ECON 3720: Introduction to Econometrics (Sections 100 and 400)

Fall Semester 2024

Instruction

Table 1: Class times

Section	Lec/Disc	Day(s)	Time	Room
100	Lecture	TuTh	12:30 PM – 1:45 PM	Nau Hall 211
400	Lecture	TuTh	2:00 PM – 3:15 PM	Nau Hall 211
401	Discussion	Fr	11:00 AM – 11:50 AM	New Cabell Hall 303
402	Discussion	Fr	12:00 PM – 12:50 PM	New Cabell Hall 168
403	Discussion	Fr	1:00 PM – 1:50 PM	New Cabell Hall 032
404	Discussion	Fr	2:00 PM – 2:50 PM	Wilson Hall 238

Instructor: Professor Ahnaf Rafi

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Office: Monroe Hall 220

Office hours: Wednesdays 1:30 PM – 3:30 PM, and by appointment

Teaching Assistant: Justin Garrison

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Office hours location: Monroe Hall basement

Office hours: Tuesdays 3:30 PM – 5 PM

Course description and prerequisites

Course Description: This course is an introduction to econometrics, which is the theory and practice of using data to answer economic questions. Econometrics combines a thorough understanding of the statistical techniques with a thoughtful approach to the questions of interest. Topics include statistical theory, measurement, and applications. Theoretical discussions and problems will be connected to analysis of real data. We will study examples and do a fair amount of practical statistical analysis ourselves. You will finish the course equipped with a good understanding of the models and methods of econometrics and in addition, skills in data handling and statistical. The aim is to help you to foster the skills necessary to plan and execute research projects to answer causal questions.

Prerequisites: Students should be familiar with basic concepts in probability and statistics. The course begins with a brief refresher just in case. Students should also be familiar with fundamental concepts of calculus. There will not be enough time for a calculus refresher.

Assessment

Table 2: Assesment scheme

Homework Problem Sets	10 %
Midterm 1	25 %
Midterm 2	25 %
Final Exam	40 %

Table 3: Final exam date and time. See also https://registrar.virginia.edu/exam-schedule-fall-2024.

Section	Date	Time
100	9th December	2 PM – 5 PM
400	14th December	9 AM – 12 PM

Course materials

Required textbook: Introductory Econometrics: A Modern Approach, 7th edition, by Jeffrey M. Wooldridge.

Recommended additional textbook: Mastering 'Metrics, by Joshua D. Angrist and Jörn-Steffen Pischke.

Software: The R programming language and RStudio. Both are free software.

Course Policies

Homework: There will be 8 homework assignments. Each assignment must be handed in at the beginning of the lecture on the day that it is due (usually Tuesday). Homework handed in late will not be graded. You are encouraged to work together on your homework assignments, and up to two students may hand in and receive credit together for a given assignment. If students collaborate, both students must understand and contribute to all the work handed in. Copying homework from other students, or failing to fully collaborate on joint assignments, will be regarded as an honor violation. Allowing another student to take partial or full credit for your work is also an honor violation. Homework will be graded by the TA. Grades assigned by the TA are not subject to appeal unless an error was made by the TA. Your work is expected to be neat and legible. You may type your answers. If the TA finds your work too sloppy and/or illegible, it will not be graded or points will be taken off at the discretion of the TA.

Exams: Exams will be a mix of multiple choice and short answer. The first two exams will take place during class and will last 75 minutes. All exams will be cumulative. Students will be permitted to bring one side of one page of notes for each new exam. That is, one side of one page for the first midterm, one full page (back and front) for the second midterm, and one page and one additional one side of one page for the final exam.

Lectures: Lecture slides will be posted to Canvas, usually by the evening before the lecture is delivered. You are strongly encouraged to print out a copy of the slides before coming to class, so you can follow along and take notes on your copies of the slides. Attendance at all lectures is

required. In addition to learning from from the slides and notes, you will also learn from questions you and your fellow students pose during lectures.

Honor policy: Every student in this course is trusted to fully comply with all of the provisions of the honor code. On every exam, please sign your name next to the honor pledge. On exams, it is expected that you will neither receive nor give aid, nor access any material other than a calculator and your cheat sheet. All alleged honor violations brought to my attention will be forwarded to the Honor Committee.

Accommodations for accessibility: All students with special needs requiring accommodations should present the appropriate paperwork from the Student Disability Access Center (SDAC) to Professor Rafi. It is the student's responsibility to present this paperwork in a timely fashion and follow up with the instructor about the accommodations being offered. Accommodations for test-taking (e.g., extended time) should be arranged with Professor Rafi at least a week before an exam.

Tentative Course Outline

1. Review of probability and statistics
2. Causality
    (a) Counterfactuals
    (b) Selection bias
    (c) Experiments and randomization
3. Linear Regression and Ordinary Least Squares (OLS)
    (a) Bivariate regression
    (b) Omitted Variable(s) Bias (OVB) and Controls
    (c) Multivariate regression
    (d) Inference in linear regression

4. Limited Dependent Variables (LDV) and associated regression techniques

5. Instrumental Variables

   (a) Endogenous regressors, confounders and instrumental variables (IV)

   (b) IV and two-stage least squares (2SLS)

   (c) Properties of IV regression estimators

   (d) Testing IV assumptions

6. Difference in Differences