

ECON 281: Introduction to Applied Econometrics

Welcome to ECON 281! This course is an introduction to applied econometrics, a field in which statistical tools and non-experimental data are utilized in the analysis of economic questions. The main purpose of this class within our economics curriculum is to introduce you to methods economists use in empirical research. The most simple and fundamental question applied econometric techniques seek to answer is: what is the effect of X on Y? How does education affect earnings? Do weather patterns in African countries affect civil conflict? Does unemployment rise when minimum wages increase? By the end of this course, you will:

1. Understand the fundamental, underlying statistics of econometric models.
2. Apply regression techniques to datasets and analyze the results to answer economic policy questions.
3. Critically evaluate the assumptions and results of econometric models in search of causal relationships.
4. Formulate economic arguments based on empirical results from real datasets by using Stata software.

Lecture and Section

Lecture: TuTh 3:30-4:50pm, Tech Institute Lecture Room 2
Section: 21/25: TA Chris M 3-3:50pm, Locy 301 (25 enrolled)
22/26: TA Chris W 3-3:50pm, Lunt 105 (30 enrolled)
23: TA Clement M 4-4:50pm, Annenberg G15 (19 enrolled)
24: TA Clement W 4-4:50pm, Annenberg G21 (17 enrolled)

Office Hours

Kutzman: Tu 9-10a, Wed 11a-12p, Th 5-6p, Fri 11a-12p, or by appointment, KGH 3485
TAs: Clement Bohr (clementbohr2022@u.northwestern.edu): MW 5-6p, KGH 3411
Christopher Heard (ChristopherHeard2022@u.northwestern.edu): TuTh 1:30-2:30p, KGH 3411

The Basics

Prerequisites

The prerequisites for this class are ECON 201, ECON 202, MATH 220, and STAT 210 or equivalent. Notes to help you review prerequisite statistics material are posted on Canvas, and you must complete the statistics review quiz by the posted deadline. If you have concerns about your preparation, please discuss them with me immediately so I can help, and plan on being extra diligent in the first weeks.

Class resources

Assignments in this course will require you to use the statistical software, Stata. To purchase your own copy of the software for your computer, a six-month license for Stata/IC is available for \$45. A license can be used to install Stata *on up to 3 computers*. Do this as soon as possible! See <http://www.stata.com/order/new/edu/gradplans/student-pricing/> to purchase. Your TA will hold an Introduction to Stata session in your first section (at which time you should have Stata installed on your personal computer) and I will be demonstrating its use in lecture. You will need a non-graphing calculator for exams. Bring it to class.

The textbook for this course is *Introductory Econometrics: A Modern Approach* by J. Wooldridge. You can use any edition, but note that lecture handouts will be provided, so purchase is optional.

Website

The course website is on Canvas, and everyone should be automatically enrolled in the Canvas website upon official enrollment in the course. Notes, assignments, solutions and other materials will be posted on the website, in addition to any announcements made in lecture or section. Check your Canvas settings to make sure you receive emails about announcements, as this is the primary way I will contact the class. If you have trouble accessing Canvas, please let me or your TA know immediately.

Section

Handouts with problems for section will be posted on Canvas, which you are encouraged to attempt before attending section. The section problems will be helpful for completing assignments and doing well on exams.

Responsibilities

I will come to class prepared; respond to and encourage questions; oversee rigorous grading of assignments and exams; be available during office hours and scheduled appointments; stimulate enthusiasm for econometrics and learning; provide you with an intermediate skill set with Stata software. As a student in this class, your responsibilities are:

1. Attend lectures and section each week, actively participating in both.
2. Complete and turn in all assignments on time.
3. Midterm: Thursday February 7, in class.
4. Final: Wednesday March 20, 7-9pm

Grades

| Assignment | Date | Percentage of Final Grade |
|---------------------|--------------------|---------------------------|
| Quizzes | Throughout quarter | 5 |
| Four Stata Projects | Throughout quarter | 20 (5 each) |
| Midterm Exam | 2/7 | 30 |
| Final Exam | 3/20 | 45 |

Quizzes

Quizzes will be given over the course of the quarter and cover class material from previous lectures and assignments. *Be sure to bring a calculator and all tables we post to every lecture* to potentially use on quizzes; there will be no sharing of calculators or tables and we will not provide them. Your quiz grade will be determined by the formula:

$$5 \times \frac{\text{Your Total Qz pts}}{\text{Total Possible Qz pts}}$$

Your lowest quiz score will be dropped. However, if you do not complete the statistics review quiz before the deadline, your lowest quiz will not be dropped when calculating your course grade. No late or make up quizzes will be offered. A single quiz missed due to an excused absence will use your one-dropped-quiz; additional quizzes missed due to excused absences will not be made up, and your final exam score will be used instead. Quizzes missed for unexcused reasons will earn a score of 0.

Stata projects and practice exercises

There will be four (equally weighted) Stata assignments. I will also post practice exercises on Canvas before exams—that will *not* be collected or graded—to help you review class material and practice/expand your Stata skills.

You will submit work for the Stata assignments electronically through the Crowdmark platform. While late work is accepted, it will be penalized by a letter grade (10%) for every additional 24hr increment.¹ This will be strictly enforced. All late assignments must be turned in within *three days* (72 hours) of the due date; no late work will be graded after solutions are posted or grades are returned. You must submit all of your work at one time. If you don't correctly format your work on Crowdmark, it may be considered late.

¹An assignment due Friday, Jan 13th at 12:00a and turned in on Friday, Jan 13th at 12:01a will have 10% of the total possible points deducted (i.e. it may earn a maximum of 90% of the possible points); if turned in on Saturday, Jan 14th at 12:01a, it will have 20% of the total possible points deducted.

Exams

There will be one midterm exam during the quarter and one cumulative final exam. No cheat-sheets will be allowed, though I encourage you to make yourself one as you study! Please check the exam dates above and make sure you can attend them. There will be no make-up exams given. In the unfortunate event that you miss the midterm for an excused reason, you will complete the exam as an open-note test before the following class. If the exam is graded and found to be of A-quality, then your final exam will count for 75% of the total grade and the midterm will count for 0% (quizzes 10%, Stata assignments 15%). If the exam is graded and found to be less than A quality, then your midterm exam score will be zero.

If you are absent from the final exam due to an excused reason, you must have taken the midterm and have a course grade of at least 60% to qualify for an incomplete grade of X. Your course grade will be determined by whichever is **lower**: (1) $5\% \times \text{Quiz} + 20\% \times \text{Stata Assignments} + 30\% \times \text{Midterm} + 45\% \times \text{Make-up Final}$, (2) $100\% \times \text{Stata Assignments}$, or (3) $100\% \times \text{Make-up Final Exam}$.

You would have to provide documentation to the Office of Undergraduate Studies and Advising (OUSA) and gain their approval to take a makeup exam in the following quarter. If you do not take the final exam and do not qualify for an incomplete or your absence is not excused, then your final exam score will be zero.

Regrades

If you believe there was a mistake in the grading of an assessment, you will need to write a statement (about half a page) explaining, staple this to the assessment, and submit it in hardcopy to me during the lecture immediately following its return so we can resolve it immediately. No changes to scores will be made without following this procedure and I will regrade the entire assessment myself. This should encourage you to pick up your work promptly and check both your answers and our grading! However, note that because the assessment will be regraded, your score may go up or down as a result of the regrade.

What constitutes an excused absence?

If you miss an exam or quiz for an excused reason, such as illness, a family emergency, or travel with a University sports team, then you need to fill out the excused absence form on Canvas, staple your documentation to the back of the excused absence form, and hand everything in to me in the lecture following the absence (or the next class that you are able to attend). If you are ill, you should report in person to the Student Health Service prior to lecture or the time of the exam and notify me no later than 6pm (Central time) on the day of an exam.

If the above is not fulfilled, an absence will be considered unexcused. If you miss an exam or quiz for an unexcused reason, you will receive a 0 on that assessment. Missing class for a job interview, a job-related activity, an internship interview, an internship-related activity, any activity related to another class, or a family event would not constitute an excused absence.

Even more class policies

Email

Any email you send me should contain "ECON 281:" plus a descriptor in the subject line so that I can identify it and respond in a timely manner. I will respond within 48 hours. Email is a good way to communicate with me about most logistical issues and some econometrics questions. Include a tentative answer for any questions sent by email. This will help me find where you are confused and permit shorter/more helpful responses. *I will not guarantee answers to content questions via email sent after 9pm the day before an exam or within 3hrs of an assignment deadline.* This is to (1) discourage you from waiting till the last minute to start an assignment or study for a test, and (2) give me a window to respond to your questions in time for them to actually be useful for you before the deadline!

Academic Honesty

In fairness to students who put in an honest effort, I take plagiarism of other students' work and other forms of academic dishonesty **very seriously**, and all cases involving suspected violation of the academic integrity guidelines will be referred immediately to the dean's office of Weinberg College. Any academic integrity violation will result in a score of zero on that assignment or exam and can result in an F for the course. It is your responsibility to inform yourself of campus policies regarding academic misconduct, which can be found here: <http://www.weinberg.northwestern.edu/handbook/integrity/>

Do your own work. Study groups are encouraged for learning to code in Stata and to discuss general ideas related to the assignment, but all submitted answers and code should be written individually in *your own words*. This means that you should not share any computer files, or your write-up, or seek (provide) assistance from (to) other students on what you are required to do individually. *If in doubt about something, ask me. I recommend writing up your answers in a separate location from your study group.*

Cellphone and Computer Policy

Except in the case of proven necessity or for the purpose of a class exercise, there will be no computers, cellphones, tablets or other mobile communication devices used during the lectures. Such devices must remain in your bag, not on your desk or lap, etc. All devices should be silenced, and students may not receive phone calls, wander the internet, or send/receive messages during class.

Accommodations

Any student requesting accommodations related to a disability or other condition is required to register with AccessibleNU (accessiblenu@northwestern.edu; 847-467-5530) and provide professors with an accommodation notification from AccessibleNU, preferably within the first two weeks of class. If you have emergency medical information you wish to share with me, or if you need special arrangements in case the building must be evacuated, inform me immediately. Please see me privately after class or during office hours. All information will remain confidential.

Topics Covered

Chapter 1: The Nature of Econometrics and Economic Data

Chapter 2: The Simple Regression Model

Chapter 3: Multiple Regression Analysis: Estimation

Chapter 4: Multiple Regression Analysis: Inference

Chapter 6: Multiple Regression Analysis: Further Issues

Chapter 7: Multiple Regression Analysis with Qualitative Information: Binary Variables

Chapter 13: Pooling Cross Sections across Time: Simple Panel Data Methods

Chapter 14: Advanced Panel Data Methods

Chapter 17: Limited Dependent Variable Models and Sample Selection Correction

Impact Evaluation: Randomized Controlled Trial, Double Difference, Regression Discontinuity Design

Looking forward to spending the quarter with you all!