University of Colorado Boulder
Department of Economics

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Economics 4848-002
Applied Econometrics, Spring 2022
Office Hours: MW 1:00-2:30 PM
Economics 208D or
https://cuboulder.zoom.us/my/briancadena
Please use this link to schedule a specific time/location:
https://calendly.com/brian-cadena/econ-4848-office-hours

TA: Lauren Schechter
lauren.schechter@colorado.edu
Office Hours: T 2:30-3:30
W 12:30-2:30 or by appt
Location: Hybrid; Zoom or in-person, ECON 414

Course Description:

This course will teach you to be comfortable with the essential aspects of performing economic analysis on real-world data. In doing so, we will spend a substantial amount of time using STATA, a statistical computer software package designed especially for empirical economic analysis. While you will spend some using pre-prepared datasets, you will also learn to create custom datasets from the US Census Bureau and Bureau of Labor Statistics for original analysis. Students who successfully completed this course have gone on to do applied data work for the government, in industry, or in other research/advocacy/policy contexts. The course meets in ECON 117, each MWF (1/10-4/27) from 11:15 AM – 12:05 PM, with the exceptions of MLK Day (1/17), Spring Break (3/21-3/25), three cancelled lectures replaced by individual project meetings (3/28, TBD, TBD), and reading day (4/29).

To follow campus policy for Spring 2022, we will begin the semester in remote synchronous status for two weeks. We will meet via Zoom at the normally scheduled class time using the link on the Canvas website. **As per campus policy, this course will revert to in-person instruction when campus re-opens (currently scheduled for January 24, 2022). This course is not hybrid; there will not be a Zoom option when campus policy allows us to meet in person.**

Prerequisites:

To enroll in this course, you must have completed Economics 3070 and at least one of Economics 1088, Math 1081 or Math 1300. Economics 3818 or an equivalent course is also required. These courses must have been passed with a minimum grade of C- regardless of whether you have declared a major in economics. This course provides practical hands-on training in using statistical software to analyze economic data. To succeed, students will need a basic command of algebra, the ability to take a derivative, and a basic understanding of the mechanics of a hypothesis test. We will review hypothesis testing, but our treatment will assume prior exposure. Students with a continuing interest in econometrics will find complementary material in Economics 4818 as it provides more depth at the theoretical level.

Course Materials:

There is no required textbook for this course. The material to be mastered will be covered in lecture notes and in-class exercises, all of which will be available on the D2L website. A printed version of the lecture notes is available at the CU Bookstore for the cost of printing and binding.

Students should purchase their own copies of Stata, and they qualify for a substantial discount through the University's GradPlan. More information is available through a link posted on the Canvas website. I recommend Stata/BE. Prices are $48 for a six-month license, $94 for a one-year license, and $225 for a perpetual license. There is no required textbook for the course; a Stata license is the only required material.

If you expect to use Stata beyond this course, you can feel free to purchase a more advanced copy or a longer duration license, but the six-month BE version will allow you to complete all the requirements of this course.

Requirements and Grading:

Your grade will depend on your performance on a number of assignments, according to the chart below:

Assignment	Weight	Due Date
Midterm Exam 1	20%	2/18 In Class (Tentative date)
Midterm Exam 2	20%	4/8 In Class (Tentative date)
Research Project	30%	4/29, (via Canvas)
Final Exam	30%	Sunday 5/1, 7:30-10:00 PM

The **Midterm Exams** will take place during a full class period. Although you will turn in your work on the midterm through Canvas, you must attend class on the day of the midterm in order to receive credit.

Students will regularly work on in-class exercises to practice the course material. There will be no graded **homework** assignments. Students should, however, plan on taking time outside of class each week to: a) Review your log file, class notes and in-class exercises from that week's classes. b) Use Stata and the data files to perform the analysis conducted in class independently in order to review Stata commands, interpretation of output, and key concepts from class lectures and c) Use Stata and the data files to perform additional data analysis beyond that conducted in class to further test your understanding of the course content. The course material is highly cumulative, so it is important to confirm mastery of each week's material in preparation for the next week's material. Trying to review several weeks of material just prior to an exam will be an ineffective strategy.

Research Paper: The goal of this course is to train you to be able to perform original analyses of economic data. To that end, you will complete one independent research project, using the skills you learn throughout the course. You will write a short paper (approximately 6-8 pages, including figures and tables) on a topic of interest to you, focusing on original analysis using data from the US Bureau of the Census or another data source. Some course time will be spent teaching you how to download and analyze U.S. Census data, and many students will formulate a research question that can be investigated using Census data. You are, however, free to pursue other data sources on topics of interest. The final draft is due on Wednesday, April 29 at 5 PM

(electronic copy via Canvas). The faculty teaching Econ 4848 have made a habit of loading all submissions to TurnItIn, and I will check each electronic submission against the database of previously submitted assignments. Evidence that your final project was based on a previous submission will result in a failing grade on the final project and likely a failing grade in the course.

As we progress through the material, be thinking of the type of project you are interested in. I will schedule appointments to meet with each student/group about a month prior to the end of the semester to make sure you have found an appropriate topic and dataset and to provide individual guidance on your projects.

The Final Exam will cover all of the material learned in the course, and will be similar in format to the midterm. Our assigned time from the Registrar is 7:30-10:00 PM on Sunday, 5/1/2022. University policy provides students with three or more exams on the same day the right to reschedule exams following the first two.[1] Any student wishing to invoke this right should notify me as soon as possible and no later than February 7. I will ask for a copy of your schedule to verify your eligibility.

Final Letter Grades will be determined based on your cumulative performance across multiple assignments. Individual components (each exam and the project) will be curved and assigned a letter grade. I will then take a weighted average of the letter grades using the weights outlined above. I intend to follow the Economics department guidelines, which suggest an average grade of roughly B-/C+ (2.50).

My expectations of you: I will gladly offer you assistance with the content of this course, including the final paper. Please also use the TA's office hours as an additional resource. If our posted office hours do not work for your schedule, it is very easy to book an alternate meeting time with us via e-mail. Before you come to either office to ask for help, we expect that you will have re-read your notes and the relevant section in the coursepack. If you miss class, you are responsible for obtaining the material you missed. There is sufficient overlap with the course pack that reviewing the relevant material there will help, but you should arrange to obtain a log file/programs/notes from a classmate (not from the professor or TA) for any day that you miss. I expect you to work through these on your own to catch back up with the class prior to coming to ask questions in my office. For the final project, I will gladly help you refine your question and think through the setup of your regressions. Interpreting the results of these regressions will be entirely up to you, as it will be a substantial component of your grade on the project.

Other Policies:

Attendance Requirement: The following is my normal attendance policy for this course. Due to the pandemic, I will offer additional flexibility and will not enforce this policy as stringently as I have in the past. I want to emphasize that students who do not attend regularly will have a difficult time with the material.

Attendance for this course is **required**. Classes are interactive, and you will get the most out of this course by attending each class meeting. However, I understand that occasionally

[1] http://www.colorado.edu/policies/final-examination-policy

circumstances necessitate missing a lecture. Thus, students will be allowed up to nine absences without penalty. **Students with more than 9 absences (three weeks of class) throughout the semester will fail the course.** Note that there are no additional absences available for standard "excused" reasons (illness, family emergency, transportation problem, etc.). I will take attendance prior to the start of every class period.

Waitlist/Administrative Drops: University policy allows instructors to drop students who do not attend class regularly during the first two weeks. Further, instructors are allowed to determine the amount of nonattendance that will result in an administrative drop.[2] In this course, I will enforce the following policy: **If you fail to attend any class meeting in the first two weeks, I will submit a request to have you dropped from the course**. Note that this policy may vary from other instructors' policies, even compared to other classes in the Economics department. If you are administratively dropped during the add window, you may attempt to re-register, but you will be subject to standard waitlist procedures.

Late Assignments/ Missed Examinations Policy: Exams will be submitted through the Canvas website, and there will be incentives to turn them in on time (along with disincentives for working beyond the end of the test period). NOTE: You *must* attend class on the day of the exam to receive credit. I expect your final projects to be turned in on time. I will offer additional flexibility this semester due to the pandemic, but please communicate any needs for additional time you may have.

If you miss an exam, there will not be a makeup exam. I will treat the score on the missed exam as a missing data point when calculating final grades. In other words, I will give no weight to the exam in the calculation of the final grade, and other assignments will be reweighted proportionately. If you foresee any conflict that will prevent you from taking an exam, please let me know as soon as possible and at least two weeks beforehand.

Cheating: If you cheat on an exam, you will fail that exam. If you plagiarize even a portion of your final project, you will fail the final project. I reserve the right to impose harsher academic sanctions up to and including failing 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 courses in multiple formats and that the sometimes unpredictable format switches present a challenge to all of us. I also recognize 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 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 in class, regardless of the mode of instruction we are currently operating in. I also have two

[2] More information on this policy is available here:
http://www.colorado.edu/registrar/students/registration/enroll/drop-class

elementary-school-aged children and my spouse and I both work full-time. Although I am hopeful that there will not be broad school closures, there is a chance that I may need to cancel class at the last moment due to a lack of childcare. 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.

Covered Topics and Tentative Schedule

Topic	Tentative Dates
Introduction and Research Design	1/10, 1/12, 1/14 (Read Mortgage Paper)
No Class – MLK Day	1/17
STATA Tutorial	1/19, 1/21, 1/24, 1/26
Descriptive Analysis	1/28, 1/31/, 2/2
Review of Hypothesis Testing	2/4, 2/7, 2/9
Bivariate Regression	2/11, 2/14, 2/16
Midterm Exam #1	2/18
Bivariate Regression continued	2/21, 2/23, 2/25, 2/28
Multiple Regression Basics	3/2, 3/4
Omitted Variable Bias	3/7, 3/9, 3/11
Categorical Variables in Regression	3/14, 3/16, 3/18
No Class – Spring Break and Prof. Cadena conference travel	3/21, 3/23, 3/25, 3/28
Interaction Models	3/30, 4/1
IPUMS Tutorial	4/4, 4/6,
Midterm Exam #2	4/8
No Class – exchanged for project meetings	4/11, 4/13
Individual Project Meetings	Week of 4/11-4/13
Advanced Topics: Data Management, Binary Dependent Variables, Difference-in-Differences Models	4/15-4/27
Final Exam	Sunday 5/1, 7:30-10:00 PM

How Can I Do Better?

Every semester, I have some students who come to office hours a few weeks into the semester who are worried that they are not doing well and wondering what they can do differently. I have noticed some differences in the habits of the strongest students compared to those of the students who find themselves in this situation. As a service to you, I am giving everyone access to the advice I expect to give later in the semester – all from day one.

1) **Mentally engage in class.** There is a big difference between passively typing in commands and taking notes on what we are doing and mentally engaging in class to really understand the material. Can you answer the questions I am asking? Do you understand why I am asking them? Are you thinking about what is being done and why, or are you simply writing things down so you can memorize them later?

2) **Review class material before the next class.** The material in this course is almost entirely cumulative, and your experience in a lecture will be much more productive if you have already mastered the material from the previous lectures. Review previous material so that it is fresh in your mind for the next lecture. I'll always open the floor for questions about earlier material at the start of class. You should take me up on this offer.

3) **Don't confuse familiarity with mastery.** This is not a course about *remembering* concepts or examples. It's a course about *doing* analysis and doing it well. Re-reading the examples from lectures or the in-class exercises will help some, but really you'll want to *do* some analysis as practice. There are two main ways to do this:

    a. **Re-do material from the lectures on your own in Stata.** Use your log file and the course data sets to re-do the analysis conducted during lecture to reinforce your understanding of the relevant concepts. First try to interpret the output on your own before reading the answer from your notes. Then, try to think of follow-up questions that you could ask based on the analysis we did or on additional analysis.

    b. **Make up your own exercises in Stata.** I'll provide multiple data sets for you to use, and you should be able to come up with your own example questions/analysis. For example, when we learn to create variables, think up some other variables to create and check to see that you have done them correctly. When we learn to do t-tests, open a new data set and see what new tests would be interesting given the content of that dataset. When we estimate regressions, use additional variables in the data set to run your own regressions and interpret them.

4) **Use the in-class exercises to test your understanding of the material.** Review the lecture material before class, and then treat in-class exercises like a mini practice exam. See how much of the in-class exercise you can complete correctly without prolonged consultation of your notes. If you spend most of the in-class exercise reading through your notes because you've forgotten everything from previous lectures, and then only complete part of the exercise before we go over the answers, that is a wasted opportunity.

Other University Policies:

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 Conduct & Conflict Resolution policies.

Requirements for COVID-19

As a matter of public health and safety, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements and all public health orders in place to reduce the risk of spreading infectious disease. 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 policy on classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from fulfilling these safety measures, please follow the steps in the "Accommodation for Disabilities" statement on this syllabus.

CU Boulder currently requires masks in classrooms and laboratories regardless of vaccination status. This requirement is a precaution to supplement CU Boulder's COVID-19 vaccine requirement. Exemptions include individuals who cannot medically tolerate a face covering, as well as those who are hearing-impaired or otherwise disabled or who are communicating with someone who is hearing-impaired or otherwise disabled and where the ability to see the mouth is essential to communication. If you qualify for a mask-related accommodation, please follow the steps in the "Accommodation for Disabilities" statement on this syllabus. In addition, vaccinated instructional faculty who are engaged in an indoor instructional activity and are separated by at least 6 feet from the nearest person are exempt from wearing masks if they so choose.

If you feel ill and think you might have COVID-19, if you have tested positive for COVID-19, or if you are unvaccinated or partially vaccinated and have been in close contact with someone who has COVID-19, you should stay home and follow the further guidance of the Public Health Office (contacttracing@colorado.edu). If you are fully vaccinated and have been in close contact with someone who has COVID-19, you do not need to stay home; rather, you should self-monitor for symptoms and follow the further guidance of the Public Health Office (contacttracing@colorado.edu. If you are unable to attend class due to illness, plan to get notes from a fellow classmate. You are not required to let me know that you will be missing class. If you expect to miss class for an extended period of time (e.g. isolation due to testing positive for COVID-19), let me know and we can work out a way for you to catch up on the material you miss.

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. In this class, I will use whatever name or pronouns you prefer, even if they do not appear on the class roster. Please make me aware of your preferences if they differ from the roster.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code academic integrity policy. Violations of the Honor Code may include, but are not limited to: 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 on the Honor Code website.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. The university 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 or against 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 email cureport@colorado.edu. Information about university policies, reporting options, and the support resources can be found on the OIEC website.

Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are 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 their rights, support resources, and reporting options. To learn more about reporting and support options for a variety of concerns, visit Don't Ignore It.

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, please let me know as soon as possible if you foresee a conflict and we will work out a solution.
See the campus policy regarding religious observances for full details.