University of California San Diego
Department of Economics

Econ 120B: Econometrics B
Summer-II, 2024

Instructor
Alisher Batmanov
Email: abatmanov@ucsd.edu
Office hours: Friday 12-1pm
Location: Atkinson 6004 and Zoom

Teaching Assistants
Juan David Hernandez Leal
Email: jhernandezleal@ucsd.edu
Office hours: Tuesday 9:30-10:30am
Location: Zoom

Maria de la Paz Ferro
Email: mdferro@ucsd.edu
Office hours: Tuesday 9:30-10:30am
Location: Zoom

Lectures
Monday & Wednesday at 2:00-4:50pm
Location: WLH 2111

Discussions
Friday at 5:00-6:50pm
Location: WLH 2111

Exam Dates
Midterm - Aug 24 at 11am in SOLIS 104
Final - Sep 7 at 9am in SOLIS 104

Course Description

This course has three main goals:

(1) The first goal is to **equip you with a thorough understanding of causal inference**. This course will cover key concepts such as selection and random assignment, natural experiments, and the potential outcomes framework. You will learn how to distinguish correlation from causation and apply these techniques to real-world problems.

(2) The second goal is to **enhance your proficiency in statistical and econometric methods**. After we review core probability concepts, you will learn the basics of linear regression, explore the properties of regression estimators, and learn how to conduct statistical inference.

(3) The third goal is to **develop your skills in data analysis and interpretation**. Throughout the course, you will work with datasets to apply the concepts learned in class using the statistical software called Stata. By the end of the course, you will be able to use it to run linear regressions, interpret their results, and make informed conclusions based on your analysis.

ECON 120B is the second course in the core econometrics sequence. The focus will be on identifying causal relationship between variables of interest using linear regression.

Prerequisites: ECON-120A | ECE-109 | MAE-108 | MATH-180A or 183 or 186

Textbook

There is no official or required textbook for this course. All necessary materials, including lecture slides and handwritten notes, will be posted on Canvas. These resources are designed to be comprehensive and self-sufficient, containing everything you will need to succeed in this course.

For those interested in additional reading, the lecture material will be based on the following textbooks: *Introduction to Econometrics* by James Stock and Mark Watson, *Causal Inference: Mixtape* by Scott Cunningham, *Introductory Econometrics: A Modern Approach* by Jeffrey Wooldridge, and *Mostly Harmless Econometrics* by Joshua Angrist and Jörn-Steffen Pischke. Additionally, some lecture content will draw from teaching materials by Peter Hull, Jon Roth, and Paul Goldsmith-Pinkham.

Lectures and Discussions

This is an **in-person class**, and as such, attendance and participation will be expected and essential for your learning.

As an encouragement for you to attend lectures, there will be an opportunity for you to earn up to 5% as a **bonus** to the course grade. Six times during the quarter we will have pop quizzes and you will be guaranteed at least 0.6% out of 1% if you are present on the day of the quiz regardless of your performance.

As an encouragement for you to attend discussions, your TAs will cover at least one problem from the upcoming problem set during the discussion in a given week.

Note that lectures, but not discussions, will be podcasted. We will be posting all slides and notes on Canvas. There will be regular **office hours** held by the instructor and the TAs for you to ask any course-related or general questions, we encourage you to come and ask questions about class material and problem sets.

There will also be a class **Discord server** which is the easiest way for you to ask us any questions – your TAs and I will try our best to address your questions as fast as we can. You can also use Discord to make groups to work on problem sets together. Here is the link to join the server: discord.gg/egTyMGDAKD

Stata

You will use the statistical software called *Stata* for questions on problem sets that ask you to work with data. The first discussion session will partially be dedicated to learning how to implement the basic commands in Stata - do not hesitate to reach out to your TAs if you have any questions about Stata. Download and license information is available under Modules on Canvas. Both the installation file and the license are meant for students enrolled in this class only. Please do not share these information with anyone outside of this class.

Assessment

Your course grade will be determined based on the following components:

Problem Sets (x3)	45%	Due on **Saturdays, Aug 10, Aug 17 and Aug 31 at 11:59pm**. Work individually or in groups of up to 4. Submit one solution per group on Gradescope.	Weeks 1, 2 & 4
Midterm	25%	Held on **Saturday, Aug 24 at 11:00 am in SOLIS 104**. Duration - 90 minutes.	Week 3
Final	30%	Held on **Saturday, Sep 7 at 9:00 am in SOLIS 104**. Duration - 2 hours. The final exam is cumulative.	Week 5
Bonus Quizzes (x6)	5%	In-class pop quizzes (unannounced). Guaranteed 0.6% out of 1% if present on a quiz day. The lowest score dropped.	Weeks 1-5
Total:	100% + 5%		

Problem Sets: In the weeks with no scheduled exams (1, 2 and 4) you will be assigned problem sets to be completed individually or in groups of up to 4 students. Each problem set carries the weight of 15% of your course grade. Please upload your solutions directly on **Gradescope**. Problem sets are designed to test your conceptual understanding of class concepts, ability to carry out analytical derivations and ability to apply concepts from lectures when working with actual data.

Late submissions of up to 12 hours after the deadline will be penalized by 5% out of 15% subtracted from the final score. No submissions will be accepted after 12pm on the following day. If you cannot submit your solutions by the deadline due to a verifiable medical/legal/sports reason, you must notify me at least 12 hours before the deadline and the weight will be shifted to other problem sets.

Midterm and Final Exams: The exams format is a mix of multiple-choice questions and essay-type problems. Exams are closed book but you can bring one cheat sheet to the exam, which should be no larger than a standard letter-sized paper (8.5 x 11 inches). Both sides of the paper may be used. Please bring a calculator to exams. You can use any calculator but a simple one will be sufficient. Other electronic devices (phone, tablet, laptop, etc.) are not permitted. Please bring a photo ID.

There will be no make-up midterm. If you miss the midterm for a verifiable medical/legal/sports reason, we will increase the contribution of the final exam to 55%. You must notify me that you must miss the midterm exam at least 12 hours before the exam and failure to do so will result in a zero grade for the midterm. Unexcused absences will also result in a zero grade. A make-up final exam might be given only for a verifiable medical/legal/sports reason. Failure to notify me at least 12 hours before the exam that you must miss the final exam will result in a zero grade for the final. Unexcused absences will also result in a zero grade.

Bonus Quizzes: There will be six **in-class** pop-up quizzes, which will be unannounced. Each quiz will consist of 5 straightforward questions based on the material recently covered in class. If you are present on the day of the quiz but score less than 3 correct answers, you will still receive a minimum of 3 out of 5 points (0.6% out of 1% per quiz). This means

if you are present five out of six times the quiz is administered, you are guaranteed 3% and can earn up to 5% towards the course grade. The lowest score will be dropped.

Letter Grades:

The course is generally graded on a relative curve. This means that I will not use any standardized scale (93%+ A, etc.) when assigning letter grades. No individual assignment or exam will be curved, only the overall numerical score at the end of the course. Top 30% of class can expect an A (A+, A, or A-). Top 70-75% can expect at least a B (B+, B, or B-). **I will also track the performance of students who actively participate in class.** At the end of the quarter, if these students' letter grades are close to the cutoffs (for example, between an A- and a B+), I may adjust the letter grades upwards for this sample of students.

Administrative Issues

(1) If you have a documented disability, please bring your AFA 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.

(2) Midterm and Final Exam Proctoring

   (a) Late show-up: If you arrive to take the exam after the first 30 minutes, you will not be allowed to take the exam.

   (b) Restroom policy: You may not use the restroom during the last 30 minutes of the exam.

(3) Grading concerns: If you believe there is a grading mistake, you must let us know within one week of the exam scores being posted. We are using Gradescope to grade exams and Gradescope makes it very easy to ask for a regrade.

Academic Honesty and Plagiarism

All graded work must be done by you. Familiarize yourself with the University's policy on academic integrity: UCSD Academic Integrity Policy. Zero-tolerance policy for violations applies. 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.

Tentative Course Schedule

	Date	Activity	Topic
Week 1	Mon, Aug 5	Lecture 1	Intro to causal inference
	Wed, Aug 7	Lecture 2	Review of probability theory
	Sat, Aug 10	Problem Set #1 due	
Week 2	Mon, Aug 12	Lecture 3	Potential outcomes framework
	Wed, Aug 14	Lecture 4	Linear regression
	Sat, Aug 17	Problem Set #2 due	
Week 3	Mon, Aug 19	Lecture 5	Properties of estimators
	Wed, Aug 21	Lecture 6	Statistical inference
	Sat, Aug 24	Midterm	
Week 4	Mon, Aug 26	Lecture 7	Multiple linear regression
	Wed, Aug 28	Lecture 8	Nonlinearity and interactions
	Sat, Aug 31	Problem Set #3 due	
Week 5	Mon, Sep 2	Lecture 9	Instrumental variables
	Wed, Sep 4	Lecture 10	Natural experiments
	Sat, Sep 7	Final	