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Economics 4848-003
Applied Econometrics, Spring 2018
Office Hours: T/Th 10:45 AM-12:00 PM
Economics 208D
Other times by appointment (just send an e-mail)

TA: Patrick Turner
Patrick.Turner@colorado.edu
Office Hours: Tuesday 2-4 PM;
Thursday 1-3 PM; by appointment
Economics 313

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 Humanities 1B45, each T/Th (1/16-5/3) from 9:30 AM – 10:45 AM, with the exceptions of cancelled lectures due to individual project meetings (4/10, 4/12) and Spring Break (3/27, 3/29).

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 are not required to purchase their own copies of STATA, although those desiring to do so qualify for a substantial discount through the University's GradPlan. More information is available through a link posted on the D2L website. I recommend Stata/IC. Prices are $45 for a six-month license, $89 for a one-year license, and $198 for a perpetual license.

Note: SMALL STATA WILL BE INSUFFICIENT FOR THIS COURSE.

You will receive full STATA documentation in PDF format if you choose to purchase the software. If you expect to use STATA beyond this course, you may purchase a more advanced copy or a longer duration license, but the six month Intercooled version will allow you to complete all the requirements of this course. Otherwise, you may access STATA on lab computers where it is installed, including the lab in the basement of the Economics building. I have provided a link on the course website showing the labs with the software installed. Note that the Economics building is closed on weekends, but it remains open until 10 PM on weekdays.

You should bring a USB memory stick to copy programs and data from our work in class. It is unlikely that you will need more than 4 GB of storage; so you should be able to find one that is relatively inexpensive (~ $10) if you do not currently have one.

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%	2/27, In Class
Midterm Exam 2	20%	4/5, In Class
Research Project	32%	5/3, 5 PM (Hard copy and electronic copy)
Final Exam	28%	Monday 5/7, 4:30-7:00 PM

The **Midterm Exams** will take place during a full class period. Although you will turn in your work on the midterm through D2L, 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 Thursday, May 3 at 5 PM (hard copy in my office, plus electronic copy via D2L). 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 4:30-7:00 PM on Monday, 5/7/2018. 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 28. 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+ (2.5).

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: 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 circumstances necessitate missing a lecture. Thus, students will be allowed up to six absences without penalty. **Students with more than 6 absences (three weeks of class) throughout the semester will fail the course.** Note that there are no additional absences

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

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 have you dropped from the course as soon as possible***. 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 D2L 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. Following a ten minute grace period, I will apply at least a 15 percent penalty to final projects turned in after the deadline, with greater penalties likely for delays of more than 24 hours.

If you miss an exam you will receive no credit unless you provide documentation of a medical or family emergency. In the case of a legitimate emergency, 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. There will be no make-up exams. 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 for up to and including failing the course as a penalty for any instance of academic dishonesty.

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

Covered Topics and Tentative Schedule

Topic	Tentative Dates
Introduction and Research Design	1/16, 1/18 (Read Mortgage Paper)
STATA Tutorial	1/23, 1/25, 1/30
Descriptive Analysis	2/1, 2/6
Review of Hypothesis Testing	2/8, 2/13
Bivariate Regression	2/15, 2/20, 2/22
Midterm Exam #1	2/27
Bivariate Regression continued	3/1
Multiple Regression Basics	3/6
Omitted Variable Bias	3/8, 3/13
Categorical Variables in Regression	3/15
Interaction Models	3/20, 3/22
Spring Break – NO CLASS	3/27, 3/29
IPUMS Tutorial	4/3
Midterm Exam #2	4/5
NO CLASS – cancelled for meetings	4/10, 4/12
Individual Project Meetings	Week of 4/9-4/13
Advanced Topics: Data Management, Binary Dependent Variables, Difference-in-Differences Models	4/17-5/3
Final Exam	Monday 5/7, 4:30-7:00 PM

How Can I Do Better?

Every semester, I have some students who come to office hours partway through 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:

Disability Accommodation
If you qualify for accommodations because of a disability, please submit to Prof. Cadena a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu.

f you have a temporary medical condition or injury, see Temporary Injuries guidelines under the Quick Links at the Disability Services website and discuss your needs with Prof. Cadena.

Religious Observances
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 course, please inform me no later than two weeks prior to any conflict you foresee, sooner if possible, so that we may find an alternative arrangement for you to complete the requirements of the course. See campus policy regarding religious observances for full details.

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. 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 differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the student code.

Discrimination and Harassment

The University of Colorado Boulder (CU Boulder) is committed to maintaining a positive learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, discrimination, harassment or related retaliation against or by any employee or student. CU's Sexual Misconduct Policy prohibits sexual assault, sexual exploitation, sexual harassment, intimate partner abuse (dating or domestic violence), stalking or related retaliation. CU Boulder's Discrimination and Harassment Policy prohibits discrimination, harassment or related retaliation based on race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been subject to misconduct under either policy should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127. Information about the OIEC, the above referenced policies, and the campus resources available to assist individuals regarding sexual misconduct, discrimination, harassment or related retaliation can be found at the OIEC website.

Academic Integrity

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the academic integrity policy of the institution. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access, clicker fraud, resubmission, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code Council as well as academic sanctions from the faculty member. Additional information regarding the academic integrity policy can be found at honorcode.colorado.edu.