any information given during lectures.
- Please do use my office hours for everything related to the content of the course. If you have doubts about the materials, do not wait until a few hours before the exam.
- Students are encouraged to ask questions in class. You've probably heard this before, but if you have a question, chances are that others in the class have the same question.

Course content and schedule (Changes, if any, will be announced in the class.)

The following course schedule should be considered tentative, and will likely change depending on our pace through the quarter. I reserve the right to modify this schedule as needed during the quarter.

0. Introduction and a brief review of Econ 120A (Chapter 1 - 3)

   - Random variable and its characterization
   - Sampling distribution, sample statistics: standard deviation and standard error
   - Covariance, correlation, regression, causality, the notion of Ceteris Paribus
   * Causal effects from the observational and experimental data

1. Simple Regression (One regressor): Estimation (Chapter 4)

   - Estimation, good estimation (BLUE)
   - OLS, MOM, (MLE - without calculus, intuition only)
   * Geometry of Regression: Conditional expectations, projection
   - Statistical and economic interpretation estimated coefficients
   - Measure of fit: SER and R-squared

2. Simple Regression (One regressor): Inferences (Chapter 5 and part of Chapter 8.2)

   - OLS Assumptions
   - Sampling distribution of the OLS estimators
   - Confidence intervals, Testing statistical significance of a single parameter: t- test
   - Heteroskedasticity and Homoskedasticity
   - Data scaling: Unit of measurement and log variables in regression
   * OLS asymptotics
   * ANOVA basics

3. Multiple Regression: Estimation (Chapter 6)

   - OVB (Omitted variable bias)
   - Statistical and economic interpretation estimated coefficients: Partial (Marginal) effect
   - Measure of fit: Adjusted R-squared
   - OLS Assumptions for multiple regression: multicollinearity

4. Multiple Regression: Inferences (Chapter 7)

   - Sampling distribution of the OLS estimators
   - Efficiency of OLS: The Gauss-Markov theorem
   - Confidence intervals, one sided t-test
   - Testing a linear combination of parameters
   - Testing statistical significance of a group of parameters: F-test

5. Topics in Multivariate Regression (Chapter 8 and 9)

   - Regression with qualitative independent variables: Dummy variables
   - Modeling nonlinear functions: Polynomial regression, Interaction terms
   - Internal and External validity of Multiple Regression Analysis

I reserve the right to add and/or subtract topics as the course progresses. Not all topics will be covered in the same detail. Time constraints may cause some topics to be omitted.