Econ 120B: Econometrics

Professor Yixiao Sun
Department of Economics,
University of California, San Diego
Summer 2020

1. Teaching Team

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2. Organization

Disclaimer I: The information below reflects the official schedule of classes as of August 1, 2020. Please check the schedule for updates.
Disclaimer II: Given the uncertainty due to the pandemic, some of the details on the syllabus may change. Please check Canvas regularly for updates.

Delivery and class time

We will use Zoom and Canvas heavily.

- The lectures and discussion sessions will be delivered live, remotely via Zoom.

- The lecture meeting time: 2:00 pm – 3:20 pm from Monday to Thursday.

- The discussion meeting time: 1:00 pm – 2:50 pm on Friday

- Please log onto canvas.ucsd.edu to get Zoom links (under "Zoom LTI PRO").

- All lecture sessions and discussion sessions will be recorded and made available asynchronously via Canvas under "Media Gallery."

- Depending on the feedback from the class, we may adopt a mix of live sessions and asynchronous videos.

Office hours

We will hold our office hours via Zoom. Zoom links will be posted on Canvas (under "Zoom LTI PRO")
 Yixiao Sun's office hours: 4:00 pm – 5:00 pm on Tuesdays and Thursdays
 Jin Xi's office hours: 4–5pm on Wednesday, and 3– 4pm on Friday

Communications

1. We are available for questions during our office hours and discussion sessions.

2. You can post your questions to the discussion board on Canvas. We will check the discussion board regularly and answer your questions there.

3. You are welcome to email us. However, we feel that email is not a very efficient way to ask econometric questions, especially when equations are involved. We prefer to meet with you on Zoom during our office hours. When you email us, please include ECON120C in the subject line.

4. As your instructors, we do not have any control over enrollment, waiting list, and any other administrative issues.

3. Course Description

ECON 120B is the second course in the core econometrics sequence. We will study linear prediction models and linear causal models, both of which are widely applied in business, finance, public policy, and other areas. We will introduce the three basic concepts in econometrics: quantifying uncertainty with confidence intervals and hypothesis testing; using regression for prediction, and using regression to infer causal relationships. The course provides the standard tools necessary to perform and to read empirical research.

Throughout, we will focus on both understanding and doing. The understanding part will come from lectures and discussion sessions. The doing part will come from problem solving and extensive statistical software use. This course requires serious commitment. Econometrics is best learned by doing, and you will be asked to do a fair amount of hands-on work.

Prerequisites

ECON 120A or ECE 109 or MAE 108 or MATH 180A or MATH 183 or MATH 186.

Textbook

The required textbook for this class is **Introduction to Econometrics**, by James Stock and Mark Watson (the third edition). The book will be available as an eBook through Canvas. Note that the lectures will cover many additional materials not found in the textbook.

The eBook and any other digital course materials, if any, are provided by the UC San Diego Bookstore through Canvas and are free for the first week of classes. After the first week of free access, your student account will be charged the inclusive access price of $22.38 unless you opt out. If, for some reason, you decide you do not want to purchase these materials, you can opt-out of the Inclusive Access program by going to the Redshelf link in your Canvas page and clicking "OPT-OUT". If you opt-out by 8/08/20 (the drop/add deadline), your student account will NOT be charged.

For any questions about billing, please contact textbooks@ucsd.edu.

To opt-out:
Click the RedShelf link in Canvas
Click View Course Materials
Scroll down to the gray opt-out button and follow the prompts

Econometrics Video Handbook

The course will closely follow the Econometrics Video Handbook (EVH), which is available through Canvas. For some topics, you may be asked to watch videos in the EVH. I will email you which video(s) to watch. The EVH is the product of the department's most recent effort in modernizing econometric training at UCSD.

Main Topics

Part I: Introduction and Review

- Introduction to Econometrics (EVH.D)

- Review: Probability Framework

- Review: Estimation, LLN and CLT (EVH.C1.d; EVH.C1.e)

- Review: Hypothesis Testing and Confidence Interval (EVH.C3-C4)

Part II: Simple Linear Prediction Model with One Predictor (EVH.E1)

- Conditional Expectation

- Population linear regression model

- Least square principle

Part III: Simple Linear Causal Model with One Causal Factor (EVH.F1-F4)

- EVH.F1: Causality and causal models

- EVH.F2: Predictive Analysis and Causal Inference

- EVH.F3: Simple Linear Causal Model

Part IV: Extension of Parts II and III

- Linear Prediction Model with More Than One Predictors (EVH.E2)

- Linear Causal Model with More Than One Causal Factors (EVH. F5)

Part V: Topics in Multiple Regression

- Nonlinear regression functions: Predictive perspective (Chapter 8)

- Bias of the OLS as an Estimator of a Causal Effect (Chapter 9)

4. Software

You will have to use the statistical software package Stata to solve some assignment problems. Download and license information is available on Canvas. Please do not distribute the license information outside of UCSD. It is against the law.

5. Assessment

Assignments (20%)

There will be four assignments, each of which will carry a weight of 5% towards the final class grade. Assignments will be graded on three scales. A score of 50% will be given to an assignment which is clearly incomplete, but has made a start towards answering some of the questions. A score of 75% will be given to an assignment which is largely complete, but does not answer every question in full. A score of 100% will be given to an assignment which is clearly well-done, and answers all of the assigned problems.

The assignments will involve both theoretical and empirical work. If you have any question on the problem sets, please ask me or TA during our office hours. Our office hours are for you.

Answers to assignments are to be submitted via Canvas. You can scan your answer into a pdf using a free app on your smart phone. Do not email assignments.

Assignments are due at 11:59 pm on the **first four Sundays of the quarter (please note the change)**. Late answers will not be accepted! The lowest assignment score will be dropped. The average of the rest three scores will be counted toward your final grade. The tradeoff for this benefit is that I will be strict about not accepting late assignments.

For each assignment, a solution will be posted on Canvas after its due date. The solution will be posted together with the assignment. Some assignment problems will appear in the exams.

Midterm Exam (30%) and Final Exam (50%)

There will be one midterm exam and one final exam.
Midterm Exam Time: August 19, 2020; 2:00 pm — 3:20 pm
Final Exam Time: September 5, 2020; 3:00 pm — 5:59 pm

- Both exams will be delivered via Canvas. Please make sure you have a good and stable internet connection.

- Both exams will be closed-book. You will need a calculator (just a simple one will do, no need for scientific or business calculators). You are not supposed to get assistance from others or post your question on the Internet during an exam. You are not allowed to use any search engine. You can bring ONE page (double-sided, no larger than 8.5in by 11in) of note. It must be hand-written; photo reducing and pasting are not permitted. The one-page policy applies to both the midterm exam and the final exam.

- There will be no make-up exam. If you miss the midterm for a verifiable medical reason, I will increase the weights of the final exam proportionally. Failure to notify me promptly that you must miss the midterm will result in a zero grade. Unexcused absences will also result in a zero.

- We will use Zoom to proctor the exams. We may ask you to show your student ID card. You are required to record your computer screen (only one monitor is allowed), desktop, and surroundings using Zoom, and share the recording via Canvas. Failure to provide a proper recording will result in a zero grade for the exam.

- You will need to scan your exam answers and submit them via Canvas.

- There will be no make-up exams. An exception is medical absence, in which case a doctor's certificate is required. Please scan and email the doctor's certificate **as soon as possible**. Failure to notify us before or on the exam date will result in a zero grade.

Grading

The course grade will be assigned as follows. First, the weighted average of numerical scores will be obtained. Suppose your scores on the assignment are 100, 100, 100, and 75. Your quizzes and final exam scores are 80 and 85, respectively. Then the weighted average is 100*5%+100*5%+100*5%+100*5%+80*30%+85*50% = 86.5. The weights on the assignments, quizzes, and the final exam cannot be changed. Second, if the class mean of the weighted average is below 75 points, points will be added to all scores to bring the mean score to 75 points. Finally, letter grades will be assigned using the following scale:

>=90 A+	[75,80) B+	[60, 65) C+	[45 50) D
[85,90) A	[70,75) B	[55, 60) C	< 45 F
[80,85) A-	[65,70) B-	[50, 55) C-	

Note that the scale is exact. So if your score is 86.5, you will get an A.

6. Other policies

If you have a documented disability, please email me your documentation 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.

Students who violate 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.