University of Colorado at Boulder
Department of Economics

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Website: Canvas
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ECON 8848: Applied Microeconometrics, Spring 2021
Syllabus and Schedule
Office Hours: M/W 11:00-12:00
https://cuboulder.zoom.us/my/briancadena
Please use this link to schedule a specific time:
https://calendly.com/brian-cadena/econ-8848-office-hours

Course Description:

Students who are successful in this course will be well prepared to conduct empirical research across a broad range of fields, although the tools are used most frequently in the applied microeconomics fields. The course provides a "user's guide" to many of the most commonly used econometric techniques, with a heavy focus on implementation and interpretation. We will begin the course with a STATA boot camp, quickly becoming familiar with the software package including programming techniques and data management skills. We will then move through a range of econometric topics, making sure to practice each technique in STATA.

Prerequisites:

To enroll in this course, you must have a working knowledge of statistics and econometrics equivalent to that obtained in ECON 7818 and ECON 7828.

Course Materials:

There is no required textbook for this course, although I will provide references to a number of books and articles for the interested student. We will also read and discuss several articles. Some of these articles will be "theory" articles, discussing the relative merits of estimators or developing and applying new ones. Others will be "application" papers, usually papers that use a technique we have discussed in an honest and useful way. I will also provide lecture notes, and you will find these and the assigned articles posted or linked on the Canvas website. You should read the articles assigned prior to coming to class and be prepared to answer questions and participate in discussions. Please bring a copy (paper or electronic) of the papers we are discussing with you to class.

Students are not required to purchase their own copies of STATA, although those desiring to do so qualify for a substantial student discount More information is available through a link posted on the Canvas website. You may complete all of the exercises for this class using Stata/IC, although you may prefer to purchase a more powerful "flavor" (SE or MP) if you intend to use Stata for your work beyond this course.

I will use Stata during some lectures to demonstrate estimators and methods that we cover. If you have Stata installed on your computer, you may find it useful to have it open on those days, but I will provide the code through the course website for review after class.

Requirements and Grading:
Your grade will depend on your performance on a number of assignments, according to the table below:

Assignment	Weight	Due Date
Problem Sets	15%	Every 1-2 weeks (~10 total)
Paper Replication/Extension	30%	Saturday, 5/1 4:30-7:00 PM (Final exam slot)
First Midterm	25%	Wednesday, 3/17 In Class (tentative date)
Second Midterm	30%	Wednesday, 4/21 In Class

Problem Sets will be posted at the onset of the course with deadlines every 1-2 weeks. These problem sets will allow you to gain direct experience with all of the econometric techniques we cover. All assignments will be Stata-based, although they will require answering interpretation/"thinking" questions as well. These problem sets will not require proofs although some will ask you to demonstrate properties of different techniques using simulation. Five percentage points of your overall grade will be based on whether you complete the assignments and turn them in on time. I will also choose two assignments at random to grade in depth, and these grades will account for the remainder of your grade. Note that the problem sets are fairly short and simple to start and become more difficult as we tackle more complicated material. You may work with other students on these assignments, and the code may be identical to other students' submissions. To eliminate the temptation to free ride, each student must submit his/her own copy of the problem set (via Canvas), and you should indicate each of your collaborators on each problem set.

Each student must answer the "thinking/interpretation" questions separately, although you may discuss the answers with other students. It is expressly forbidden to copy and paste answers to these questions from another student, and any evidence that this occurred will result in a penalty of, at a minimum, zero credit for that assignment.

Paper Replication/Extension: Unlike the harder sciences, the field of economics has historically placed a relatively small weight on the value of replication (although this is changing somewhat). Nevertheless, economists make mistakes all the time, and some of them go undiscovered forever. So, as a means to practice all of the skills we are developing, and in service of the broader good, you will replicate the central analysis of a paper in a field that is of interest to you. You should choose a published paper that relies on publicly available data or on data that the authors have made freely available. The paper's central methodology should be one of the methods we cover in this course. You must also provide at least one extension to the original work. Possible extensions include adding additional years of data, running additional specifications (e.g. functional form, synthetic control instead of DiD, etc.), and subjecting the results to additional robustness checks. Alternatively, you could use similar methods in a slightly different context – different geography, different time period, etc. An existing paper is not suitable as a replication paper if you cannot feasibly extend the paper. This assignment will function as our final exam. An electronic copy of this paper will therefore be due on Canvas by the end of our assigned time from the Registrar.

I will submit all final papers to TurnItIn. Note that although this assignment requires the replication of the central analysis from a published paper, you *may not borrow any language from the original paper without proper citation.* I will require that you complete and attach the department's academic integrity cover sheet for the assignment.

The First Midterm will cover material from the beginning of the course through lecture on March 10. The exam will take place during a normal class meeting. You *will not* have to do any STATA programming for the midterm. Instead, the questions will focus on the interpretation and implementation of techniques we have discussed. The questions will thus be very similar to the interpretation questions asked on the problem sets. You may also be asked questions about the papers that we read.

The Second Midterm will be nominally cumulative, but it will focus heavily on material covered after the first midterm. It will be similar in format to the first midterm, and it will take place during our normal lecture time in the penultimate week of classes.

Final Letter Grades will be a weighted average of each of the components listed above. Prior to averaging, I will assign letter grades to each component based on the scores a good student at this level could reasonably be expected to attain.

Writing: Please note that this course requires a great deal of writing. The goal of the course is to prepare you to conduct and *to communicate about* original research in applied microeconomics. As you will soon find, the writing and communication components of applied econometrics are at least as important as the actual econometric skills. In grading papers, exams, and problem sets, I place substantial weight on students' ability to convey their understanding and interpretation of the methodologies and results. I do so in order to mirror the degree to which the discipline rewards these skills, especially in the job market process.

Seminar Series: You are strongly encouraged to attend the Economics department seminar series, especially when the speaker presents on an empirical applied micro topic. Learning to conduct and present original research is the key to your success in the discipline. These seminars are an excellent resource for you in that endeavor. You are also strongly encouraged to attend the LEPHD-overs brown bag series where students will present ongoing research that often uses the techniques we will be discussing.

Late Assignments/ Missed Examinations Policy: Problem Sets will be turned in through the Canvas website where they will receive a time stamp. Problem sets will be posted at least 10 days in advance, and each will be due on a Friday by midnight. Following a 5-minute grace period, I will assign zero credit toward the "completion" component of the Problem Set grade for any assignment turned in after the deadline. In the event that a late problem set is randomly selected to be graded in detail, I will deduct 1 point (out of 5) for each half day it is late, and assignments submitted more than 48 hours after the due date will receive no credit.

The paper replication must be turned in by the end of our assigned Final Exam time from the registrar.

There will be no make-up exams. If you have a conflict with an exam, please discuss the conflict as soon as possible. If you are unable to take an exam as scheduled, the missed exam will be

given no weight in the calculation of the final grade and other assignments will be reweighted accordingly.

A note on my role: I am willing to offer you assistance with any assignment for this course, including the final paper. I will strongly suggest, however, that you form study groups for the problem sets and use the other members of your group as your initial resource in solving programming problems. I will not tell you how to solve specific coding issues on the problem sets, nor will I tell you whether you have answered interpretation questions properly prior to the due date. Solutions will be provided shortly after the deadline to turn in the assignment.

I generally cannot offer help on projects that are unrelated to this course, e.g. work you are doing as part of your dissertation or as an RA for other faculty members. My goal in offering this course is to create a critical mass of well-trained graduate students who can then continue to learn more on their own and then serve as a resource to each other. If I become an official member of your dissertation committee, however, I will be happy to meet with you and discuss your dissertation research.

Cheating: If you copy interpretation answers from a classmate (or previous student) on a problem set, you will receive no credit for that problem set. If you cheat on an exam, you will fail that exam. If you plagiarize even a portion of your final project, you will, at a minimum receive no credit for the copied portion. More than one past student has copied text directly from the paper they are replicating for the final project; if you do this, you will receive no credit for that portion of your work. I reserve the right to impose harsher academic sanctions up to and including failing the course for any instance of cheating. Also, note that failing any component of the course makes it very unlikely that you will earn a "B-" or better in the course.

Learning During a Global Pandemic:
The pandemic has affected and will continue to affect all of us in profound and unpredictable ways. This semester, I commit to offering empathy and flexibility to students enrolled in the class, and I ask that you offer me the same. I recognize that you are adjusting to taking (and teaching!) courses online and that things other than your coursework may have become higher priorities than usual. At times during the semester, you may need to attend to your own health care or care for loved ones. I also recognize that you may have imperfect internet access or that you may be in a different time zone. I am more than willing to be flexible and to find ways to support you. Please be in touch with me if you are struggling and let me know how I can help.

Some of you may have children at home without consistent childcare; know that I will welcome them and their noises as you participate in class. I also have two elementary-school-aged children who will likely be in and out of remote learning this semester, and my spouse and I both work full-time. While I will do my best to keep up normal response times to e-mail and to make myself available outside of regularly scheduled office hours and class meetings, I hope that you will extend some grace and patience to me this semester as well.

We will not have class on the campus-wide wellness day of February 17. I will also observe the "Spring Pause" this semester. Although we will have class on March 22 and 24, there will not be a problem set due that week.

Tentative Schedule

Topic	Tentative Dates
Introduction and STATA Basics	1/15, 1/20
Advanced STATA	
Programming – Loops, Macros	1/25
Simulation	1/27
Linear Regression Review	
Functional Forms – Logs, Polynomials, Categorical Variables, Interaction Models	2/1, 2/3
Review of FWL and the meaning of "controlling for"	2/8
The Experimental Ideal	
Treatment Effects – Potential Outcomes Framework	2/10
Causality in an OLS Regression – the CIA	2/15
No Class – Wellness Day	2/17
Propensity Score Methods	2/22
Advanced Data Management	2/24
Panel Data Models	
Difference-in-Differences	3/1, 3/3, 3/8 – paper
RE, FE, FD	3/10, 3/15 - paper
FIRST MIDTERM EXAM	3/17
Variance Estimation	3/22, 3/24 - paper
Instrumental Variables	
Basics – Constant Treatment Effects	3/29
Local Average Treatment Effects	3/31, 4/5 – paper
Individual Project Meetings	4/7, 4/12
Regression Discontinuity	4/12, 4/14 – paper
No Class – exchange for project meetings 4/12	4/19
SECOND MIDTERM EXAM	4/21
Binary Dependent Variables	4/26
Wrap-Up	4/28
FINAL EXAM slot (Replication paper due)	Saturday, 5/1 4:30-7:00 PM

Additional Policies: This course is governed by additional policies covering all courses at CU Boulder. They are listed below for your reference.

CLASSROOM BEHAVIOR

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on classroom behavior and the Student Code of Conduct.

REQUIREMENTS FOR COVID-19

As a matter of public health and safety due to the pandemic, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements, and public health orders in place to reduce the risk of spreading infectious disease. Required safety measures at CU Boulder relevant to the classroom setting include:

● maintain 6-foot distancing when possible,

● wear a face covering in public indoor spaces and outdoors while on campus consistent with state and county health orders,

● clean local work area,

● practice hand hygiene,

● follow public health orders, and

● if sick and you live off campus, do not come onto campus (unless instructed by a CU Healthcare professional), or if you live on-campus, please alert CU Boulder Medical Services.

Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to Student Conduct and Conflict Resolution. For more information, see the policies on COVID-19 Health and Safety and classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from fulfilling these safety measures, please see the "Accommodation for Disabilities" statement on this syllabus.

All students who are new to campus must complete the COVID-19 Student Health and Expectations Course. Before coming to campus each day, all students are required to complete the Buff Pass.

Students who have tested positive for COVID-19, have symptoms of COVID-19, or have had close contact with someone who has tested positive for or had symptoms of COVID-19 must stay home. In this class, if

you are sick or quarantined, you are welcome to attend class as normal or to catch up using our recorded class meetings whenever your health allows.

ACCOMMODATION FOR DISABILITIES

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.

PREFERRED STUDENT NAMES AND PRONOUNS

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name. I will gladly address you by whatever name/pronouns you prefer, and I encourage you to rename yourself in the Zoom call to remind me of your preferences.

HONOR CODE

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the Honor Code Office website.

SEXUAL MISCONDUCT, DISCRIMINATION, HARASSMENT AND/OR RELATED RETALIATION

The University of Colorado Boulder (CU Boulder) is committed to fostering an inclusive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information about the OIEC, university policies, anonymous reporting, and the campus resources can be found on the OIEC website.

Please know that faculty and graduate instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, let me know of any conflict as soon as possible. I will treat a religious holiday as an excused absence and use the standard policies of the course in adjusting the requirements.

See the campus policy regarding religious observances for full details.